CDC Pandemic Influenza Collaborative Planning for Delivery of Essential Health Care Services: Portland Oregon Metro Area and SW Washington

Project Evaluation Report

Prepared for
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Northwest Oregon Health Preparedness Organization

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EXECUTIVE SUMMARY

Purpose of Project

The purpose of this grant was to develop, exercise, and evaluate a coordinated approach to health care delivery in the face of a Severity Index Category 5 influenza pandemic. Specifically, the approach to coordination developed for this project was modeled after the well-established Multi-Agency Coordination (MAC) Group. The MAC Group is a component of the National Incident Management System (NIMS) and has been used for decades as a decision-making tool in natural disasters.

The adaptation of a traditional MAC Group to address health and medical emergencies is relatively new and had not been attempted in our region prior to this project. The Health/Medical MAC Group was comprised of local hospitals, public health, and a representative of the physician community. The group's charge was to make decisions about scarce resource allocation and develop policy recommendations affecting the system of care for patients with influenza and those with other significant medical needs during a severe influenza event.

Understanding that the health care response to a severe pandemic will present extraordinary operational and ethical challenges, we committed to explicitly integrate the use of an ethics framework into the Health/Medical MAC Group's decisions that would affect care delivery and health care system coordination

The entire project was undertaken with the intent that resulting products could be disseminated and adapted by other communities. Given this intent, the project utilized NIMS-compliant approaches, along with public health and academic resources typically available in midsized urban areas.

Project Implementation

The project was carried out in three phases. The first phase focused on developing a proposed system of care based on an assessment of the local health care system's current capacities and on the projected demands for influenza and non-influenza care during a 1918-like influenza pandemic. During the second phase, the coordination approach, (i.e., the Health/Medical MAC Group) was developed and refined. The third phase focused on evaluating the effectiveness and community's acceptance of the approaches to health care delivery and coordination.

Initially, phase two was to include an iterative series of functional community level decision-making exercises anchored in scenarios that represented various points in the evolution of a 10-week wave of a severe influenza pandemic. The exercise series began according to this plan. However, the autumn wave of the 2009 H1N1 pandemic came to dominate the attention of both local public health and local health care delivery providers. As a result, the planned exercise series shifted to a series of real-time, Health/Medical MAC Group meetings.

Successes and Learning

We believe that this shift from a planned exercise series to real-time coordination activities improved community engagement, and resulted in practical and meaningful learning. The following list highlights significant successes and learning we had in the course of this project.

- We were hopeful that we could develop an approach to prioritize and coordinate care based on objective data on system capacity, available resources, and likely health outcomes. As the project progressed, we learned that there were major barriers to using an approach deeply rooted in quantitative measures of capacity and health outcomes. As a result, the project evolved to have an emphasis on practical, real-time, ethically-based decision making at the community level.

- We developed an effective approach to quantitatively analyze local hospital inpatient care delivery capacity. This resulted in useful information for developing approaches to 1) defining essential services, 2) planning for deferral of inpatient care (e.g., delaying elective surgery), and 3) planning for the reengineering of certain types of care so that they could be provided in venues other than hospitals.

- We developed an epidemiologic model of influenza incidence and health care delivery impacts at the local community level. This model proved useful in estimating demand for care, taking into account the influence of high-risk medical conditions and the impacts of available 21st-century ambulatory care treatments such as antibiotics and antiviral drugs.

- We developed, implemented, tested, and evaluated a NIMS-compliant approach to community-level decision making to support health care system coordination. The majority of the Health/Medical MAC Group implementation was carried out in the context of real-time decision making around H1N1 issues requiring a coordinated regional health care delivery approach. Despite the transition from the planned exercise series to a series of actual decision-making meetings, we were able to retain the community observation and evaluation components included in the exercise plan.

  Key successes specific to the Health/Medical MAC Group include:
  - Integration of an explicit ethics framework into decision-making processes.
  - Wide participation *and on-going commitment* of local hospitals, public health, and a representative of the physician community as decision-makers.
  - Development of efficient and effective approaches to providing staff support, facilitation, as well as effective integration into the local emergency management structure.
  - General acceptance of the decision-making processes by a diverse group of community stakeholders.
  - Identified opportunities for improving decision making and coordination processes, from stakeholders representing diverse community and organizational perspectives.

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I. INTRODUCTION

This report describes relevant background, project design, activities and findings of the Portland Oregon metro area's *Pandemic Influenza Collaborative Planning for Delivery of Essential Health Care Services Project*. Additionally, the continuation of activities resulting from the project will be discussed. This demonstration project was funded by the Centers for Disease Control and Prevention to support collaborative planning among public and private health care providers to develop a Pandemic Health Care Delivery System Model that would ensure the delivery of essential influenza and non-influenza health care services during a severe Severity Index Category 5 pandemic influenza outbreak.

In an actual severe pandemic, urban communities would need to depend primarily on local resources and capacities. It is likely that most urban communities will be confronted with managing local pandemic impacts at roughly the same time. Thus, it will not be practical for communities to depend on extraordinary leadership, academic or consultative resources from outside the community. As a result, we chose to implement this project utilizing local public health and academic resources.

The project proposal was submitted by the Multnomah County Health Department on behalf of the NW Oregon Health Preparedness Organization (HPO) in cooperation with the Oregon Public Health Division. The HPO is comprised of representatives from all hospitals and public health departments in Clackamas, Clatsop, Columbia, Multnomah, Tillamook and Washington counties in Oregon (Oregon Health Care Preparedness Region 1), and Clark County in Washington. Additional partners include representatives from the Oregon Department of Human Services, medical and other health professional societies, the Coalition of Community Clinics, behavioral health representatives, members of various culturally-defined commuinties, non-governmental organizations, fire/EMS agencies, and the Oregon Association of Hospitals and Health Systems.

The project was funded for a 12-month period beginning October 2008; an extension was granted through the end of May 2010 due to the substantial impacts the 2009 H1N1 Pandemic had on the ability of staff to concentrate purely on grant activities in the face of stakeholder demands related to H1N1. The impacts of H1N1 also affected project processes, particularly in the ways stakeholders were willing and able to be involved in grant-related activities versus real-time H1N1 response activities. These impacts will be discussed further in various sections of this report. A second extension was granted to support continued refinement of the local health emergency preparedness strategies developed as part of this project.

The intent of the project was to produce community-accepted, practical, local health response strategies and tools for pandemic response, and create opportunities for individual and organizational learning. The products of this demonstration project (plan templates, frameworks, tools, etc.) have been designed so they can be implemented utilizing the types of resources available in most medium- to large-sized urban communities.

As the project proceeded, it became evident that describing the "Pandemic Health Care Delivery System Model" was clearer if conceptualized as two components:

- The system for health care delivery during a pandemic: This includes the collection of various health care delivery entities and their individual and joint approaches to providing care during a pandemic. This would include hospitals, private and public clinics, home health services, long-term care facilities, and nursing phone lines as supported by potential communication tools including community health outreach programs and media (radio, print, and television).

- The community-process for coordinating health care during a pandemic: This is centered in the Health/Medical Multi-Agency Coordination (MAC) Group, a decision-making group comprised of representatives from hospitals, public health and other health care entities. The MAC Group is charged with allocating scarce health care resources, developing interagency policies, and prioritizing health care delivery response activities based on capabilities and available resources during a health/medical event (in this case, a pandemic influenza outbreak). Members of this group have collective authority of the participating entities to make these types of decisions for the larger health care delivery system. The existence or use of a MAC Group for a health/medical emergency had not been formally tested in the region prior to this project, although the MAC Group model is a well established strategy used for fire and natural disasters as part of the National Incident Management System (NIMS).

II. BACKGROUND

The ability to complete this project was, in great part, a result of the existing local health and medical emergency preparedness work previously completed in the region. To provide context for the development and implementation of this project, the following information is discussed: 1) previous emergency preparedness work, 2) estimated and predicted effects of a Severity Index Category 5 pandemic influenza event on the region/community, and 3) influence of the 2009 H1N1 pandemic on local planning and skill building.

Existing Local Health/Medical Emergency Preparedness Organizations

For the past several years, coordination and leadership of regional health care delivery system preparedness activities for the seven counties participating in this project has been provided through the activities of the NW Oregon Health Preparedness Organization (HPO). The HPO is a regional planning collaboration of hospitals, public health, health care and related governmental organizations working to ensure that the region is prepared for and responds effectively and efficiently to large-scale health emergencies that have impacts across institutional and jurisdictional lines. This collaboration was initially formed as a response to the anthrax scare and terrorist attacks in the fall of 2001.

In the beginning, participants came from the major hospital/health systems and health departments in the Portland metro area. However, as the HPO and state preparedness approaches evolved, additional partners from the less populous adjacent rural and coastal communities were added. In addition, strong linkages were developed with governmental emergency management organizations in the region.

The HPO has a rich and successful history of multi-agency, multi-jurisdictional collaboration to support health emergency preparedness planning and exercising. This collaboration has overcome regional and organizational differences in the public and private health sectors that could be perceived as barriers to cooperation and success. HPO staff and stakeholders have developed a culture that is firmly rooted in making decisions by "working consensus," conducting scenario-specific planning, and appropriately utilizing expertise and authority of participants through topic-specific work groups. The HPO uses non-directive facilitative leadership and management techniques to engage stakeholders and manage preparedness planning processes. The HPO's overall planning approach is to first develop consensus on which response results in the best and most effective community health impact; then to create implementation plans that are integrated with emergency management and public safety agencies; and lastly to exercise, refine, and integrate with related plans. The work of participants is differentiated based on differing organization positions and responsibilities. This approach includes a CEO-level Public/Private Executives Group, a managerial Steering Committee, and time-limited topic-specific work groups typically made up of professional and technical staff and managers.

HPO activities are primarily funded by the federal Hospital Preparedness Program (HPP) via the State of Oregon Public Health Emergency Preparedness Program. The HPO Steering Committee annually allocates federal HPP funds available to the region to hospitals, health systems, and other related health care entities in Oregon HPP Region 1 (Clatsop, Clackamas, Columbia, Multnomah, Washington, and Tillamook counties). Under contract with the state, the Multnomah County Health Department (MCHD) provides administrative and leadership support to the HPO.

Northwest Oregon has made great strides in its preparedness for large-scale health emergencies. All 17 regional hospitals have developed surge capacity and capability to care for 15% to 20% more patients than usual. Hospitals and counties have signed agreements to provide each other with mutual aid. Private medical offices and safety-net clinics have engaged in preparedness activities. Specific planning for emergency medical services, trauma, burn, chemical injury, and behavioral health surge has also been completed.

Our community's ability to carry out this grant in the short timeframe was largely due to the existing planning foundation of the HPO and the strong partnerships that have been developed and cultivated across institutions and jurisdictions over the past eight years. Through the HPO's leadership, health response partners in the region have jointly exercised institutional and community regional emergency response plans several times. One example is the national 2007 Top Officials (TopOff) exercise. This track record of highly successful public health and health care preparedness work is what brought stakeholders to the table to participate and contribute to this project. They saw this project as an opportunity to expand and complete critical ongoing preparedness work.

In 2007, the Oregon Department of Human Services Public Health Division proposed legislation that subsequently became law in January 2008, giving the State Public Health Director broad authority to allocate health care resources and to issue treatment evaluation and protocols in the event of an emergency. Concurrently, the Public Health Division convened a Medical Advisory Group (MAG) consisting of a broad range of health care practitioners supplemented by elected officials, ethicists, media experts, and organizations representing health care interests. The purpose of the MAG was to develop a structure for advising the State Public Health Director in developing ethically and operationally sound emergency response guidelines. The assumptions for this group were that 1) emergency decision making on the allocation of resources and altering standards of care would require that the options be widely discussed and vetted prior to an actual emergency, 2) the state needed expert advice from clinicians, and 3) the state was in the position to provide high-level guidance that could be used, with modification, across Oregon.

The project also coordinated with the Oregon Public Health Division to ensure that past and ongoing MAG activities were considered and appropriately integrated into the ethics framework developed through this project. Central to this approach was the idea of "vertical integration" of a common set of ethical principles and processes to assure congruence between local and state approaches.

Work by the MAG resulted in an ethics framework for health care response in the setting of severe surges in health care utilization, such as might be experienced in a Severity Index Category 5 pandemic influenza event. The state framework makes it explicit that potential guidance and clinic decisions in this area must take into account certain core ethical principles: 1) Social Solidarity, 2) Strict Adherence to Professional Standards, and 3) Justice. The state framework encourages decision making that considers decisions' impact on each of these principles, not just one or two. The MAG's developed ethics framework informed, along with community discussions, the regional ethics framework developed for this project. This regional framework is discussed in Section 3 and includes similar ethical considerations: 1) Common Good, 2) Justice, 3) Prudence, and 4) Respect.

A Severity Index Category 5 Pandemic's Estimated Effect on Community/ Region

A Severity Index Category 5 pandemic influenza event would present challenges that have not been experienced in the U.S. for three generations. One challenge would lie in a greatly increased demand for hospital services to treat influenza patients. This demand would occur in the face of the community's continuing need for other essential health care services, as well as severe health care staffing shortages and other critical operational challenges.

At the outset of the project, applying CDC estimation methods to local data suggested the number of deaths during an eight-week pandemic wave would be at least five times the usual number of deaths from all causes. Local analysis carried out during the project suggested that during the peak of a pandemic wave, demand for hospital services to treat influenza patients alone is likely to be three times the community's existing average hospital bed census.

In addition to operational challenges, the amount of illness and death is likely to have a devastating emotional impact in the community. The impacts on the delivery of health care will be profound, resulting in the need for health care providers to operate under altered standards of care, and for community members to understand and accept changes in both the delivery and the outcomes of care.

Influence of the 2009 H1N1 Pandemic on Local Planning and Skill Building

The 2009 H1N1 pandemic resulted in both public health and health care delivery institutions acquiring a strong intuitive sense of the unpredictability of emergencies, in particular, pandemics. The pandemic experience promoted an emphasis on real-time management and adjustment as opposed to longer-term conceptual planning. Underlying this was the fact that very little in the 2009 pandemic occurred the way it was imagined in 2006-08 pandemic planning efforts. These differences, and the difference in severity between the 2009 pandemic and the project planning scenario, compromised the credibility of the 1918-like planning scenario.

For example, the origin of the pandemic virus was Mexico, not a far away location typically used in previous planning efforts (Asia). Similarly, there was no period of weeks or months in which to observe the pandemic's behavior and finalize plans. In addition, there was a promise of vaccine availability in the 2009 pandemic while past planning scenarios assumed that vaccine would be available late if at all.

Assumptions on social distancing, infection control, and other public health actions also differed from planning scenarios as a result of the mild nature of the pandemic. Also, in Oregon, there were pronounced intra-state variations in timing and intensity of disease transmission. Early intense disease activity in southern Oregon prompted health care providers in Region 1 to ask, "Are we next?"

The most important issue consistent with past planning was the intense interest of the media and the public in the status and progression of the pandemic. The various mismatches between the current reality and past plans and expectations reinforced focus on managing the current situation and realistically planning for the near future. Given the transparency of local public health officials around the mild nature the pandemic, planning for the current situation was enhanced while planning and exercising for a severe 1918-like pandemic scenario was compromised.

Although the planning for a 1918-like scenario was compromised by the advent of H1N1, the implementation of the proposed use of a Multi-Agency Coordination (MAC) Group was possibly strengthened. The H1N1 pandemic did provide public health and health care delivery institutions an opportunity to experience first hand the usefulness of participating in a Health/Medical MAC Group as well the opportunity to develop self efficacy with the process. As a result of this success, the Health/Medical MAC Group has continued to work together to modify policies that were no longer necessary based on the status of the H1N1 pandemic, and then to continue the group's development. This continued work is described in Section 5 of the report.

In addition, the Health/Medical MAC Group members demonstrated their commitment to the group's development in that, despite competing priorities, half of Health/Medical MAC Group members participated in either a focus group or key stakeholder interview as part of the project's evaluation. Among these evaluation participants, there was representation from small hospitals, large heath systems, emergency management, and public health. As will be discussed in Section 3 and Section 4, evaluation participants made several comments about the group's ability to perform more effectively as members developed trust in each other and had opportunities to learn together.

This experience is similar to how effective organizational learning is described in the literature; specifically, by P.J. Senge's work: "When you ask people about what it is like being part of a great team, what is most striking is the meaningfulness of the experience. People talk about being part of something larger than themselves, of being connected, of being generative."[1]

[1] Senge, P. M. (1990) *The Fifth Discipline. The art and practice of the learning organization*, London: Random House.

III. PROJECT DESIGN

The project's design was informed by our community's previous learning, influenza pandemic scenario assumptions, emergency preparedness literature, and community values. This section describes the learning principles, implementation phases, and the goals and assumptions incorporated into the project.

Learning Principles

- Promoting organizational learning by creating an environment in which people expand their individual and collective capacity to create desired results; where new and expansive patterns of thinking are encouraged; and where people are continually learning to see the whole together. This model of learning is especially applicable for disciplines such as emergency preparedness because a learning organization or team is able to be flexible, adaptive and productive in rapidly changing situations. The ability to build capacity in the real-time H1N1 pandemic demonstrated this assertion.

- Supporting adult learners by guiding them to their own knowledge rather than supplying facts, building on their experience and knowledge, and focusing on the aspects of a lesson most useful to them in their work.[2]

- Using community-based participatory research principles, including iterative practice that incorporates research, reflection, and action in a cyclical process; and stakeholder participation in evaluation activities resulting in outcome refinement.

Implementation Phases and Need for Consultative Resources

Project activities were designed to develop and test a community-accepted, practical, local health response strategies and tools that could be implemented by urban communities utilizing the "ordinary" capacities and resources likely to be locally available during a pandemic. The activities were implemented in three phases:

- Phase One: Describe the current health care delivery system and explore ways to increase capacity to handle the increased demand for influenza care during a severe pandemic, while maintaining essential services not related to influenza; and develop an ethics framework based on community values.

- Phase Two: Develop the Health/Medical Multi-Agency Coordination (MAC) and conduct an iterative exercise series for the Health/Medical MAC Group to practice decision making and applying the ethics framework. (In actuality the planned exercises became real-time meetings as a result of the H1N1 pandemic.)

[2] Knowles, M. S. (1950) *Informal Adult Education*, New York: Association Press

- Phase Three: Conduct evaluation activities to inform the refinement of the Health/Medical MAC Group and measure stakeholder acceptability of utilizing a Health/Medical MAC Group for decision making during a health/medical emergency.

Due to the complexity and evolving nature of this project, it proved crucial that local, consultative resources be retained to guide the Health/Medical MAC Group development, epidemiological modeling, ethics framework development, and the analyses of current hospital utilization and possible deferability of services. These processes and resulting products and/or methodologies are discussed in the Activities and Findings Section of this report.

Response Goals and Assumptions

The project's intent and desired outcomes are based on the following goals and assumptions:

- Minimize death and disability resulting from influenza as much as possible, given available resources.

- Maintain an intact community, one that is able to resume normal life physically, socially, economically, emotionally and spiritually following the pandemic. This requires that the local health care delivery system utilize available health care resources effectively and efficiently, that it address influenza and non-influenza health conditions in a balanced way, and act in a way that is perceived by community members as ethical and appropriate under the circumstances. Also important is that the response results in the equitable distribution of operational and financial burdens across individual hospitals, clinics, individual providers and larger health systems.

- Preparedness should be built on approaches that have been successful in the community. The Multnomah County Health Department has been the lead agency for hospital and health system preparedness in the Portland metro area since the fall of 2001. Through the HPO, the Health Department has facilitated regional health care preparedness efforts that have been evaluated by the RAND Corporation, which found it to be highly successful and accountable.[3]

- Effective response approaches must be compatible with the National Incident Management System (NIMS). NIMS provides a highly flexible set of tools and processes to support effective utilization of limited resources. These tools are based in an organizational structure that can align governmental and private sector interests and create accountable management of resources. Because it is widely accepted across various response disciplines, using NIMS also presents an opportunity for effectively engaging many community response partners.

[3] RAND (2006) Technical Report – *Integrating Public Health and Hospital Preparedness Programs*

- Ethical considerations must be explicitly integrated throughout the process. As others have pointed out, a successful response to a pandemic depends on the ability to incorporate ethical principles in a way that is understood and supported by responders and the community at large.

- Health care and public health data must be incorporated into the system for health care delivery during a pandemic. In managing a pandemic response, decision makers must understand and explicitly balance 1) health care needs to treat influenza and other important medical conditions; 2) the availability of health care personnel and other resources; and 3) the effectiveness (based on anticipated outcomes) of applying available resources to various health care delivery methods/sites to treat influenza and other conditions.

- Transparency of the processes used to establish, manage and coordinate the system for health care delivery during a pandemic is critical to achieving community support. Community members must be involved in the project through use of community participatory research methods.

IV. PROJECT ACTIVITIES AND FINDINGS

Activities and associated findings are discussed as they were implemented and as they are tied to formal grant evaluation measures. *For ease of reading and clarity of reporting, evaluation measures are incorporated into the narrative and are identified by being underlined and in italics.*

The activities discussed in Sections 1 through 3 were designed to assess current health care utilization and strategies to increase capacity as necessary during a severe pandemic in a manner that would be ethical and acceptable to the community. Section 4 discusses the implementation and community's acceptance of the Health/Medical MAC Group's process. Section 5 includes the dissemination plan, future activities of the Health/Medical MAC Group, and a brief discussion about anticipated issues for future work. Specific activities in each section include:

Section 1
- Analysis of current hospital care utilization
- Analysis of projected pandemic influenza prevalence and hospital demand

Section 2
- Challenges in determining essential health care services
- Specific challenges of the pandemic environment
- Types of alternative care delivery sites/methods utilized
- Supplies and resources needed in the face of a Severity Index Category 5 Influenza pandemic.

Section 3
- Development and evaluation the ethics framework based on community values

Section 4
- Development of the Health/Medical Multi-Agency Coordination Group, tools, and exercises
- Evaluation of the Health/Medical Multi-Agency Coordination Group's process

Section 5
- Dissemination plan
- Future activities of the Health/Medical MAC Group and a brief discussion about anticipated issues for future development including bi-state collaboration; legal issues related to licensure; necessary technology support; and required communication processes

Section 1: Analysis of Current Hospital Care Utilization and Projected Pandemic Influenza Prevalence and Hospital Demand

To *identify the resources needed for influenza and non-influenza patient care*, we planned to undertake two analyses aimed at

- Quantifying resources consumed by current patterns of care.
- Projecting the resources that would be required to meet increased health care demand resulting from a severe influenza pandemic.

These analyses were designed to support the primary goal of this project, which was to develop a pandemic health care delivery system intended to minimize death and disability resulting from both influenza and other significant illnesses and injuries.

At the outset of the project, we were hopeful that we would be able to quantify inpatient hospital utilization (and its associated resource needs) as well as various aspects of ambulatory care (and their resource needs). As we got deeper into the project, we decided to concentrate our analytic efforts on hospital care. We did this because 1) we could not gain timely access to representative ambulatory care datasets, and 2) information from health care delivery stakeholders made it apparent that delivery of most ambulatory services during a pandemic would change radically. As a result, analyzing current patterns of utilization would provide very limited insights into essential services and potential system capacity as they would play out during a severe pandemic. Consequently, we decided not to attempt a quantitative analysis of ambulatory care services. Instead, we collected qualitative information on local ambulatory care; this information is discussed in Section 2.

The analysis of potential local demand for hospital care services during a Severity Index Category 5 pandemic influenza event proceeded substantially as planned. The only major modification was making adjustments in projections for hospital care demand in light of the assumed effectiveness of present-day ambulatory care treatments, especially antibiotics and antivirals.

Analysis of Current Hospital Care Utilization

The use of hospital discharge databases to examine the inpatient health care utilization is a common practice. Such analyses are most commonly performed at the level of the individual hospital, hospital system, or the state as a whole. These data are routinely used in the study of health economics and to help hospitals better understand what services are in highest demand so they can shape their services appropriately. Building on this established practice, discharge data were used to assess hospital utilization for the Portland metro area. The goals of analyzing hospital discharge data for this project were to

- Identify health care services that could be deemed essential based on current utilization.
- Provide a basis for exploring which services could be deferred, modified, or eliminated to free up hospital capacity to treat pandemic influenza and provide essential services.
- Gain a quantitative sense of the amount of hospital capacity that could be applied to care for pandemic influenza patients.

Multi-disciplinary Perspective

The analysis was carried out by a team of contractors and staff listed in Table 1. A detailed report of this analysis, entitled: *Summary of Discharge Database Analysis for Flu Pandemic Project (v.2)* is included as Attachment 1.

Table 1: **Analytic Team for Hospital Care Utilization**

Team Member	Role	Professional Qualifications	Organizational Affiliation
Jeff Fletcher, PhD	Lead Analyst	Assistant Professor of Systems Science	Portland State University
John McConnell, PhD	Economics Consultant	Assistant Professor of Health Economics	Oregon Health and Science University
Rajiv Sharma, PhD	Economics Consultant	Assistant Professor of Economics	Portland State University
Barry Anderson, PhD	Decision Science Consultant	Professor Emeritus of Psychology	Portland State University
Robert Stenger, MD, MPH	Medical Consultant	Family Physician / Resident in Preventive Medicine	Oregon Health and Science University
Jessica Sosso-Vorpahl, MD, MPH	Medical Consultant	Family Physician	Oregon Health and Science University
Safina Koreishi, MD	Medical Consultant	Family Physician	Oregon Health and Science University

Methodology and Findings

Data for the analysis were derived from the Oregon Hospital Discharge Database. This is a standardized database maintained by the Oregon Association of Hospitals and Health Systems. With the exception of Veterans Affairs facilities, all Oregon hospitals' discharges are tracked in this database. For most of the study, calendar year 2007 discharge records for hospitals in the Portland metro area (except the Portland Veterans Affairs Medical Center) were used. For some analyses a 52-week period from December 4, 2006, to December 2, 2007, was used to avoid the edge effect at the end of the 2007 data.

Discharge records in the database are de-identified. They include patient demographic data, up to nine International Classification of Disease (ICD-9) diagnosis codes, up to six ICD-9 procedure codes, a Diagnosis Related Group (DRG) code, a DRG Major Diagnostic Category (MDC) code, Length of Stay (LOS), as well as billing/insurance and other data. The database included approximately 226,000 discharges comprising approximately 961,000 inpatient bed days.

DRGs were employed as the primary basis for classifying discharges into clinically coherent groupings. We chose to use DRGs because they are quite granular; the 579 DRGs allow for detailed classification. In some analyses, the Agency for Health Care Research and Quality (AHRQ) Clinical Classification System (CCS) was used to supplement DRG classifications.

The analysis began with ranking DRGs by the number of inpatient bed days that fell into each DRG. The principal investigator reviewed this ranking and combined selected DRGs into broad clinically coherent groups (e.g., mental health and addiction, obstetric care, newborn care, clearly essential services, etc.).

A key observation from the preliminary analysis was that mental health/addiction services and obstetric/newborn care accounted for a significant fraction of bed-day utilization. There was also a significant fraction of admissions that appeared to be for elective procedures. These preliminary observations affected the design of further analyses. Specifically, we developed two approaches to consider how existing patterns of utilization could be changed to apply current inpatient capacity to treatment of pandemic influenza:

- Reengineering Care**:** This approach was applied to considering how mental health/addiction care and obstetric/newborn care could be provided at sites other than a traditional inpatient facility. This approach is discussed in Section 2 of this report.

- Deferral of Care**:** This approach was applied to identifying specific classes of inpatient admissions that could potentially be delayed until after the demand for pandemic care had moderated or resolved.

Deferral of care was analyzed through two basic approaches: 1) clinical judgment of physicians, and 2) patterns of temporal variation in admissions and discharges.

Deferral of Care–Clinical Judgment: A panel of three, board-certified family physicians exercised clinical judgment regarding potential deferral of care. Care that could be deferred was defined by the question: "Could hospital services for patients in this group be delayed for six to eight-weeks without significant morbidity or mortality for most patients?" The panel reviewed a listing of the top 100 DRGs. The DRGs were rank-ordered by community-wide bed-day utilization. The DRG utilizing the most days was ranked number one. These 100 DRGs accounted for 72.5% of all hospital bed days. The description of each DRG category was enhanced by adding Clinical Classification System (CCS) descriptors. This was done for CCS categories that comprised >1% of a DRG's bed days.

This resulted in 653 DRG-CCS combinations, giving the panel of physicians more descriptive data on which to base their clinical deferability judgments. The members of the clinician panel agreed on deferability in 77% of the DRG-CCS groups. Result of this analysis are summarized in Table 2 and discussed in the *Summary of Discharge Database Analysis for Flu Pandemic Project Report (v.2)* included as Attachment 1.

Table 2: Results from Clinical Deferability Judgments

Categories	Criteria for Inclusion	% of Total Hosp. Days
Mental Health and Addiction (MH)	DRG 426, 429, 430, 521, 522, or 523	8.0%
OB without complications (includes C-sections and healthy newborns)	DRG 371, 373, or 391	10.9%
OB with complications	DRG 370, 372, 383, or 390	2.9%
Non-OB/MH clearly deferrable	unanimous panel vote on DRG-CCS (among non-OB/MH top 100 DRGs)	9.7%
Non-OB/MH clearly not deferrable (includes premature newborn care)	unanimous panel vote on DRG-CCS (among non-OB/MH top 100 DRGs)	32.8%
Non-OB/MH deferability unclear	mixed panel vote on DRG-CCS (among non-OB/MH top 100 DRGs)	8.1%
TOTAL (reviewed by physician panel)	Top 100 DRGs with associated CCS representing > 1% of DRG	72.5%

These results suggest that there is a significant opportunity to reengineer the specific classes of care to free up inpatient bed capacity. More specifically, if uncomplicated obstetric and newborn care could be carried out in other venues, there is a potential to free up approximately 11% of inpatient bed-day capacity. Similarly, reengineering mental health and addiction care could free up another 8% of inpatient capacity.

The results also suggest an opportunity to defer certain types of care. There was agreement among all physician panelists that about 10% of the bed days could be freed up through deferral of care. Although there were another 8% of bed days where there was not agreement among all physicians regarding deferral, it is possible that some fraction of these admissions and their associated utilization could be candidates for deferral of care. Another point to consider is that the above estimates are based on an analysis of 72.5% of total bed days. It is possible that additional bed days could be freed up if analysis of the remaining 27.5% of bed days produced comparable results.

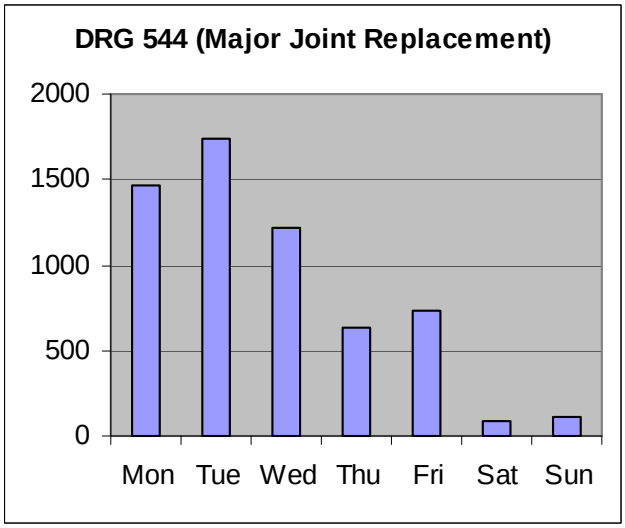
Deferral of Care–Temporal Analysis: According to the project's health economics consultants, there is a body of literature that documents significant variations in hospital admission/discharge behavior over time. For example, day-to-day variation in admission patterns is routine, with patients scheduled for elective procedures being admitted on Mondays and Tuesdays. Similarly, significant variations in elective admissions and discharges are seen during some holiday periods. Based on these patterns, we analyzed discharge data for temporal variation based on the hypothesis that currently occurring variation could reveal types of admissions and procedures that could be deferred. We undertook two types of analysis exploring temporal variation.

First, we looked at variation in admissions and discharges during a 10-week holiday period (from early December through the first week in February). This analysis revealed some variation, suggesting that certain types of procedures (e.g., joint replacement) were indeed subject to deferral. However, the dataset was too small to reveal robust patterns. This is an area for possible future research.

We then looked at variations in admissions and hospital census between days of the week. This analysis clearly revealed a difference in hospital admissions between presumably elective procedures (e.g., major joint replacement) and acute illnesses (e.g., acute myocardial infarction).

As Figures 1 and 2 illustrate, the predominance of admissions for major joint replacement were on Monday and Tuesday with a marked decrease in admissions on Saturdays and Sundays. Admission patterns for acute-type illness (as illustrated in this example by DRG 121-acute myocardial infarction) show a fairly consistent admission pattern throughout the week with little weekday/weekend variation.

Figures: 1 and 2: Admission by Days of Week by Condition/Procedure



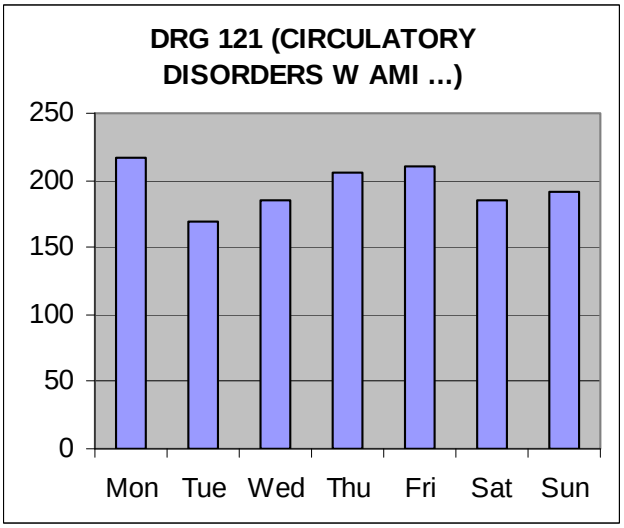
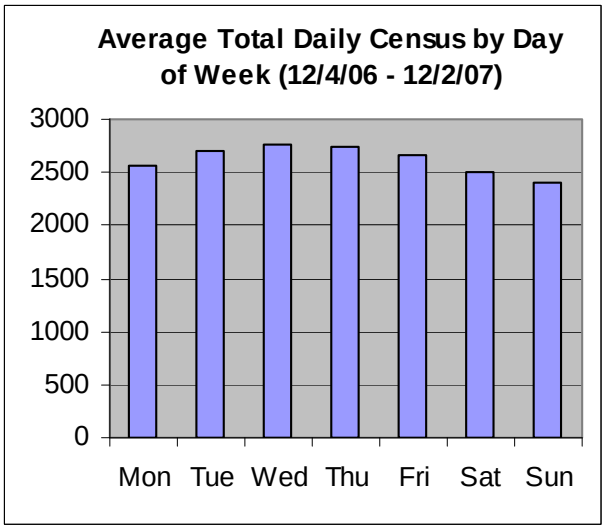


Figure 3: Average Daily Census



Despite the above patterns, there is relatively little variation in average total daily census (Figure 3). This is likely the result of deliberate maximization of resource use. That is, under normal circumstances, hospitals strategically manage rates of admissions and discharges so that 1) overall hospital census is consistent and manageable, and 2) maximum efficiency in use of staff and other resources is achieved, thereby supporting profitability. A question that we were not able to answer was whether overall census could be driven down by consistent deferral of admissions with a high degree of intra-week variability.

Finally, the analytic team attempted to develop a quantitative metric of deferability. This analysis is presented in a report entitled *Summary of Discharge Database Analysis for Flu Pandemic Project (v.2.)* and is included as Attachment 1.

Analysis of Current Hospital Care Utilization: Comments and Conclusions

Analyzing current hospital care utilization turned out to be valuable in a number of ways. First, it demonstrated practicality of using existing data derived from everyday administrative practice. While the specific analytic methods we used needed to be developed either de novo or from existing literature approaches, developing these methods was relatively straightforward. In addition, our analytic approach demonstrated the value of multidisciplinary participation in developing strategies useful in pandemic planning.

Second, the analysis provided insights into current patterns of hospital utilization as they occur in the Portland metro area. In turn, these insights (e.g., the large amount of bed days expended on mental health and addiction services and on obstetric and newborn care) provided a basis for strategic and tactical planning to increase inpatient capacity for pandemic patients. The analysis brought into sharper focus the need and opportunity to reengineer mental health care and obstetric/newborn care. It also provided some concrete information relevant to the issue of canceling elective surgeries. It provided a rough quantitative indicator of the amount of hospital capacity that could be freed up by cancelation of certain types of procedures. It also raised questions about the types of hospital capacity (regular medical/surgical bed, operating room, post-anesthesia recovery, and ICU) that might be impacted by cancellation of the various types of procedures.

Third, we gained an understanding of the proportion of current hospital utilization that potentially could be freed up through reengineering of care or deferral of care. The results suggested that somewhere in the neighborhood of 30% to 40% of bed days could conceivably be made available for pandemic care, assuming utilization of aggressive reengineering of some services and deferral of elective services.

Finally, we gained an understanding of a critical limitation of our analytic approach. Specifically, there is a significant issue in using retrospectively gathered data to prospectively plan for and manage a health care delivery system facing the extreme stressors of a pandemic. The data we worked with were quite clear in describing what was wrong with each patient and what resources were used to care for them. The challenge is that patients typically do not present to the hospital with a clear diagnosis or a predetermined list of interventions they will require. Rather, they often present with nonspecific symptoms; diagnoses and necessary treatments become clear during and after the course of the illness and its care. Because of this, it will be necessary to develop additional methodologies (e.g., well structured admission triage systems) that can be applied prospectively.

Analysis of Projected Pandemic Influenza Prevalence and Hospital Demand

A detailed report of this analysis, entitled: *Case Estimation Approach for Pandemic Planning Exercises* is included as Attachment 2.

For this project, we believed it was important to develop a credible estimate of pandemic influenza incidence at the community level and how that incidence would play out in demand for health care. In particular, we assumed that hospital care would be critical to the survival and return to health of severely ill influenza patients.

We also were concerned that hospital care is highly specialized, focusing on particular populations and particular methods of care, often with highly specialized staff. This specialization of care in the non-pandemic situation involves differing physical plant layouts, specialized equipment and supplies, and specialized skill sets that cannot easily be transitioned to caring for unfamiliar patient populations. For example, re-assigning a neonatal intensive care nurse to adult critical care could have significant impacts on efficiency and quality of care.

Given this, we were particularly interested in obtaining projections of influenza illness that would provide some insights into need for the volume and types of care required by specific patient populations. Our hope was to translate these demand characteristics into needs for specific inpatient capacities such as regular adult hospital bed capacity (medical/surgical beds), pediatric capacity, and adult and pediatric intensive care capacity.

In reviewing existing pandemic projection models, we were not satisfied that they provided credible insights into likely levels of patient demand, especially the age distribution of patients and their level of illness. Similar to the hospital discharge database analysis described earlier in this discussion, our model for projecting pandemic influenza and demand was carried out by a team of analysts and consultants. Team members are listed in Table 3.

Table 3: Analytic Team for Pandemic Modeling

Team Member	Role	Professional Qualifications	Organizational Affiliation
Amy Sullivan, PhD, MPH	Lead Analyst	Epidemiologist	Multnomah County Health Department
Cynthia Mills, DMV, MPH	Analyst	Disease Modeling (Masters Thesis)	Multnomah County Health Department
Katrina Grant, MD	Medical Consultant	Family Physician	Oregon Health and Science University

Methodology

Fortunately, local data were available from the 1918 Influenza Pandemic as it played out in Portland, Oregon. Dr. Sullivan had previously carried out an analysis of death records of individuals hospitalized in a special influenza hospital that operated in Portland during the 1918 pandemic. This study provided fairly detailed data on the course of the pandemic, including individuals' ages and the overall time course of one pandemic wave. These data provided a basis against which the models we developed could be calibrated.

The first step in developing the model was to derive an equation from Portland's 1918 epidemic curve and influenza deaths. This equation was then used in a deterministic modeling approach utilizing ModelMaker® software. Portland metro area data and demographics for 2008 were entered into the model to serve as the population at risk.

To develop projections of incidence for each age group, "clinical trajectories" were established for each age group. A typical trajectory is shown in Figure 4. These trajectories modeled outcomes utilizing two sets of assumptions:

- Assumptions on the course of influenza among various age-defined populations. These assumptions were derived from medical literature on the course of influenza.

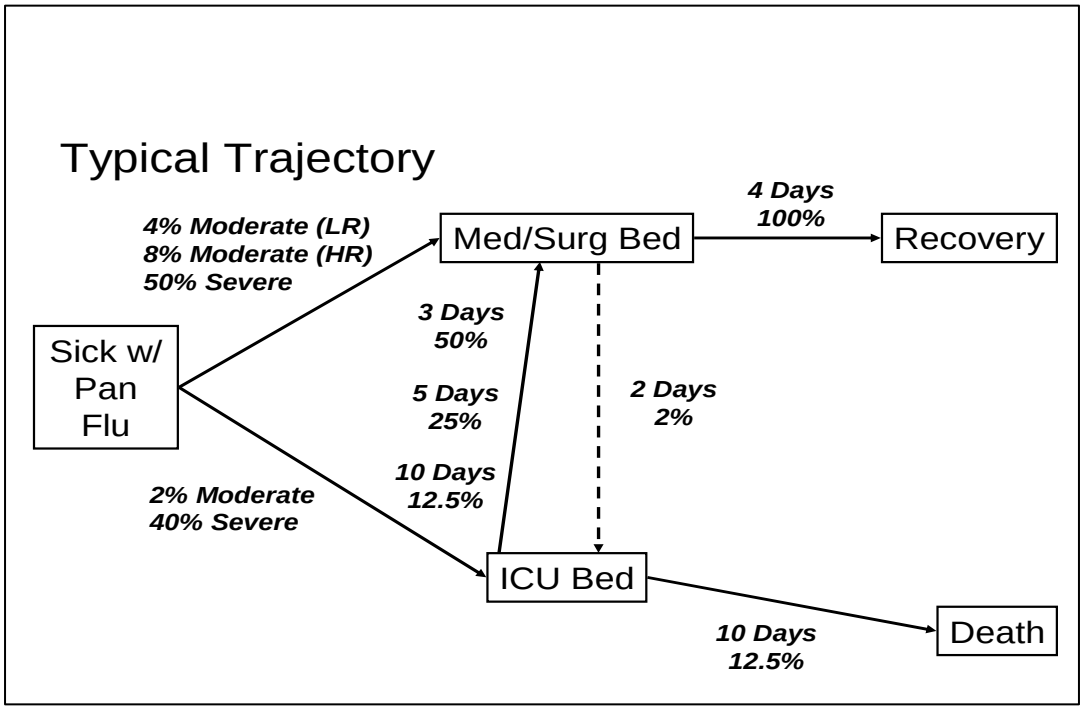
- Assumptions on the prevalence of chronic disease as a risk factor for progression to moderate and severe influenza illness. Assumptions on chronic disease prevalence were developed for each demographic group based on medical and epidemiologic literature, and Oregon Behavioral Risk Factor Survey System data.

For example, the specific assumptions underlying the trajectory illustrated in Figure 4 include:

- 40% of severely ill patients will initially be admitted to an ICU bed, 50% will be admitted to a regular medical/surgical bed, and the remaining 10% (not shown in the figure) will have been managed as outpatients and therefore not admitted to the hospital.

- 2% of moderately ill patients will be admitted to the ICU, while 12% (4% from low-risk populations and 8% from high-risk populations) will be admitted to a regular bed. The remaining 86% of moderately ill patients (not shown in the figure) are assumed to be successfully managed with outpatient treatment alone.

Figure 4: Example of Clinical Trajectory



Modeling started with the assumption that only 1918-like medical care would be available (primarily supportive care and procedures available in 1918, such as thoracentesis to drain an empyema). Early models developed under the assumption of 1918-like care predicted unrealistically high demand for 21st century hospital care. Models were progressively refined, building in assumptions about the availability of ambulatory care that would be effective in modifying the course of influenza and treating complications. Specifically, it was assumed that antibiotics would be available and effective in treating bacterial pneumonia. It was also assumed that antiviral drugs would be effective in moderating the course of influenza illness.

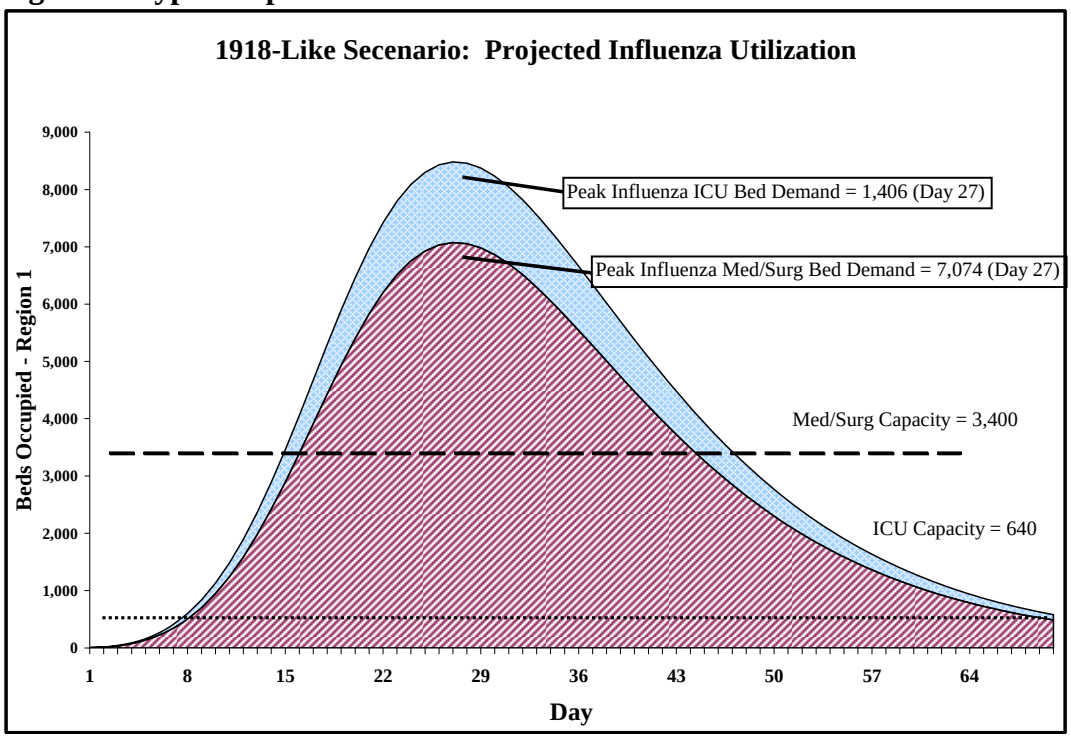
Calibration and Incidence of Illness and Demand for Health Care: Results

The model performed very well in predicting overall mortality when compared to local 1918 data. The model estimated overall deaths in the community within 3% to 10% of the actual 1918 experience. However, estimates for specific age groups varied substantially. For example, in various model iterations, projected deaths among 20 to 44 year olds matched actual 1918 deaths closely. Projected deaths in this group were at least 80% of actual 1918 deaths. Conversely, the model severely underestimated deaths among people younger than 20 years old, with the projected number of deaths being less than 20% of that experienced in 1918.

Overall, the model predicted that the metro area would experience approximately 513,000 cases of influenza during an eight-week wave. This represents an attack rate of 24%. The model predicted 4,972 deaths, a 1% case fatality ratio (CFR). Despite substantial fine tuning of the model, we could not get it to produce a 2% CFR without other parameters and results becoming unrealistic.

The model predicted that most moderate and severe illness (93%) would be seen in high-risk populations. Various iterations of the model were carried out to look at demand for hospital services. For example, under an assumption of relatively unaggressive outpatient medical treatment, approximately 35,000 people would require hospitalization over a 10-week pandemic wave. A typical epidemic curve from the model is shown in Figure 5. The numeric output of this example is included as Attachment 3. Under a more aggressive 2009-like treatment approach with outpatient antibiotics and antivirals, it is anticipated that approximately 11,000 individuals would require hospitalization.

Figure 5: Typical Epidemic Curve from the Model



Projected Pandemic Influenza Prevalence and Hospital Demand: Comments and Conclusions

This effort to model demand for health care in the face of a Severity Index Category 5 pandemic proved useful for the project in a number of ways.

First, it provided an opportunity for project staff and planners to consider health care delivery system factors that will be critical to a successful pandemic response. These include the age distribution of the impacted population, the prevalence of chronic disease both as a risk factor for severe influenza and in representing co-morbid conditions that would require treatment. It also provided an opportunity to consider the differences between the 1918 medical environment and that of the present day. These considerations not only affected model development, they influenced thinking about developing a system for delivering care in a pandemic situation.

Second, the modeling itself succeeded in producing reasonable outputs of potential value to the community in the planned exercise series and in further community preparedness planning. The various scenarios helped to anchor thinking. For example, the ability for stakeholders to visualize the course of the pandemic and see how large the demand for hospital care would be illustrated the gravity of the challenges that would be encountered in a Severity Index Category 5 pandemic. The model we were able to produce did not meet all of our needs. Underestimates of pediatric cases and overestimates of geriatric cases were detrimental to detailed planning for these groups. Also, although the model calibrated fairly well against local 1918 data, a 2% CFR could not be produced in the context of a very high attack rate and the applied prevalence of chronic disease. To get the model to produce this CFR, other estimates would have had to be adjusted, which would have further increased the fatal case numbers produced.

Section 2: Challenges in Determining Essential Health Care Services, Specific Challenges of the Pandemic Environment, and a Revised Approach to Defining Essential Medical Services

This section will discuss challenges and approaches we faced when attempting to define an essential health care service in the non-emergency health care environment as well as in a severe pandemic one. In addition it includes a description of how we explored reengineering essential *sites and approaches to patient care, as well as methods for deploying care resources in a coordinated manner.*[4]

After considerable data analysis and multidisciplinary work, we came to the conclusion that we could not *develop a detailed methodological framework identifying a list of essential services to be maintained for treatment of influenza and non-influenza conditions during a Severity Index Category 5 pandemic influenza event* that is operationally useful and applicable to a broad range of scenarios. This conclusion arises from two major problems:

- The inherent challenges in determining which health care services are essential, even in a non-emergency environment
- The specific challenges associated with the pandemic environment

Challenges in Determining Essential Health Care Services

First, relatively few services are homogeneous in being obviously essential. For example, renal dialysis can appropriately be designated as "essential" in almost all cases because failure to perform the procedure over the course of several weeks (e.g., during a pandemic wave) would have predicable disastrous outcomes for most, if not all, patients. Most other services potentially designated as "essential," however, may embody a great deal of diversity in clinical presentation, course, and outcome over that same period. For these not obviously essential services, a good deal of evaluation and triage is necessary to determine whether a patient truly needs a given service to survive and return to health. So for most services, a predefined list does not eliminate the need to evaluate (or presumptively treat) patients.

Second, for many serious medical conditions, there is insufficient scientific knowledge to determine what the intermediate and long-term outcomes of the condition will be in a given case. A small proportion of conditions do have fairly well-defined intermediate and long-term outcomes. However, against the background of larger groups of conditions with less well-defined outcomes, there is a danger of creating a systematic bias that favors treatment of well-studied or well-characterized conditions as "essential" while the less well characterized become "non-essential." On the positive side, this bias supports a rational and prudent approach to resource utilization, acting on what is known. On the negative side, health conditions are not prioritized for study based on their overall importance to the health of the population.

[4] Evaluation measure operationalized from *"Essential sites and methods of patient care, and methods for deploying care resources in a coordinated manner, are incorporated into the Pandemic Health Care Delivery System Model."*

Our knowledge of various conditions (and ability to predict outcomes) can reflect factors such as researchers' scientific interests, potential profitability of various treatment modalities, and social/political advocacy around specific health conditions. In the end, the bias towards treating well-studied conditions may simply reflect a number of drivers other than overall population health outcome. In addition, as discussed in Section 1, there is substantial difficulty in predicting service delivery demands and associated outcomes, as well as in defining appropriate approaches to care even when supported with a high volume of quality retrospective data.

Specific Challenges of the Pandemic Environment

We came to realize that we had a relatively static view of essential health care services when we proposed this project and during the early implementation. We had envisioned a Severity Index Category 5 pandemic as an event for which a consistent definition of essential services could be developed and used. As the project progressed, we came to understand that the concept of essential health care services would be highly dynamic in the severe pandemic environment due to unpredictable variables:

- The variation in pandemic impact on the population and resulting demand for health care during the course of a wave of transmission, and
- The variation in clinical management of influenza patients as a result of increasing knowledge about the effectiveness of pandemic treatment modalities.

<u>Variation in pandemic impact on the population and demand for health care</u>

Through our work in modeling the incidence of influenza and the resulting health care demand, we began to think of a pandemic wave as having three phases.

The early phase would feature progressive growth of influenza incidence. At the beginning of this phase, delivery of health care services would remain relatively similar to the situation during a non-pandemic period. As a result, services considered to be essential during this phase would roughly mirror those of the non-pandemic period.

The middle phase would feature growth in pandemic incidence to a peak level followed by decline. Through modeling and local experience with the H1N1 pandemic, we learned that due to prolonged illness, the prevalence of influenza-related health care demand would most likely peak and persist after influenza incidence began to decline. In H1N1, this pattern was expressed most clearly in the demand for intensive care services continuing well past the peak incidence of illness onset (and hospital admission).

During this phase, demand for treatment of pandemic influenza would overwhelm existing health care capacity to varying degrees. Our modeling suggested that during the peak of incidence in a ten-week wave, demand for influenza-related hospital services could be three times the total existing hospital capacity of the region. Given this volume of demand, and its likely persistence past the peak of community transmission, it becomes clear that the response in this phase would require radical modification of service delivery for both influenza and other conditions. So during this phase, we would expect the definition of essential services to undergo substantial shifts. These shifts could occur in rapid sequence depending on specific health care needs, availability of resources and other factors.

The third phase would be characterized by a continuing decline in incidence and prevalence of illness, and the associated demand for health care services. This would be the phase of renormalization. It is anticipated that renormalization would be implemented strategically, based on available staffing, exhaustion of health care providers, availability of financial resources, and other factors. During this phase, the definition of "essential" would shift back towards that of the pre-pandemic period.

Variation in clinical management of influenza based on effectiveness of treatment modalities
We believe that during the course of a pandemic wave, medical practitioners and institutions would rapidly gain knowledge about the effectiveness (or lack of effectiveness) of various treatment approaches. We expect that this knowledge would affect individual practitioners' and institutions' treatment approaches. These changes in treatment (and any associated changes in resource utilization) could affect judgments on what services were deemed essential. These judgments would apply to influenza as well as other conditions. For example, services that appeared to be both effective and reasonable in resource consumption would likely come to be deemed essential. Conversely, treatments observed to be either less effective or requiring less reasonable levels of resources would be deemed nonessential.

A related issue is that the judgment of which services are "essential" also depends on providers' expectations. In a non-emergency situation, retrospective clinical evaluation shows that a lot of provided care turns out to have been unnecessary; many patients with a given illness with potentially severe consequences would have done well with or without care. But despite this, providers in the non-emergency context attempt to ensure good outcomes in the maximum number of cases by investing health care resources in an attempt to detect and then treat low-probability adverse outcomes. That is, we use resources to reduce uncertainty. In a health emergency, where resources are less available, there is no choice but to accept more uncertainty. So providers will need to change in two ways: 1) they must judge in real time the evidence for effectiveness of their interventions, and 2) they also need to change their expectations about reducing the risk of uncommon negative outcomes (especially in non-influenza conditions).

Revised Approach to Defining Essential Medical Services
As we came to better appreciate the dynamic nature of prioritizing services relative to demand and available resources, we changed our approach to defining essential services. That is, we shifted away from trying to develop a static pre-defined list of essential services. Instead, we concentrated on two areas of work:

- Developing processes, including the use of a decision-making group (i.e. Health/Medical MAC Group) that could be applied in real-time to identify essential services in the context of the demands for care and availability of resources at that point in time.

- Identifying potential methods of increasing health care delivery capacity (surge strategies) with the assumption that decisions about implementing these various strategies would be made primarily in real-time through the health care delivery coordinating process (i.e., the Health/Medical MAC Group). It is important to note that substantial work still needs to be done to explore and test capacity building strategies.

Developing the Health/Medical MAC Group and other processes to be applied in real-time

The Health/Medical MAC Group is fully operational and is further developing its structure, training, and decision-making tools. These processes are currently under development with involvement from a variety of stakeholder groups. The Health/Medical MAC Group will participate in functional exercises to check their improvement and the effectiveness of developed decision-making processes. The group will also continue to solicit feedback from stakeholders to *ensure that developed processes will be accepted by the Northwest Oregon Health Preparedness Organization Steering Committee and other local stakeholders.*[5] Section 4 discusses how stakeholder feedback has already been used to develop the Health/Medical MAC Group, and Section 5 discusses some of the structural and decision-making processes the group is working on, in large part, as a result of stakeholder feedback received during this project.

Identifying Surge Strategies

Identifying ways in which to increase surge capacity arose from the results of the health care capacity assessment described in Section 1 as well as our experience with care delivery during the autumn 2009 H1N1 wave. Our learning resulted in two approaches, each with multiple individual strategies:

- Increasing Capacity through Deferral of Elective Care, and
- Reengineering Care Delivery and Developing Other Care Approaches
  - Reengineering Care - Behavioral Health
  - Reengineering Care - Obstetrics
  - Reengineering Care - Hospital Admission Triage
  - Reengineering Care - Ambulatory Care
  - Reengineering Care - Home Health Care
  - Reengineering Care - Skilled Nursing Facility Care
  - Developing other types of care approaches – Access to Influenza Care

Increasing Capacity through Deferral of Elective Care

As discussed in Section 1, our project's consulting physicians took the results of the hospital discharge data study and worked to develop rational bases on which to defer care for certain conditions. The criterion used to classify a procedure/service as deferrable was "Would the deferment of the procedure/service for a six-to-eight-week period cause significant increase in morbidity or mortality for the patient?" Products included lists of classes of conditions, "temporal fingerprints" of utilization to guide decision making, and a mathematical "deferability index." These tools could help institutional and community-level decision makers (in this case, the Health/Medical MAC Group) shape the health care delivery system.

Ultimately, categorizing large classifications of disease into distinct categories proved to be impractical. The consulting physicians concluded that there was too much diversity within large DRG-defined classes of conditions and care and too much uncertainty in applying retrospective population data to clinical decision making around services for an individual.

[5] Evaluation measure operationalized from: "The methodological framework is accepted by the Northwest Oregon Health Preparedness Organization Steering Committee, other local stakeholders and CDC project staff as appropriate."

As a result, they concluded that there must be a system that authorizes use of clinical judgment in decisions around admission of individuals to the hospital. Similarly, "temporal fingerprints" and the mathematical "deferability index" also turned out to be impractical. Both contained too much variability ("noise") relative to useful information ("signal"). Both are intriguing, and would require further development and rigorous testing to reassess their potential value.

Reengineering Care Delivery and Developing Other Care Approaches

Several strategies were explored and some implemented in response to the 2009 H1N1 pandemic.

Reengineering Care – Behavioral Health: The analysis of hospital bed utilization presented in Section 1 highlighted a surprising result; 8% of all hospital bed days were expended on behavioral health diagnoses. In looking at this group in more detail, most of this utilization was driven by chronic and persistent mental illness, primarily schizophrenia and severe depression. However, substance abuse also made a significant contribution.

To explore whether care for these conditions could be removed from the inpatient hospital setting and provided in alternative ways, project staff convened an expert group of mental health providers from the community. These included a psychiatrist who serves as medical director for the hospital with the largest inpatient psychiatric service in Region 1, as well as representatives of community mental health provider agencies, community support agencies, and advocates.

This group was less than enthusiastic about decommissioning existing inpatient mental health capacity to produce general medical surge capacity in the face of a severe influenza pandemic. The group questioned the practicality of repurposing the resources used for behavioral health admissions based on three areas of concern.

One concern was the physical nature of dedicated behavioral health units. These units typically have been redesigned and remodeled to be appropriate and effective for the intended patients. Often, engineered capacities (e.g., oxygen and vacuum plumbing) have been eliminated or curtailed. In addition, other physical features, including the use of nonadjustable bed frames that are bolted to the floor, secure doors and other expanded security features, and small rooms that do not have sufficient space for medical equipment, make behavioral health units less than optimal for general medical care.

Additionally, the group explained that when behavioral health patients occupy a regular hospital bed, it is often because there are medical complications that require monitoring and treatment. For example, behavioral health patients who are medically unstable as a result of medication toxicity or illnesses and injuries that complicate mental health and addiction conditions are indeed medical patients. These patients' care is not automatically amenable to alternative treatment approaches. They must be admitted, managed and discharged based on their medical needs in consideration of the community's medical needs and resource context.

The second major concern raised by the group was the absence of alternative methods and systems of care even during nonemergency times. According to the group participants, it is well recognized in medical and behavioral health literature and through practical experience that comprehensive, community-based care for behavioral health conditions is effective and efficient. However, it is equally recognized, particularly in the Portland metro area that resources for such community-based care are significantly lacking.

There are absolute deficiencies in access to both behavioral health treatment (e.g., psychiatric care) as well as supportive services, including housing, substance abuse treatment and a variety of other social services and supports. As a result, during nonemergency times people with behavioral health disorders receive inadequate services. This situation puts these individuals at risk of a variety of complications, including homelessness, medical illness, unmanaged mental illness symptoms and/or addiction, involvement with the criminal justice system, and victimization. In the context of a severe pandemic, the behavioral health providers felt that the current situation would worsen for people with behavioral health disorders, particularly those with chronic and persistent mental illness (CPMI). The group hypothesized that mental illness symptoms would be exacerbated as a result of stress associated with increased illness in the community, coupled with less support from families and health care providers, resulting in a potential "downward spiral" for many patients.

The third area of concern arose from ethical considerations. Meeting participants observed that people with behavioral health disorders historically have received relatively low priority for resources to treat their illness and provide necessary support services to promote stability. At the same time, it was acknowledged that people with behavioral health disorders are extremely vulnerable to adverse health and safety consequences as a result of their illness. To the behavioral providers the confluence of high vulnerability and low resource support made it ethically untenable to further withdraw resources from this population. This position is in agreement with the results from the community feedback used to develop the ethics framework discussed in Section 3.

Meeting attendees concluded that reengineering inpatient behavioral health care, specifically attempting to decrease inpatient utilization, would not be a prudent, ethical, or effective strategy for increasing overall hospital inpatient medical care capacity. In fact, they argued that such reengineering would likely result in increased use of health care resources, overwriting any potential gains in hospital capacity.

Reengineering Care – Obstetrics: As discussed in Section 1 obstetric care, including normal and complicated vaginal deliveries, routine and complicated cesarean sections, and normal newborn care, account for at least 14% of hospital bed days in the region. The great majority of this care is support for normal labor and delivery and care of normal newborns. In the face of a severe pandemic, there may be an opportunity to reengineer some of this care, thereby freeing up inpatient hospital capacity for the care of influenza patients or for the care of other patients with serious illness or injury.

To explore reengineering possibilities, we invited administrators of various hospital-based obstetric programs to participate in a discussion about adapting obstetric services in the face of a Severity Index Category 5 pandemic. Representatives of both the major high-risk obstetric services attended. Unfortunately, there were no attendees from the hospitals that care for the majority of uncomplicated deliveries and newborns. Three strategies were identified as central to reengineering obstetrics care:

- Complete closure of most obstetric units as such, with conversion of those units to general medical care;
- Utilization of alternative sites for most labor and delivery; and
- Consolidation of high-risk obstetrical care into a very small number of hospitals.

Participants agreed that complete closure of some (perhaps most) obstetrics units was central to creating surge capacity. The rationale for this was largely clinical. That is, it would not be tenable to run "mixed units" providing care for obstetric as well as medical patients (either influenza patients or those with other conditions). Attendees felt that it would be very difficult to provide a reasonable quality of care in a mixed situation because of the respective limitations of skills on the part of both nurses specializing in obstetrics and those not specializing in obstetrics. In addition, there would be a profound problem with infection control in such a mixed unit, with pregnant and recently pregnant women and their newborns being at high risk of influenza complications. Given this, the only viable clinical approach is convert entire obstetric units (or portions of units that would allow effective isolation of OB patients) to general medical care.

Absent the usual inpatient obstetric capacity, there would be a need to identify other appropriate sites for labor and delivery, particularly for low-risk pregnancies. There was strong agreement among obstetric meeting participants that moving routine labor and delivery to alternative sites, coupled with early discharge to home or to facilities, such as designated hotels with some nurse staffing for those patients needing additional support, would be an appropriate strategy. Participants felt that existing birthing centers and surgical centers would be appropriate venues for labor and delivery.

The use of surgical centers for routine surgery would probably be limited in the face of the pandemic. In addition, these centers are reasonably well-equipped for managing obstetrical complications by virtue of having the equipment and supplies necessary to do more advanced care, including providing oxygen, intravenous fluids, and even carrying out cesarean sections. Participants felt that staffing of the centers could largely be achieved utilizing nurse midwives and a limited number of obstetricians.

Existing birthing centers staffed by experienced midwives were also seen as appropriate labor and delivery sites. There was no hesitation among meeting participants that nursing staff would accept this, but whether physicians would support this was unclear. There was some discussion of encouraging care by direct entry midwives (e.g., in homebirth settings). Among the group of allopathic meeting participants, there were concerns about whether this was an appropriate strategy in terms of the type of care provided and about potential liability arising from the association of institutions with direct entry midwives.

The shift to non-hospital-associated labor and delivery sites would require some additional capacities to maintain current allopathic standards of care and safety. This includes high-quality triage procedures carried out by staff who are well-trained and experienced in identifying high-risk pregnancies. According to the obstetric meeting participants, 75% or more of high-risk pregnancies are identified prior to labor, so it would be practical to triage these women to the high-risk labor and delivery sites. However, it was acknowledged that there would need to be additional capacities to safely manage women who were triaged to low-risk delivery sites but subsequently developed complications. These capacities include rapid availability of expert obstetric consultation, communication systems to support this consultation, and rapid medical transportation services.

The third leg of the reengineering approach would be maintenance of a small number of geographically dispersed high-risk obstetric centers with Level III neonatal intensive care unit (NICU) capacity. Currently, the Portland metro area has three Level III NICUs. From the discussion it was not clear whether or not all three should be maintained during a severe influenza pandemic. If only one or two centers were maintained, staff from the others could be contributed to the open centers.

Meeting participants were very optimistic about the ability to achieve reengineering of obstetric services. They did not feel it would require extensive preplanning, and felt that it could be achieved rapidly (i.e. days, rather than weeks or months). Given this, they felt that reengineering was a reasonable strategy.

This belief among providers was in agreement with community members involved in the discussions informing the ethics framework development. During these community discussions, there was strong support for "moving" pregnant women and babies away from facilities treating patients with influenza. Several discussion participants suggested that there would be a lot of "self directed referral" of women to alternative settings.

Obstetric meeting attendees identified other issues that would need to be addressed to make a reengineered temporary obstetrical care system effective:

- Public education: Two primary issues were identified. One was how to educate pregnant women about the special factors related to influenza during pregnancy and labor and delivery. These include prevention (especially vaccination) and addressing the severe impacts of influenza on pregnant women and newborns. The other issue was providing information to women and their families about how temporary service changes would affect options for labor and delivery, including the disruption of patient expectations and existing patient/provider relationships. Based on information learned from the community discussions, these messages would, in most cases, be received well.

- Providing appropriate postpartum care: In the Portland metro area, women tend to spend one to two days in the hospital after vaginal delivery. The requirement for reasonable postpartum care will not be resolved by switching the site of delivery. Some women will be able to go home after a very short stay (less than 24 hours). However, others will require longer stays; the facilities for such stays were not identified. In addition, a substantial fraction of deliveries are carried out through cesarean section. Typically, there is a three-to-four-day hospital stay following cesarean. The same problems identified for vaginal delivery are issues for this population as well.

- Addressing the financial impact on hospitals: Participants recognized that there could be significant financial impacts on high-risk obstetric centers, general community hospitals, and the physicians and other staff who provide care in these settings. Part of this discussion included the potential of higher liability risks associated with carrying out the technical care in nonstandard settings and using nonstandard care methodologies and staffing.

Reengineering Care - Hospital Admission Triage: Through the project we explored the role of community triage standards for hospital admission to help ensure equitable access to hospital care for the most ill in our population. We have convened meetings of hospitalists and specialists to work on this approach. Our Decision Science consultant was also involved.

Through one stakeholder meeting (co-sponsored by the local medical society) and individual follow-up with participants, there was significant interest in working on developing a triage standard. Participants saw the standard as necessarily based in a clear understanding of community members' ethical values about how and to whom care should be provided in a Severity Index Category 5 pandemic. They saw a need for further community dialogue to develop the values. Participants also expressed significant optimism about the possibilities of developing a functional approach and making the approach consistent across the community. Providers participating also recognized that developing such an approach would require a significant amount of pre-planning and involvement of both the medical and general communities to accomplish. Progression of the local H1N1 pandemic presented a significant barrier to advancing this work. The ability of medical community participants diminished as did the capacity of staff to support the activity. As a result, development of a community-wide hospital admission triage approach was put on hold until resolution of the H1N1 pandemic and its impacts.

Reengineering Care - Ambulatory Care: Due to the lack of available data for the multiple public and private ambulatory care providers, it was not possible to assess the current utilization patterns or capacity. As a result, it was not possible to explore any surge capacity strategies. It was recognized that the coordination with public media and messaging would be the most realistic strategy to optimally utilize these multiple and varied resources. Public messages would focus on community-wide triage, specifically educating the public when to seek care from ambulatory care providers, a nursing-staffed "flu" phone line, or practice self-care at home. These messages would evolve as more information is learned about the virus, effectiveness of treatment modalities, and available resources. These messages would be informed in large part, by what is reported by local providers along with Federal and State authorities.

Reengineering Care - Home Health Care: Focused conversations with home health care providers were not successfully convened. Reasons for this challenge stem from the diverse body of providers as well as the fact that most are very small businesses and are not organized as an industry. Based on these challenges, our exploration of reengineering care delivery sites focused on nursing facilities as well as assisted-living facilities rather than individual home health care providers.

Reengineering Care - Nursing Facility Care: The project explored ways in which the spectrum of nursing facilities (e.g., skilled nursing facilities, intermediate care facilities, and assisted-living facilities) could serve as surge capacity during a severe pandemic event. This was done primarily through a meeting with representatives of the nursing facility community including representatives of companies owning one or more nursing facilities, the statewide association of nursing facilities, and the state of Oregon medical consultant for long-term care.

For context, participants pointed out that Oregon is first in the nation in developing alternatives to nursing facilities by encouraging the availability of various forms of home care and community care. As a result, skilled nursing facility census (and capacity) is lower in facilities in Oregon than in other states. Nursing facility capacity in Oregon Capacity in Nursing Facilities is defined in terms of three measures:

- Number of licensed beds: Providers tend to keep this number high in order to be able to expand services if needed
- Available beds: The number of beds ready to accept a patient. This is adjusted dynamically in anticipation of rising or falling demand.
- Actual beds: The number of beds that are actually staffed; this is driven by both demand and availability of staffing.

In calendar year 2007, 69% of licensed beds were staffed and being utilized on average. This implies the potential for surge capacity of 30% to 50%. Attendees of the nursing facility meeting thought that their and other long-term care facilities could make a meaningful contribution to providing care in a severe pandemic situation. They saw two basic roles for these facilities: 1) providing "step down" care to people who no longer need hospital services, and 2) serving as an alternative to hospital care for people with moderate illness. Industry representatives felt confident that skilled nursing facilities could effectively serve in the step down role. They cited the ability to provide intravenous treatment (hydration as well as antibiotics, and other IV medications) and the ability to manage co-morbidities, including diabetes and heart disease, being done within the current scope of skilled nursing facility care.

Similarly, they felt that assisted living facilities could also contribute to capacity, but in a limited manner. They would not be able to provide intravenous treatment, but could manage individuals with fairly stable co-morbidities. The severity of co-morbidities that could be managed would be limited as a result of limited ability to provide nursing oversight of unlicensed assistive personnel.

Meeting participants were not daunted by some of the challenges specific to influenza patients. In particular, they mentioned cohorting and other infection control strategies that they explained were fairly routine in their facilities. Participants did, however, mention a number of challenges:

- These facilities do not routinely stock significant amounts of personal protective equipment (PPE). In addition, they were concerned that they would be direct competitors with the hospitals for obtaining such supplies. In most of Oregon, there is a region-wide system for distribution of medical supplies. The system serves hospitals and other medical providers as well as long-term care providers.

- Staffing could be a serious barrier. Oregon has implemented a system of staffing ratios for nursing facilities. These ratios were developed in partnership with the major union representing nursing facility workers (the Service Employees International Union – SEIU). The ratios are specified in Oregon Administrative Rules, and therefore have the force of law. There are provisions for emergencies waivers that would allow for increased patient-to-staff ratios. These waivers would need to be granted by the State. Because of the history and legal nature of the ratio development process, obtaining a waiver could be complex, even in a severe pandemic situation.

- Nursing facilities will face an increase in demand from patients who were previously stable in community-based settings. It is anticipated that previously stable patients will require admission to nursing facilities for two reasons. First, the intensity of support required by these patients might increase if they become even moderately ill with influenza. Secondly, it is likely that the regular caregivers for many of these patients will become ill (or have ill family members) and therefore not be able to provide care as usual. In any case, these previously stable patients will be competing for admission with patients intended to receive "step-down" services as a result of early hospital discharge.

- Reimbursement system for nursing facilities presents barriers. Currently, nursing facility capacity is actively adjusted by management according to demand. Unfortunately, demand is expressed in terms of patients who are eligible for facility care under the standards of Medicare, Medicaid, or other third-party payers. Capacity is adjusted to meet the needs of patients with a reimbursement source. So even if workers are available, they will not be hired and capacity will not expand unless there is a reimbursement source for additional patients. Other specific requirements are part of the larger problem of eligibility. An example is the current requirement of a three-day hospital stay to receive reimbursement for skilled nursing facility care. One general solution to the issue of eligibility for reimbursement is a relaxation or waiver of Federal standards. The Oregon Advantage Plan (Medicare managed care) may serve as a model for this type of waiver; these plans currently have the ability to waive the three-day hospital stay requirement.

Beyond these specific challenges, and even with optimism and interest from the industry, unfortunately there is a fundamental lack of nursing facility capacity. In the Portland metro area, there are approximately 500 to 600 total licensed nursing facility beds. These include both skilled facility and intermediate care facility beds. Taking into account the potential surge capacity of 30% to 50% over baseline noted above, this still results in a total capacity of 650 to 900 nursing facility beds. Even assuming that all of the surge capacity can be applied to influence the patients, it still only results in a surge of a few hundred patient beds. This contrasts with the roughly 3,800 hospital beds that would serve as the referral base for "step down" discharges to nursing facility care.

Developing Other Types of Care Approaches – Access to Influenza Care: The 2009 H1N1 pandemic provided a learning opportunity that confirmed our belief that the real-time identification of essential services based on current needs would be most useful and effective way to ensure that health care is provided in a balanced and prudent way to those with influenza and other health conditions. To address the demand for care associated with the autumn 2009 H1N1 pandemic, we explored an approach to *health care delivery sites/methods that could provide essential care for influenza patients* [6] via the Access to Influenza Care (AIC) Project.

The underlying public health purpose of the AIC Project was to prevent inequities in influenza health outcomes based in economic disadvantage. To the extent that economic disadvantage is a barrier to access, there is a danger that poor health outcomes could occur at higher rates among people who do not have access to care. The AIC Project is based on the idea that timely access to appropriate care would prevent medical complications of influenza and thereby protect the health of the economically at risk population. The primary operational goal of the project was to provide access to basic influenza evaluation, care, and treatment for low-income uninsured people without a medical home. A secondary operational goal was to divert inappropriate emergency department (ED) use, thereby helping to preserve ED capacity for patients with more serious medical conditions requiring emergency care. The AIC Project was a direct result of the Portland metro public health departments' directors' concern about our community's ability to provide flu care for uninsured/low-income population during the H1N1 pandemic. The AIC approach was developed during the summer of 2009; it operated between October 2009 and December 2010.

Existing safety net clinics in the region already struggle on a daily basis to meet the needs of low-income, uninsured community members. This group of clinics is largely dependent on volunteer clinicians. The safety net clinics' active involvement in HPO-sponsored planning has resulted in plans that attempt to maintain a reasonable degree of safety net clinic capacity in the face of emergencies. The capacity of these clinics is considered in community-wide ambulatory surge capacity plans. However, the safety net clinics themselves do not have significant surge capacity. Through our work on this Pandemic Influenza Collaborative Planning for Delivery of Essential Health Care Services grant, and our vision of the "system of care," we identified the need to develop a temporary care system to meet the needs of our vulnerable community members.

[6] Evaluation measure operationalized from: "Types of health care delivery sites that could provide essential care for influenza patients."

To ensure any supplemental care system we developed was aligned with how the community currently serves this population we engaged a number of partners in the system development. We developed a two-tier call system that offered general flu information, as well as the possibility of nurse consultation, antiviral medication, and clinic visits to low-income, uninsured residents of Clackamas, Columbia, Multnomah, and Washington counties. Flu information was provided by the State Flu Hotline (accessed via 2-1-1). Any community member could call, and those who presented need for a medical evaluation or treatment underwent assessment for current ability to access care. If they did not have access to care, they were assessed for eligibility for nurse triage services based on income and insurance status. If they qualified for AIC nursing service (i.e., no reliable medical home, income below 200% Federal Poverty Level, and uninsured or underinsured for outpatient services) they were transferred to the AIC nurse triage call center.

Call center nurses utilized a triage questionnaire developed by the AIC Project to assess each patient's medical condition and determine the level of care needed. All callers received advice for self and family care for influenza. Also, based on age, severity of illness, and presence of medical risk factors, callers could receive a donated clinic visit, a prescription and referral for free antiviral medication, or a referral to an emergency department. All nursing call center activities were carried out under standing orders issued by the Health Officer for Clackamas, Multnomah and Washington counties. Liability coverage for these activities was shared between the participating counties (to cover errors in medical protocols, standing orders, and computer-aided triage), and the managed care organization that operated the call center and supervised the nurses (to cover errors in performance on the part of their nurses).

The AIC Project was made possible as a result of the wide range of agencies that agreed to be partners. There was participation from safety net clinics, hospitals/health systems, a social service agency, a managed care organization, health department staff, emergency management staff, volunteers and contractors. These groups have differing missions in their day-to-day work. They also have differing capacities and organizational cultures. Despite these differences, they came together with a common mission: to develop a system to serve the underserved in the face of the 2009 pandemic.

Services of 2-1-1 were procured through amendment of an existing contract with Multnomah County. The metro area counties provided funding to 2-1-1 to allow them to obtain additional computer equipment and staff to operate the call center. Later in the process, the Oregon Public Health Division provided additional funding to allow 2-1-1 to provide flu information services statewide. In the process of developing the nurse triage call center, we approached local health care provider organizations with existing call center infrastructure. In the face of anticipated increases in call volume due to H1N1, and because of underlying infrastructure limitations, these organizations were unable to commit to providing nurse triage services.

Following the spring H1N1 wave, CareOregon, a local Medicaid managed care organization, sought input and direction from one of the local health departments regarding H1N1 preparedness.

During that conversation, CareOregon offered to partner with public health in addressing H1N1 among low-income populations. We requested that they provide nurse triage services, and they agreed to do so at no charge, utilizing some of their existing call center capacity. As we worked together to develop the system, we agreed to integrate Medical Reserve Corps (MRC) volunteers from metro area MRC units to help staff the call-center triage operation.

We also took a partnership approach to developing clinical triage protocols, authorities, and documentation. We worked with a software developer associated with the Coalition of Community Health Clinics (the association of local safety net clinics). The developer created a web-based data system to electronically guide nursing staff through the triage protocols, and serve as the medical record for all nurse triage patients.

We collaborated with public health and emergency management agencies in multiple counties to develop logistics systems to distribute antiviral medications to identified distribution sites. We also partnered with local public health departments to assure outreach to populations for whom the call center system was designed. The intent of this outreach was to promote use of the system by low-income uninsured populations.

In addition, through discussions with partners (primarily large hospitals/health systems) we secured commitments for a large number of donated clinic visits. The agreement was that these visits were intended to be one-time episodes of care aimed at evaluation and treatment of influenza symptoms. This process included rich discussions on the legal and ethical obligations to care for individuals discovered to have other conditions needing treatment. We succeed in coming to agreement with each of the organizations donating visits; concerns about legal and ethical obligations ultimately did not impair participation. We asked for and received commitments for donation of approximately 2,000 clinic visits per month from large providers. These commitments resulted in 7,400 committed visits across 16 different clinical access sites.

The AIC Project also addressed distribution of no-cost antiviral medications. Under the criteria approved by the Oregon Public Health Division, low-income, uninsured patients were eligible for strategic national stockpile (SNS) antiviral medications. Safety net clinics volunteered to distribute antiviral medications at no cost to the client. We secured at least one antiviral distribution site per county, pending implementation of a statewide system to distribute SNS antivirals at no or low patient cost via commercial pharmacy chains.

We considered the AIC Project to be a success in two important ways. First, it functioned and provided services as designed even though a relatively small number of services were utilized (63 nurse triage calls, 27 clinic referrals, and 11 antiviral prescriptions). Second, and perhaps more importantly, it demonstrated the ability of our community to join together and design and implement approaches to surge capacity in real-time (near the peak of infection).

Estimate Supplies and Resources Needed

Each hospital is required by the Joint Commission to have an emergency plan which includes surge capacity plans for pandemics and mass casualty events. Through local regional planning efforts, all hospitals in Region 1 have developed strategies for increasing bed capacity, continuing staffing levels that support the surge in patients, and ensuring that adequate supplies are available either through maintaining existing supply chains or identifying alternate standards for the utilization of medical supply resources. Most of these plans are based on supporting a hospital to increase patient care capacity (either independently or with intra-system partners) by about 15%-25% of normal capacity. Unfortunately, based on projections presented in Section 1, hospitals in our region need to be prepared to surge to 300% of usual capacity at the peak of a local Severity Index Category 5 pandemic influenza event. We would expect demand for supplies to be in a similar range (although it could be somewhat lower as a result of alternate standards for patient care and resource use).

We conducted a literature review and hospital resource survey to begin to identify *staffing and personnel types, and the supplies and resources required to deliver the essential services and care for patients with influenza during a Severity Index Category 5 pandemic influenza event.*

The academic literature on the assessment of health care system capacity and the impacts from pandemic activity is somewhat limited. Our literature review was able to identify articles on the need for hospital triage to help protect resources and how hospitals can better predict and plan for surge. Most telling were the articles discussing how the Severe Acute Respiratory Syndrome (SARS) outbreak in Toronto, Canada, impacted the use of palliative radiation therapy and childbirth education. Additionally, we identified articles discussing the impact of pandemics on the blood supply and how to ration scarce blood products to support essential health care services in a community. As well, we studied literature discussing that in a public health emergency such as a pandemic, shortages will quickly occur for mechanical ventilators, critical care beds and other life-saving treatments. A review of emergency preparedness for mass critical illness within the United States suggests that communities already face a short supply of resources such as critical care staff, medical supplies and treatment spaces that will likely limit the number of critically ill victims who can receive life-sustaining interventions.

Locally, a 2009 resource survey, designed with technical assistance provided by emergency preparedness personnel at two local hospitals, was administered to hospitals belonging to the HPO to identify variations in hospitals' abilities to implement a 100% surge in hospital inpatient capacity (doubling of current capacity). It was evident in the responses that the more rural hospitals in the region were not able to surge even 10% beyond the usual capacity, while urban/suburban hospitals were able to surge upwards of 15%-20% of capacity under their existing plans.

With the requirement to surge comes the need for certain staff, space and supplies to support these efforts. The survey identified that hospitals had plans to obtain additional staff capacity from contracted agencies, re-engineering of shifts and job assignments, and on-call lists.

Most hospitals stated that they are able to convert unused space into negative pressure or HEPA-filtered isolation areas/rooms, which would positively benefit patient care during a Severity Index Category 5 pandemic response. Similarly, all hospitals responding to the survey indicated that pre-determined alternative care sites to provide patient care outside of the hospital had been established and approved by the Joint Commission.

Although all hospitals that responded had varying numbers of ventilators, only a select few had ventilators available for the pediatric and neonatal populations. Similarly, the amount of medications on hand in the private sector, including antivirals such as Tamiflu, is also quite limited within the region.

It was our intention to utilize the survey findings to produce an exercise inject for the Health/Medical MAC Group that would charge the group to allocate scarce resources working with a 25% shortage of inventory at the hospitals and a 10% employee absenteeism rate. Due to the conversion of exercises to real-time meetings addressing H1N1 issues, this was not implemented; however, the Health/Medical MAC Group did work to establish regional standards for the utilization of masks, respirators, and N95 masks in a specific H1N1 situational context. This could be viewed as a precursor to the allocation of a scare resource. The Health/Medical MAC Group decided that, to be eligible for allocations of scarce respiratory protection supplies, a hospital needed to be in compliance with the revised usage policy. Hospitals not in compliance would risk not receiving any future allocations from matériel caches allocated by the Health/Medical MAC Group. Detailed information on exercise development, process, and conversion to real-time meetings will be discussed in Section 4 and examples of exercise materials are included as Attachment 4.

Based on CDC projections during a Severity Index Category 5 Pandemic as many as 40% of health care personnel will be affected in ways that will make them unable to work. Given the high attack rate and severity of illness, there is no question that demands for health care will far exceed capacity. The real preparedness challenge is not to identify in the abstract the *needs for staffing, supplies and resources to address related and unrelated essential health care services during varying levels of patient volume during a Severity Index Category 5 pandemic influenza event.*[7] Instead, the challenge is to 1) develop a pre-event "menu" of potential personnel and matériel resources, and 2) determine how limited resources should be deployed to maximize health outcomes.

[7] Evaluation measure operationalized from: "Resources needed to operate various types of health care delivery sites at varying levels of patient volume and need."

Section 3: Ethics Framework and Community Acceptance

In the event of a Severity Index Category 5 pandemic influenza, public health and health care systems officials agree that the demand for health care services will exceed the availability of resources. This will force policy makers to make difficult decisions that may impact the freedom, health, and prospects for survival of individuals. Public health and health care systems officials also believe that the community will be more likely to accept the need for and consequences of difficult decisions if they are made in an open, transparent, and inclusive way. An ethics framework has been developed as part of this project to facilitate a fair and transparent decision-making process used by the Health/Medical MAC Group.

Community input was used both to develop and evaluate the ethics framework. First, community discussions were conducted to collect information on local values about health and health care. Information from these discussions, the ethics literature, and the ethics framework created by the State Public Health Division's Medical Advisory Group (MAG) informed the development of the ethics framework.[8] Second, Health/Medical MAC Group members and observers were engaged in project evaluation activities, including 1) focused group discussions, 2) key stakeholder interviews, 3) exercise/meetings self-evaluation and 4) surveys to collect feedback on the acceptability of the framework and its use in the decision-making process.

This section will discuss 1) the development of the ethics framework, 2) the application of the ethics framework during the Health/Medical MAC Group exercise and subsequent meetings, and 3) findings from the evaluation activities measuring the community's acceptance of the framework.

Development of Ethics Framework

The ethics framework was designed based on widely held community values and priorities related to provision of medical services. An ethicist and the Manager of Assessment and Evaluation services for the Multnomah County Health Department gathered this information through five community discussions designed to explore reactions to curtailing hospital services during a severe influenza pandemic. These groups were held in Portland, Seaside, and Wilsonville, Oregon; and Vancouver, Washington. The discussion groups were guided by four premises:

- Policy makers want decisions made during an influenza pandemic to be based on a consideration of community values as well as on science.

- To include community values in the decision-making process, decision makers must understand the beliefs and values held by community members with regard to provision of medical services during an influenza pandemic.

[8] The ethicist contracted for this project strongly encouraged the use of local community input to inform the development of the framework described in this section. In the end, both the ethics framework developed and tested for this project and the framework created for the State by the MAG included similar ethical dimensions. It is reasonable to believe that decisions made using the framework created for this project would be compatible with those made using the State's framework.

- Engagement of community members in discussions about possible curtailment or modification of in-hospital medical services during a severe influenza pandemic will reveal community beliefs and values.

- Insufficient time and other barriers will not allow appropriately engaging the community to provide input during a severe pandemic.

Participants in the discussions were presented four scenarios to stimulate discussion. Each scenario described the experience of a patient whose in-hospital treatment would be delayed or redirected to another hospital or other facility during a severe influenza pandemic. After hearing each scenario, discussion participants were asked to describe their reactions from three different perspectives: 1) the perspective of the patient who may have his or her treatment delayed, 2) that of the public health officials responsible for making decisions to curtail or alter services, and 3) that of community members who are at risk of serious complications if they contract the influenza and would significantly benefit from hospital care.

From these discussions, a number of values emerged including the following:

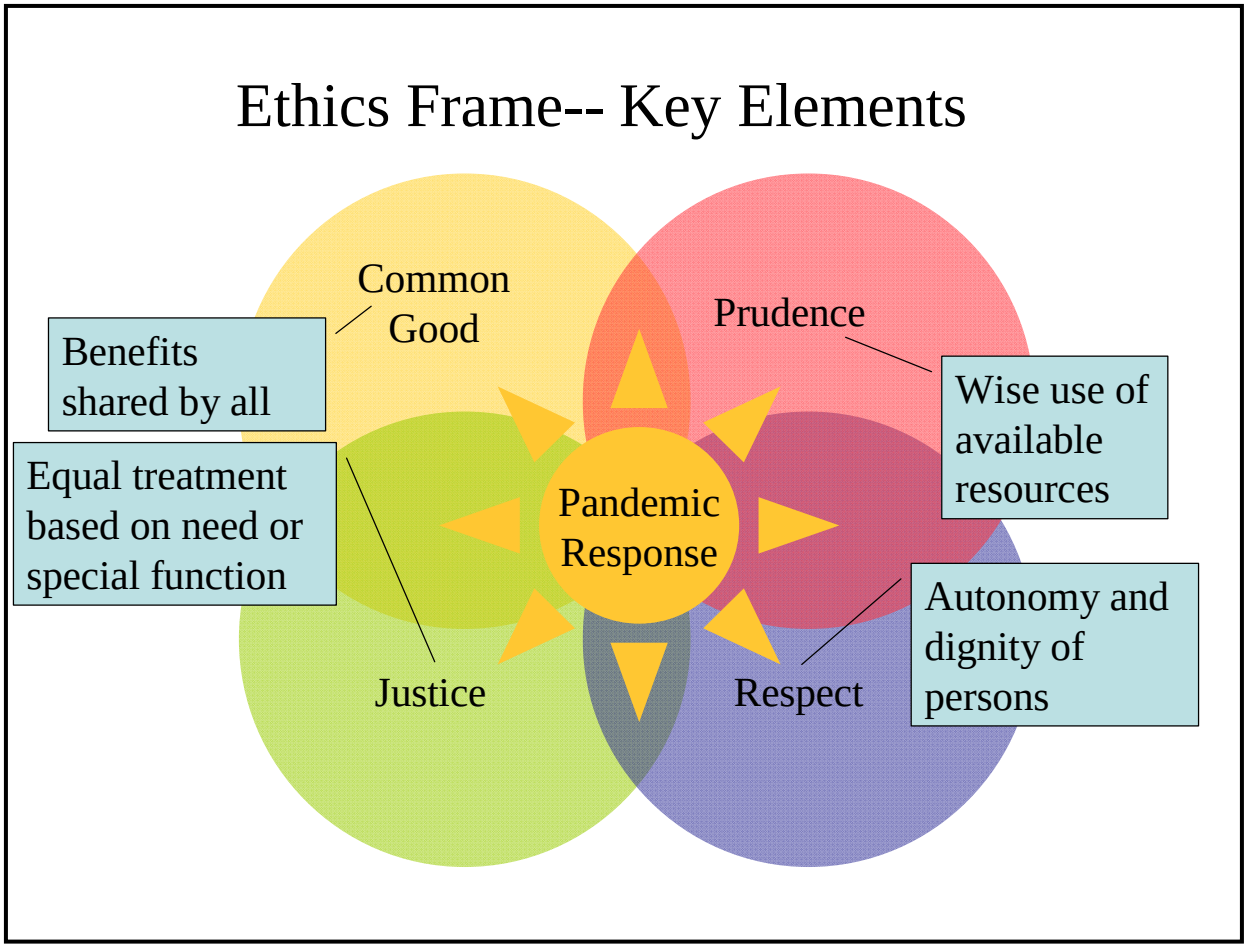
- The good of everyone
- Community
- Transparency
- Honesty
- Protection of vulnerable populations—including the homeless, those with disabilities, non-English speakers and the mentally ill.
- Inclusiveness
- Self-reliance
- Protection of mothers and children
- Public safety (violence prevention)
- Fairness
- Equity

In addition to the information learned from these groups and the ethics literature, the expertise of the project's ethicist informed the ***development of the ethics framework.***[9] Although the ethics framework presented here is somewhat different from the framework developed for Oregon by the MAG, it is believed that these frameworks would lead to similar decisions. It was believed under guidance from the ethicist, that a locally-developed framework would make its acceptance more likely than if the region adopted one developed for the entire state.

The complete community discussion report that discusses the process used to learn from the community about health values and an annotated bibliography from the literature are included as Attachment 5 and Attachment 6 respectively. The resulting ethics framework is comprised of four dimensions: prudence, common good, justice and respect. It is accompanied by a set of questions for the Health/Medical MAC Group to consider when allocating resources, prioritizing services, and developing and implementing policies. The ethics framework developed for this project is illustrated in Figure 6.

[9] Evaluation measure operationalized from: "Frameworks and other practical tools for examining and resolving ethical issues are developed and incorporated into scenario-based exercises in order to evaluate the effectiveness of these tools to support decision making around providing or curtailing specific essential health services during a pandemic." This measure has been divided into two sections, with the remaining part discussed later in this section.

Figure 6: Ethics Framework Developed for Health/Medical MAC Group



Application of the Ethics Framework

After developing the ethics framework, project staff *developed a series of scenario-based exercises designed to evaluate the degree to which the ethics framework was incorporated into the decision-making process about developing regional policies, allocating scarce resources, and/or curtailing selected elective health services during a pandemic influenza event*.[10] Only one of three pre-planned, scenario-based exercises was conducted. The remaining exercises were replaced with real-time Health/Medical MAC Group meetings to address issues arising in the setting of the H1N1 pandemic (and were also relevant in response to a pandemic of greater severity). This change allowed real-time application of the ethics framework, making the evaluation of its usefulness more informative for future events.

[10] Evaluation measure operationalized from: "Frameworks and other practical tools for examining and resolving ethical issues are developed and incorporated into scenario-based exercises in order to evaluate the effectiveness of these tools to support decision making around providing or curtailing specific essential health services during a pandemic."

A critical component of the Health/Medical MAC Group's mission was to provide ethically-sound regional strategies related to the allocation of critical resources and development of interagency policies. To support this goal, the ethics framework was incorporated into the *Health/Medical Multi Agency Coordination (MAC) Group Handbook.* As part of applying the ethics framework, a set of recommended questions were intended to provide a clearer idea of what was meant by each of the four dimensions. These questions are included in the *Handbook* and are presented in the following two tables.

Table 4: Ethics Framework: Policy Development and Implementation

Decision makers can use the following questions to apply the above ethical principles to policy development and implementation. Consensus based answers to these questions will form the ethical dimension of ongoing decisions and communication with the community about the public health response to the pandemic.

1. **Common good:** In what way will all members of the community share equally in the societal well being hoped for in this strategy? What social functions does this strategy seek to protect?

2. **Justice:** In what way are the several norms of justice being met?
   - Equality: What categories did we consider in applying the equality norm? In what ways is the plan based on equality among persons with similar characteristics of age, health potential, gender, social status?
   - Inequality: What rationales did we use to justify unequal treatment among selected members of the community?
   - Special Needs: What compensatory aid did we set up for persons with special needs? What categories of special need have we considered, included, and excluded (with statements of rationale for inclusion and exclusion decisions)?
   - Merit: What groups were given priority based on their essential social role?
   - Exclusions: What is the rationale for excluding specific persons from the outreach effort?
   - Conflict of Interest: What potential conflicts of interest have been considered and how are they being dealt with?

3. **Prudence:** What categories of expertise did this strategy incorporate into planning? What expertise are we consulting during implementation?

4. **Respect:** Are we producing appropriately brief, clear, and simple statements of how the pandemic strategy protects the general well being of society? How does this strategy respect the rights of individuals to knowledge, autonomy, and dignity?

Table 5: Ethics Framework: Clinical Resources and Prioritizing Services

These principles provide a foundation for specific decisions about allocation of clinical resources and facilities during the phases of the pandemic event.

1. **Common Good:** Design the response to protect the health-related wellbeing of the whole population and the continuing functioning of society. Minimize the total morbidity and mortality.
   - Design the response to protect essential societal functions.
   - Minimize the negative effects of the pandemic on the general functioning of society.

2. **Justice:** Design the response to provide a fair distribution of health-related benefits and burdens that result from the health care and public health response to the pandemic.
   - Seek an equitable distribution of opportunity for health benefits relative to the capacity for benefit:
   - Life saving
   - Morbidity minimization
   - Seek an equitable distribution of burdens relative to the capacity to bear burden:
   - Risk of death
   - Risk of injury
   - Inconvenience
   - Seek equity across socioeconomic spectrum adjusting for effects of poverty, language and ethnicity on health and access to services.
   - Conflict of interest:
   - Decision makers declare any potential conflicts and remove themselves from decision control when appropriate.
   - Institutional leaders share responsibility for decisions.

- **Prudence:** Use relevant expert inputs while designing and implementing the health care response.
  - Epidemiologic and medical science
  - Effectiveness of interventions to achieve goals
  - Efficiency in the use of resources
  - Agility in responding to evolving epidemic

- **Respect:** Maintain communication and procedures to respect autonomy and dignity.
  - Transparency: Explain the rationale for the response and state reasons for unequal distribution of benefits and burdens likely to occur.
  - Autonomy: Offer the opportunity for members of the community to be in accord with the actions of the public health authority.
  - Respectful Coercion: Act with respect when it is necessary to override the wishes of some members of the community for personal health services.

The questions differed depending on whether the group was making interagency policies or allocating scarce resources. After receiving training on traditional MAC Group operations, including an orientation to the *Handbook* which included the ethics framework, it was expected that Health/Medical MAC Group members would study and understand the ethics framework. The Health/Medical MAG Group coordinators reviewed the framework's four dimensions at the beginning of each Health/Medical MAC Group's exercise and meetings. Additionally a poster of the ethics framework was displayed as a visual reminder due to time limits during the exercise and subsequent meetings, the detailed questions listed above in Table 4 and Table 5 were not explicitly asked.

Evaluation of the Ethics Framework—Community Acceptability

The decision making of the Health/Medical MAC Group and the application of the ethics framework were evaluated by convening *key stakeholders to identify ethical ramifications and potential population impacts associated with decision making about developing regional policies, allocating scarce resources, and/or curtailing selected elective health services during a Pandemic influenza event.*[11]

This section describes the evaluation of the ethics framework. Section 4 will discuss the Health/Medical MAC Group's development and evaluation. Very similar methodologies were used to collect data for evaluating the overall Health/Medical MAC Group's processes and for evaluating the ethics framework. The participants in both evaluations were the same. The primary methodology for both evaluations is presented in this section; the additional components used specifically for evaluating the overall Health/Medical MAC Group's process discussed in Section 4.

Methodology and Stakeholders

Key stakeholders included the Health/Medical MAC Group members and observers representing emergency management, public health, hospital systems, community-based organizations, culturally-defined communities, and project consultants (ethics, decision-making science, health economics, clinical, etc.). All were involved in evaluating the Health/Medical MAC Group exercise and two of the real-time meetings, and all were invited to participate in focused group discussions and stakeholder interviews after the exercise and meeting series.[12]

At the end of each exercise and subsequent meetings, Health/Medical MAC Group members reflected on their process. Unless the discussion pertained specifically to the ethics framework, it is discussed in Section 4. During the exercise and subsequent meetings observers completed surveys and, depending on the time available, either responded verbally or in writing to feedback questions. Only the information collected via these methods that pertains to the ethics framework is discussed in this section; the remaining feedback is discussed in Section 4.

[11] Evaluation measure operationalized from "Key stakeholders are convened to identify ethical ramifications and population impacts associated with curtailing selected essential services during a pandemic."

[12] The series ended up including one functional exercise and three real-time meetings; observers were involved in the functional exercise and two of the three real-time meetings. Due to pressing issues presented by H1N1, an additional MAC Group meeting was held on October 22, 2009. This meeting was scheduled one week in advanced and consequently, there was not time to secure a facility large enough to accommodate observers. This ended up being the second real-time meeting.

There were differing opinions among project staff and consultants about whether to employ observers at the MAC Group's first meeting. It was expected that much of the MAC Group's efforts would focus on learning to work together and becoming familiar with the *Health/Medical Multi-Agency Coordination (MAC) Group Handbook.* Some staff and consultants felt that having observers present would be a barrier to open interchange and learning. Despite the risks, staff decided to invite ten observers to participate and pilot the observation survey.

During the exercise, observers were not asked to give specific examples of how they saw the ethics framework applied. Questions were added to the observation survey requesting that observers provide specific examples of what they heard or saw that demonstrated application of each of the four dimensions comprising the ethics framework.

As intended, learning from the observers' involvement in the exercise informed the observer training developed for the subsequent meetings. The training focused on traditional MAC Group operations, the observation tool, and the ethics framework. Thirty-four observers attended the training. Of these participants, 30 participated as observers during the Health/Medical MAC Group exercise and subsequent meetings. For those observers who did not attend the training, materials covered during the training were provided as they arrived at the exercise and subsequent meetings. Evaluation staff members were available to answer questions.

Nineteen Health/Medical MAC Group members and 74 observers participated in the exercise and meetings. Seventy percent of the observers attended only the exercise or a Health/Medical MAC Group meeting. Of the 22 observers attending more than one of the exercise/meetings, 90% attended two of the three real-time meetings. Seventy-eight surveys were completed during the exercise/meetings series. Not all observers chose to complete surveys. During the exercise and first real-time meeting, observers were asked to complete one survey for the entire discussion/decision-making process. During the last real-time meeting, observers were asked to complete two surveys, one for each decision made. Table 6 illustrates the categories or groups the observers represented.

Table 6: Observer Representation

Group Represented	**Percent of Observers**
Community Leaders/Liaison	16%
Local Public Health	15%
Contractors	12%
Hospitals	9%
Behavioral Health	9%
Emergency Management	8%
Clinical Community	8%
Skilled Nursing	7%
Community-Based Organizations	5%
State Public Health	4%
Ethics Field	4%
Public Information	3%
	100%

Once the exercise and meetings series was completed, nine Health/Medical MAC Group members and 17 observers (14 of whom attended more than one Health/Medical MAC Group exercise/meeting) participated in either focused group discussions or stakeholder interviews. Evaluation activities were conducted with the Health/Medical MAC Group members and observers separately to encourage candid conversation. Evaluation tools are included as Attachment 7.

Brief Description of Health/Medical MAC Group Exercise and Meeting Schedule

Before discussing stakeholder feedback on how the framework was applied, a brief description of the discussions held during the Health/Medical MAC Group exercise and subsequent meetings is provided. More detail about these discussions and the resulting decisions will be described in Section 4 of this report. Between September 2, 2009, and October 29, 2009, the Health/Medical MAC Group was anticipated to meet for one training session and three functional exercises (four meetings in total). Due to the 2009 H1N1 event, the group met for the planned training, one (of the three) functional exercise(s), and three real-time meetings (five meetings in total). Observers were involved in the functional exercise and two (of the three) real-time meetings. The three times during which observers were present[13] and evaluation data collected are discussed below:

Exercise One (September 16, 2009): There were two discussions. The first focused on orienting the group to 1) the base scenario, hospital data, and maps; 2) ethics framework; and 3) establishing a formal meeting process. For the second part, the group was asked to 1) develop criteria for using mutual aid agreements to respond to supply shortages experienced by all hospitals in the region, 2) develop criteria for identifying the hospitals with the potential to provide higher volumes of services and more comprehensive services and, based on these criteria, list the hospitals in order of their treatment capabilities, and 3) allocate critical resources and document the rationale for the allocations. H1N1 did not come into play during this exercise.

First Real-time Meeting (October 7, 2009): This was a discussion was about hospital visitation policies in the H1N1 pandemic setting – specifically regarding who could visit patients in the hospital and who should be excluded. This decision was driven by the practical need related to the prevalence of H1N1 in the community. The conversation focused on visitors' age and their risk of exposing medically at-risk patients in the hospital to H1N1. Guidance was developed outlining visitation restrictions based on age of the potential visitor and symptoms that might represent influenza. Before the meeting, hospitals' policies regarding age criteria for restriction were inconsistent. Some allowed asymptomatic visitors between the ages of 13-18, but not 12 and younger; others did not allow anyone younger than 18 to visit. The group recognized these inconsistencies would be confusing to the public and could possibly undermine the scientific credibility and public acceptance of the health care system's visitation policies.

Second Real-time meeting (October 22, 2009): No observers present. This meeting will be described in Section 4.

[13] The series ended up including one functional exercise and three real-time meetings; observers were involved in the functional exercise and two of the three real-time meetings. They were not involved in the second real-time meeting on October 22, 2009. This was the second real-time meeting. This meeting will be discussed in Section 4.

Third Real-time Meeting (October 29, 2009): There were two discussions. The first was about use of respirators and other masks in hospital inpatient and outpatient settings. This included discussion of the ongoing and possible shortages of masks and respirators facing various hospital systems. The group explored strategies to protect mask supplies including reusing masks when not compromised (while always ensuring that universal precautions were fully practiced). The second discussion addressed the potential need for a policy about curtailing or deferring elective procedures. Topics, while pertinent in the setting of a severe pandemic, also had practical benefits in refining pandemic H1N1 response.

Key Findings

The following list describes the common themes from stakeholder feedback. After this summary, an analysis of the feedback is presented. NOTE: Statements of participants and observers are italicized and enclosed in quotation marks.

- The Health/Medical MAC Group members and community observers overwhelmingly supported the use of the ethics framework in decision making.

- Most of the Health/Medical MAC Group members and observers believed that the ethics framework was used in decision making and most were able to articulate examples of how the framework was applied during the Health/Medical MAC Group's discussion.

- When comparing the examples given, there were inconsistencies about definitions of each of the four dimensions of the framework: prudence, common good, justice and respect (e.g., some used examples for common good that others considered examples of justice).

- Many Health/Medical MAC Group members and observers indicated that they would have benefited from more training on the framework so they could have a clearer idea of definitions for each of the framework's dimensions.

- "Prudence" was the most frequently described dimension of the framework that was identified by observers and Health/Medical MAC Group members (although prudence was not necessarily mentioned by name). "Common Good" was mentioned by name most frequently in comments by observers and Health/Medical MAC Group members, but its application was not as easily defined as prudence.

- Most Health/Medical MAC Group members and observers expressed the need to develop a simple, concrete tool to use when applying the framework. This process would make the decision-making process more transparent and therefore more likely to be accepted by the public. It was emphasized that this transparency would become increasingly important as the decisions became more complex and had higher stakes.

Findings from Health/Medical MAC Group Members

Almost all of feedback from the Health/Medical MAC Group members indicated that they felt that the ethics framework was used during their decision making, and that it encouraged the group to *"think of the community as a whole."* Several members indicated that even though they thought it was applied to decision making, there was no documentation of its use and suggested that a decision tool/process be created to *"run decisions through."* Members cited two potential benefits from such a tool: 1) it would help the group make decisions and 2) it would allow the group to add to its decision-making documentation, an understanding of how the framework was applied. There was agreement among several members that both of these issues would become increasingly important as the decisions become more difficult.

"I think it was great that we were all reflecting on the ethics framework, but I think one thing we might want to do is take a step back and ask 'Are we really producing a defensible and appropriate decision here?'"

"I think some of the hard things [involve making] sure that the standard of care is equitable, that everyone is treated the same. We're going to have to have a set framework because it is lives we are talking about."

During the focused group discussion and stakeholder interviews, there was overwhelming agreement amongst Health/Medical MAC Group members that prudence was considered in all cases, as conversations included the need for information and scientific facts. Members also agreed that it was frustrating that there was not sufficient information available (nor would be) when decisions needed to be made. In Section 4 this topic is discussed in more detail.

Many indicated that they felt that the other three dimensions-common good, justice, and respect-were implied or stated in the group's discussions, but they recognized that they did not have documentation of their consideration. Additionally, many members agreed that they did not have to make *"life or death"* decisions, such as the cancellation of surgeries, so clear documentation of the decisions they did make was not as critical as it would become when decisions would have serious implications for individuals.

Two different types of suggestions to facilitate clear documentation of the ethics framework's application were offered. The first type involved having an additional MAC Group member sit at the table. This person could be a voting member from a stakeholder group such as a representative of safety net clinics or a non-voting "expert observer" such as an ethicist. This additional member's role would be to ask the group to articulate which ethical dimensions were considered and specifically to ask "Who would this decision hurt?"

The second type of suggestion was to develop a decision-making matrix through which each possible decision could be evaluated to assess its ethical implications. The matrix, it was suggested, could assess 1) who would be negatively affected, 2) who would benefit most, and 3) which ethical dimensions/questions are most important to the decision at hand.

Feedback from participants clearly indicated that whatever tool/process was developed for applying the framework, it must be concrete and facilitate faster decision making rather than be a separate, academic step.

During the first (and only) exercise when the members of the Health/Medical MAC Group were asked to evaluate themselves, they explicitly mentioned their application of the ethics framework. During this self evaluation, members acknowledged that the entire process was new, including the use of an ethics framework. Some members suggested that more training be done on the framework and that as members they needed to review it and accompanying questions highlighted in Tables 4 and 5. (These are included in the operations guidebook.)

One concern brought up during all evaluation activities with both Health/Medical MAC Group members and observers was that it took considerable (if not too much) time for the Health/Medical MAC Group to make decisions. Much of this feedback was prefaced with the understanding that this was a new process so this was not necessarily a negative thing. Given the need for timely decisions, it is highly unlikely that the questions listed in Tables 4 and 5 would be realistic to ask during decision making since doing so would add significant time to the decision making. However, many Health/Medical MAC Group participants indicated that more training on the ethics framework would be beneficial.

It is this feedback, combined with the feedback provided by observers indicating that they would like more training on the ethics framework that suggests that the recommended ethics questions illustrated in Tables 4 and 5 be retained and used primarily for training to encourage agreement on definitions for each of the dimensions. As one observer stated,

"Although it seemed that it was used, the more we talk about it and hear others talk about it; its application is less clear."

Findings from Community Observers

Observers were involved in the exercise and two of the three real-time meetings. The exercise was conducted using pre-planned materials for a Severity Index Category 5 pandemic; the following three real-time meetings occurred in response to institutions' requests to address issues relevant to both the ongoing H1N1 situation and planning for a severe pandemic.

Ten observers were present in the one meeting conducted as an exercise. They were primarily emergency managers and a couple of consultants to the project. In the two real-time meetings, observers came from emergency management, public health, hospital systems, community-based organizations, culturally-defined communities, and the team of project consultants (ethics, decision-making science, health economics, clinical, etc.).

Unlike the real-time meetings, during the exercise, observers had substantial time to discuss their opinions on how the Health/Medical MAC Group performed. This first group of observers was somewhat critical about the length of time it took to make decisions. This issue of efficiency (which improved significantly throughout the process) will be discussed in Section 4 of this report.

Observers of the exercise also indicated that they could tell that Health/Medical MAC Group members were using the ethics framework and indicated that it was clear that the MAC Group wanted to be "fair." However, by doing so, the MAC Group sometimes slowed down the process. Overall, observers thought that having a framework was a good idea and that it would encourage collaboration.

In general, observer feedback from the real-time meetings and evaluation activities conducted after the exercise/meetings series was completed was very similar to the feedback from the Health/Medical MAC Group members. Themes coming from the focused group discussion and key stakeholder interviews with observers are discussed below.

Several observers indicated that the use of an ethics framework was very important, but that it would be counterproductive if the group was unable to make decisions because they could not make everyone happy.

A few observers suggested that it would be constructive for the group to stop themselves during discussions that were going on too long, and ask themselves questions such as the following:

"Wait, are we considering the ethics framework? What parts would help us move forward in this conversation?"

Most participants emphasized that it was paramount in communicating with the public that decisions were made using a process designed to benefit the entire community. . Recommendations on how this communication should be done will be discussed in Section 4.

Stakeholder feedback also discussed the importance of communicating to the public that decisions were made by consensus of public health and health care systems, not just health care systems, *"forcing the decisions to be reasonable and as fair as possible."*

Several stakeholders commented during interviews that it would be ideal to ask during each decision, *"Who is this going to affect poorly?"* Once identified, the Health/Medical MAC Group would need to come to consensus as to whether they could defend their choice.

Observers of the exercise expressed overwhelming agreement that "prudence" was applied in all conversations. Similar to Health/Medical MAC Group members, many observers expressed concern that insufficient data were available at times. Observers provided the following feedback on whether the other three dimensions of the ethics framework were applied during each of the decisions made.

"Decisions were made on scientific data." and "*We would need other people in this conversation who know the technical aspects involved."*

More information on each of these decisions will be discussed in Section 4.

Overall, most observers were able to provide examples of how the framework was applied. At times, observers' responses illustrated that they did not agree with one another on definitions of the ethics dimensions. These inconsistencies in definitions are noticeable in comments included in this report. These inconsistencies also support the feedback from evaluation participants that more training on the ethics framework would be beneficial.

As the Health/Medical MAC Group met more, observers were more likely to report that they saw the ethics framework applied. It is impossible to conclude whether this change is an improvement of the Health/Medical MAC Group's process or the observers' efficacy in recognizing the ethical dimensions implied in the discussions they observed. However, since only 30% of the observers were the same for the second and third meetings and this improvement was most noticeable between these meetings, the stronger (but not conclusive) explanation is that this positive feedback is a result of the Health/Medical MAC Group's growth rather than observers' improved efficacy.

Common Good: Benefits shared by all

Survey responses and some comments during the focused group discussion and key stakeholder interviews indicated fairly strong agreement that common good was a factor in decision making. (As mentioned earlier, there were some potential differences in how "common good" is defined.) Observers who strongly agreed that common good was considered during the discussion about the visitation policy gave the following reasons for their opinions:

"Interested in protecting society from preventable spread of H1N1…"

"Points were made by MAC Team members to consider common good and justice for all."

"There was the concern to protect the most medically vulnerable."[14]

"Overall discussion was focused on the health and wellbeing of whole hospital and population and access to family and friends to support patients."

There was the strongest agreement between observers that the common good was considered during the discussion about developing a policy for deferring elective surgeries. Here are some of the observers' comments describing what they heard/observed to make them feel that common good was considered:

"How to increase hospital capacity for essential services across the community…"

"Determine how to create capacity while managing the needs of communities."

"Strong conversation to allocate resources among many levels of need…"

Observers who thought that common good was not considered provided the following feedback:

[14] May be an example of " justice"

"They [MAC Group members] only seemed interested in the health of the people in the hospital."

"Hospitals are where sick people go. Not once did they discuss protecting the community from the illness that is in the hospital. Need broader thinking."

"Discussion focused on policy for staff not 'whole population' and continued functioning of society."

"Issue focused only on hospitals and specific groups of people, not everyone."

"Strong concern to avoid cross contamination through universal practices and adjusting clinical practice…"

Interestingly, there were no negative comments made about the discussion of when to make a policy on deferring elective surgeries. This may be a result of fatigue on the part of the observers or that they agreed that the group did not have time to address this serious topic in any depth due to time constraints of the meeting. During the focused group discussion and key interviews, some observers said that it seemed easier to consider "the common good," but that relying mostly on this dimension would leave out some segments of the population. One stakeholder asked whether it made sense to rank the ethical dimensions. Specifically, the observer suggested that ranking "respect" first was a way to ensure that those people who are usually not at the table or have a voice are put in the forefront of the conversation.

"It could build trust in some ethnic communities if the [Health/Medical MAC] Group considered individual rights first. When emphasizing the common good first, that can be seen as the dominant culture's good."

One participant in the focused group discussion brought up the complexity of the ethics dimensions, explaining that, *"Common good may not mean the greater good."* and *"Everyone shares the burden."*

<u>Justice: Equal treatment based on special need or function</u>

Observers were less likely to agree that they saw justice considered during the visitation policy discussion. (As mentioned earlier, there were some potential differences how justice is defined.) In fact, only one observer strongly felt that Health/Medical MAC Group members took into account justice as an issue in its decision during the discussion.

"[They considered] providing exceptions to meet everyone's needs."

Several observers were concerned that non-English speakers and people from different cultures would not understand or accept the decision to restrict hospital visitors by age and that this consideration was not taken into account by the Health/Medical MAC Group.

"Non-English speakers were not mentioned."

There was agreement that if this type of decision was made, the age restrictions should be consistent across all facilities and based on the best science available to prevent discrimination of people younger than 12 years old (e.g., if the decision was based on only speculative data on transmission risk for age groups).

There was stronger alignment between observers about the application of justice during the mask use discussion. Most observers agreed that justice was considered in this topic, but only in the context of hospitals and health care workers.

"Concern about protecting health care workers was considered."

"Almost everything said discussions of handling inter-agency differences in areas and use policy directly addressed this point."

There was some concern that patients' safety was not explicitly discussed, but some observers indicated that it was implied because not using contaminated masks was taking into account the safety of patients. Additionally, there were a few comments expressing concern that hospitals' needs were being considered over other health care providers such as clinics and emergency medical services.

Similar to observer opinions about common good, there was strong agreement about the application of justice during the discussion on deferring elective surgeries.

"Equity among hospitals was raised as a concerned."[15]

"Discussion was primarily on [identifying] what the foundational issues are: ICU capacity, continuation of general care, or elective surgery?"

Respect: Autonomy and dignity of persons

The consideration of respect was the most difficult for observers to agree on. There was some disagreement on whether respect was explicitly considered when making decisions during the visitation policy discussion. A few observers strongly felt that individuals' rights to autonomy were protected.

"There was an undertone of not wanting to unnecessarily restrict those who have legitimate reasons to visit patients."

Opposing opinions included the following observation: *"They only looked at H1N1 as a disease and not once talked about the impact it could have on patients who are already sick. For example, if someone is dying in hospice. Could they really deny a 12-year old to visit?"*

[15] May be example of "common good"

This last comment is important to note because the final policy did make exception for end of life cases, yet it was not understood or heard by a few observers. This point highlights the importance to anticipate challenges to the decisions made and to craft clear public messaging anticipating as many of these issues as possible.

Most observers indicated that the mask use discussion did not lend itself to considering respect (to the degree other conversations had). It was mostly agreed that common good, justice and prudence considerations were more important as the decisions needed to be about protecting people from virus exposure while preserving masks rather than protecting someone's autonomy and dignity. In addition, the majority of observers indicated that the conversation about deciding whether it was time to make a policy about deferring elective surgeries did not go far enough for the concept of respect to enter in.

"[They] did not discuss effect on individual patients."

Observers' Recommendations for Improvement

When asked on the survey to make recommendations for improvement of the ethics framework, most respondents indicated that the use of an ethics framework was a good idea. Many stated that the public would trust the process more if there were clear documentation of how the framework was applied in each decision. Other comments included:

"[They] need a more explicit way of recognizing the balance between ethical principles and operational challenges. The group seemed to mainly live in the operational realm and didn't recognize when operational concerns might compromise ethical principles."

"They need to look at the broader impact and have more ethical discussions."

"A little more 'big picture' thinking and linking directly to human consequences rather than abstract policy considerations; It still seems to me that at times the discussion was being driven by (unclear) *concern for limiting potential liability by not following a rule."*

"I think the ethical framework is adequate. Would like to see it used more explicitly…"

Section 4: Health/Medical Multi-Agency Coordination (MAC) Group and Community Acceptance

This section will discuss 1) the development of the Health/Medical MAC Group; 2) tools developed to support the Health/Medical MAC Group; 3) the original exercise series as planned, and shifts away from the planned exercises to real-time meetings in response to the 2009 H1N1 Pandemic; and 4) findings from the evaluation activities measuring the community's acceptance of the Health/Medical MAC Group as a decision-making model for use during a large-scale regional emergency with significant health and medical impacts.

The Health/Medical MAC Group model developed for this project is a decision-making group comprised of local hospitals, public health, and a representative of the physician community as decision-makers who collectively have the authority and responsibility to allocate scarce health care resources, develop interagency policies, and prioritize health care delivery response activities across the regional health care system during a health/medical event. Recent H1N1 influenza events provided an opportunity to test the use of and community support for this type of decision-making model.

Development of the Health/Medical MAC Group

Private sector health/medical policy decisions are made by institutional leaders at the hospital or health system levels. Similarly, local public health officials make public health decisions at the jurisdictional level (in Oregon, the county or state). Our community did not have a formal process in place to support multi-jurisdictional/multi-sector health/medical decision making during large-scale, regional emergencies such as a pandemic. The MAC Group model is a standard decision making and multi-agency coordination tool within the Multi-Agency Coordination System, a key component of the National Incident Management System.

Utilization of MAC Groups is a well established strategy for management of wildfires and natural disasters. However, the existence or use of a MAC Group for a health/medical emergency had not been formally tested in our region prior to this project. Historically MAC Groups have not been used for emergencies in the Portland metro area. In large part this has been due to an absence of large and complex events requiring community-level resource prioritization and response policy alignment. There has also been resistance by the local emergency management community to employ a variety of regionally-based response strategies, including MAC Groups. As a result, there is no established regional Emergency Coordination Center to support a MAC Group. Our local health/medical sector already had success coordinating exercise and real event responses regionally, and was eager to explore whether the MAC Group model could be effectively applied to help manage health/medical emergencies. With some initial hesitation, the local emergency management community supported the health/medical sector's exploration of using a regional Health/Medical MAC Group.

Development of the Health/Medical MAC Group began with a review of existing MAC Group models from various agencies and jurisdictions. We found a number of models. Because all of the models came from disciplines other than health, we had to identify one that was comprehensive and could be modified to meet the needs of a health/medical event. Through this initial review process, it was evident that we would benefit from consultation with technical experts who had been involved with MAC Groups and processes during real-time response to emergencies.

We engaged contractors from Organizational Quality Associates (OQA), an education and consulting organization facilitating organizational learning. OQA staff members have held local, regional and national leadership positions directly related to strategic planning, emergency services, and the Incident Command System and operations. The OQA consultants have decades of experience serving on MAC Groups and coaching organizational development. They did not; however, have any substantive experience working with a Health/Medical MAC Group, allowing for mutual learning among project and OQA staff.

With the assistance of the OQA consultants, a workgroup was convened to develop the Health/Medical MAC Group Model. The workgroup was comprised of HPO staff, hospital representatives, emergency management representatives and the OQA consultants. The workgroup developed the Health/Medical MAC Group model to be a decision-making group responsible for allocating scarce health care resources, developing interagency policies, and prioritizing health care delivery response activities based on the health care system's capabilities during a health/medical event (in this case, a pandemic influenza outbreak). The workgroup adapted an existing operation manual[16] to develop the *Handbook* that served as the operations manual for the Health/Medical MAC Group's process. This *Handbook* will be described later in this section.

When activated, the Health/Medical MAC Group is designed to provide a structure for public health and health care leaders to convene and discuss policy decision making and prioritization. Specifically in the context of a pandemic influenza event, the Health/Medical MAC Group was envisioned as providing:

- Regional representation and participation in incident prioritization decisions related to a strained health care delivery system;
- Ethically-based regional strategies related to the allocation/re-allocation of critical resources;
- Proposed altered standards of care and alternative care systems;
- Community mitigation approaches to limit transmission of disease in the community; and
- Management of consistent and accurate information concerning the health emergency within the region.

[16] *The NW MAC Operations Handbook* developed by the Pacific Northwest Wildfire Coordinating Group (PNWCG)

In light of the above functions, the working group decided that Health/Medical MAC Group should be comprised of agency representatives including 1) health department administrator / health officers or designees, 2) hospital administrators or designees, and 3) a community clinical representative (physician, clinic manager).

In keeping with the traditional MAC Group approach, all decisions are made via group consensus and are to result in one of the following actions:

- Make a collaborative decision and assign responsibility for implementation;
- Defer decision for consideration until more information has been collected;
- Determine if the issue is outside of the Health/Medical MAC Group's responsibilities and mission. If so, transfer the issue to the appropriate organization or individual.

Traditionally, agency administrators appoint and authorize MAC Group Agency Representatives. Appointments are made through a letter stating that the representative has delegated authority to commit his/her agency's funds and resources, has authority to speak on behalf of her/his organization, make decisions for the prioritization of critical resources, resolve issues, and propose new interagency policy during an emergency. While most of the Health/Medical MAC Group members had been delegated this authority by their agency administrator, many did not feel comfortable exercising this level of authority. This discomfort was perceived by Health/Medical MAC Group members and observers as a significant challenge in the group's development. This challenge will be discussed as part of the evaluation and community acceptance of the Health/Medical MAC Group later in this section.

As discussed in the Background Section of this report, the ability to develop a Health/Medical MAC Group for this project was a direct result of the long-standing collaboration and leadership of regional health care delivery system preparedness activities for the seven counties participating in this project. These regional preparedness activities have been coordinated through the NW Oregon HPO since the fall of 2001. The HPO has successfully facilitated multi-agency, multi-jurisdictional health emergency preparedness planning and exercising. Much of this work has been guided by the HPO Steering Committee, comprised of high level managers in public and private health organizations.

Members of this Steering Committee were actively involved in recommending the individuals to participate as Health/Medical MAC Group members from their respective system/organization. This process differs somewhat from traditional MAC Groups for which agency administrators directly appoint representatives. The majority of recommended participants ended up serving as the Health/Medical MAC Group member; in some cases a different member was designated by the person initially recommended. This authority of the Steering Committee to appoint members demonstrates the investment of private health care systems and public health into the HPO Steering Committee process and ultimately the Health/Medical MAC Group.

This trust and value of system-wide collaboration was reinforced as the Health/Medical MAC Group shifted from grant-related exercises to real-time H1N1 issues, as discussed later in this section. This shift provided an opportunity for broad regional coordination of health/medical efforts between public health officials, area hospitals, community health clinics, emergency management and state officials to ensure an efficient and effective response to a pandemic event. This multi-agency coordination proved to be a key component in developing policy-level decisions and directives that were then disseminated to affected communities and target populations.

In the past few years, the Portland metro region has undertaken significant planning on how best to coordinate the regional health/medical response with jurisdictional level emergency management agencies. This laid the groundwork for developing the Health/Medical MAC Group. The Health/Medical MAC Group was established under the laws of the State of Oregon, the State of Washington, and codes of participating counties. As is true for most communities in the United States, the relevant state and local laws and codes vest authority and responsibility for emergency response in cities, counties, and the State. The legal frameworks in the Portland metro area do not create a specific legal authority to manage an emergency response at the regional level, nor do they create legal authority for decision making on the part of private sector entities. As a result, the Health/Medical MAC Group model was developed to be inclusive of all counties in the Oregon Healthcare Preparedness Region 1: Clackamas, Clatsop, Columbia, Multnomah, Tillamook, and Washington; and Clark County in Washington State. There was an underlying understanding that compliance with the decisions of the MAC Group was voluntary and collaborative.

The counties within Oregon Preparedness Region 1 and Clark County, Washington, contain 19 acute care hospitals, more than 1,350 clinics offering care by "primary care capable" physicians in a wide variety of practice arrangements, a multiplicity of specialty physicians, 23 safety net clinics, and multiple volunteer-staffed free clinics. In addition, five counties in the Portland metro area have organized volunteer-based Medical Reserve Corps units, and there are numerous social service organizations that may be able to meet needs of vulnerable populations in an emergency, but whose capacity is not fully known given the uncertainties of staff availability and insecure, long-term funding.

Tools Developed to Support the Health/Medical MAC Group

The primary output from this phase of the project is the *Health/Medical Multi-Agency Coordination (MAC) Group Handbook*. This tool describes the role and operations of a regional Health/Medical MAC Group and provides the information necessary for other jurisdictions to explore replicating this technology in their communities. A copy of the *Handbook* included as Attachment 8. The *Handbook* was written to be inclusive of all counties in Oregon Healthcare Preparedness Region 1 and Washington Region IV. The *Handbook* discusses in detail the way the group is organized, roles and responsibilities of members, activation procedures, delegation of authority, the format of Health/Medical MAC Group meetings, and the types and process for the Group to follow when making decisions – including the application of the ethics framework.

The following types of tools, which can be adapted to other jurisdictions, are also included:

- Maps of the locations of the region's hospitals
- Authorities for Health/Medical emergency response in the State(s)
- Health/Medical MAC Group training and training assignments
- Information on Regional Health/Medical resource ordering, and information flows between response entities
- Sample letter of delegation of authority
- Sample situation status report
- Health/Medical MAC Group meeting agenda checklist
- Health/Medical MAC Group Coordinator/group conference call templates
- At-A-Glance comparison of coordination and command
- Health/Medical MAC Group logistical needs within the host county ECC
- Incident prioritization criteria
- Ethics framework and criteria
- Information exchange of organizations associated with the Health/Medical MAC Group
- Glossary of terms

In addition to the *Health/Medical Multi-Agency Coordination (MAC) Group Handbook,* the other major product was the *Health/Medical Multi-Agency Coordination (MAC) Group Exercise Plan*. This was developed to be used by the Health/Medical MAC Group during the planned iterative, three-part functional exercise series. This plan was developed with leadership from OQA and explained the purpose and scope of the exercise series, the learning objectives, and anticipated outputs from the series. It also described rules for the exercise participants and logistics, including the involvement of community observers during the last two exercises.

Similar to the workgroup convened to develop the *Handbook*, we convened a workgroup to develop an exercise scenario that involved three exercise iterations. Significant time and multi-disciplinary expertise was invested to develop the exercise series. OQA provided expertise in MAC Group operations and exercise development; public health provided epidemiologic projections of a Severity Index Category 5 pandemic influenza event; hospitals provided expertise in how the regional hospitals/health systems function during routine and emergency events; and the HPO provided background on Memorandums of Understanding between hospital/health systems for emergency mutual aid as well as information on how the local emergency response community was organized. Although not all of this work got used fully during the course of this project, the learning gained from this process helped staff develop the skills to efficiently produce the information needed for the real-time MAC Group meetings that replaced the exercises.

The original functional exercise series was built around a wave of Severity Index Category 5 pandemic influenza event resulting from a novel strain of influenza. The scenario (which pre-date H1N1) was designed with the assumption that the first cases were seen on the East Coast of the United States and that by the 10^{th} day of its arrival in the Pacific Northwest, it affected all hospitals and clinics in the Oregon Healthcare Preparedness Region 1 and Washington Region IV.

The three-part exercise series was designed to follow the increasing complexity associated with being further along the pandemic curve using this timeframe:

Functional Exercise One: Day 10 of the 12-week epidemiological curve
Functional Exercise Two: Day 31 of the 12-week epidemiological curve
Functional Exercise Three: Day 42 of the 12-week epidemiological curve

Detailed simulated situation status reports including incidence, morbidity, and mortality rates, resource availability, and challenges hospitals/facilities faced were to be provided for each exercise. This background information was to be provided to Health/Medical MAC Group members approximately one week prior to the exercise to allow for some preparation, yet retain somewhat realistic time frames simulating a real event. For each exercise, several "injects" or issues for the group to address were designed. Section 1 discussed the methodology used for projecting the epidemiological curve and measuring the health care capacity. A copy of the *Health/Medical Multi-Agency Coordination (MAC) Group Exercise Plan* is included as Attachment 4.

Functional Exercise Series and Real-time Meetings in Response to the 2009 H1N1 Pandemic

Project staff were actively developing the MAC Group *Handbook*, exercise schedule, and exercise materials prior to the introduction of H1N1 influenza in late April 2009. In addition, active outreach to hospital/health system staff at operational, managerial and executive levels was ongoing prior to and after the introduction of H1N1. The timing of project activities and introduction of H1N1 created some significant challenges.

Attempting to carry out grant-related planning activities during the summer and fall 2009 H1N1 pandemic resulted in confusion, despite careful work to explain and differentiate the exercise series from real-time events. This occurred particularly for higher-level institutional stakeholders such as hospital system chief medical officers, chief executive officers, and administrative and finance officers who had not been intimately involved in earlier pandemic planning and were receiving a lot of information about the current H1N1 situation from other statewide organizations (such as the Oregon Association of Hospitals & Health Systems).

In response to this observation, prior to the second scheduled exercise, we contacted the Health/Medical MAC Group representatives to get their input on how to proceed with the exercise series. Overwhelmingly, stakeholders indicated that their ability and willingness to be involved in grant-related activities related to a 1918-like planning scenario had changed; however, they did support the continuation of the group to address real-time issues. This willingness, demonstrated *community-wide support from public health, community leaders, hospitals/health systems, vulnerable populations, home health services, ethicists and others to establish and utilize the Health/Medical Multi-Agency Coordination (MAC) Group as a decision-making process throughout the project (especially in the environment of the H1N1 pandemic).* [17]

[17] Evaluation measure operationalized from "Community-wide support and engagement representing public health, community leaders, hospitals/health systems, vulnerable links, home health services, ethicists and others to support the establishment of a Pandemic Health Care Delivery System Model is utilized throughout the project."

Even through H1N1 did not overwhelm our local health care delivery system, it did impact it. Hospitals responded quickly to the changing environment and available information about the progression of disease in our community. Many were struggling within their own institutions to make real-time regional policy and resource allocation decisions. They expressed a desire to be in alignment with their sister organizations and were interested in having a regional forum for regional discussion and decision making.

In response to these issues, the Health/Medical MAC Group developed several policies including 1) a regional hospital visitation policy recommendation, 2) a regional hospital mask use policy recommendation, and 3) a recommendation for Tamiflu distribution. All of these policy recommendations were implemented throughout the health care system in Northwest Oregon and Southwest Washington. This work is described in the next discussion.

We understood that the conversion to "real time" events was a departure from the project's design using a Severity Index Category 5 pandemic influenza event; despite this, we believed that the lessons learned, the outcomes for the community, and the relationship building that would occur would serve our community. These benefits would still build the capacity needed for a larger scale event in the future.

Between September 2, 2009, and October 29, 2009, it was anticipated that the ***Health/Medical MAC Group, comprised of representatives of regional hospital systems and public health, would participate in multiple scenario-based exercises to identify personnel and resource sharing issues.***[18] Due to the fall 2009 H1N1 pandemic, the group met for the planned training, one (of the three planned) exercise(s), and three real-time meetings. The members of the Health/Medical MAC Group continued to meet after the planned period of grant project activities. They are currently meeting quarterly and will formally reconvene as the MAC Group and meet more often if there is specific emergency business to address. As will be discussed in Section 5, barring another health/medical emergency, they will be working on developing the group processes, including formalizing a way to apply the ethics framework, and developing a process for involving alternate Health/Medical MAC Group representatives, technical experts, and community members. The Health/Medical MAC Group was convened for the following purposes:

- Sept 2, 2009: Traditional MAC Group Training
- Sept 16, 2009: Health/Medical MAC Group Functional Exercise (first of three planned)
- Oct 7, 2009: Health/Medical MAC Group First Real-time Meeting
- Oct 22, 2009: Health/Medical MAC Group Second Real-time Meeting (additional one)
- Oct 29, 2009: Health/Medical MAC Group Third Real-time Meeting

[18] Evaluation measure operationalized from "Stakeholders participate in multiple scenario-based exercises to identify personnel and resource sharing issues."

MAC Group Training

The training was conducted on September 2, 2009, by OQA consultants who taught project staff and Health/Medical MAC Group members about MAC Groups and their role in the National Incident Management System, how MAC Groups interface with other emergency response organizations, and how to develop as a group. This training is usually conducted over two full days, but was condensed to four hours due to the anticipated challenges participants would have fitting two full days of training into their busy schedules. Observers were involved in the exercise and two (of the three) real-time meetings. The exercise/meeting series is described below as things evolved from original plans to responding to H1N1.

Health/Medical MAC Group Functional Exercise (first of three planned)

The Health/Medical MAC Group exercise (September 16, 2009) was based on the pre-planned series described earlier in this section. The first part of this exercise was to get the Health/Medical MAC Group familiarized with the following:

- The base scenario, hospital data, and maps;
- Ethics framework; and
- Formal meeting process.

For the second part, the group practiced making the types of decisions they would in a real event, including the following:

- Develop criteria for using mutual aid agreements to address supply shortages experienced by all hospitals in the region;
- Develop criteria for identifying the hospitals with the potential to provide more comprehensive packages of clinical services, and based on these criteria, list the hospitals in order of their treatment capabilities; and
- Allocate critical resources and document the rationale for the allocations.

Traditionally MAC Groups work with seven to nine representatives. The idea is to keep the group small so that it can effectively and efficiently make decisions. We decided to have one representative per public health department, one per hospital/health system, and one to represent the private clinician community. Despite our health community's multi-year history of collaborative work, developmentally various institutions were not ready to let other "like organizations" represent them (e.g., have a limited set of hospitals speak on behalf of all hospitals). Having all hospitals/health systems and health departments represented resulted in a group of 17 members.

The OQA consultants raised concerns that a Health/Medical MAC Group of this size would be too large to be effective. It was decided to divide the MAC Group into two smaller groups of seven to eight members, with one MAC Coordinator and five observers in each room. After the allotted time for the groups' work, they participated in a quick self-evaluation. As will be discussed in the evaluation discussion, both of the small groups expressed that it was hard to get to the work at hand before they got acquainted with one another and formed a team.

After this self-evaluation by each of the two Health/Medical MAC Groups, both groups and all the observers were convened in a large room. Observers had the opportunity to hold a conversation about what they saw and heard. The most vocal observers indicated that it was frustrating that the group they observed seemed to care more about not offending anyone than getting decisions made. Other observers described that they saw collaboration, the desire to be fair, and protection of self-interest. These themes and their evolution over the course of the exercise/real-time meetings are described in the evaluation discussion later in this section.

When we moved from the exercise to real-time meetings, we decided to combine all members into one Health/Medical MAC Group with two coordinators. This resulted in a large group to facilitate. With a larger group it was likely that the group took longer to reach consensus, however it did not inhibit the group's ability to make decisions. The three real-time meetings are discussed below. Examples of documented decisions are included as Attachment 9

Health/Medical MAC Group First Real-time Meeting

During the first real-time meeting (October 7, 2009) the discussion was about hospital visitation policies regarding who could visit patients in the hospital in light of the prevalence of H1N1 in the community. The group began with review of the ethics framework to ensure decisions made were grounded in ethical values identified by the community. Next, the group received a situation status update on 1) the incidence and prevalence of disease in the community, 2) the status of hospital visitation policies (e.g., which hospitals had already implemented interim policies, which hospitals were considering changes), and 3) variations in the interim hospital visitation policy approaches. The major variations in policy included 1) age of visitor the policies applied to, 2) whether the policies applied to specific inpatient units versus the entire hospital, 3) number of visitors allowed per patient, and 4) whether there was active versus passive screening of visitors for symptoms of influenza-like illness. After the situation status update, the group discussed why they wanted to develop a regional hospital visitation policy. The group created the following rationale for their decision to develop a regional policy:

- A regional hospital visitation policy stems from a desire to have a uniform policy that would be more easily communicated to the public to engender public trust and minimize public confusion.

- The policy would be based on infection control practices and evidence-based medical and public health practices in the interest of protecting the public, hospital staff, and medically at-risk populations from becoming ill with the H1N1 influenza virus.

After agreeing on a rationale, the group reviewed three policy options drafted by the Health/Medical MAC Group coordinators and also reviewed the decision-making criteria outlined in the *Handbook*. The discussion focused on the age of the visitor and the risk of exposure to H1N1 (for medically at-risk patients in the hospital).

As described in the situation status update, the interim policies already created by some hospitals were inconsistent between organizations with some allowing asymptomatic visitors between the ages of 13-18, but not 12 and younger, and others not allowing anyone younger than 18 to visit. The group recognized these inconsistencies would be confusing to the public and possibly could undermine the credibility of the individual hospital/health system's decisions.

The group agreed to implement temporary visitor restrictions for units in the hospital with medically at-risk populations; the specific units would be defined by each hospital. At a minimum, the policy applied to visitors age 12 and younger. Hospitals could choose to limit visitation for children ages 13-18 under certain circumstances and/or implement special screening procedures for this population. Hospitals could also choose to apply this visitation policy to the entire hospital. The policy did include exceptions to these restrictions (e.g., for visits to patients receiving end-of-life care and a few other specific circumstances). In addition, the hospital visitation policy required hospitals, at a minimum, to conduct passive screening of visitors with influenza-like illness symptoms (e.g., posting signs asking ill visitors to leave or take other specified actions).

After the Health/Medical MAC Group meeting, the Coordinators created a final draft policy to reflect the decisions made and distributed it to MAC Group members, as well as to the hospitals that were unable to participate in the meeting due to time and travel constraints. The Health/Medical MAC Group members shared the policy with their administrators for final approval. The policy was adopted and implemented by all hospitals/health systems in the region within two days.

Health/Medical MAC Group Second Real-time Meeting

In the second real-time meeting (October 22, 2009), *the group was faced with vulnerable links.*[19] The scarcity of masks and Tamiflu pediatric suspension was addressed as the group explored strategies to protect mask supplies, including reusing masks when not compromised (always ensuring that universal precautions were fully practiced). They also agreed how to distribute a limited supply of Tamiflu suspension. This meeting followed the format of the first exercise. Participants began with a review of the ethics framework, followed by a situation status update with information on the incidence and prevalence of disease in the community.

The first policy discussion resulted in the development of *an effective process necessary to maintain essential vulnerable links during a pandemic is established*. Specifically, the discussion was about how to distribute the limited amount of government-controlled Tamiflu suspension available in the region. At the time, only 1,200 courses were available, an amount judged to be inadequate for the anticipated need. A few days prior to the meeting the local public health authorities decided to release a small amount of the Strategic National Stockpile (SNS) cache of suspension antivirals to meet the needs of the uninsured/underinsured population.

[19] Evaluation measure operationalized from measures: 1) "Impacts to vulnerable links are incorporated into the scenario-based exercises;" and 2) "Vulnerable links likely to be impacted during a Severity Index Category 5 pandemic event are identified and stakeholders engaged to explore solutions."

They recommended the antivirals be made available through Access to Influenza Care (AIC) sites,[20] and hospital emergency departments. The Health/Medical MAC Group was able to agree on the sites to receive the suspension and on the allocation formula for each site.

The MAC Group received a briefing on the situation from a technical specialist and reviewed a draft policy recommendation created by a technical specialist group. The draft recommendation was to distribute 900 courses of Tamiflu suspension to facilities providing outpatient urgent/emergency care to children and 300 courses to AIC Project sites serving low-income uninsured pediatric patients. There was also a recommendation to explore distribution of SNS Tamiflu suspension through a large regional retail pharmacy. Through discussion the group developed the following rationale for the policy decision:

- Many hospitals were already compounding the Tamiflu suspension at their facilities or through their pharmacies and had the drug on hand. Given this capacity, it would not make sense to allocate such a small amount of pre-packaged suspension to hospitals throughout the region, when there would likely be a greater need for the drug among under/uninsured children seen in non-hospital outpatient settings.

- It would be prudent to send all of the doses directly to the AIC Project sites and let hospitals provide patients who presented at their emergency departments with antiviral medication compounded by the hospital.

After agreeing on the rationale, the group decided to make all of the existing Tamiflu suspension cache available to the AIC Project sites that served pediatric populations. They agreed the decision only applied to the current SNS cache counties had in hand. The group anticipated that by the time additional Tamiflu suspension would be available, there would be a better mechanism for distribution through the regional retail pharmacy option discussed above.

The second policy discussion was about whether or not to implement a regional mask use policy for all hospitals/health systems. Hospitals were following individual organizational protocols for mask use; this resulted in varied utilization rates and near exhaustion of supplies for at least one hospital system. Another health system projected it would run out of N95 masks within seven to 10 days while other hospitals/health systems reported to have supplies that ranged from barely adequate to ample. The State of Oregon had released masks from the SNS stockpile to the County Emergency Operation Centers (EOC); however, it was a limited supply and Health/Medical MAC Group members wanted to be certain these resources were distributed in a thoughtful and equitable way.

[20] The Access to Influenza Care Project aimed to assure access to basic influenza clinical evaluation and treatment to low-income uninsured people who do not have a medical home so that these individuals can receive timely health services necessary to prevent medical complications of influenza. Providing this access to care will also help preserve hospital emergency department capacity for patients with more serious medical conditions requiring emergency care. Described in Section 2.

Prior to the second and third meetings, the Health/Medical MAC Group coordinators convened a technical specialist group to review current hospital mask use policies and CDC recommendations for mask use to develop a draft policy recommendation for the Health/Medical MAC Group to consider. This group was comprised of infection prevention specialists from each of the major hospital systems, one small hospital, a government hospital, and a local health officer. This specialist group reviewed current data and policies on hospitals' mask utilization. In doing so, they identified both commonality in the rationale for creating a regional policy recommendation for mask use and some significant differences in policies driving mask utilization.

This allowed the group to develop a draft policy recommendation for the Health/Medical MAC Group to consider that included general precautions, mask use for droplet precautions, respiratory protection for aerosol-generating procedures, respiratory protection for high-risk workers, mask use for patients and the public, health care/worker patient interactions, and directives to be following before accessing SNS stockpile resources.

At its meeting, the Health/Medical MAC Group was briefed on the mask supply levels for all hospitals/health systems in the region and was given a summary of each organization's mask use policy. The group reviewed the draft policy recommendation for mask use in hospitals in the face of a pandemic and a shortage in masks supply (i.e., the draft policy created by the technical specialist group). One member of technical specialist group was present at the meeting to respond to questions and/or concerns about the policy. By the time of this meeting, the one hospital system with significantly different mask use was working rapidly to change procedures and criteria in its mask use policy. As a result, the policy variation across institutions was being resolved. Nevertheless, the group determined that a regional mask use policy recommendation would be of benefit to the community and created the following rationale:

- A regional mask use policy would ensure a community standard for how masks are used. This would help those in the position of making scarce resource allocation decisions do so with confidence that mask utilization is the same across hospitals.

- A regional mask use policy would help to conserve scarce resources in the community while optimizing the safety of staff, patients, and the community at large.

- By adopting an aligned community standard, State policy could be more easily influenced.

The draft policy recommendation included a number of elements (e.g., mask use for droplet precautions, use in high-risk aerosol situations, changing masks, mask use for patients, mask use for the public). The Health/Medical MAC Group adopted a parts the policy and requested that the infection control technical specialist group reconvene to develop more specificity on the recommendations; they planned to finalize the policy at the next Health/Medical MAC Group meeting. In the meantime, Health/Medical MAC Group members agreed to review the recommended criteria for considering the draft policy with their institutional leadership, and utilize existing mutual aid agreements to support each other's mask shortages until a final policy was adopted.

Health/Medical MAC Group Third Real-time Meeting

The third real-time meeting (October 29, 2009) also included two topics of discussion. The first item was to finalize the mask use policy; the second item was about curtailing or deferring elective procedures/surgeries. As with all the Health/Medical MAC Group meetings, participants reviewed the ethics framework and received a situation status update with information on the incidence and prevalence of disease in the community. The group made minor revisions to the mask use policy rationale. Then they reviewed the hospital mask use policy recommendation that had been revised by the infection control technical specialist group since the prior meeting.

Health/Medical MAC Group members walked through each policy element (e.g., precautions, mask use for droplet precautions, etc.) and approved them, made modifications for clarity, or added elements. Specifically, they added content to better protect for workers at high-risk of influenza complications (pregnant women, etc.).

The second discussion was about whether the Health/Medical MAC Group should begin to develop a policy about curtailing or deferring elective procedures/surgeries in light of the current status of H1N1 and possible recurrent waves of virus transmission. Hospitalization admissions had peaked about one week prior to this meeting. However, hospitals' census was still high due to the significant length of stay, particularly for ICU patients. In the event the community needed more hospital capacity to care for influenza patients, cancelling/postponing some services would be one option to consider.

The group was presented with anecdotes about how other communities were addressing these issues (e.g., Florida, southern Oregon). They were also provided with the results of hospital data analysis conducted for this grant and findings from the community discussions used to develop the ethics framework. The hospital data suggested that postponement of elective procedures, elective surgery and other elective admissions at hospitals in the region could potentially open as many as 500 medical/surgical beds per day (approximately 15% of usual region-wide medical/surgical capacity). Lesser degrees of postponement could free up smaller numbers of beds.

Because some of the postponed procedures also involve significant stays in post-anesthesia recovery and ICU settings, this strategy could also open as many as 50 ICU-capable beds per day (equivalent to approximately 8% of usual region-wide ICU capacity). Even with these capacity projections and the qualitative data from the community about what types of services could be delayed or altered, the Health/Medical MAC Group members felt that they were not prepared to develop actionable policies on which procedures to defer/cancel.

The group easily agreed this topic was pertinent and one that would require thoughtful planning with the right mix of technical, policy and financial experts. Health/Medical MAC Group members did not reach consensus on the urgency of the issue. Some participants felt developing guidance now was necessary because if they waited, it would be too late to make these complex decisions. Other participants did not know if it was the best use of various experts' time and looked to public health representatives to predict what the epidemiology curve would look like.

The group asked the Health/Medical MAC Group coordinators to gather additional information from public health on the projected course of the disease, and also to explore whether State public health had completed any planning on this issue. The group ran out of time for additional discussion and asked the coordinators to poll the group on their organizations' perceptions of what the urgent issues are. They wanted to be sure they were focusing their efforts on the most important topics at hand.

Evaluation of the Health/Medical MAC Group—Community Acceptability

The evaluation activities and participants involved in the evaluation of the Health/Medical MAC Group were the same as those used to evaluate the ethics framework, with the addition of a focused group conducted with the OQA consultants. A brief overview of the evaluation methodology is provided in this section and described in more detail in Section 3. The findings from the evaluation of the ethics framework and the Health/Medical MAC Group, as well as the policies described earlier in this section demonstrate that *the group was able to ethically, effectively, and rapidly respond to a pandemic influenza event by developing regional policy and/or allocating scarce resources for a specified operational period.*[21] NOTE: There was some disagreement on the rapidity of decision making, but this challenge was noticeably reduced as the group met and trust was developed.

Methodology and Stakeholders

Key stakeholders involved in the evaluation included the Health/Medical MAC Group members, OQA consultants, and observers representing emergency management, public health, hospital systems, community-based organizations, culturally-defined communities, and project consultants in various areas (ethics, decision science, health economics, clinical care, etc.). All three stakeholder groups were invited to participate in separate focused group discussions and stakeholder interviews at the end of the exercise/meetings series. In addition, evaluation data were collected during the exercise/meetings. During these exercise/meetings, Health/Medical MAC Group members reflected on their process and observers completed surveys. The OQA consultants observed and provided coaching during the exercise and subsequent meetings and conducted the post-meeting self evaluation.

The findings from these evaluation activities are presented in the following discussion. For this discussion, the term "participants" refers to those stakeholders involved in the evaluation activities.

Key Findings

The following list highlights the common themes from stakeholder feedback. After this summary, an analysis of the feedback is presented. This feedback has been provided to the Health/Medical MAC Group and is being considered as the group continues its development.

- Overwhelmingly, participants thought that the use of a Health/Medical MAC Group would be accepted by the community as long as decision making is transparent and the public understands that the group is comprised of "*public health and hospital systems*."

[21] Evaluation measure operationalized from "The community is able to ethically, effectively, and rapidly respond to a Severity Index Category 5 pandemic influenza event through cooperative mobilization, resource sharing, and coordination."

- Most participants believed that local public health needs to be part of the group and be the group's *"voice."*

- Most participants valued regional decision making and thought that it would encourage credibility with the public as well as be more effective in protecting everyone from negative consequences (including exposure to the influenza virus and inequitable financial burdens for hospitals).

- Observers wanted to incorporate community feedback in the Health/Medical MAC Group's process.

- Several participants suggested that the group add representatives from the safety net clinics to ensure that vulnerable communities are represented.

- The majority of participants thought that the most critical element of effective decision making was having the "*right peopl*e" at the table. Characteristics of the *"right people"* included being able to collaborate and think of the entire community.

- Group members and OQA consultants wanted each organization to have a few alternates trained to be Health/Medical MAC Group members.

- Most group members and some observers felt strongly that delegated authority needed to be defined and standardized between organizations/systems.

- Participants wanted to formalize a way to incorporate technical experts when the content of decisions was beyond their comfort level.

Findings from Evaluation Activities

The following analysis of stakeholder feedback demonstrates that overwhelmingly *the decision-making process (Health/Medical MAC Group) used to curtail and/or provide selected essential services during a pandemic influenza event was accepted by stakeholders.*[22]

Benefits of Involving Health Care Systems and Public Health

The majority of observers thought that attempting to use a Health/Medical MAC Group was a great idea and appeared to be an effective decision-making process.

"There has never been a MAC Group before, so having one is a significant success."

"The fact that proactive discussions and decision making are being undertaken to optimize the use of health care resources would, I think, be accepted by the public."

[22] Evaluation measure operationalized from "The decision-making process used to curtail and/or provide selected essential services during a Severity Index Category 5 pandemic influenza event will be accepted by stakeholders as being appropriate for the circumstances."

Several observers and group members believed that the Health/Medical MAC Group would be accepted if the public knew that decisions were made collaboratively. Observers placed emphasis on the combination of public health and health care systems, and representatives of health care systems placed emphasis on the collaboration between health care systems.

"[This combination] forces the decisions to be reasonable and as fair as possible."

"Having a regional response made sense. I think decisions made by all of us would be accepted by the community rather than have the separate systems or hospitals making them."

Most observers and group members agreed that the community should have access to the decision-making process and the issues considered. This transparency was seen as critical, especially if decisions are made about who could visit the hospital or who could receive health care services. Group members expressed that hospitals' interests must be considered and that these interests should not be *"hidden"* since they are a reality in the health care system, and are required to protect business continuity and ultimately health care capacity within the region. One group member gave the example on how the hospital visitation policy helped avert *"hospital shopping."*

"The visitation policy helped. One location was getting all the deliveries because of a different policy. They were swamped and the other location was losing revenue."

<u>The Need for Community Input</u>

A small number of observers expressed concern about having the Health/Medical MAC Group make decisions; these observers were concerned that there was not representation from various community groups on the Health/Medical MAC Group or in the observer pool.

"Just like with the observers, some ethnic community groups may not be represented or considered. I was frustrated by not being a voice at the table to respond or add to points."

"I would like to have known if and what community input was considered."

Some participants gave examples of culturally-specific considerations that needed to be taken into account when the Health/Medical MAC Group made decisions.

"Some cultural groups are more family oriented or extended-family oriented. If somebody gets sick they just show up to visit. This information needs to come from authorities like the Health Officer for the science part and with translation from a community leader for understanding. I think if you do this, people will begin to understand and follow the policies."

"There is some distrust already in the community. The messages should be explained that they are for everyone. The messages need to be simple, like 'stay home unless you have these symptoms. You will be given care if you get that sick.' It is also important that it isn't a profit thing for the hospitals and that they don't want to help only people with insurance."

Most of the participants expressing these types of concern did respond favorably, once they learned (after formal evaluation activities were completed) that the Health Department employs "Community Connectors" who serve as liaisons between a variety of culturally-defined communities and public health. These staff members are from the communities with whom they interact. They are responsible for soliciting input from community members about the information needed/wanted and then, working with the Health Department, developing and delivering the information.

In the end, most observers felt that if people understood that decisions were made to benefit all the people in the region, and not just for certain neighborhoods or socio-economic groups, that most would accept the decisions, even if they did not like them.

Engaging Health Care Systems throughout the Region

We were able, to varying degrees, *engage representatives of the Oregon Healthcare Preparedness Region 1 and Clark County, Washington in the Health/Medical MAC Group decision-making process, and demonstrate the ability to make decisions and implement policy intended to have a positive effect on health outcomes during a pandemic.*[23]

Historically, it has not been difficult to engage hospitals and health care systems in HPO activities. Unfortunately, there have been difficulties reconciling the different planning and response challenges between the coastal hospitals and the Portland metro area hospitals. An additional challenge is that Oregon and Washington have somewhat differing approaches to hospital preparedness planning. Despite these challenges, considerable effort has been and continues to be made to work as a region. Although hospitals in the coastal region did not participate in the functional exercise and subsequent meetings due to travel time and distance, they were supportive of the Health/Medical MAC Group concept. They also adopted most of the regional policies even though there were not at the table to develop them. This success was achieved by actively soliciting feedback on draft policies from those not able to be at the table. Group members from various parts of the region identified this as a realistic and positive strategy for inclusivity.

"It was helpful that even though some members couldn't be at the meeting, they were provided the preliminary decision and were allowed to provide feedback before [a] final decision was made."

More than half of the group members voiced that if regional decisions were going to be made, a formal process needed to be developed to collect data and other information from Southwest Washington and other counties (outside of the Portland metro area) in time for Health/Medical MAC Group meetings.

"I was pleased to see that almost everybody was there. I think Southwest Washington is an important player."

[23] Evaluation measure operationalized from "The Oregon Healthcare Preparedness Region 1 and Clark County, Washington is prepared to deploy limited resources in a manner that maximizes health outcomes during a pandemic."

"There are cross jurisdictional issues between counties, organizations and states. Getting information from both states was a challenge and we need to continue to be aware of the differences in laws, regulations, and systems for acquiring supplies."

There was one member who voiced a concern about trying to please everyone in the region and whether this would make the decisions meaningful.

"It seemed that the mask use policy was watered down some so that everyone could live with it, specifically the wording 'may re-use.' Was this really a regional/united-front decision or would we still have too much variance between systems?"

Value of Participating on the Health/Medical MAC Group

Most group members felt that it was valuable to participate on the Health/Medical MAC Group. They thought that making regional decisions and building relationships with others from all the different systems was very worthwhile, even if it meant that they sometimes were going to have to give up something.

"I liked that people could talk about their hospital as an example, but then bring it back up to the community system perspective."

"It was great to have the ability to call someone directly from another system to discuss ongoing issues."

Some group members volunteered that they or their organizations/systems were hesitant to participate, but that quickly this feeling disappeared. One member explained that it got to the point where her organization's internal group convened to address H1N1 would ask about the Health/Medical MAC Group's thinking on emerging issues.

Other comments made about their involvement included:

"I think my personal goal was met. [My organization] is now perceived as on the same plane as everyone else, not that we are in our own world."

"We are a smaller system and it is harder to stick your neck out. It helped us to be part of a larger group."

"I think it has really strengthened relationships with all of the different working hospitals. It made us work more closely. I think also the system-wide decision adds a level of credibility that individual entities are unable to possess."

One member gave an example of how having a regional decision helped her system work with a patient in a respectful way, while reinforcing that their policy was made to protect the safety of everyone:

"A man with four kids wanted to bring all of them in to visit his wife who was having a baby. He was willing to pay for the H1N1 test, but we had to say 'no' based on the Health/Medical MAC Group's decision. He ended up calling all of the other hospitals and everyone said the same thing. Our action looked reasonable, and it reinforced that it was done for infection control."

The Role of Public Health

Health/Medical MAC Group members were asked whether public health has a different role than that of the health care systems representatives. The most common response to this question was that local public health should be an equal member of the Health/Medical MAC Group. Members recognized that public health had authority in areas and it was more efficient to have them at the table but clarified that this did not mean that they would be controlling how the hospitals were operated.

"Public health should not be telling hospitals how to run their business."

At times, appropriately engaging local health departments within the region around health care delivery system preparedness has proved to be difficult. This is largely because much of the HPO's work has focused on hospitals and health systems, while local health departments have focused on specific public health preparedness concerns (e.g., epidemiology, mass vaccination, etc.). Consequently, some public health authorities have believed that their presence at the Health/Medical MAC Group was not necessary. This belief changed at the start of the project and they did participate in the Health/Medical MAC Group. However, as the group began addressing issues that were more hospital-focused, health departments' participation dropped off. A couple of prominent local public health leaders continued to participate, and this continued engagement was seen as valuable by group members.

"I think my relationship with public health especially in my region [has strengthened]. [This process] opened my eyes to the capacity and level of expertise there is and how much they can offer and how much support they can give our organizations. I wasn't aware of that."

"*We did realize that our system is not its own entity. [It was good to] understand everyone's role in the larger community, including public health."*

A few group members asked about State involvement. They expressed that State (Oregon and Washington) involvement would be helpful, not as a voting member but as a technical advisor on SNS, CDC recommendations and decisions made in other parts of Oregon and Washington. Additionally, the states were seen as critical sources of supplies and information for vulnerable links during a pandemic, but the project did not get to the point where *written agreements were created identifying roles for lead state and local public health stakeholders to address vulnerable links.*[24]

[24] Evaluation measure operationalized from "Written agreements to identify roles for lead stakeholders are drafted to address vulnerable links and are included as a part of the Pandemic Health Care Delivery System Model."

Improvement and Challenges in the Health/Medical MAC Group's Process

Most participants gave credit to the facilitators as being a large part of the group's success.

"They [Health/Medical MAC Group coordinators] were very professional, and made sure that everyone's point was considered valid."

"They set the tone of respect and kept us on track, especially when we jumped to operations and implementation instead of policy."

Equally important, most participants believed that the group was able to perform more efficiently and effectively each time they met. Reasons given for this progress included *"getting the right people at the table"* and *"building trust with each other."* Most participants commented that as group members became more familiar with one another and began trusting one another, the group's ability to make decisions improved. One participant made this observation:

"I remember one observer providing feedback [after the functional exercise] that they [hospitals] all had 'dogs in the fight.' This type of feedback just wasn't there as the group kept meeting."

When asked to describe the characteristics effective members' possessed, participants mentioned "*believing that the group was working to make decisions in the best interest in the community-including the best interests of the hospital;" "[being] collaborative;"* and *"trusting [the group]*."

Additionally, group members stated that ideal members would "*have working knowledge of their hospital operations"* and *"ideally have some knowledge of financial and medical issues, but at least have direct access to Chief Financial, Medical and Operations Officers*." This issue of direct access was seen as a challenge that the Health/Medical MAC Group needed to address.

Delegation of Authority and Technical Expertise

Several of the participants recognized that with each meeting, group members were more willing to reveal to what they could and could not commit their institutions (either because of their delegated scope of authority or because a conflicting approach had already been adopted by their institution/system).

"By the end of the process, we were able to be pretty vocal about 'here is what I can do and here is what I can't do.'"

Some group members and observers felt that the differences in delegated authority among Health/Medical MAC Group members presented challenges and could possibly make the group unable to do their work in real-time. One group member expressed this concern:

"We did come up with good choices and ultimately they were in the end approved by our agencies, but some still had to go back to get approval, they couldn't speak for their agencies. If we had to make decisions in two hours, I don't know if we could do this."

However, there was general agreement among group members that, regardless of their level of authority, they may not be able to make some decisions without consulting technical experts or administrators.

"I don't have the content to make some types of decisions. Even my Executive Team, they would have to consult with others first."

"My Administrator told me to bring back decisions I was uncomfortable making. Can't we do this in real-time?"

Suggestions group members offered to deal with issues of delegated authority included 1) have the topics sent out in time so that Health/Medical MAC Group members could consult their administrators, and 2) have the relevant technical experts *"on call,"* so they could call them if needed to finalize a decision during the meeting.

There were many comments by participants about the need to have different types of expertise *"at the table"* depending on the decision at hand. This issue became evident during the last meeting when the group was asked to decide whether it was time to begin developing a policy about curtailing elective procedures/surgeries in light of the current status of H1N1. The group did not reach consensus on the urgency of the policy issue and several members voiced that they needed to consult their higher-level administrators. One observer expressed frustration with this result.

"The group couldn't make a decision about making a decision."

The OQA consultants explained that traditional MAC Groups utilize outside participants and allow cooperating agencies and technical experts to attend MAC Group meetings, but they do not participate in the decision-making process. They emphasized that group members need to have delegated authority in order for the group to function effectively, autonomously, and quickly.

"*You can get the expertise as long as the people in the MAC Group understand the process and have delegation to represent their organizations."*

Observers also believed that the Health/Medical MAC Group membership should remain constant (including two or three trained alternates) because it was the relationships within the group that made the group effective. In contrast, some group members felt that "*content experts"* should have the vote for the institution/system for specific topics. Almost all participants thought that this issue of who is involved directly in decision making needed to be resolved. Both the Health/Medical MAC Group members and the OQA consultants agreed that regardless of who is going to vote on the decision, it was important that group members have information prior to the meeting so that appropriate experts can be consulted.

The discussion about making decisions with incomplete data highlighted another difference in opinion between Health/Medical MAC Group members and the OQA consultants. Group members did not feel comfortable making decisions if they did not have sufficient information and the support of their higher-level administrators. The OQA consultants stated that MAC Groups "*always"* face the dilemma of needing to make decisions without all the data, and that the group members need to have the authority and the confidence to make decisions in these cases.

Training for Health/Medical MAC Group Members, Developing Alternates and Collaboration

The OQA consultants strongly encouraged the Health Department and the HPO to "*rethink the belief*" that it would not be possible to get agency administrators and/or Health/Medical MAC Group members to commit to several days verses a few hours for training.

"This is a lesson learned for us. When we first started this because of the culture of the health profession, Multnomah County and some of the hospitals it was told to us that people don't have time to spend a day doing something. We can only do something in an hour chunk or two."
OQA consultants indicated that they would *"push back a lot harder"* next time a client wants to condense training into a few hours and emphasize the commitment level required: *"this is serious business folks."*

The consultants strongly felt that this investment of time upfront would have saved time in the long run. These all-day trainings would have provided in-depth training on roles, group process, delegated authority, scope of practice, and would also have provided time for the group to *"gel"* prior to participating in functional exercises and real-time meetings.

The consultants also felt that a lot of time was wasted by holding multiple, short meetings rather than one or two all-day meetings to develop the *Health/Medical Multi-Agency Coordination (MAC) Group Handbook.* They explained that by having several meetings, a lot of time was spent on reviewing decisions made during the earlier meetings.

The consultants also thought that the work groups would have benefited by having more training on Health/Medical MAC Group operations prior to their working on the *Health/Medical Multi-Agency Coordination (MAC) Group Handbook, Health/Medical Multi-Agency Coordination (MAC) Group Exercise Plan*, and other tools used by the Health/Medical MAC Group.

Most group members and observers indicated that they would have benefited from more training on the ethics framework as well as on MAC Group operations. Some group members indicated that if future trainings and exercises were scheduled out far enough (several months) and kept short, their high-level administrators would *"likely be interested"* in participating in light of the H1N1 experience. This suggestion is in conflict with what participants said about wanting more training and the OQA consultants' concern about the inefficiency of abbreviated training.

Several group members and observers expressed that it would be beneficial if each system/agency have two or three individuals trained to be Health/Medical MAC Group members. This practice is used in traditional MAC Groups, but was not developed for this project. Participants emphasized that all alternates would need to be involved in the Health/Medical MAC Group training and exercises.

When asked what could be done to improve the Health/Medical MAC Group (in addition to what has already been discussed), a few participants suggested that the group collaborate with groups that are already meeting, such as the Northwest Hospital Emergency Management Group.

"Maybe some of the issues discussed in these groups could be brought to the Health/Medical MAC Group for decision making?"

Section 5: Project Dissemination Plan, Ongoing Activities of the Health/Medical MAC Group and Issues for Future Study

This section will discuss 1) the dissemination plan for products and findings from this demonstration project; 2) ongoing activities of the Health/Medical MAC Group; and 3) anticipated issues for future study, including bi-state collaboration, legal issues related to licensure and liability, necessary technology support, and required communication processes.

Project Dissemination Plan

The goal of disseminating the project findings and products is to make available the project's tools, methodologies and processes to parties doing related health care preparedness work.

Tools Developed

- *Health/Medical Multi-Agency Coordination (MAC) Group Handbook*
- *Health/Medical Multi-Agency Coordination (MAC) Group Exercise Plan*
- Ethics Framework for Delivery of Essential Health Care Services
- Evaluation tools for measuring community acceptance

These tools are all part of the project's evaluation report and can be found at the Multnomah County Health Department website: www.mchealth.org

Target Audiences

Audiences with whom project findings will be shared include but are not limited to Oregon Healthcare Preparedness Regional Coordinators, Oregon Healthcare Preparedness Region 1 and SW Washington local public health administrators, health officers, county emergency managers, local public health emergency preparedness managers, and hospital administrators; Health/Medical MAC Group representatives, State Public Health Emergency Preparedness Program staff, NW Oregon Health Preparedness Organization Steering Committee members, and Organizational Quality Associates.

Dissemination Activities

The following activities have been completed or are anticipated at the time of this reporting.

Stakeholders and Community Partner Dissemination: The *Health/Medical Multi-Agency Coordination (MAC) Group Handbook* was distributed in February 2010 to all stakeholders listed under "Target Audiences." In addition, the Multnomah County Emergency Manager shared the *Handbook* at a meeting of Health Care Preparedness Region 2 Emergency Managers.

Peer-Reviewed Journal Contributions: The Principal Investigator is convening a group of interested co-authors to explore whether to develop and submit a manuscript for possible publication in peer-reviewed journals. Ideas for papers include: 1) Planning for a Pandemic: Techniques for Understanding Your Current Hospital Usage, and 2) Deferability Potential Based on Discharge Data, or Techniques for Quantifying Deferrable Hospital Visits Based on Discharge Data Sets.

Conference Presentations: Project staff presented at the *Collaborative Planning for the Delivery of Essential Health Care Services Meeting,* March 9-10, 2010, in Atlanta, GA. The purpose of this conference was for grant participants to present methodologies utilized, tools developed, and findings.

The Principal Investigator presented at the *Annual Oregon Epidemiologists' Meeting,* May 26-28, 2010, in Bend, OR. The purpose of this annual meeting is for Oregon's public health professionals to exchange information on current disease issues and trends. This year's conference featured issues of communicable disease topics of current concern (including H1N1) and public health preparedness.

The Principal Investigator may submit to present at the *Oregon Emergency Management Associates Annual Conference,* October 2010, Hood River, OR. Content is to be determined.

At the time of this reporting, the project staff has learned that the National Association of County and City Health Officials (NACCHO) has recognized the project as a "promising practice." There is some discussion whether it will be recognized as a "model practice." If it is designated as a "model practice," it will be acknowledged at the *NACCHO Annual Conference,* July 14-16 2010, Memphis, TN. In either case a written description of the practice will be the NACCHO website.

Ongoing Activities of the Health/Medical MAC Group

Health/Medical MAC Group members requested quarterly meetings to develop relationships and processes. HPO staff and the OQA consultants convened the first quarterly meeting on February 3, 2010. During the meeting the group committed to continuing the development, refinement, and institutionalization of the Health/Medical MAC Group.

The following list describes the future Health/Medical MAC Group work:

- Review (ongoing) the *Health/Medical Multi-Agency Coordination (MAC) Group Handbook.*
- Develop working guidelines.
- Conduct team building activities on the topics of decision making, communication skills, and learning members' personal and organizational values perspectives.
- Discuss and select processes to bring in new Health/Medical MAC Group members.
- Develop procedures to respond when there is less than full working consensus during initial decision making, when the overall situation changes, and when one or more organizations dissent after a decision has been made.
- Determine how issues go to the Health/Medical MAC Group and how issues are prioritized.
- Develop the ways technical specialists will be utilized by the Health/Medical MAC Group.

- Determine how member alternates are utilized and trained.

- Determine relationship between and perspectives of the Public Health MAC Group and the Health/Medical MAC Group.

- Determine level of public transparency, how and when to inform the public of decisions and obtain public feedback.

- Agree on proposals for Health/Medical MAC Group hosting Incident Support Organization training.

With a time extension on the Project 5 Grant, the Health/Medical MAC Group's work plan will be expanded to include the following activities:

- Further develop an ethics tool for use during Health/Medical MAC Group decision making to demonstrate the consideration of the four dimensions comprising the ethics framework.

- Explore individual and community public health ethics perspectives.

- Explore methods to ensure that health care provision during scarce resource situations does not exacerbate underlying racial/ethnic health disparities.

- Provide additional Health/Medical MAC Group trainings for both new members and for those identified as alternates in order to ensure a sustainable community methodology for policy and scarce resource decisions.

Issues for Future Study

The following discussion explores four issues that had been identified through the HPO's and the Health Department's previous work and were included in the original project's design. Due to the change in the project's focus from a 1918-like influenza event to H1N1, most of these issues were not addressed directly. Some played out during the Health/Medical MAC Group's work and some have been addressed during previous work. Consequently, the original performance measures have been operationalized to reflect the scope of work that was addressed. These issues include 1) bi-state collaboration, 2) legal issues related to licensure, 3) necessary technology support, and 4) required communication processes.

Bi-state Collaboration

As discussed in Section 4, Health/Medical MAC Group members felt strongly that bi-state collaboration and aligned regional decisions would serve the community better, be more acceptable, and help spread the financial burden more equitably among health care systems. Members strongly voiced that a formalized process be developed to collect data and other information from Southwest Washington and other counties (outside of Clackamas, Washington, and Multnomah Counties) in time for Health/Medical MAC Group meetings. Several group members expressed a similar sentiment to the following comment made by one group member:

"There are cross jurisdictional issues between counties, organizations and states. Getting information from both states was a challenge and we need to continue to be aware of the differences in laws, regulations, and systems for acquiring supplies."

During the course of this project, the Health/Medical MAC Group faced cross-border issues. Specifically, resource ordering arose as an issue that required ***bi-state and cross-border coordination.***[25]

The following section provides background explaining why cross-border issues affect the region's ability to effectively address a health/medical event and highlights work completed to develop a regional resource ordering process—including activities that were conducted in response to H1N1 during the course of this project.

The geographic region involved in this project includes Clackamas, Clatsop, Columbia, Multnomah, Tillamook and Washington counties in Oregon; and Clark County in Washington. The Columbia River serves as a state boundary that separates Multnomah County, Oregon from Clark County, Washington. More than 100,000 people commute between the two states each day for work, services, shopping and recreation. Many of Clark County's residents use health care services that are located in Portland or are part of health systems with facilities on both sides of the river. To ensure that residents on both sides of the Columbia River have equitable access to care, cross-border arrangements between counties and states must be developed. Because resource ordering was a prominent issue faced during this project, this issue will be the focus of this discussion. Factors making this an issue are highlighted below:

- During the H1N1 event, all hospitals in Clackamas, Washington, and Multnomah counties (Oregon) ordered scarce health resources through a Regional Emergency Coordination Center (ECC) which was hosted by one county (Multnomah). This County ECC compiled resource requests and shared the information with the Health/Medical MAC Group so they could make allocation decisions. Hospitals in Clatsop, Columbia, and Tillamook Counties (Oregon) order through their local health department to the State of Oregon.

- Clark County orders scarce health resources through the State of Washington.

- Health systems with hospitals in both Oregon and Washington states have to submit separate orders through the emergency management organization of the relevant county or state.

Work done over the past years to develop a regional resource ordering system in anticipation/response to these issues is highlighted below:

- Developed multiple approaches to regional resource ordering and gained input from hospitals and public health (centralized vs. decentralized process): January 2007 – July 2007.

[25] Evaluation measure operationalized from: 1) "Cross-border issues likely to become apparent during a pandemic are identified by appropriate bi-state health officials;" 2) "Cross-border issues resulting from a pandemic are incorporated into scenario-based exercises to test the effectiveness of proposed approach to address those issues;" and 3) "An acceptable approach is established between appropriate bi-state jurisdictions for addressing cross-border issues during a pandemic."

- Convened Region 1 Emergency Managers to agree on an approach to resolve regional scarce health resource ordering: July 2007.

- Planned for and facilitated region-wide resource ordering workshop: September 2008.

- Exercised regional resource ordering through one county during "SARS Attacks" emergency preparedness exercise: November 2008.

- Implemented centralized scarce health resource ordering system during H1N1, allowing all participating hospitals to order Tamiflu through one county: April 2009.

- Formalized and implemented regional ordering process for scarce health resources: fall 2009, H1N1 event.

Work is ongoing to re-convene emergency managers from the counties to affirm continuation of having one county provide regional support and resource ordering.

Legal Issues Related to Licensure and Liability

Over the past several years, work has been done to *identify the legal issues that could prevent professionals and health providers from participating in a coordinated response to a pandemic influenza event.*[26] The following discussion highlights this work.

Multnomah County, along with other counties within Oregon Healthcare Preparedness Region 1 and Clark County, Washington, has addressed the licensure and legal liability issues of volunteer professional staff through the establishment of Medical Reserve Corps units.

Work with hospital/health system members of the HPO has resulted in the formal adoption of a Memorandum of Understanding (MOU) between hospitals and health systems in the region. The MOU is a voluntary agreement that commits participating organizations to 1) coordinating emergency planning; 2) preparing for a coordinated health sector response to large-scale emergencies; 3) facilitating communications; and 4) providing mutual aid at the time of a medical disaster. Hospitals/health systems also have emergency credentialing plans in place which are consistent with the Joint Commission standards.

To a lesser degree, clinicians and hospitals have expressed concerns about liability created by having to deal with an unknown disease such as a novel strain of influenza, and implementing altered standards of care. Some of these questions were dealt with through Oregon's adoption (during the 2009 legislative session) of a new law that extended Tort Claims Act liability protection to health care providers and institutions in a declared emergency/public health crisis.

[26] Evaluation measure operationalized from: 1) "Legal consequences associated with licensure of professional staff, liability of staff and health care institutions are identified, investigated, and included in development of the Pandemic Health Care Delivery System Model;" 2) "Legal issues have be identified, and recommendations will be developed with an eye towards minimizing the potential for keeping professionals and health providers from participating in a coordinated response to a pandemic influenza event;" 3) "Legal issues associated with professional staffs and organizations are identified and recommendations established to address these issues;" and 4) "The Pandemic Health Care Delivery System Model is built on a foundation that has considered legal issues of professional staff and health care institutions."

The principal investigator of this project was a member of the Oregon Law Commission workgroup that developed the new legislation. His involvement involved advocating for 1) the Commission to see that the concerns were a real issue to providers, particularly physicians, due to historical conflicts between health care providers and the legal system, 2) the inclusion of hospitals/health care systems in the liability solution, and 3) the expansion of a tort claims act approach as a fundamental liability protection mechanism.

Another key aspect of work on legal issues related specifically to altered standards of care. Prior to this project, preliminary work was done to develop a mechanism whereby local communities could identify altered standards of care that would then be adopted (or sanctioned) by the state. This approach evolved as a result of working with the OQA consultants and the Oregon Public Health Division leadership and counsel.

While working with OQA, we came to appreciate that liability has always been an inherent part of making difficult and controversial decisions in the face of emergencies. Lawsuits will happen; the focus must be on taking right and necessary actions, and being well situated to defend decision makers against suits. This latter point involves 1) having clear processes by which decisions are made (in this case the Health/Medical MAC Group), and 2) having the decisions well documented and approved by the appropriate authorities.

In working with Oregon Public Health Division leadership and counsel, we agreed that it probably was not necessary or appropriate for the state to sanction local decisions. The weight of opinion (both programmatic and legal at both the state and local level) was that there was adequate local authority under general public health authorizations for these decisions to be made locally or regionally. In this view, the state offers no particular added value in terms of liability protection. The initial theory was that since state courts are the venue in which malpractice suits are typically filed, a statewide standard of care offered providers enhanced protection against liability. As we worked through the issues, this theory became less compelling. Basically, the conversation shifted to the position in which liability was seen as driven by the inherent reasonableness of the decision under the specific circumstances. We also came to appreciate that these circumstances were local. Decisions are made based on individuals' needs for care at a particular time and place (and therefore a particular resource and ethical context). As a result, the standard of care is really a local phenomenon, not a state one.

Technology Support

One of the original activities of the project was to identify technology support needed to manage the components of a Severity Index Category 5 pandemic influenza event over an eight-week period, including the processes and the information collected. The three original evaluation measures were predicated on the idea that there would be overarching technological systems, such as hospital capacity websites that require technology standards, and the assumption that we would be developing technological supports for the "system of care." During the project, it became clear that questions on minimum technology standards could not be addressed until there was improved ability to gain and understand situation status information.

As a result of this learning, a more appropriate goal is to *enhance the situation status capacities of individual critical providers (i.e. hospitals, and others) and integrating this information into a community level situation status report.*[27]

At the onset of this project, it was understood that having a clear process for health care delivery systems to share real-time data on the situation status, policy direction, public information, and personnel and resource need/availability/tracking would be crucial to an effective pandemic response. At the start of this project, Oregon State DHS Oregon had in place a Hospital Capacity website with the capability to monitor real-time Oregon hospital and emergency department data. It was believed that this technology would support coordination of the health sector response to a pandemic influenza event. During the switch from a 1918-like influenza exercise scenario to the actual H1N1 situation, we were able to test this website. We learned quickly that there was a need for significant improvements in the existing technology to support situation status functions. Learning from H1N1 is highlighted below:

- The existing process for collecting and maintaining situation status on hospitals was inconsistent and inefficient. The State Hospital Capacity website was clearly inadequate. It did not have field structures or field definitions that were adequate to support a clear understanding of hospital status based on the current situation. In addition, human factors significantly broke down (e.g., many hospitals did not report their status and others did so incompletely or inaccurately).

- As time went on, the hospital systems developed situation status systems and reports that were progressively more functional for the hospital system's internal use. The hospital systems shared these reports with the County Emergency Coordination Center's Planning Section Situation Status Unit which compiled the information for the Health/Medical MAC Group and regional situation status reports. One system in particular had an excellent set of situation status reports. These reports tracked overall influenza hospital admissions, ICU influenza patient census, employee absenteeism and other critical measures. Other hospital systems routinely tracked mask/respirator inventory in electronic format and also shared this information with the County Emergency Coordination Center's Planning Section Situation Status Unit.

- Other electronic tools were used (e.g., online surveys such as Zoomerang) to gather selected data such as inventories of specific supplies. These tools proved valuable for focal questions.

- Hospitals used various internal tools for tracking personnel assignments and needs. There was no universal tool accessible to the community. Neither was there any use of existing tools to predict staffing or other needs.

[27] Evaluation measure operationalized from: 1) "Minimum standards for technology support are considered as part of the discussion regarding Pandemic Health Care Delivery System Model;" 2) "The range of technology support needed and the role of technology support are assessed in terms of managing the components of a Severity Index Category 5 pandemic influenza event;" and 3) "Technology support is incorporated into the Pandemic Health Care Delivery System Model."

- As a result of these experiences, it was recognized that a tool be developed that will facilitate the collection of standardized information from all systems as well as have the ability to collect additional data as needed.

- Lastly, it was recognized that human-to-human communication regarding qualitative aspects of situation status was very valuable and revealed important information that was not captured numerically (and perhaps cannot be captured quantitatively).

Utilizing data from the emerging internal electronic hospital situation status data systems, human-to-human communication, and local public health surveillance data, it was possible to construct weekly regional situation status reports. These reports featured an overview of hospital status at the community level, transmission trajectory of the pandemic, and expectations for health care utilization in the coming week. Hospital partners found the reports useful to gauge the situation in their hospital vs. the larger community, and for planning for the near future.

Required Communication Processes.

Communication processes for both community-level triage and self-care are critical components of the health care system during a health crisis. Triage messages focusing on helping people determine whether they need to come in for care or use medically-supported self care would need to be part of the system of care. In Section 2 community-level triage is discussed as part of the health care delivery model.

A review of the evaluation feedback (discussed in Section 4) about *the range of communications messages and methods that could be utilized during a pandemic to conserve health care services by encouraging self-care when appropriate*[28] is highlighted below:

- Public health needs to be the *"voice"* of decisions made.

- Both health care systems and public health were involved in decision making.

- An ethics framework was used to guide decision making.

- Sick people will get care: insurance or ability to pay is not the decision criterion.

- Staying away from hospitals, emergency departments and clinics unless necessary is a way to not expose oneself or others to influenza.

- Community members need to conduct outreach that is culturally relevant and public health needs to be the authority representing science. If this is done, community members will understand and most likely follow recommendations.

[28] Evaluation measure operationalized from "The range of communications methods that could be utilized by the general public during a pandemic will be identified and assessed in terms of effectiveness as an alternative to traditional means of accessing health services."

- Messages should be on flyers, hotlines, television, radio, and newspapers (in many languages and community-specific publications).

- The existence of the Health/Medical MAC Group should be communicated to the public prior to a health/medical event.

The process for providing and maintaining current and effective communications with the general public, as well as health care responders[29] is as follows: Health/Medical MAC Group members were responsible for communicating decisions back to their respective organizations. Decisions made were also communicated through regional situation status reports sent to health care providers and other responding agencies. In addition, Health/Medical MAC Group coordinators provided these decisions to the Public Information Officers at the Joint Information Center for incorporation into public messages as appropriate.

[29] Evaluation measure operationalized from "The processes for providing and maintaining current and effective communications with the general public, as well as health care responders, will be established and integrated into the Pandemic Health Care Delivery System Model."

CDC Pandemic Influenza Collaborative Planning for Delivery of Essential Health Care Services: Portland Oregon Metro Area and SW Washington

APPENDICES

Attachment 1	*Summary of Discharge Database Analysis for Flu Pandemic Project (v.2)*	(37 pages)
Attachment 2	*Case Estimation Approach for Pandemic Planning Exercises*	(10 pages)
Attachment 3	"The numeric output of a typical epidemic curve from the model"	(2 pages)
Attachment 4	*Health/Medical MAC Group Exercise Plan* and Materials	(30 pages)
Attachment 5	*Pandemic Influenza Healthcare Delivery and Decision Making: A Community Discussion*	(27 pages)
Attachment 6	"CDC Pan Flu Grant –Catalog of relevant literature"	(36 pages)
Attachment 7	Evaluation Materials	(14 pages)
Attachment 8	*Health/Medical Multi-Agency Coordination (MAC) Group Handbook*	(34 pages)
Attachment 9	Examples of the Health/Medical MAC Group Decisions	(10 pages)

Summary of Discharge Database Analysis for Flu Pandemic Project (v. 2)
Prepared by Jeff Fletcher for Multnomah County Health Department
Last Updated: February 28, 2010

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Overview

The goals of the database analysis portion of this project include:

1. Identify types of hospital visits that can potentially be deferred (or relocated) during a pandemic.
2. Provide sample profiles of non-pandemic hospital usage to feed into pandemic epidemiological model and exercises with community stake holders.
3. Better understand current regional hospital usage patterns.
4. Develop or identify useful methods for characterizing current usage and deferrability.

This information can help inform discussions with appropriate stakeholders with an eye towards accommodating some of the extra healthcare utilization needs during a severe Flu Pandemic episode in the Portland region, including reallocation of hospital resources (e.g. deferral or change of treatment venues).

Some of the key findings from this data analysis include recognizing:

1. The large impact uncomplicated obstetrics (OB) has in overall hospital utilization (about 10.9% of all hospital days; includes uncomplicated C-sections and healthy newborns).
2. The large impact that clearly deferrable visits (mostly elective surgeries) have in overall hospital utilization (about 9.6% of all hospital days).
3. The large impact that mental healthcare and addiction treatment have in overall hospital utilization (about 8.0% of all hospital days).

4. The usefulness of using Diagnosis Related Group (DRG) codes (one per hospitalization) combined with sub-groupings based on the Agency for Healthcare Research and Quality (AHRQ) Clinical Classification Software (CCS) classifications for the Principle Diagnosis of each hospitalization. This combination achieved an appropriate level of granularity where a panel of clinicians could make judgments on the deferrability of different hospital visit types.
5. The usefulness of calculated census data in understanding actual hospital usage patterns, as opposed to measures such as licensed beds.
6. Significant temporal variation in hospital utilization (both for weekend vs. weekday and holiday season vs. non-holiday season) and how this varies among different types of hospital visits (defined in terms of discharge DRG and CCS classification).
7. That quantifying this temporal variation for different visit types helps validate the clinical judgment about deferrability, while also highlighting some visit types that need further investigation as to their deferrability.
8. That this data analysis and judgments on deferrability are unlikely to be useful in individual triage decisions, but are useful in higher-level planning, such as understanding regional hospital usage patterns for different visit types.
9. The different care specialization at different hospitals and how deferral decisions based on visit type might affect hospitals differently.
10. The limitations of the discharge database in identifying non-pandemic flu vs. non-flu patients and ICU vs. non-ICU patients.

Deciding Data Granularity

Which Data?

Originally a database of all 17 Portland regional area hospital discharges for the year 2007 was used for analysis. Discharge records in the database are de-identified and include patient demographic data, up to nine International Classification of Disease (ICD-9) diagnosis codes, up to six ICD-9 procedure codes, Diagnosis Related Group (DRG) code, DRG Major Diagnostic Category (MDC) code, Length of Stay (LOS), as well as billing/insurance and other data.

This database contains an entry for every hospital discharge during 2007, but not all admissions for the year. It contains admissions prior to Jan. 1, 2007 if the patient was discharged in 2007, but not any admissions for patients admitted in 2007 and discharged after the end of the year. So the number of discharges is unbiased within any intra-year time period, but the number of admissions in the database drops artificially towards the end of the year.

Because we wanted to investigate some temporal patterns based on admission data across a complete year we added Dec. 2006[1] discharge data and then looked at a 52 week (364 day) period from Monday Dec. 4, 2006 to Sunday Dec. 2, 2007[2]. Examples of questions we wanted to address using admissions dates rather than discharge dates include:

[1] Note that the 2008 discharge database was not available.
[2] This method misses admissions that occurred prior to Dec.2, 2007 but which were not discharged until after Dec. 31, 2007. Patient stays of more than 30 days are rare (about 0.86%, calculated using discharge records for the first half of 2007).

- Can we assess whether care for some diagnoses can be deferred based on the fact that they tend to have significantly less admissions on holidays and weekends than on weekdays?
- Can we assess whether care for some diagnoses can be deferred based on the fact that they tend to have fewer admissions during the Christmas/New Year's holiday season than at non-holiday periods?

More accurate admission data was also needed in order to calculate hospital census numbers during the year. While census data can be inferred from discharge or admission count along with LOS data, it is sometimes helpful to think in terms of daily census numbers directly when looking at particular types of hospital utilization and calculated census data was also prepared for the flu pandemic exercises.

In addition to accessing deferability based on weekdays vs. weekend and holidays, we also wanted to assess changes in admission counts during the Christmas/New Year's holiday period for different types of hospital stays. In order not to confound the day of the week effect, the goal was to use a two week period surrounding these holidays and compare it to admission data both before and after the holidays. A 10 week period was used for this analysis from Sunday 12/3/06 to 2/10/07[3].

These different cuts on the data are listed in Table 1 along with some aggregate data on each. Note that the Length of Stay (LOS) data provided in each discharge record does not include the day of discharge unless it is the same as the admission date. Patients who have the same admission and discharge date have a LOS of 1; patients who have a discharge date on the day following their admission date also have a LOS of 1. This convention was also followed when calculating census data. Patients were not counted in the census on their discharge date unless it was also their admission date.

Table 1 Different cuts of the data used for analysis along with some of their summary values.

Dataset	Date range	Days	Records	Avg./Day	Avg. LOS	Total Days
Discharges	1/1/07 – 12/31/07	365	226,735	621.2	4.24	961,376
Admissions	12/4/06 – 12/2/07	364	226,258	621.6	4.19	948,921
Census	12/4/06 – 12/2/07	364	N/A	2,623.0	N/A	954,788
Holiday Adm.	12/3/06 - 2/10/07	70	43,659	623.7	4.19	182,906

Table 2 gives average daily census data for each hospital along with some aggregate data for the period 12/4/06 – 12/2/07. Note that these are averages across all types of admissions. Some hospitals have higher censuses for certain kinds of problems (e.g., see Table 4 for results of mental health and addiction admission and census data). This list (and analysis) does not include the Portland Veterans Hospital which is not required to report their data to the state, nor does it include Tuality Forest Grove (its few discharges are counted with Tuality Healthcare hospital). The average daily census calculated from this data is 2,623 (with a range of 1906 to 2932 and a

[3] We switched to a Sunday to Monday definition of a week here so as to not to split Christmas Eve (Sun.) and Christmas Day (Mon.) into different weeks. This also applies to New Year's Eve and New Year's Day.

standard deviation of 160.3). To give some feel for saturation[4], the average overall census is 89.5% of the maximum census seen during the year-long study period.

Table 2 Average calculated census data for the period 12/4/06 – 12/2/07 (ordered from highest to lowest); percentage of total census for each hospital; the max, min, and standard deviation of daily census; and the percentage of max census represented by average census. The average LOS (from admissions data 12/4/06 – 12/2/07) is also shown by hospital.

Hospital	Avg. Daily Cen-sus	% of Overall Avg. Daily Cen-sus	Min Daily Cen-sus	Max Daily Cen-sus	Std. Dev. of Daily Cen-sus	Avg. Cen-sus as % of Max Cen-sus	Avg LOS
PROVIDENCE ST VINCENT MED CTR	430.3	16.40%	320	512	32.8	84.0%	4.0
OREGON HEALTH SCIENCES UNIV.	400.7	15.27%	260	463	32.8	86.5%	5.0
PROVIDENCE PORTLAND MED CTR	309.1	11.78%	243	362	22.9	85.4%	4.5
LEGACY EMANUEL HOSPITAL	299.9	11.43%	232	348	20.9	86.2%	5.5
SW WASHINGTON MEDICAL CTR	258.4	9.85%	201	310	20.9	83.4%	3.8
LEGACY GOOD SAMARITAN HOSP.	175.7	6.70%	122	214	16.5	82.1%	4.5
KAISER SUNNYSIDE MEDICAL CTR	166.7	6.35%	119	313	22.4	53.3%	3.8
ADVENTIST MEDICAL CENTER	144.5	5.51%	102	184	15.3	78.5%	4.2
LEGACY SALMON CREEK HOSPITAL	96.9	3.69%	57	128	12.5	75.7%	3.6
TUALITY HEALTHCARE	89.9	3.43%	58	118	11.1	76.2%	4.0
LEGACY MERIDIAN PARK HOSPITAL	82.8	3.16%	47	111	12.1	74.6%	3.5
LEGACY MOUNT HOOD MEDICAL CENTER	55.8	2.13%	35	74	8.0	75.4%	3.2
WILLAMETTE FALLS HOSPITAL	41.6	1.59%	18	64	8.6	65.0%	2.9
PROVIDENCE MILWAUKIE HOSPITAL	30.8	1.17%	14	51	6.2	60.4%	3.0
COLUMBIA MEMORIAL HOSPITAL	18.8	0.72%	6	32	4.9	58.9%	3.0
PROVIDENCE SEASIDE HOSPITAL	11.5	0.44%	4	21	3.5	54.8%	3.1
TILLAMOOK COUNTY HOSPITAL	9.8	0.37%	1	21	3.6	46.6%	3.0
Overall Values for All 17 Hospitals	**2,623**	**100%**	**1906**	**2932**	**160.3**	**89.5%**[5]	**4.2**

Which Classification Schemes?

An important problem we faced was to decide at what level to think and to communicate with stakeholders in terms of which patients might be deferred or given different treatment during a flu pandemic. In the discharge data for 2007 there are 4,831 unique ICD-9 principle diagnosis

[4] Note that there are 3,863 total licensed beds (regular and ICU, excluding emergency room), but the proportion of these beds that are staffed or physically available was not available from the data. See http://www.ahrq.gov/research/havbed/definitions.htm for definitions of bed statuses.

[5] The overall value is higher than for any individual hospital because the denominator (max census) values for each hospital do not all occur on the same day. So the overall value for max census is relatively dampened compared to individual hospital values.

codes and 2,022 unique ICD-9 principle procedure codes[6]. In addition, 90% of records have a second diagnosis, 78% have a third diagnosis, and 27% have four or more diagnoses for a particular hospital stay.

Our initial approach was to group discharge records with similar principle diagnosis codes or similar principle procedure codes using the Agency for Healthcare Research and Quality (AHRQ) Clinical Classification Software (CCS) data[7]. This CCS data collapses multiple ICD-9 codes into significantly fewer clinically relevant categories (there are 284 diagnosis categories and 234 procedure categories). This approach was fairly quickly set aside in favor of grouping by DRG codes instead (there are 579 DRG codes). Reasons for this included the fact that a single DRG code per discharge was thought to capture resource utilization better than just relying on principle diagnosis or procedure (given that patients often have multiple diagnosis and procedures).

Using the 2007 discharge data we grouped discharges by DRGs and sorted them by the total hospital days (sum of all LOS values for each DRG)[8]. The health officer for the county (Dr. Gary Oxman) labeled the most impactful DRGs as *urgent*, *elective*, *probably elective*, or *unclear* based on the DRG descriptions alone. The top 202 DRGs (accounting for ~90% of all hospital days) out of the 528 DRGs that occurred in the database were categorized in this way. Only 6 DRGs were labeled as elective or possibly elective accounting for about 3% of total hospital days, 110 were labeled urgent (~51% of total hospital days), and 86 were labeled unclear (~36% of total hospital days). Based on this analysis it was decided that a better understanding of what was behind the more impactful DRGs (especially those labeled unclear) was needed.

In order to get a better sense of what might be deferrable or moved to other treatment venues, at Dr. John McConnell's suggestion, we next looked at combining DRGs and CCS codes by breaking down the discharges under each DRG by CCS code. Based on doing this analysis with some sample impactful DRGs, it was decided that DRGs alone were too course a level to assess deferability and that this combination gave a much clearer picture.

Data Analysis

Physician Panel Judgment of Deferrability

For this next phase a panel of three practicing physicians (Drs. Rob Stenger, Jessica Vorpahl, and Safina Koreishi) each independently ranked the deferability of DRG-CCS combinations. This was done for the most impactful 100 DRGs (those representing the most total hospital days) and for all CCSs categories (based on principle diagnoses) under these DRGs that accounted for more than 1% of that DRG's hospital days. This resulted in 653 DRG-CCS combinations being assessed, which accounted for a total of about 72.5% of all hospital days in the 2007 discharge dataset. The assessment for each physician was binary (yes or no) with regard to the following

[6] All records have a principle diagnosis listed; only 64% of records have a principle procedure listed.
[7] Available at http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp
[8] We use total hospital days as a proxy for the impact on hospital usage. We also considered using DRG weight, but this did not seem to be that useful. Other possibilities in the database (which have not been explored) include RDRG severity level and charge breakdowns (e.g. for operating room, oncology, labor and delivery, radiology, etc.)

question: “Could hospital services for patients in this group be delayed for 6-8 weeks without causing significant morbidity or death for most patients? (yes/no).” The results for these 653 DRG-CCS visit types are listed in Table A1 of Appendix A. The physician panel also identified which of the top 100 DRGs could be classified as mental health and addiction related, and which could be classified as obstetrics related (subdivided into with and without complications). These classifications were different than the deferrability question above. They were done as background information for considering whether mental health/addiction and uncomplicated OB patients might be treated at alternative venues during a flu pandemic.

These results are summarized in Dr. Robert Stenger’s report[9] of May 14, 2009: *Physician Rating of Deferability of within-DRG CCS Categories*. The main findings are in Table 3 below. There was 77.2% agreement of all 3 physician reviewers on the deferrability (or not) of the 653 combined DRG-CCS categories (504/653). DRG-CCS categories that were not assessed by the panel represent 27.5% of all hospital days in the discharge database.

Table 3 Main results of assessment of 3-physician panel on deferability (or possible relocation) of 653 combined DRG-CCS categories (representing the top 100 DRGs and all associated CCS categories for each DRG that made up more than 1% of the DRG’s hospital days). The DRG value comes directly from the individual records in the discharge database, the CCS codes comes from mapping the ICD-9 code in the principle diagnosis field to the associated CCS category. These categories represent 72.5% of all hospital days. Non-assessed categories represent 27.5% of hospital days.

Categories	**Criteria for inclusion**	**% of Total Hosp. Days**
Mental Health and Addiction (MH)	DRG 426, 429, 430, 521, 522, or 523	8.0%
OB without complications (includes C-sections and healthy newborns)	DRG 371, 373, or 391	10.9%
OB with complications	DRG 370, 372, 383, or 390	2.9%
Non-OB/MH clearly deferrable	unanimous panel vote on DRG-CCS (among non-OB/MH top 100 DRGs)	9.7%
Non-OB/MH clearly NOT deferrable (includes preemies)	unanimous panel vote on DRG-CCS (among non-OB/MH top 100 DRGs)	32.8%
Non-OB/MH not clearly deferrable or clearly non-deferrable	mixed panel vote on DRG-CCS (among non-OB/MH top 100 DRGs)	8.1%
TOTAL (reviewed by physician panel)	Top 100 DRGs with associated CCS representing > 1% of DRG	72.5%

This panel initially looked at CCS codes for both principle diagnoses and principle procedures under each DRG, but quickly decided that the procedure codes were not that helpful in making their deferability assessments.

It is noteworthy that most DRGs contained a mixture of deferrable and non-deferrable CCS categories as judged by the physician panel. This supports the idea that the DRG level alone was

[9] Note that where percentage values differ between Dr. Stenger’s report and this one it is because he calculated percentages based on the hospital days in the *assessed data*. Unless otherwise stated percentages here are based on *total hospital days*, including those not assessed by the doctor panel.

too course a level. Also, the deferability of the same CCS categories varied when they appeared under different DRGs. Even a single physician rated a CCS category differently depending on which DRG it fell under and sometimes all 3 physicians agreed on a different deferability decision for the same CCS that appeared under different DRGs. This supports the original decision not to use CCS alone as it would also have been too course a categorization scheme.

Triage vs. Deferability Assessment

While the physician panel felt comfortable that their clinical judgments at the DRG-CCS level "could provide a more refined estimate of the overall hospital volume that could be reduced during the initial stages of an outbreak (e.g. by requesting hospitals cancel elective surgeries, defer non-emergent and scheduled admissions, etc.)" they were not confident that these "judgments of deferability at the CCS level could be successfully used as part of a larger triage strategy in more advanced stages of an outbreak." One reason for this is that the discharge database contains retrospective clinical judgments of diagnoses and DRG category, but triaging patients needs to be based on severity and type of symptoms on presentation to the hospital. For this reason the physician panel looked at developing a triage classification based on presenting symptoms and stage of the epidemic.

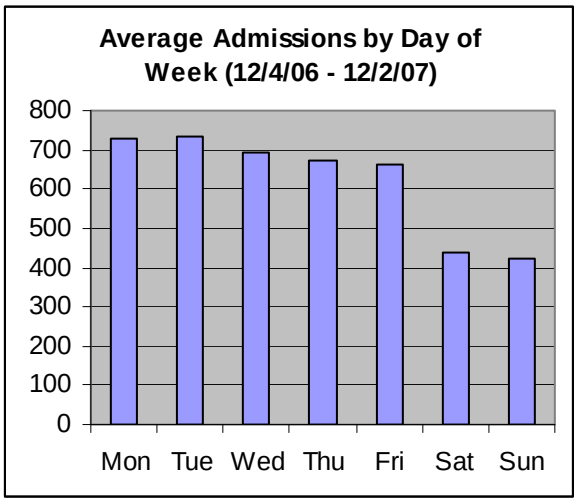
Temporal Analysis and Deferability

One approach suggested by Dr. Rajiv Sharma was to look for differences in the number of admissions for different time periods as another measure of deferability. For instance, the differences between weekdays and weekends/holidays, and the differences between holiday periods and non-holiday periods might reveal differences that indicated self-deferral by patients and the hospital system's aggregate judgment as to what conditions can be deferred to more standard weekday work hours for staff.

We began by using a 10 week period (12/3/06 - 2/10/07) surrounding the Christmas and New Year holiday period. We compared the two or three weeks containing Christmas and New Year's Day with the surrounding weeks. While there was some detectable effect for some clearly deferrable visit types (e.g. hip replacement), for others there appeared to be too weak a signal to detect in the noise. This was partly due to having less data due to this shorter time period. We decided fairly early on to focus on the difference between weekdays and weekend/holidays averaged over the whole year, but further analysis of a holiday season effect might prove useful in the future.

Note that there are different intra-week patterns for admissions vs. census data, as is evident in Fig. 1. For admissions the weekend average is 61.5% as large as the weekday average. In contrast, for census data the weekend average is 91.4% of the weekday average. So overall, census numbers show much less of a weekend effect than admissions.

A



B

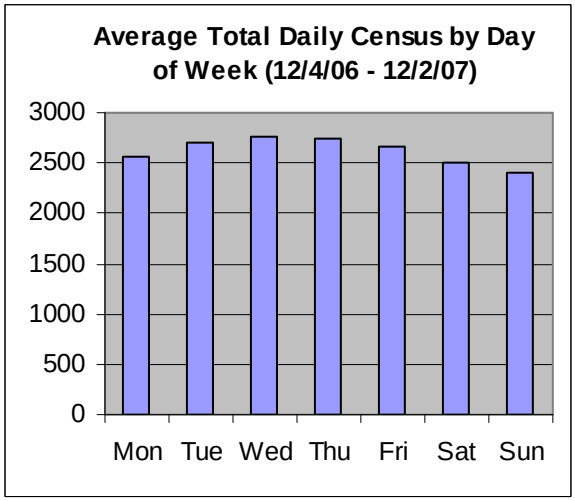
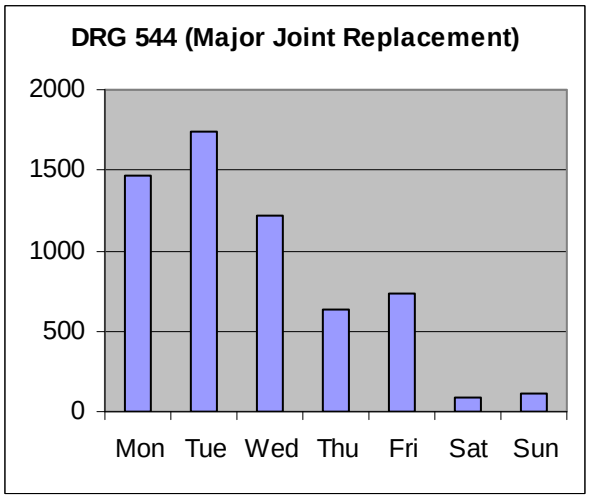


Figure 1 shows the overall average weekday pattern for both admissions (A) and census data (B) for one year.

The weekend effect on admissions is also very variable for individual visit types. For example, for DRG 544 (Major Joint Replacement) the average number of admissions on weekends is only 8.4% of what it is on weekdays, whereas for heart attacks where the patient survives (DRG 121, Circulatory Disorders w AMI & Major Comp, Discharged Alive), the weekend average daily admission value is 95.2% of the average for weekdays. This contrast is illustrated in Fig. 2.

A



B

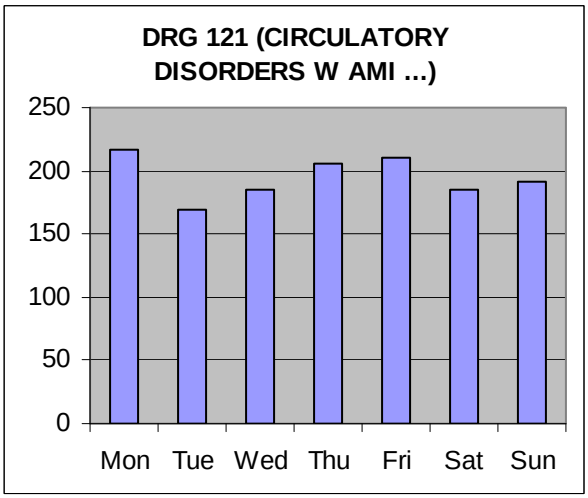


Figure 2 contrasts the weekday vs. weekend admission patterns for joint replacement surgery (A) and heart attacks (B).

While these findings confirm the clinical judgment that heart attacks are less deferrable than hip replacements, we wanted a more formal way to quantify the effect of weekends and holidays on admissions for different visit types. The idea was to compare this analysis with the three physician panel's assessment of the deferability of clinical visit types defined by DRG-CCS pairs. The current analysis used the same 653 DRG-CCS pairs used by the physician panel, but

in order to avoid end of year effects, here we looked at admissions for the period 12/4/06 – 12/2/07 (52 weeks) rather than 2007 discharges[10].

We defined a deferability index (DI) as follows: the probability of a weekend/holiday admission compared to the expectation of a weekend/holiday admission if there were no weekend/holiday effect. This expectation is 110 / 364 where 110 is 52*2 weekend days plus 6 weekday holidays. (How these 6 holidays were chosen is explained in the Appendix B). So for each DRG-CCS pair this index is:

[(# weekend/holiday admits for DRG-CCS) / (total admits for DRG-CCS)] / [110 / 364]

This measure of deferability is 0.0 if there are no admissions on weekend/holidays and 1.0 if the number of admissions on weekend/holidays matches the expectation of no weekend/holiday deferrals (the null hypothesis). A value of 0.4 for example would mean that the admissions for a particular visit type that fell on weekend/holidays were only 40% as numerous as would be expected if there were no weekend/holiday deferral effect. Note that DI values greater than 1.0 were also possible indicating that some visit types were more likely on weekends or holidays, e.g. multiple significant trauma with spinal cord injuries (DRG-CCS: 486-227) has a DI of 1.89.

In the data analysis group we had a fair amount of discussion on how to assess the statistical significance of DI values. Even if there was no weekend/holiday effect, just due to stochasticity it would be rare to get a deferability index of exactly 1.0. We did not settle on a clear method of assessing statistical significance, but instead focused on those DI values that showed the most marked difference from the physician panel assessment and which represented a significant number of hospital days (> 500 days). This produced 34 DRG-CCS pairs where there seemed to be a clear discrepancy between the DI and the unanimous judgment of the panel. Two members of the original panel (Drs. Stenger and Vorpahl) independently assessed reasons for the discrepancies. The main hypothesis were:

1. length of deferrability on the order of a weekend or holiday is significantly different than deferral for 6-8 weeks during a pandemic
2. CCS/DRG titles do not provide sufficient information to make a clinical judgment
3. discharge principle diagnosis was significantly different than complaint at admission

The main results for this reanalysis were:

- For 10/34 visit types both physicians agreed these were likely due to hypothesis #1 (length of deferability, weeks vs. days). These are primarily either types related to OB/Newborns or Chemotherapy that the data says are deferrable on weekends but physicians judged not deferrable for 6 weeks.
- For 8/34 visit types both physicians agreed these were likely due to hypothesis #2 (CCS/DRG titles don't provide sufficient information to make a clinical judgment). These are primarily items related to surgical procedures (e.g "major chest surgery" or "cardiac valve replacement") that docs rated as not deferrable because they could be potentially life threatening, but data says were deferrable on weekends/holidays.

[10] This difference caused one DRG-CCS pair to have no data in the new analysis, so only 652 were used.

- For 1/34 lines both physicians agreed this was likely due to hypothesis #3 (final diagnosis vs complaint at admission)
- For 13/34 lines physicians did not agree on a particular hypothesis.

From this we concluded that:

- Weekend/holiday analysis probably misrepresents deferability of some OB and chemotherapy care (about 1/3 of the visit types reanalyzed).
- In other areas of disagreement, the conservative approach would be to count these lines as non-deferrable (consistent with physician panel's judgment), though in some cases these may be elective surgeries/admissions that could be safely deferred.
- The DI was useful in adding support to the majority of assessments by the physician panel and where differences arose there were generally understandable reasons.

Other Data Analysis Efforts

Data for Epidemiological Model on Exercise Dates

Baseline data for contemporary normal use was required for the 1918 pandemic inspired epidemiological model. The idea was to use 2007 census data for the calendar dates surrounding each of the three exercises and then supplement this baseline with predicted additional demands from the epidemiological model. Ideally this baseline data would be broken down to match categories used in the model. This included by hospital, age bands (< 1 , 1-4, 5-19, 20-44, 45-64, > 64), seasonal flu patients vs. non-flu, ICU vs. normal floor patients, and ICU with flu vs. other ICU patients. Unfortunately the data itself could only tell us 2007 census values by hospital and age band (see next two sections). This data was prepared, but the focus of the exercises shifted away from use of the epidemiological model predictions towards real-world issues related to the N1H1 outbreak.

Who is a Flu Patient?

Surprisingly, there do not appear to be an DRG codes explicitly linked to flu infections and their treatment. There is one CCS code (123, "Influenza") which maps onto only four ICD-9 codes:

- 4870 INFLUENZA WITH PNEUMONIA
- 4871 FLU W RESP MANIFEST NEC
- 4878 FLU W MANIFESTATION NEC
- 488 FLU D/T AVIAN FLU VIRUS

Searching the whole 2007 discharge database for these four ICD-9 codes reveals only 104 records with one of these codes as the principle diagnosis and another 87 records where one of these ICD-9s shows up in any of the diagnosis fields (2-9). Physician Katrina Grant looked through the DRG's, and identified a few that may have been used for flu-related hospitalizations. These include DRG 421 (viral illness>17) and DRG 422 (viral illness and fever of unknown origin 0-17). It could also be that respiratory DRGs were used for flu patients, the most general being DRGs 79 to 81 (respiratory infections & inflammations), though it is impossible to distinguish the cause. Others possibilities include DRGs 99 to 102, and DRG 87. In summary, we found that the DRGs are too general to reliably identify flu patients.

At the ICD-9 level there are two additional codes for "viral pneumonia nec/nos" (ICD-9 4808 and 4809, respectively), which may include some influenza cases. In addition, Dr. Grant stated:

"It is also possible that many hospitalized cases with bacterial complications of flu are simply falling into the pneumonia category without further identification of pathogen."

Even if we assume all "viral pneumonia" as flu (by adding ICD-9s 4808 and 4809 to the four listed above that explicitly mention flu) this gives 227 admissions for principle diagnosis or 384 admissions across all 9 diagnosis fields (still only ~1 per day across all hospitals). We also used these 6 ICD-9 codes to look at census numbers for the months Sept., Oct., and Nov. 2007 (to cover date ranges requested for exercises). There were between 80-120 census days per month across all hospitals that were associated with the flu (or "viral pneumonia"). This is 3 or 4 per day out of a total daily census of ~2,500. So in terms of non-pandemic hospital utilization for flu, we were not able to detect significant numbers of flu patients using only the discharge database.

Who is an ICU Patient?

There is no direct designation in the discharge database concerning which patients have spent time in the ICU, nor for how long. Ideally we would know which days a patient was using the ICU. One possibility we considered was to look at which procedures might indicate ICU usage indirectly. For example, CCS categories for procedures include code 216 "Mech ventil" which maps to ten ICD-9 procedure codes:

- 9602 INSERT OROPHARYN AIRWAY
- 9670 CONT MECH VENT-UNSPC DUR
- 9605 RESP TRACT INTUBAT NEC
- 9671 CONT MECH VENT < 96 HRS
- 9604 INSERT ENDOTRACHEAL TUBE
- 9672 CONT MECH VENT 96+ HRS
- 9601 INSERT NASOPHARYN AIRWAY
- 9392 OTH MECH RESP ASSIST
- 9390 CONT POS AIRWAY PRESSURE
- 9603 INSERT ESOPH OBTU AIRWAY

The challenge here is that some of these codes may be used in anesthesia coding for surgical patients. One possibility we did not pursue is to look for patients with no surgical diagnoses/procedure codes with codes for ventilation. Even if we were able to indentify patients who spent some time in the ICU, we would not know their length of stay in the ICU vs. floor beds as procedure codes give no indication of dates or other temporal information.

DRG 565 and 566 (respiratory system diagnosis with ventilator support, <96 or +96 hours, respectively) might be a good surrogate for the ICU patients that required mechanical ventilation (and presumably most of them could be considered ICU flu patients if a flu related ICD-9 was given as the principle diagnosis), but this is very unlikely to give a complete picture of ICU flu patients. In summary, we concluded that further data analysis alone was unlikely to yield reliable estimates for ICU utilization, nor which part of this utilization was due to flu patients.

Differences in Mental Health / Addiction Census Across Hospitals

In order to facilitate discussions about possibly utilizing alternative (non-hospital) venues for the treatment of mental health problems and addiction during a pandemic episode, a deeper analysis was undertaken to understand how census and admission values for these broad categories varied

across hospitals. The same DRGs listed in Table 3 for mental health and addiction were used to identify patients by hospital.

Table 4 shows the 8 hospitals with the greatest number of Mental Health and Addiction Treatment patients for 12/4/06 to 12/2/07. (The other 9 hospitals average less than one MH patient per day.) Shown are total admissions, average length of stay (LOS) for MH patients, total number of MH related hospital Days, "% Admits MH" is percentage of each hospital's admits that are MH related, and "% Days MH" is percentage of each hospital's total days. The average daily MH related census by hospital is also shown.

Hospital	MH Admits	MH Avg. LOS	MH Days	% Admits MH	% Days MH	Avg. Daily MH Census
ADVENTIST MEDICAL CENTER	2,601	7.20	18,716	21.0%	35.8%	51.9
PROVIDENCE PORTLAND MED CTR	2,347	7.66	17,971	9.4%	16.0%	49.7
PROVIDENCE ST VINCENT MED CTR	1,370	8.53	11,682	3.5%	7.5%	32.2
LEGACY GOOD SAMARITAN HOSPITAL	1,045	5.75	6,005	7.4%	9.4%	22.7
LEGACY EMANUEL HOSPITAL	1,025	7.97	8,169	5.2%	7.6%	16.4
OREGON HEALTH SCI. UNIV. HOSP.	793	6.42	5,092	2.8%	3.6%	14.4
SW WASHINGTON MEDICAL CENTER	790	6.55	5,178	3.2%	5.5%	14.0
TUALITY HEALTHCARE	173	10.27	1,776	2.1%	5.5%	4.7

Note that Adventist Medical Center ranks 8th in terms of overall average census, but has the highest census (average of 51.9 per day) of all hospitals for mental health patients. This is more than a third of their overall average daily census. Also note that even though mental health stays are typically longer than average, Adventist's average LOS across all patients matches the overall average for all hospitals (see Table 2).

Tying DRG-CCS Classification to Oregon Health Plan Classifications

The Oregon Health Plan (OHP) includes a prioritized list of 680 medical conditions or categories of treatment (called "lines")[11]. We wanted to explore whether the OHP effort to prioritize care choices might inform our efforts to identify conditions that could be deferred during a flu pandemic episode. There is no direct mapping of DRG or CCS codes to the OHP list, but there is a mapping between the OHP list and ICD-9 codes[12]. Since CCS codes also have a mapping to ICD-9 codes, we decided to try and map the OHP list to CCS categories via shared ICD-9 codes.

Starting with the OHP data and mapping the 680 OHP "lines" to CCS categories (via ICD-9 codes) results in many of the OHP lines mapping to multiple CCS categories (even though there are only 258 CCS codes). Of the 680 OHP lines, 285 map to only one CCS code; an additional 184 map to two CCS codes, and the remaining 210 map to three or more codes (with a maximum of 52 CCS codes mapping to as single OHP line). As a specific example, OHP line 1 (PREGNANCY) maps to 21 different CCS categories, most related to pregnancy but also the CCS categories of "Substance-related disorders" and "Miscellaneous mental disorders." The mean value is about 29 ICD-9 codes mapped to each OHP line (19,898 OHP-lines to ICD-9 mapping rows for the 680 OHP lines). Of these nearly twenty thousand rows, there are 13,154

[11] Latest version at www.oregon.gov/OHPPR/HSC/docs/Jan10PList.pdf
[12] http://www.oregon.gov/OHPPR/HSC/docs/4.09.09FinalChanges/Apr09ICD-9-CM.txt

unique ICD-9 codes. Many of these ICD-9 codes are not relevant to our data given that there are only 4,831 unique ICD-9 principle diagnosis codes in 2007 discharge data . Also, out of the 19,898 rows 2,277 have no ICD-9 match in the CCS mapping table.

Given these results and time constraints, we were not encouraged to do further analysis at this time. It remains an interesting and open question as to whether OHP prioritizations could inform planning or triage decisions related to a flu pandemic episode.

Conclusion

The data analysis part of this project achieved its goal of giving decision makers and other stakeholders a better feel for current hospital utilization, while point out areas where the discharge data alone could not adequately answer important questions about current usage (e.g. Flu and/or ICU status of hospital patients). New methods of analysis include the use of a physician panel to review deferrability of visit types defined by the combination of DRG and CCS categories, the Deferrability Index (DI), and the use of calculated census data from discharge and admissions data. While this represents a good start, there are still several areas where further analysis might prove useful. These include:

- Further use of clinical panels, for instance in clarifying flu status and ICU usage, in establishing clear triage methodology, and in exploring alternative venues
- Further analysis of differences in hospital usage patterns for other broad categories such as obstetrics and elective surgery
- Analysis of billing data for insights into other issues of utilization and the way financial considerations may affect deferrability decisions
- Analysis of other categorizations including MDC classifications or other ways to roll up to higher levels of categorization
- Further analysis of holiday season effect
- Refinement of Deferrability Index, especially around issues of statistical significance and how to compare to physician panel's assessments
- Further analysis of Oregon Health Plan prioritization and how it could be leveraged for deferrability and/or triage plans during a flu pandemic

Appendix A: Table of 653 DRG-CCS Hospital Visit Types

Table A1 gives codes, descriptions, total admissions, weekend/holiday admissions, average length of stay (LOS), total hospital days, deferability index, and physician panel judgment of deferrability for the 653 DRG-CCS pairings evaluated (ordered by total hospital days). Note that Deferrability Index is 0 for pairings that have no admissions on weekends or holidays and 1.0 for pairings the show no weekend/holiday effect. In contrast, physician panel deferrability is 1 if all physicians agree that the visit type is deferrable and 0 if all three physician agree that it is not deferrable.

DRG	CCS DX	DRG title	CCS DIAGNOSIS	Total Admits	Weekend Holiday Admits	Avg LOS	Total Days	Defer-ability Index (DI)	Panel Defer-rability (0-1)
391	218	NORMAL NEWBORN	Liveborn	23023	5597	2.1	48137	0.80	0
430	657	PSYCHOSES	Mood disorders	4374	809	7.2	31593	0.61	2/3
430	659	PSYCHOSES	Schizophrenia and other psychotic disorde	2214	431	10.9	24229	0.64	0
462	254	REHABILITATION	Rehab	1209	53	15.0	18161	0.15	1
544	203	MAJOR JOINT REPLACEMENT OR REATTACHMENT OF LOWER EXTREMITY	Osteoarthros	4845	1	3.4	16651	0.00	1
89	122	SIMPLE PNEUMONIA & PLEURISY AGE >17 W CC	Pneumonia	3963	1158	4.2	16567	0.97	0
127	108	HEART FAILURE & SHOCK	chf;nonhp	3869	987	4.0	15437	0.84	0
373	193	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	OB-related perin trauma	6944	1835	2.1	14354	0.87	0
386	218	EXTREME IMMATURITY OR RESPIRATORY DISTRESS SYNDROME, NEONATE	Liveborn	385	105	33.3	12836	0.90	0
14	109	INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION	Acute CVD	2570	734	4.4	11301	0.95	0
388	218	PREMATURITY W/O MAJOR PROBLEMS	Liveborn	1425	395	7.1	10155	0.92	0
576	2	SEPTICEMIA W/O MV96+ HOURS AGE >17	Septicemia	1688	455	5.8	9807	0.89	0
316	157	RENAL FAILURE	Ac renl fail	1874	448	5.1	9524	0.79	0
390	218	NEONATE W OTHER SIGNIFICANT PROBLEMS	Liveborn	3110	739	2.7	8384	0.79	0
88	127	CHRONIC OBSTRUCTIVE PULMONARY DISEASE	COPD	2145	632	3.9	8298	0.97	0
320	159	KIDNEY & URINARY TRACT INFECTIONS AGE >17 W CC	UTI	1848	521	3.8	6984	0.93	1/3
371	189	CESAREAN SECTION W/O CC	Prev c-sectn	2268	262	3.0	6870	0.38	0
277	197	CELLULITIS AGE >17 W CC	Skin infectn	1627	434	4.2	6817	0.88	0
387	218	PREMATURITY W MAJOR PROBLEMS	Liveborn	359	101	17.4	6251	0.93	0
79	129	RESPIRATORY INFECTIONS & INFLAMMATIONS AGE >17 W CC	Asp pneumon	991	299	5.6	5529	1.00	0
204	152	DISORDERS OF PANCREAS EXCEPT MALIGNANCY	Pancreas dx	1169	324	4.6	5377	0.92	0
138	106	CARDIAC ARRHYTHMIA & CONDUCTION DISORDERS W CC	Dysrhythmia	1617	374	3.2	5107	0.77	0
210	226	HIP & FEMUR PROCEDURES EXCEPT MAJOR JOINT AGE >17 W CC	Fx hip	847	229	5.9	4962	0.89	0

174	153	G.I. HEMORRHAGE W CC	GI hemorrhag	1375	349	3.5	4827	0.84	0
121	100	CIRCULATORY DISORDERS W AMI & MAJOR COMP, DISCHARGED ALIVE	Acute MI	1117	330	4.3	4817	0.98	0
578	2	INFECTIOUS & PARASITIC DISEASES W OR PROCEDURE	Septicemia	299	84	15.5	4620	0.93	0
373	195	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Ot compl bir	2168	557	2.0	4433	0.85	0
105	96	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W/O CARD CATH	Hrt valve dx	548	48	7.9	4307	0.29	2/3
296	55	NUTRITIONAL & MISC METABOLIC DISORDERS AGE >17 W CC	Fluid/elc dx	1232	299	3.5	4304	0.80	0
426	657	DEPRESSIVE NEUROSES	Mood disorders	1017	206	4.2	4261	0.67	0
12	653	DEGENERATIVE NERVOUS SYSTEM DISORDERS	Delirium/dementia/amnestic/other cognitiv	391	90	10.8	4226	0.76	0
180	145	G.I. OBSTRUCTION W CC	Int obstruct	853	255	4.8	4101	0.99	0
522	660	ALC/DRUG ABUSE OR DEPEND W REHABILITATION THERAPY W/O CC	Alcohol-related disorders	365	88	11.2	4094	0.80	1/3
544	226	MAJOR JOINT REPLACEMENT OR REATTACHMENT OF LOWER EXTREMITY	Fx hip	680	200	5.9	3979	0.97	0
579	238	POSTOPERATIVE OR POST-TRAUMATIC INFECTIONS W OR PROCEDURE	Complic proc	476	92	8.1	3857	0.64	0
389	218	FULL TERM NEONATE W MAJOR PROBLEMS	Liveborn	686	150	5.6	3855	0.72	0
492	45	CHEMOTHERAPY W ACUTE LEUKEMIA OR W USE OF HI DOSE CHEMOAGENT	Maint chem/r	461	14	8.2	3762	0.10	0
500	205	BACK & NECK PROCEDURES EXCEPT SPINAL FUSION W/O CC	Back problem	2394	44	1.6	3726	0.06	1
410	45	CHEMOTHERAPY W/O ACUTE LEUKEMIA AS SECONDARY DIAGNOSIS	Maint chem/r	966	30	3.9	3720	0.10	0
143	102	CHEST PAIN	Chest pain	2559	698	1.4	3693	0.90	2/3
557	100	PERCUTANEOUS CARDIOVASCULAR PROC W DRUG-ELUTING STENT W MAJOR CV DX	Acute MI	1167	289	3.0	3526	0.82	0
371	195	CESAREAN SECTION W/O CC	Ot compl bir	901	179	3.7	3372	0.66	0
493	149	LAPAROSCOPIC CHOLECYSTECTOMY W/O C.D.E. W CC	Biliary dx	700	166	4.4	3057	0.78	2/3
569	146	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Diverticulos	264	57	11.6	3056	0.71	2/3
566	131	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Adlt resp fl	557	163	5.3	2975	0.97	0
371	190	CESAREAN SECTION W/O CC	Fetal distrs	768	193	3.9	2967	0.83	0
541	233	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Intracrn inj	70	23	41.5	2905	1.09	0
521	660	ALCOHOL/DRUG ABUSE OR DEPENDENCE W CC	Alcohol-related disorders	575	156	5.0	2900	0.90	1/3
87	131	PULMONARY EDEMA & RESPIRATORY FAILURE	Adlt resp fl	575	168	5.0	2900	0.97	0
371	187	CESAREAN SECTION W/O CC	Malposition	792	160	3.6	2822	0.67	0
78	103	PULMONARY EMBOLISM	Pulm hart dx	725	174	3.9	2793	0.79	0
547	100	CORONARY BYPASS W CARDIAC CATH W MAJOR CV DX	Acute MI	280	66	9.7	2705	0.78	1/3

373	185	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Long pregncy	1314	291	2.0	2665	0.73	0
372	193	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	OB-related perin trauma	1021	259	2.6	2652	0.84	0
418	238	POSTOPERATIVE & POST-TRAUMATIC INFECTIONS	Complic proc	586	150	4.5	2647	0.85	0
570	14	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Colon cancer	315	19	8.3	2629	0.20	1
373	181	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Ot preg comp	1257	312	2.1	2624	0.82	0
565	131	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT 96+ HOURS	Adlt resp fl	198	49	13.1	2594	0.82	0
569	145	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Int obstruct	201	52	12.8	2564	0.86	0
294	50	DIABETES AGE >35	DiabMel w/cm	827	230	3.1	2550	0.92	0
144	237	OTHER CIRCULATORY SYSTEM DIAGNOSES W CC	Complic devi	455	99	5.5	2512	0.72	0
572	135	MAJOR GASTROINTESTINAL DISORDERS AND PERITONEAL INFECTIONS	Intest infct	463	124	5.3	2472	0.89	0
550	101	CORONARY BYPASS W/O CARDIAC CATH W/O MAJOR CV DX	Coron athero	396	43	6.1	2402	0.36	1
167	142	APPENDECTOMY W/O COMPLICATED PRINCIPAL DIAG W/O CC	Appendicitis	1545	410	1.5	2354	0.88	0
79	122	RESPIRATORY INFECTIONS & INFLAMMATIONS AGE >17 W CC	Pneumonia	305	71	7.7	2349	0.77	0
574	63	MAJOR HEMATOLOGIC/IMMUNOLOGIC DIAG EXC SICKLE CELL CRISIS & COAGUL	Wht blood dx	469	139	5.0	2347	0.98	1/3
383	181	OTHER ANTEPARTUM DIAGNOSES W MEDICAL COMPLICATIONS	Ot preg comp	781	191	3.0	2324	0.81	0
545	237	REVISION OF HIP OR KNEE REPLACEMENT	Complic devi	523	17	4.3	2251	0.11	0
205	151	DISORDERS OF LIVER EXCEPT MALIG,CIRR,ALC HEPA W CC	Oth liver dx	406	94	5.5	2215	0.77	1/3
373	192	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Umbil cord	1140	318	1.9	2172	0.92	0
429	653	ORGANIC DISTURBANCES & MENTAL RETARDATION	Delirium/dementia/amnestic/other cognitiv	233	48	9.3	2170	0.68	1/3
110	115	MAJOR CARDIOVASCULAR PROCEDURES W CC	Aneurysm	309	16	6.9	2143	0.17	0
370	189	CESAREAN SECTION W CC	Prev c-sectn	628	74	3.4	2136	0.39	0
150	145	PERITONEAL ADHESIOLYSIS W CC	Int obstruct	188	52	10.9	2047	0.92	0
449	242	POISONING & TOXIC EFFECTS OF DRUGS AGE >17 W CC	Poisn ot med	658	192	3.1	2040	0.97	0
202	663	CIRRHOSIS & ALCOHOLIC HEPATITIS	Screening and history of mental health an	365	103	5.6	2030	0.93	2/3
75	19	MAJOR CHEST PROCEDURES	Brnch/lng ca	268	1	7.6	2026	0.01	2/3
523	660	ALC/DRUG ABUSE OR DEPEND W/O REHABILITATION THERAPY W/O CC	Alcohol-related disorders	615	142	3.3	2023	0.76	2/3
499	205	BACK & NECK PROCEDURES EXCEPT SPINAL FUSION W CC	Back problem	647	17	3.1	2010	0.09	1
371	188	CESAREAN SECTION W/O CC	Pelvic obstr	484	121	3.8	1861	0.83	0
263	199	SKIN GRAFT &/OR DEBRID FOR SKN ULCER OR CELLULITIS W CC	Ulcer skin	96	3	19.4	1858	0.10	1
370	195	CESAREAN SECTION W CC	Ot compl bir	382	81	4.9	1856	0.70	0

523	661	ALC/DRUG ABUSE OR DEPEND W/O REHABILITATION THERAPY W/O CC	Substance-related disorders	387	78	4.7	1828	0.67	2/3
386	221	EXTREME IMMATURITY OR RESPIRATORY DISTRESS SYNDROME, NEONATE	Resp distres	88	19	20.8	1826	0.71	0
243	205	MEDICAL BACK PROBLEMS	Back problem	521	126	3.5	1819	0.80	1
75	130	MAJOR CHEST PROCEDURES	Pleurisy	175	30	10.4	1812	0.57	1
373	196	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Nml preg/del	969	253	1.9	1795	0.86	0
385	218	NEONATES, DIED OR TRANSFERRED TO ANOTHER ACUTE CARE FACILITY	Liveborn	393	99	4.6	1792	0.83	0
219	230	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	Fx leg	672	211	2.6	1762	1.04	0
218	230	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W CC	Fx leg	306	102	5.6	1728	1.10	0
82	19	RESPIRATORY NEOPLASMS	Brnch/lng ca	346	77	5.0	1721	0.74	1
442	238	OTHER O.R. PROCEDURES FOR INJURIES W CC	Complic proc	220	42	7.8	1712	0.63	0
243	231	MEDICAL BACK PROBLEMS	Oth fracture	427	134	3.9	1668	1.04	1/3
569	14	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Colon cancer	119	13	14.0	1663	0.36	1
389	224	FULL TERM NEONATE W MAJOR PROBLEMS	Ot perint dx	262	73	6.3	1652	0.92	0
359	46	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	Bnign ut neo	794	2	2.0	1626	0.01	1
498	205	SPINAL FUSION EXCEPT CERVICAL W/O CC	Back problem	551	2	2.9	1613	0.01	1
373	191	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Amnios dx	562	144	2.9	1612	0.85	0
88	128	CHRONIC OBSTRUCTIVE PULMONARY DISEASE	Asthma	425	101	3.8	1603	0.79	0
108	213	OTHER CARDIOTHORACIC PROCEDURES	Cardiac anom	182	8	8.8	1598	0.15	2/3
372	183	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	HTN in preg	477	83	3.3	1569	0.58	0
182	146	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	Diverticulos	383	105	4.0	1538	0.91	2/3
331	237	OTHER KIDNEY & URINARY TRACT DIAGNOSES AGE >17 W CC	Complic devi	320	66	4.8	1523	0.68	0
497	205	SPINAL FUSION EXCEPT CERVICAL W CC	Back problem	294	6	5.1	1486	0.07	1
521	661	ALCOHOL/DRUG ABUSE OR DEPENDENCE W CC	Substance-related disorders	308	76	4.8	1480	0.82	1/3
449	241	POISONING & TOXIC EFFECTS OF DRUGS AGE >17 W CC	Poison psych	487	155	3.0	1469	1.05	0
370	190	CESAREAN SECTION W CC	Fetal distrs	327	79	4.3	1411	0.80	0
1	233	CRANIOTOMY AGE >17 W CC	Intracrn inj	123	32	11.4	1400	0.86	0
182	251	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	Abdomnl pain	429	114	3.3	1395	0.88	1
188	238	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Complic proc	259	80	5.3	1365	1.02	0
182	155	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	Other GI dx	333	91	4.0	1329	0.90	2/3
104	96	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	Hrt valve dx	126	9	10.4	1315	0.24	2/3
541	234	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Crush injury	25	7	52.0	1299	0.93	0

82	42	RESPIRATORY NEOPLASMS	2ndary malig	237	63	5.5	1296	0.88	1
370	187	CESAREAN SECTION W CC	Malposition	262	54	4.8	1269	0.68	0
481	39	BONE MARROW TRANSPLANT	Leukemias	59	7	21.0	1237	0.39	2/3
541	109	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Acute CVD	33	7	37.4	1235	0.70	0
182	135	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	Intest infct	402	110	3.1	1233	0.91	0
188	114	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Perip athero	257	75	4.8	1233	0.97	1
522	661	ALC/DRUG ABUSE OR DEPEND W REHABILITATION THERAPY W/O CC	Substance-related disorders	151	45	8.1	1228	0.99	2/3
373	190	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Fetal distrs	651	186	1.9	1213	0.95	0
486	234	OTHER O.R. PROCEDURES FOR MULTIPLE SIGNIFICANT TRAUMA	Crush injury	105	38	11.4	1194	1.20	0
373	184	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Early labor	371	101	3.2	1189	0.90	0
565	122	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT 96+ HOURS	Pneumonia	73	16	16.1	1177	0.73	0
449	661	POISONING & TOXIC EFFECTS OF DRUGS AGE >17 W CC	Substance-related disorders	298	96	3.9	1155	1.07	2/3
174	146	G.I. HEMORRHAGE W CC	Diverticulos	322	82	3.6	1152	0.84	0
371	183	CESAREAN SECTION W/O CC	HTN in preg	225	29	5.1	1146	0.43	0
191	152	PANCREAS, LIVER & SHUNT PROCEDURES W CC	Pancreas dx	59	8	19.1	1128	0.45	2/3
359	171	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	Menstrual dx	633	5	1.8	1124	0.03	1
124	108	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH & COMPLEX DIAG	chf;nonhp	196	49	5.7	1118	0.83	1/3
372	195	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	Ot compl bir	431	109	2.5	1087	0.84	0
370	183	CESAREAN SECTION W CC	HTN in preg	149	16	7.1	1058	0.36	0
217	211	WND DEBRID & SKN GRFT EXCEPT HAND,FOR MUSCSKELET & CONN TISS DIS	Ot conn tiss	46	11	22.8	1051	0.79	1
569	155	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Other GI dx	66	11	15.7	1036	0.55	2/3
569	114	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Perip athero	78	19	12.9	1007	0.81	0
182	250	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	Nausea/vomit	275	86	3.4	947	1.03	1
191	17	PANCREAS, LIVER & SHUNT PROCEDURES W CC	Pancreas can	64	2	14.8	945	0.10	1/3
182	138	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	Esophgeal dx	304	78	3.1	932	0.85	2/3
113	248	AMPUTATION FOR CIRC SYSTEM DISORDERS EXCEPT UPPER LIMB & TOE	Gangrene	84	9	10.9	917	0.35	0
554	237	OTHER VASCULAR PROCEDURES W CC W/O MAJOR CV DX	Complic devi	178	20	5.1	908	0.37	0
542	131	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Adlt resp fl	37	11	24.5	907	0.98	0
202	151	CIRRHOSIS & ALCOHOLIC HEPATITIS	Oth liver dx	173	33	5.2	905	0.63	1/3
569	144	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Ulcerat col	74	13	12.1	898	0.58	1

182	154	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	Gastroent	268	72	3.3	895	0.89	1
570	146	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Diverticulos	108	17	8.2	885	0.52	2/3
127	99	HEART FAILURE & SHOCK	Htn complicn	180	41	4.9	882	0.75	0
554	114	OTHER VASCULAR PROCEDURES W CC W/O MAJOR CV DX	Perip athero	190	8	4.6	874	0.14	2/3
296	58	NUTRITIONAL & MISC METABOLIC DISORDERS AGE >17 W CC	Ot nutrit dx	201	45	4.3	873	0.74	1
386	219	EXTREME IMMATURITY OR RESPIRATORY DISTRESS SYNDROME, NEONATE	Low birth wt	19	3	45.8	870	0.52	0
183	146	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	Diverticulos	302	76	2.8	860	0.83	2/3
124	101	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH & COMPLEX DIAG	Coron athero	339	68	2.5	858	0.66	1/3
541	227	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Spin cor inj	20	10	42.5	850	1.65	0
572	148	MAJOR GASTROINTESTINAL DISORDERS AND PERITONEAL INFECTIONS	Peritonitis	144	36	5.8	839	0.83	0
481	40	BONE MARROW TRANSPLANT	Mult myeloma	47	0	17.8	838	0.00	2/3
553	237	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Complic devi	94	15	8.9	832	0.53	0
358	46	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W CC	Bnign ut neo	278	9	3.0	827	0.11	1
210	230	HIP & FEMUR PROCEDURES EXCEPT MAJOR JOINT AGE >17 W CC	Fx leg	121	42	6.7	814	1.15	0
263	197	SKIN GRAFT &/OR DEBRID FOR SKN ULCER OR CELLULITIS W CC	Skin infectn	100	23	8.1	814	0.76	1
183	251	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	Abdomnl pain	349	98	2.3	812	0.93	1
547	101	CORONARY BYPASS W CARDIAC CATH W MAJOR CV DX	Coron athero	77	8	10.5	812	0.34	1
541	131	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Adlt resp fl	17	7	47.8	812	1.36	0
113	50	AMPUTATION FOR CIRC SYSTEM DISORDERS EXCEPT UPPER LIMB & TOE	DiabMel w/cm	69	6	11.6	803	0.29	0
570	155	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Other GI dx	100	6	7.9	790	0.20	2/3
359	170	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	Prolapse	335	0	2.3	776	0.00	1
316	99	RENAL FAILURE	Htn complicn	200	43	3.9	775	0.71	0
359	169	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	Endometrios	384	3	2.0	774	0.03	1
542	2	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Septicemia	19	7	39.8	756	1.22	0
570	15	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Rctm/anus ca	89	1	8.4	749	0.04	1
370	184	CESAREAN SECTION W CC	Early labor	90	13	8.3	743	0.48	0
493	152	LAPAROSCOPIC CHOLECYSTECTOMY W/O C.D.E. W CC	Pancreas dx	131	45	5.6	728	1.14	1
79	56	RESPIRATORY INFECTIONS & INFLAMMATIONS AGE >17 W CC	Cystic fibro	67	3	10.7	720	0.15	0

121	108	CIRCULATORY DISORDERS W AMI & MAJOR COMP, DISCHARGED ALIVE	chf;nonhp	128	40	5.6	719	1.03	0
1	47	CRANIOTOMY AGE >17 W CC	Ot bnign neo	106	8	6.8	719	0.25	2/3
486	231	OTHER O.R. PROCEDURES FOR MULTIPLE SIGNIFICANT TRAUMA	Oth fracture	53	20	13.4	708	1.25	0
569	238	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Complic proc	33	9	21.5	708	0.90	0
383	195	OTHER ANTEPARTUM DIAGNOSES W MEDICAL COMPLICATIONS	Ot compl bir	148	36	4.8	706	0.80	0
570	47	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Ot bnign neo	94	1	7.5	703	0.04	1
486	233	OTHER O.R. PROCEDURES FOR MULTIPLE SIGNIFICANT TRAUMA	Intracrn inj	50	18	14.0	702	1.19	0
144	97	OTHER CIRCULATORY SYSTEM DIAGNOSES W CC	Carditis	173	45	4.0	700	0.86	0
544	212	MAJOR JOINT REPLACEMENT OR REATTACHMENT OF LOWER EXTREMITY	Ot bone dx	182	0	3.8	699	0.00	2/3
566	122	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Pneumonia	105	32	6.7	699	1.01	0
567	139	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Gasduo ulcer	58	13	12.0	695	0.74	0
76	19	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Brnch/lng ca	113	16	6.1	693	0.47	1
76	103	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Pulm hart dx	82	17	8.4	685	0.69	2/3
217	201	WND DEBRID & SKN GRFT EXCEPT HAND,FOR MUSCSKELET & CONN TISS DIS	Infect arth	53	9	12.9	685	0.56	1/3
217	230	WND DEBRID & SKN GRFT EXCEPT HAND,FOR MUSCSKELET & CONN TISS DIS	Fx leg	46	14	14.7	674	1.01	0
481	38	BONE MARROW TRANSPLANT	Non-Hodg lym	30	0	22.2	667	0.00	2/3
370	188	CESAREAN SECTION W CC	Pelvic obstr	160	39	4.2	664	0.81	0
390	224	NEONATE W OTHER SIGNIFICANT PROBLEMS	Ot perint dx	214	72	2.9	617	1.11	0
144	117	OTHER CIRCULATORY SYSTEM DIAGNOSES W CC	Ot circul dx	174	44	3.5	615	0.84	0
182	141	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	Ot dx stomch	135	38	4.5	611	0.93	2/3
373	183	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	HTN in preg	243	39	2.5	609	0.53	0
570	144	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Ulcerat col	59	4	10.3	608	0.22	1
1	109	CRANIOTOMY AGE >17 W CC	Acute CVD	83	15	7.3	606	0.60	0
105	237	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W/O CARD CATH	Complic devi	37	5	16.2	601	0.45	0
359	47	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	Ot bnign neo	230	5	2.6	594	0.07	1
1	35	CRANIOTOMY AGE >17 W CC	Brain/ns can	102	15	5.8	592	0.49	0
75	122	MAJOR CHEST PROCEDURES	Pneumonia	46	6	12.9	592	0.43	0
498	209	SPINAL FUSION EXCEPT CERVICAL W/O CC	Ot acq defor	183	0	3.2	590	0.00	2/3
371	184	CESAREAN SECTION W/O CC	Early labor	92	22	6.4	585	0.79	0
569	143	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Abdom hernia	47	14	12.4	585	0.99	1
371	191	CESAREAN SECTION W/O CC	Amnios dx	143	39	4.1	582	0.90	0

541	2	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Septicemia	11	0	52.9	582	0.00	0
150	143	PERITONEAL ADHESIOLYSIS W CC	Abdom hernia	73	12	7.6	557	0.54	0
149	146	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Diverticulos	104	5	5.3	552	0.16	2/3
373	186	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	DM in preg	266	56	2.1	550	0.70	0
387	219	PREMATURITY W MAJOR PROBLEMS	Low birth wt	25	6	22.0	550	0.79	0
569	42	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	2ndary malig	38	5	14.3	544	0.44	1
371	185	CESAREAN SECTION W/O CC	Long pregncy	138	19	3.8	529	0.46	0
12	113	DEGENERATIVE NERVOUS SYSTEM DISORDERS	Late eff CVD	72	15	7.3	525	0.69	1
554	248	OTHER VASCULAR PROCEDURES W CC W/O MAJOR CV DX	Gangrene	57	4	9.2	523	0.23	0
442	237	OTHER O.R. PROCEDURES FOR INJURIES W CC	Complic devi	74	9	7.0	519	0.40	0
387	224	PREMATURITY W MAJOR PROBLEMS	Ot perint dx	23	1	22.6	519	0.14	0
371	182	CESAREAN SECTION W/O CC	Hemorr preg	114	20	4.5	509	0.58	0
110	213	MAJOR CARDIOVASCULAR PROCEDURES W CC	Cardiac anom	47	6	10.6	499	0.42	0
359	175	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	Ot femal gen	234	10	2.1	487	0.14	1
370	182	CESAREAN SECTION W CC	Hemorr preg	69	18	7.1	487	0.86	0
568	143	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	Abdom hernia	88	7	5.5	484	0.26	1
574	59	MAJOR HEMATOLOGIC/IMMUNOLOGIC DIAG EXC SICKLE CELL CRISIS & COAGUL	Anemia	116	27	4.2	482	0.77	1
568	138	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	Esophgeal dx	102	1	4.7	482	0.03	2/3
567	153	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	GI hemorrhag	34	13	14.2	482	1.27	0
574	237	MAJOR HEMATOLOGIC/IMMUNOLOGIC DIAG EXC SICKLE CELL CRISIS & COAGUL	Complic devi	38	7	12.6	479	0.61	0
174	140	G.I. HEMORRHAGE W CC	Gastritis	130	27	3.7	477	0.69	0
205	6	DISORDERS OF LIVER EXCEPT MALIG,CIRR,ALC HEPA W CC	Hepatitis	101	27	4.7	473	0.88	1/3
110	114	MAJOR CARDIOVASCULAR PROCEDURES W CC	Perip athero	52	2	9.1	473	0.13	0
75	133	MAJOR CHEST PROCEDURES	Oth low resp	84	2	5.6	472	0.08	0
174	141	G.I. HEMORRHAGE W CC	Ot dx stomch	110	21	4.3	470	0.63	0
542	122	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Pneumonia	13	4	36.2	470	1.02	0
541	115	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Aneurysm	13	3	35.8	465	0.76	0
358	171	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W CC	Menstrual dx	191	5	2.4	464	0.09	1
75	42	MAJOR CHEST PROCEDURES	2ndary malig	58	1	7.9	460	0.06	1
110	100	MAJOR CARDIOVASCULAR PROCEDURES W CC	Acute MI	69	26	6.7	459	1.25	0
296	52	NUTRITIONAL & MISC METABOLIC DISORDERS AGE >17 W CC	Nutrit defic	60	7	7.5	452	0.39	1

570	214	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	GI cong anom	24	9	18.7	449	1.24	2/3
568	12	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	Esoph cancer	29	0	15.4	446	0.00	1
210	237	HIP & FEMUR PROCEDURES EXCEPT MAJOR JOINT AGE >17 W CC	Complic devi	72	11	6.2	444	0.51	0
191	42	PANCREAS, LIVER & SHUNT PROCEDURES W CC	2ndary malig	65	1	6.7	438	0.05	1
217	237	WND DEBRID & SKN GRFT EXCEPT HAND,FOR MUSCSKELET & CONN TISS DIS	Complic devi	40	4	10.8	431	0.33	1/3
358	170	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W CC	Prolapse	134	0	3.2	429	0.00	1
572	142	MAJOR GASTROINTESTINAL DISORDERS AND PERITONEAL INFECTIONS	Appendicitis	76	13	5.6	429	0.57	0
553	114	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Perip athero	63	5	6.7	423	0.26	1
218	229	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W CC	Fx arm	81	18	5.2	422	0.74	0
144	103	OTHER CIRCULATORY SYSTEM DIAGNOSES W CC	Pulm hart dx	87	25	4.8	421	0.95	0
541	218	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Liveborn	9	2	46.8	421	0.74	0
105	213	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W/O CARD CATH	Cardiac anom	60	6	7.0	417	0.33	2/3
568	13	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	Stomch cancr	38	2	11.0	417	0.17	1
372	181	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	Ot preg comp	174	33	2.4	416	0.63	0
557	101	PERCUTANEOUS CARDIOVASCULAR PROC W DRUG-ELUTING STENT W MAJOR CV DX	Coron athero	143	14	2.9	415	0.32	2/3
217	238	WND DEBRID & SKN GRFT EXCEPT HAND,FOR MUSCSKELET & CONN TISS DIS	Complic proc	36	3	11.4	411	0.28	1/3
566	129	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Asp pneumon	56	12	7.3	410	0.71	0
569	15	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Rctm/anus ca	22	4	18.5	408	0.60	1
541	100	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Acute MI	9	3	44.6	401	1.10	0
316	158	RENAL FAILURE	Chr ren fail	101	18	3.9	394	0.59	0
371	181	CESAREAN SECTION W/O CC	Ot preg comp	112	16	3.5	393	0.47	0
373	187	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Malposition	193	54	2.0	391	0.93	0
372	184	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	Early labor	83	17	4.7	391	0.68	0
372	191	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	Amnios dx	106	25	3.7	390	0.78	0
373	188	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Pelvic obstr	196	58	2.0	389	0.98	0
570	143	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Abdom hernia	40	3	9.7	389	0.25	1
76	122	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Pneumonia	40	9	9.7	387	0.74	0

359	172	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	Ovarian cyst	171	11	2.2	382	0.21	1
108	101	OTHER CARDIOTHORACIC PROCEDURES	Coron athero	46	1	8.2	375	0.07	2/3
182	140	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	Gastritis	113	26	3.3	371	0.76	1
1	111	CRANIOTOMY AGE >17 W CC	Other CVD	71	3	5.2	371	0.14	0
188	155	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Other GI dx	81	18	4.6	370	0.74	1/3
79	130	RESPIRATORY INFECTIONS & INFLAMMATIONS AGE >17 W CC	Pleurisy	47	11	7.8	367	0.77	2/3
565	129	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT 96+ HOURS	Asp pneumon	29	8	12.6	366	0.91	0
12	81	DEGENERATIVE NERVOUS SYSTEM DISORDERS	Ot hered CNS	77	23	4.7	365	0.99	1
373	189	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	Prev c-sectn	193	46	1.9	364	0.79	0
554	116	OTHER VASCULAR PROCEDURES W CC W/O MAJOR CV DX	Art embolism	73	12	5.0	363	0.54	0
174	155	G.I. HEMORRHAGE W CC	Other GI dx	102	18	3.5	362	0.58	0
370	191	CESAREAN SECTION W CC	Amnios dx	56	13	6.4	361	0.77	0
541	236	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Opn wnd extr	3	2	120.0	360	2.21	0
372	185	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	Long pregncy	151	32	2.4	358	0.70	0
426	650	DEPRESSIVE NEUROSES	Adjustment disorders	119	37	3.0	355	1.03	0
370	196	CESAREAN SECTION W CC	Nml preg/del	55	7	6.4	354	0.42	0
110	116	MAJOR CARDIOVASCULAR PROCEDURES W CC	Art embolism	37	7	9.5	352	0.63	0
569	142	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Appendicitis	32	10	10.9	349	1.03	0
497	209	SPINAL FUSION EXCEPT CERVICAL W CC	Ot acq defor	79	0	4.3	342	0.00	2/3
542	233	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Intracrn inj	10	1	34.1	341	0.33	0
1	42	CRANIOTOMY AGE >17 W CC	2ndary malig	54	5	6.3	340	0.31	0
149	47	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Ot bnign neo	80	0	4.2	333	0.00	1
553	116	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Art embolism	42	6	7.9	333	0.47	0
541	96	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Hrt valve dx	6	0	55.2	331	0.00	0
191	47	PANCREAS, LIVER & SHUNT PROCEDURES W CC	Ot bnign neo	31	1	10.5	325	0.11	1
541	101	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Coron athero	4	1	81.3	325	0.83	1/3
388	219	PREMATURITY W/O MAJOR PROBLEMS	Low birth wt	27	7	12.0	324	0.86	0
358	169	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W CC	Endometrios	106	2	3.0	322	0.06	1
541	231	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Oth fracture	9	2	35.7	321	0.74	0
383	183	OTHER ANTEPARTUM DIAGNOSES W MEDICAL COMPLICATIONS	HTN in preg	114	16	2.8	318	0.46	0
331	50	OTHER KIDNEY & URINARY TRACT DIAGNOSES AGE >17 W CC	DiabMel w/cm	68	13	4.6	316	0.63	0
149	14	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Colon cancer	68	2	4.6	311	0.10	1

541	238	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Complic proc	6	0	51.8	311	0.00	0
541	240	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Burns	4	1	77.8	311	0.83	0
183	155	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	Other GI dx	124	36	2.5	307	0.96	1/3
150	142	PERITONEAL ADHESIOLYSIS W CC	Appendicitis	23	8	13.3	307	1.15	0
570	238	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Complic proc	26	1	11.7	304	0.13	0
104	101	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	Coron athero	15	1	20.0	300	0.22	2/3
541	145	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Int obstruct	5	1	59.6	298	0.66	0
383	182	OTHER ANTEPARTUM DIAGNOSES W MEDICAL COMPLICATIONS	Hemorr preg	52	9	5.7	297	0.57	0
110	237	MAJOR CARDIOVASCULAR PROCEDURES W CC	Complic devi	41	5	7.2	294	0.40	0
113	237	AMPUTATION FOR CIRC SYSTEM DISORDERS EXCEPT UPPER LIMB & TOE	Complic devi	20	1	14.7	294	0.17	0
388	224	PREMATURITY W/O MAJOR PROBLEMS	Ot perint dx	28	6	10.5	293	0.71	0
541	237	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Complic devi	8	0	36.6	293	0.00	0
149	145	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Int obstruct	52	14	5.6	290	0.89	0
468	233	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Intracrn inj	39	17	7.4	290	1.44	0
386	224	EXTREME IMMATURITY OR RESPIRATORY DISTRESS SYNDROME, NEONATE	Ot perint dx	8	0	35.8	286	0.00	0
12	79	DEGENERATIVE NERVOUS SYSTEM DISORDERS	Parkinson-s	51	15	5.6	285	0.97	2/3
569	237	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Complic devi	14	0	20.2	283	0.00	0
358	47	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W CC	Ot bnign neo	72	2	3.9	282	0.09	1
371	196	CESAREAN SECTION W/O CC	Nml preg/del	69	10	4.1	281	0.48	0
210	207	HIP & FEMUR PROCEDURES EXCEPT MAJOR JOINT AGE >17 W CC	Patholog fx	38	9	7.3	279	0.78	0
541	230	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Fx leg	9	1	31.0	279	0.37	0
149	155	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Other GI dx	55	4	5.1	278	0.24	2/3
76	131	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Adlt resp fl	21	7	13.2	277	1.10	0
121	106	CIRCULATORY DISORDERS W AMI & MAJOR COMP, DISCHARGED ALIVE	Dysrhythmia	52	15	5.3	276	0.95	0
105	115	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W/O CARD CATH	Aneurysm	30	3	9.0	269	0.33	0
1	237	CRANIOTOMY AGE >17 W CC	Complic devi	25	2	10.8	269	0.26	0
497	231	SPINAL FUSION EXCEPT CERVICAL W CC	Oth fracture	32	10	8.3	265	1.03	0
385	224	NEONATES, DIED OR	Ot perint dx	29	8	9.1	265	0.91	0

		TRANSFERRED TO ANOTHER ACUTE CARE FACILITY							
331	161	OTHER KIDNEY & URINARY TRACT DIAGNOSES AGE >17 W CC	Ot dx kidney	64	16	4.1	264	0.83	1/3
108	100	OTHER CARDIOTHORACIC PROCEDURES	Acute MI	22	5	12.0	263	0.75	0
449	243	POISONING & TOXIC EFFECTS OF DRUGS AGE >17 W CC	Poisn nonmed	58	18	4.5	259	1.03	1/3
217	21	WND DEBRID & SKN GRFT EXCEPT HAND,FOR MUSCSKELET & CONN TISS DIS	Bone/ct cncr	23	1	11.1	256	0.14	2/3
568	238	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	Complic proc	43	2	5.9	254	0.15	0
385	219	NEONATES, DIED OR TRANSFERRED TO ANOTHER ACUTE CARE FACILITY	Low birth wt	16	2	15.8	253	0.41	0
188	147	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Anal/rectal	62	9	4.0	251	0.48	1
183	154	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	Gastroent	108	22	2.3	249	0.67	1
219	229	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	Fx arm	95	21	2.6	247	0.73	0
541	138	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Esophgeal dx	4	0	61.8	247	0.00	1/3
188	120	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Hemmorhoids	80	25	3.1	246	1.03	1
554	50	OTHER VASCULAR PROCEDURES W CC W/O MAJOR CV DX	DiabMel w/cm	35	3	7.0	246	0.28	1/3
372	182	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	Hemorr preg	73	20	3.3	244	0.91	0
105	101	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W/O CARD CATH	Coron athero	28	1	8.7	244	0.12	0
481	37	BONE MARROW TRANSPLANT	Hodgkin-s ds	12	0	20.3	243	0.00	2/3
567	238	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Complic proc	14	4	17.1	240	0.95	0
104	100	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	Acute MI	19	5	12.5	238	0.87	0
578	4	INFECTIOUS & PARASITIC DISEASES W OR PROCEDURE	Mycoses	15	3	15.8	237	0.66	0
370	181	CESAREAN SECTION W CC	Ot preg comp	48	11	4.9	235	0.76	0
468	237	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Complic devi	33	4	7.1	235	0.40	0
150	155	PERITONEAL ADHESIOLYSIS W CC	Other GI dx	30	0	7.8	234	0.00	0
358	172	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W CC	Ovarian cyst	70	8	3.3	233	0.38	1
205	237	DISORDERS OF LIVER EXCEPT MALIG,CIRR,ALC HEPA W CC	Complic devi	29	5	8.0	231	0.57	0
371	186	CESAREAN SECTION W/O CC	DM in preg	61	12	3.8	229	0.65	0
468	122	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Pneumonia	19	6	12.1	229	1.04	0
124	97	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH & COMPLEX DIAG	Carditis	65	10	3.5	227	0.51	1/3
468	157	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Ac renl fail	17	6	13.2	224	1.17	0
486	230	OTHER O.R. PROCEDURES FOR MULTIPLE SIGNIFICANT TRAUMA	Fx leg	15	3	14.9	224	0.66	0

541	143	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Abdom hernia	2	0	112.0	224	0.00	1/3
541	12	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Esoph cancer	5	1	44.6	223	0.66	1/3
124	106	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH & COMPLEX DIAG	Dysrhythmia	48	13	4.6	221	0.90	1/3
370	186	CESAREAN SECTION W CC	DM in preg	38	7	5.8	220	0.61	0
110	97	MAJOR CARDIOVASCULAR PROCEDURES W CC	Carditis	33	2	6.6	218	0.20	0
75	217	MAJOR CHEST PROCEDURES	Ot cong anom	29	2	7.5	217	0.23	2/3
105	97	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W/O CARD CATH	Carditis	13	1	16.7	217	0.25	0
542	152	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Pancreas dx	5	2	43.4	217	1.32	0
370	185	CESAREAN SECTION W CC	Long pregncy	54	12	4.0	216	0.74	0
217	229	WND DEBRID & SKN GRFT EXCEPT HAND,FOR MUSCSKELET & CONN TISS DIS	Fx arm	26	5	8.3	216	0.64	0
541	211	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Ot conn tiss	3	0	72.0	216	0.00	1/3
486	227	OTHER O.R. PROCEDURES FOR MULTIPLE SIGNIFICANT TRAUMA	Spin cor inj	14	8	15.4	215	1.89	0
104	97	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	Carditis	11	3	19.4	213	0.90	0
542	95	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Oth nerv dx	7	3	30.0	210	1.42	0
183	138	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	Esophgeal dx	134	40	1.6	209	0.99	2/3
567	138	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Esophgeal dx	14	3	14.9	208	0.71	1/3
358	175	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W CC	Ot femal gen	74	1	2.8	207	0.04	1
570	147	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Anal/rectal	29	2	7.1	205	0.23	1
372	192	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	Umbil cord	92	19	2.2	203	0.68	0
359	168	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	PID	72	5	2.8	199	0.23	0
191	16	PANCREAS, LIVER & SHUNT PROCEDURES W CC	Liver/ibd ca	29	2	6.8	197	0.23	2/3
499	42	BACK & NECK PROCEDURES EXCEPT SPINAL FUSION W CC	2ndary malig	11	3	17.8	196	0.90	2/3
468	197	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Skin infectn	21	7	9.3	195	1.10	0
541	213	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Cardiac anom	7	1	27.9	195	0.47	1/3
383	186	OTHER ANTEPARTUM DIAGNOSES W MEDICAL COMPLICATIONS	DM in preg	58	8	3.3	193	0.46	0
183	135	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	Intest infct	87	33	2.2	192	1.26	0
78	238	PULMONARY EMBOLISM	Complic proc	56	12	3.4	192	0.71	0
497	237	SPINAL FUSION EXCEPT CERVICAL W CC	Complic devi	27	0	7.1	192	0.00	0

541	47	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Ot bnign neo	6	0	31.8	191	0.00	1/3
468	109	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Acute CVD	16	5	11.8	189	1.03	0
567	145	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Int obstruct	6	1	31.5	189	0.55	0
183	141	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	Ot dx stomch	68	19	2.8	187	0.92	2/3
76	133	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Oth low resp	25	4	7.4	185	0.53	0
104	108	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	chf;nonhp	8	1	22.9	183	0.41	2/3
358	168	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W CC	PID	31	5	5.9	182	0.53	0
372	190	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	Fetal distrs	75	25	2.4	177	1.10	0
541	11	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Hd/nck cancr	5	0	35.4	177	0.00	1/3
570	237	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Complic devi	20	2	8.7	174	0.33	0
75	234	MAJOR CHEST PROCEDURES	Crush injury	15	2	11.6	174	0.44	0
569	47	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	Ot bnign neo	11	0	15.8	174	0.00	1
468	131	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Adlt resp fl	16	1	10.8	173	0.21	0
569	153	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W MAJOR GI DX	GI hemorrhag	5	1	34.4	172	0.66	0
570	42	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	2ndary malig	19	1	9.0	171	0.17	1
75	131	MAJOR CHEST PROCEDURES	Adlt resp fl	9	4	19.0	171	1.47	0
191	18	PANCREAS, LIVER & SHUNT PROCEDURES W CC	GI/perit can	13	0	13.1	170	0.00	2/3
372	186	VAGINAL DELIVERY W COMPLICATING DIAGNOSES	DM in preg	67	14	2.4	164	0.69	0
566	127	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	COPD	23	10	7.1	164	1.44	0
76	42	OTHER RESP SYSTEM O.R. PROCEDURES W CC	2ndary malig	22	4	7.5	164	0.60	1
486	229	OTHER O.R. PROCEDURES FOR MULTIPLE SIGNIFICANT TRAUMA	Fx arm	16	5	10.3	164	1.03	0
76	130	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Pleurisy	13	2	12.5	163	0.51	1
481	44	BONE MARROW TRANSPLANT	Neoplsm unsp	6	1	27.2	163	0.55	2/3
442	244	OTHER O.R. PROCEDURES FOR INJURIES W CC	Other injury	17	5	9.5	161	0.97	0
149	144	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Ulcerat col	30	0	5.3	160	0.00	1
553	248	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Gangrene	19	0	8.4	160	0.00	0
243	232	MEDICAL BACK PROBLEMS	Sprain	77	24	2.1	159	1.03	1
568	18	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	GI/perit can	12	1	13.3	159	0.28	1
565	127	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR	COPD	13	4	12.2	158	1.02	0

		SUPPORT 96+ HOURS							
542	109	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Acute CVD	6	3	26.3	158	1.65	0
389	222	FULL TERM NEONATE W MAJOR PROBLEMS	Perint jaund	65	15	2.4	157	0.76	0
75	127	MAJOR CHEST PROCEDURES	COPD	23	0	6.8	157	0.00	0
124	96	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH & COMPLEX DIAG	Hrt valve dx	31	6	5.0	156	0.64	0
191	149	PANCREAS, LIVER & SHUNT PROCEDURES W CC	Biliary dx	20	1	7.8	155	0.17	2/3
12	95	DEGENERATIVE NERVOUS SYSTEM DISORDERS	Oth nerv dx	26	4	5.9	154	0.51	2/3
389	220	FULL TERM NEONATE W MAJOR PROBLEMS	Birth asphyx	9	1	17.1	154	0.37	0
1	95	CRANIOTOMY AGE >17 W CC	Oth nerv dx	33	1	4.6	153	0.10	0
183	250	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	Nausea/vomit	61	13	2.5	151	0.71	1
191	151	PANCREAS, LIVER & SHUNT PROCEDURES W CC	Oth liver dx	20	3	7.5	149	0.50	1/3
570	175	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	Ot femal gen	17	3	8.8	149	0.58	1
468	159	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	UTI	12	4	12.4	149	1.10	0
542	197	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Skin infectn	3	0	49.7	149	0.00	0
124	237	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH & COMPLEX DIAG	Complic devi	30	4	4.9	148	0.44	1/3
499	231	BACK & NECK PROCEDURES EXCEPT SPINAL FUSION W CC	Oth fracture	19	7	7.5	143	1.22	0
557	237	PERCUTANEOUS CARDIOVASCULAR PROC W DRUG-ELUTING STENT W MAJOR CV DX	Complic devi	69	8	2.1	142	0.38	0
390	222	NEONATE W OTHER SIGNIFICANT PROBLEMS	Perint jaund	82	20	1.7	140	0.81	0
87	133	PULMONARY EDEMA & RESPIRATORY FAILURE	Oth low resp	52	11	2.7	140	0.70	0
144	238	OTHER CIRCULATORY SYSTEM DIAGNOSES W CC	Complic proc	39	11	3.5	138	0.93	0
331	156	OTHER KIDNEY & URINARY TRACT DIAGNOSES AGE >17 W CC	Nephritis	21	3	6.6	138	0.47	0
568	141	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	Ot dx stomch	17	2	8.1	137	0.39	2/3
541	13	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Stomch cancr	3	0	45.3	136	0.00	1/3
565	128	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT 96+ HOURS	Asthma	10	1	13.3	133	0.33	0
566	133	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Oth low resp	19	6	6.9	132	1.04	0
188	143	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Abdom hernia	35	9	3.7	128	0.85	1
442	661	OTHER O.R. PROCEDURES FOR INJURIES W CC	Substance-related disorders	9	1	14.2	128	0.37	1/3
498	237	SPINAL FUSION EXCEPT CERVICAL W/O CC	Complic devi	36	0	3.5	126	0.00	0
468	44	EXTENSIVE O.R. PROCEDURE	Neoplsm unsp	22	2	5.7	126	0.30	0

		UNRELATED TO PRINCIPAL DIAGNOSIS							
554	115	OTHER VASCULAR PROCEDURES W CC W/O MAJOR CV DX	Aneurysm	21	3	6.0	126	0.47	0
570	18	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC W/O MAJOR GI DX	GI/perit can	16	0	7.9	126	0.00	2/3
468	50	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	DiabMel w/cm	11	3	11.5	126	0.90	0
553	50	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	DiabMel w/cm	11	1	11.4	125	0.30	0
188	237	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Complic devi	33	10	3.8	124	1.00	0
183	140	ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	Gastritis	52	12	2.4	123	0.76	1
554	118	OTHER VASCULAR PROCEDURES W CC W/O MAJOR CV DX	Phlebitis	25	7	4.9	123	0.93	0
468	59	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Anemia	7	1	17.6	123	0.47	0
76	238	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Complic proc	23	2	5.3	122	0.29	0
150	238	PERITONEAL ADHESIOLYSIS W CC	Complic proc	11	4	11.1	122	1.20	0
568	42	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	2ndary malig	8	0	15.3	122	0.00	1
331	238	OTHER KIDNEY & URINARY TRACT DIAGNOSES AGE >17 W CC	Complic proc	32	12	3.8	121	1.24	0
557	108	PERCUTANEOUS CARDIOVASCULAR PROC W DRUG-ELUTING STENT W MAJOR CV DX	chf;nonhp	12	0	10.0	120	0.00	2/3
191	663	PANCREAS, LIVER & SHUNT PROCEDURES W CC	Screening and history of mental health an	11	3	10.9	120	0.90	1
567	143	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Abdom hernia	7	1	17.0	119	0.47	1
565	133	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT 96+ HOURS	Oth low resp	6	0	19.7	118	0.00	0
149	214	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	GI cong anom	24	3	4.9	117	0.41	2/3
481	58	BONE MARROW TRANSPLANT	Ot nutrit dx	5	0	23.4	117	0.00	2/3
108	237	OTHER CARDIOTHORACIC PROCEDURES	Complic devi	12	2	9.7	116	0.55	0
567	13	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Stomch cancr	6	1	19.3	116	0.55	1
149	147	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Anal/rectal	36	1	3.2	115	0.09	1
383	670	OTHER ANTEPARTUM DIAGNOSES W MEDICAL COMPLICATIONS	Miscellaneous mental disorders	29	9	4.0	115	1.03	0
468	58	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Ot nutrit dx	11	3	10.4	114	0.90	0
468	129	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Asp pneumon	9	2	12.7	114	0.74	0
542	218	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Liveborn	1	0	113.0	113	0.00	0
542	157	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Ac renl fail	2	1	55.5	111	1.65	0

188	47	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Ot bnign neo	34	8	3.2	110	0.78	1
113	114	AMPUTATION FOR CIRC SYSTEM DISORDERS EXCEPT UPPER LIMB & TOE	Perip athero	15	1	7.3	110	0.22	0
566	130	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Pleurisy	15	6	7.3	110	1.32	0
553	118	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Phlebitis	17	5	6.4	109	0.97	0
113	108	AMPUTATION FOR CIRC SYSTEM DISORDERS EXCEPT UPPER LIMB & TOE	chf;nonhp	2	2	54.5	109	3.31	0
75	238	MAJOR CHEST PROCEDURES	Complic proc	11	1	9.8	108	0.30	0
468	115	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Aneurysm	3	0	36.0	108	0.00	0
138	105	CARDIAC ARRHYTHMIA & CONDUCTION DISORDERS W CC	Conduction	40	15	2.7	107	1.24	0
149	15	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Rctm/anus ca	21	0	5.1	107	0.00	1
568	139	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	Gasduo ulcer	10	0	10.6	106	0.00	0
468	127	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	COPD	10	2	10.5	105	0.66	0
124	99	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH & COMPLEX DIAG	Htn complicn	20	6	5.2	104	0.99	1/3
542	129	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Asp pneumon	7	3	14.9	104	1.42	0
567	12	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Esoph cancer	6	0	17.2	103	0.00	1
468	145	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Int obstruct	5	1	20.6	103	0.66	0
442	234	OTHER O.R. PROCEDURES FOR INJURIES W CC	Crush injury	17	8	6.0	102	1.56	0
578	7	INFECTIOUS & PARASITIC DISEASES W OR PROCEDURE	Viral infect	10	1	10.2	102	0.33	2/3
542	231	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Oth fracture	4	0	25.5	102	0.00	0
219	212	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	Ot bone dx	52	0	1.9	101	0.00	2/3
498	231	SPINAL FUSION EXCEPT CERVICAL W/O CC	Oth fracture	19	6	5.3	101	1.04	0
76	234	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Crush injury	9	4	11.2	101	1.47	0
547	108	CORONARY BYPASS W CARDIAC CATH W MAJOR CV DX	chf;nonhp	7	2	14.3	100	0.95	1
138	107	CARDIAC ARRHYTHMIA & CONDUCTION DISORDERS W CC	Cardia arrst	32	14	3.1	99	1.45	0
553	108	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	chf;nonhp	13	3	7.6	99	0.76	0
105	108	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W/O CARD CATH	chf;nonhp	9	2	11.0	99	0.74	0
104	115	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	Aneurysm	6	0	16.5	99	0.00	0
567	42	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	2ndary malig	6	1	16.5	99	0.55	1

542	58	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Ot nutrit dx	2	0	49.5	99	0.00	0
486	228	OTHER O.R. PROCEDURES FOR MULTIPLE SIGNIFICANT TRAUMA	Fx skull fac	10	2	9.7	97	0.66	0
218	212	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W CC	Ot bone dx	31	0	3.1	96	0.00	2/3
542	259	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Unclassified	1	0	96.0	96	0.00	0
296	51	NUTRITIONAL & MISC METABOLIC DISORDERS AGE >17 W CC	Ot endo dsor	22	7	4.3	95	1.05	2/3
218	237	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W CC	Complic devi	16	2	5.9	94	0.41	0
429	259	ORGANIC DISTURBANCES & MENTAL RETARDATION	Unclassified	21	8	4.4	93	1.26	1/3
294	49	DIABETES AGE >35	DiabMel no c	35	6	2.6	92	0.57	2/3
1	213	CRANIOTOMY AGE >17 W CC	Cardiac anom	17	0	5.4	91	0.00	0
79	1	RESPIRATORY INFECTIONS & INFLAMMATIONS AGE >17 W CC	Tuberculosis	10	2	9.1	91	0.66	0
567	141	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Ot dx stomch	4	0	22.3	89	0.00	2/3
572	211	MAJOR GASTROINTESTINAL DISORDERS AND PERITONEAL INFECTIONS	Ot conn tiss	16	3	5.5	88	0.62	1/3
1	44	CRANIOTOMY AGE >17 W CC	Neoplsm unsp	11	2	8.0	88	0.60	0
149	142	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Appendicitis	17	3	5.1	87	0.58	0
210	201	HIP & FEMUR PROCEDURES EXCEPT MAJOR JOINT AGE >17 W CC	Infect arth	8	0	10.9	87	0.00	0
497	201	SPINAL FUSION EXCEPT CERVICAL W CC	Infect arth	7	1	12.4	87	0.47	0
110	121	MAJOR CARDIOVASCULAR PROCEDURES W CC	Oth vein dx	14	4	6.1	86	0.95	0
449	660	POISONING & TOXIC EFFECTS OF DRUGS AGE >17 W CC	Alcohol-related disorders	34	14	2.5	84	1.36	1/3
105	100	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W/O CARD CATH	Acute MI	8	2	10.4	83	0.83	0
389	661	FULL TERM NEONATE W MAJOR PROBLEMS	Substance-related disorders	8	4	10.4	83	1.65	0
554	238	OTHER VASCULAR PROCEDURES W CC W/O MAJOR CV DX	Complic proc	7	2	11.9	83	0.95	0
468	63	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Wht blood dx	3	0	27.7	83	0.00	0
104	213	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	Cardiac anom	8	0	10.1	81	0.00	0
113	118	AMPUTATION FOR CIRC SYSTEM DISORDERS EXCEPT UPPER LIMB & TOE	Phlebitis	2	0	40.5	81	0.00	0
566	103	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Pulm hart dx	16	7	5.0	80	1.45	0
542	42	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	2ndary malig	3	1	26.7	80	1.10	0
542	224	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Ot perint dx	1	0	80.0	80	0.00	0

1	238	CRANIOTOMY AGE >17 W CC	Complic proc	12	4	6.6	79	1.10	0
389	213	FULL TERM NEONATE W MAJOR PROBLEMS	Cardiac anom	3	0	26.3	79	0.00	0
542	96	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Hrt valve dx	1	0	79.0	79	0.00	0
1	81	CRANIOTOMY AGE >17 W CC	Ot hered CNS	11	2	7.1	78	0.60	0
578	246	INFECTIOUS & PARASITIC DISEASES W OR PROCEDURE	FUO	11	2	7.1	78	0.60	1/3
468	234	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Crush injury	9	3	8.7	78	1.10	0
219	203	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	Osteoarthros	38	0	2.0	77	0.00	2/3
331	234	OTHER KIDNEY & URINARY TRACT DIAGNOSES AGE >17 W CC	Crush injury	25	8	3.1	77	1.06	0
468	108	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	chf;nonhp	8	4	9.6	77	1.65	0
481	63	BONE MARROW TRANSPLANT	Wht blood dx	3	1	25.7	77	1.10	2/3
104	99	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	Htn complicn	2	0	38.5	77	0.00	2/3
218	201	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W CC	Infect arth	13	0	5.8	76	0.00	0
442	242	OTHER O.R. PROCEDURES FOR INJURIES W CC	Poisn ot med	8	5	9.5	76	2.07	0
481	45	BONE MARROW TRANSPLANT	Maint chem/r	6	0	12.7	76	0.00	2/3
359	173	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	Menopausl dx	43	0	1.7	75	0.00	1
566	128	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Asthma	16	6	4.7	75	1.24	0
1	216	CRANIOTOMY AGE >17 W CC	Nerv cong an	11	0	6.8	75	0.00	1/3
468	103	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Pulm hart dx	9	1	8.3	75	0.37	0
542	153	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	GI hemorrhag	2	0	37.5	75	0.00	0
550	237	CORONARY BYPASS W/O CARDIAC CATH W/O MAJOR CV DX	Complic devi	12	1	6.2	74	0.28	0
568	155	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	Other GI dx	5	0	14.8	74	0.00	1/3
331	162	OTHER KIDNEY & URINARY TRACT DIAGNOSES AGE >17 W CC	Ot dx bladdr	21	3	3.5	73	0.47	1/3
205	118	DISORDERS OF LIVER EXCEPT MALIG,CIRR,ALC HEPA W CC	Phlebitis	11	4	6.6	73	1.20	1/3
553	117	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Ot circul dx	9	3	8.1	73	1.10	1/3
76	129	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Asp pneumon	6	2	12.2	73	1.10	0
542	244	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Other injury	3	1	24.3	73	1.10	0
468	151	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Oth liver dx	2	0	36.5	73	0.00	0
121	237	CIRCULATORY DISORDERS W AMI & MAJOR COMP, DISCHARGED ALIVE	Complic devi	11	1	6.5	72	0.30	0
124	103	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH &	Pulm hart dx	9	2	8.0	72	0.74	0

		COMPLEX DIAG							
121	101	CIRCULATORY DISORDERS W AMI & MAJOR COMP, DISCHARGED ALIVE	Coron athero	15	4	4.7	71	0.88	0
108	47	OTHER CARDIOTHORACIC PROCEDURES	Ot bnign neo	11	0	6.5	71	0.00	2/3
542	243	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Poisn nonmed	3	3	23.7	71	3.31	0
210	212	HIP & FEMUR PROCEDURES EXCEPT MAJOR JOINT AGE >17 W CC	Ot bone dx	20	0	3.5	70	0.00	2/3
468	231	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Oth fracture	7	1	10.0	70	0.47	0
104	237	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	Complic devi	6	0	11.7	70	0.00	0
468	155	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Other GI dx	11	1	6.3	69	0.30	0
110	118	MAJOR CARDIOVASCULAR PROCEDURES W CC	Phlebitis	10	6	6.9	69	1.99	0
219	225	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	Joint injury	32	2	2.1	68	0.21	2/3
144	100	OTHER CIRCULATORY SYSTEM DIAGNOSES W CC	Acute MI	17	3	4.0	68	0.58	0
481	35	BONE MARROW TRANSPLANT	Brain/ns can	6	0	11.3	68	0.00	2/3
498	217	SPINAL FUSION EXCEPT CERVICAL W/O CC	Ot cong anom	21	0	3.2	67	0.00	2/3
468	42	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	2ndary malig	11	0	6.1	67	0.00	0
108	104	OTHER CARDIOTHORACIC PROCEDURES	Oth heart dx	7	0	9.6	67	0.00	2/3
1	227	CRANIOTOMY AGE >17 W CC	Spin cor inj	5	0	13.4	67	0.00	0
468	149	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Biliary dx	4	3	16.8	67	2.48	0
1	79	CRANIOTOMY AGE >17 W CC	Parkinson-s	12	0	5.5	66	0.00	2/3
75	47	MAJOR CHEST PROCEDURES	Ot bnign neo	12	0	5.5	66	0.00	1
150	42	PERITONEAL ADHESIOLYSIS W CC	2ndary malig	12	1	5.5	66	0.28	0
468	228	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Fx skull fac	10	3	6.6	66	0.99	0
217	212	WND DEBRID & SKN GRFT EXCEPT HAND,FOR MUSCSKELET & CONN TISS DIS	Ot bone dx	6	0	11.0	66	0.00	2/3
499	201	BACK & NECK PROCEDURES EXCEPT SPINAL FUSION W CC	Infect arth	4	1	16.5	66	0.83	0
113	238	AMPUTATION FOR CIRC SYSTEM DISORDERS EXCEPT UPPER LIMB & TOE	Complic proc	2	0	33.0	66	0.00	0
468	210	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	SLE	4	0	16.3	65	0.00	0
429	657	ORGANIC DISTURBANCES & MENTAL RETARDATION	Mood disorders	3	1	21.7	65	1.10	2/3
481	59	BONE MARROW TRANSPLANT	Anemia	2	1	32.5	65	1.65	2/3
468	21	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Bone/ct cncr	11	0	5.8	64	0.00	0
385	221	NEONATES, DIED OR TRANSFERRED TO ANOTHER ACUTE CARE FACILITY	Resp distres	8	2	8.0	64	0.83	0

150	214	PERITONEAL ADHESIOLYSIS W CC	GI cong anom	8	3	8.0	64	1.24	1/3
383	191	OTHER ANTEPARTUM DIAGNOSES W MEDICAL COMPLICATIONS	Amnios dx	25	1	2.5	63	0.13	0
331	159	OTHER KIDNEY & URINARY TRACT DIAGNOSES AGE >17 W CC	UTI	14	2	4.5	63	0.47	1/3
82	41	RESPIRATORY NEOPLASMS	Ot primry ca	10	2	6.3	63	0.66	2/3
468	117	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Ot circul dx	5	2	12.6	63	1.32	0
149	238	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Complic proc	8	1	7.8	62	0.41	0
188	244	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Other injury	23	12	2.7	61	1.73	0
468	238	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Complic proc	17	1	3.6	61	0.19	0
497	217	SPINAL FUSION EXCEPT CERVICAL W CC	Ot cong anom	15	0	4.1	61	0.00	2/3
468	100	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Acute MI	3	2	20.3	61	2.21	0
486	236	OTHER O.R. PROCEDURES FOR MULTIPLE SIGNIFICANT TRAUMA	Opn wnd extr	3	2	20.3	61	2.21	0
124	102	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH & COMPLEX DIAG	Chest pain	23	5	2.6	60	0.72	1/3
553	100	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Acute MI	8	5	7.5	60	2.07	0
468	55	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Fluid/elc dx	8	2	7.5	60	0.83	0
542	138	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Esophgeal dx	2	1	30.0	60	1.65	0
149	143	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Abdom hernia	12	4	4.9	59	1.10	1
566	125	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Bronchitis	9	4	6.6	59	1.47	0
110	117	MAJOR CARDIOVASCULAR PROCEDURES W CC	Ot circul dx	8	2	7.4	59	0.83	0
150	237	PERITONEAL ADHESIOLYSIS W CC	Complic devi	7	1	8.4	59	0.47	0
218	207	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W CC	Patholog fx	10	0	5.8	58	0.00	0
578	3	INFECTIOUS & PARASITIC DISEASES W OR PROCEDURE	Oth bact inf	5	1	11.4	57	0.66	0
547	106	CORONARY BYPASS W CARDIAC CATH W MAJOR CV DX	Dysrhythmia	3	2	19.0	57	2.21	2/3
149	44	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Neoplsm unsp	13	0	4.3	56	0.00	1
566	234	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Crush injury	9	4	6.2	56	1.47	0
468	153	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	GI hemorrhag	7	0	8.0	56	0.00	0
565	123	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT 96+ HOURS	Influenza	3	1	18.7	56	1.10	0
542	83	TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W/O MAJ O.R.	Epilepsy/cnv	2	0	28.0	56	0.00	0
124	107	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH & COMPLEX DIAG	Cardia arrst	6	3	9.2	55	1.65	0
567	155	STOMACH, ESOPHAGEAL &	Other GI dx	2	0	27.5	55	0.00	2/3

		DUODENAL PROC AGE > 17 W CC W MAJOR GI DX							
82	20	RESPIRATORY NEOPLASMS	Ot respir ca	7	0	7.7	54	0.00	2/3
547	237	CORONARY BYPASS W CARDIAC CATH W MAJOR CV DX	Complic devi	7	1	7.7	54	0.47	0
150	148	PERITONEAL ADHESIOLYSIS W CC	Peritonitis	4	0	13.5	54	0.00	0
191	234	PANCREAS, LIVER & SHUNT PROCEDURES W CC	Crush injury	4	0	13.5	54	0.00	0
243	212	MEDICAL BACK PROBLEMS	Ot bone dx	29	0	1.8	52	0.00	2/3
358	173	UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W CC	Menopausl dx	16	0	3.3	52	0.00	1
205	234	DISORDERS OF LIVER EXCEPT MALIG,CIRR,ALC HEPA W CC	Crush injury	14	4	3.6	51	0.95	0
468	51	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Ot endo dsor	2	1	25.5	51	1.65	0
219	208	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	Acq foot def	21	0	2.4	50	0.00	2/3
554	117	OTHER VASCULAR PROCEDURES W CC W/O MAJOR CV DX	Ot circul dx	13	1	3.8	50	0.25	0
545	209	REVISION OF HIP OR KNEE REPLACEMENT	Ot acq defor	11	0	4.5	50	0.00	2/3
76	132	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Lung externl	3	0	16.3	49	0.00	2/3
541	58	ECMO OR TRACH W MV 96+HRS OR PDX EXC FACE, MOUTH & NECK W MAJ O.R.	Ot nutrit dx	2	0	24.5	49	0.00	1/3
149	175	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Ot femal gen	14	0	3.4	47	0.00	1
468	47	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Ot bnign neo	14	0	3.4	47	0.00	0
545	203	REVISION OF HIP OR KNEE REPLACEMENT	Osteoarthros	9	0	5.2	47	0.00	2/3
566	19	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT < 96 HOURS	Brnch/lng ca	8	2	5.9	47	0.83	0
553	101	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Coron athero	6	1	7.8	47	0.55	0
567	18	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	GI/perit can	2	1	23.5	47	1.65	1
442	236	OTHER O.R. PROCEDURES FOR INJURIES W CC	Opn wnd extr	11	3	4.1	45	0.90	0
218	231	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W CC	Oth fracture	2	0	22.5	45	0.00	0
553	115	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Aneurysm	8	2	5.5	44	0.83	0
108	115	OTHER CARDIOTHORACIC PROCEDURES	Aneurysm	6	0	7.3	44	0.00	0
547	248	CORONARY BYPASS W CARDIAC CATH W MAJOR CV DX	Gangrene	1	0	44.0	44	0.00	0
568	44	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	Neoplsm unsp	4	0	10.8	43	0.00	1
188	142	OTHER DIGESTIVE SYSTEM DIAGNOSES AGE >17 W CC	Appendicitis	8	2	5.3	42	0.83	0
113	116	AMPUTATION FOR CIRC SYSTEM DISORDERS EXCEPT UPPER LIMB & TOE	Art embolism	3	2	14.0	42	2.21	0
481	41	BONE MARROW TRANSPLANT	Ot primry ca	2	0	21.0	42	0.00	2/3
219	237	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	Complic devi	18	0	2.3	41	0.00	0

110	238	MAJOR CARDIOVASCULAR PROCEDURES W CC	Complic proc	11	3	3.7	41	0.90	0
567	14	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Colon cancer	2	0	20.5	41	0.00	1
468	56	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS	Cystic fibro	3	1	12.7	38	1.10	0
481	42	BONE MARROW TRANSPLANT	2ndary malig	2	0	18.5	37	0.00	2/3
76	134	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Ot uppr resp	5	0	7.2	36	0.00	1/3
545	226	REVISION OF HIP OR KNEE REPLACEMENT	Fx hip	5	2	7.2	36	1.32	0
104	105	CARDIAC VALVE & OTH MAJOR CARDIOTHORACIC PROC W CARD CATH	Conduction	2	0	17.5	35	0.00	0
568	153	STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES PROC AGE > 17 W CC W/O MAJOR GI DX	GI hemorrhag	2	1	17.5	35	1.65	0
76	8	OTHER RESP SYSTEM O.R. PROCEDURES W CC	Oth infectns	6	3	5.7	34	1.65	1/3
167	251	APPENDECTOMY W/O COMPLICATED PRINCIPAL DIAG W/O CC	Abdomnl pain	22	4	1.5	32	0.60	1/3
76	127	OTHER RESP SYSTEM O.R. PROCEDURES W CC	COPD	4	1	7.8	31	0.83	0
567	44	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Neoplsm unsp	2	0	15.5	31	0.00	1
108	108	OTHER CARDIOTHORACIC PROCEDURES	chf;nonhp	1	1	31.0	31	3.31	0
149	237	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Complic devi	8	0	3.8	30	0.00	0
149	217	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Ot cong anom	1	0	30.0	30	0.00	2/3
553	121	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Oth vein dx	1	0	30.0	30	0.00	2/3
553	106	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Dysrhythmia	2	0	14.5	29	0.00	0
567	234	STOMACH, ESOPHAGEAL & DUODENAL PROC AGE > 17 W CC W MAJOR GI DX	Crush injury	2	0	14.5	29	0.00	0
219	204	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	Ot joint dx	17	0	1.6	28	0.00	2/3
219	201	LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	Infect arth	6	1	4.7	28	0.55	0
545	212	REVISION OF HIP OR KNEE REPLACEMENT	Ot bone dx	2	0	13.5	27	0.00	2/3
499	207	BACK & NECK PROCEDURES EXCEPT SPINAL FUSION W CC	Patholog fx	4	1	6.5	26	0.83	0
553	213	OTHER VASCULAR PROCEDURES W CC W MAJOR CV DX	Cardiac anom	3	1	8.7	26	1.10	1/3
149	234	MAJOR SMALL & LARGE BOWEL PROCEDURES W/O CC	Crush injury	5	0	5.0	25	0.00	0

Appendix B: Which Days Were Counted as Holidays?

To determine which days should count as holidays, we ranked the number of admissions for each day across all hospitals in the period 12/4/06 – 12/2/07. The range was 360 to 828 admits/day. All weekdays had more admissions than weekend days with exception of six days: New Year's Day, Memorial Day, July 4, Labor Day, Thanksgiving, and Christmas (Note that Christmas eve and New Year's eve are Sundays in this data). All weekend days and these six holidays had <511 admits/day. The biggest jump in this ranking occurs from 511 to 555 where there are then three intermediate possible holidays: Friday after Thanksgiving, Wednesday before Thanksgiving, and the Friday (12/22/06) before the Christmas long weekend (555,558, 567 admits, respectively). The second biggest jump in the ranking is then to 601 admits for a non-holiday Friday. So these three days were intermediate between the fairly distinct weekend days and weekdays. We did not include them as holidays because two out of the three are not traditionally holidays and these days as a group were slightly closer to the weekday group than the weekend group. Interestingly, there is some evidence of rebound: Monday after Thanksgiving is the highest admit date in the dataset (828). Other high admit days include Wednesday 1/3/07 after New Year's, Tuesday after Labor Day, and the Mondays both before and after July 4 (a Wednesday).

Case Estimation Approach for Pandemic Planning Exercises

Introduction

Pandemic influenza planning and exercises depend on having estimates of local impact. Scenarios with specific case estimates are often used. Good software programs are available to model elements of response, like hospitalization estimates, usually based on historic information from large metropolitan areas such as London and New York. While of proven utility, models designed for one purpose can be difficult to adapt for another. In response to needs for a local pandemic influenza exercise encompassing the broadly defined healthcare system of the Portland, Oregon metropolitan area, we developed a case estimate approach to utilize local knowledge of pandemic influenza and address specific stakeholder concerns, like hospital equipment needs for pediatric patients.

We present the case estimate approach developed and discuss the limitations of applying assumptions about past pandemics in modern times – given both our current population structure and our current healthcare system.

Methods

Case estimate development
Parameters provided for the development of the case estimates needed were as follows:

- Include multiple pediatric age groups and risk groups based on underlying chronic disease
- Include three levels of cases – those treated at home or outpatient (not hospitalized); those needing hospital inpatient care; and those needing intensive care unit (ICU) support.
- Develop case numbers based on a 1918-type of pandemic scenario – including a 1918 estimated case fatality rate of 2% and attack rates in the population approaching 30% – as the "worst-case" scenario
- Allow for changes in population numbers, severity, magnitude, and duration of event.
- Allow for reports that included daily, weekly, or total case numbers for different time points during the local epidemic scenario

We used a deterministic approach that incorporated key parameters affecting the likely severity of the epidemic, and the epidemic curve of 1918 mortality in Portland, Oregon. Key parameters were identified as the attack rates; case fatality and recovery rates; rates for developing medical complication; average durations of illness; prevalence of chronic disease; and difference in the likelihood of hospitalization between those with and without underlying chronic diseases. Estimates for these parameters were obtained through a literature search (Table 1) and were able to be changed in the model.

We directly calculated values for new infections based on a well-described parameter obtained from 1918: the epidemic curve of mortality for Multnomah County during the first 8 weeks of the local epidemic. This curve was known in detail from a review of 1918 death certificates, and was a way to explicitly link the 1918 experience to modern demographic parameters.

Attack rates in the literature helped us estimate the final experience of a local epidemic –the area under the epidemic curve. The attack rate times the susceptible population gave the total number of cases for the total time period; the *relationship* between time and the epidemic curve expressed by,

$$k_0 + k_1 e\left[-\left(\frac{t - k_2^2}{k_3^2} \right)^2 \right]$$

(where t=time and k_0-k_3 are constants) allowed for estimation of the number affected at a given point in time. Because the curve was for mortality, we added a time delay (average duration of illness) in the data used to fit the curve. The coefficients, k, for the Gaussian peak epidemic curve were identified using the curve-fitting function of IGOR Pro (Version 5.0, Wave Metrics, Inc; Table 1). Direct use of an epidemic curve allowed for subsequent adjustment of epidemic scenarios (e.g., duration 8 weeks or 12 weeks) by changing these four constants.

Two population inputs were used: one for calibrating the model and one for running the exercise scenario values. Multnomah County population for 1918 was used to calibrate the model. Because many of the key parameters for a 1918-like scenario were difficult to estimate, we wanted to assess these parameters given the known outcomes: deaths due to influenza in Multnomah County during the first eight weeks of the local epidemic in 1918, and the cause of influenza-related death (i.e., influenza with pneumonia or influenza alone).

After calibrating the model, we input population data of the estimated 2008 catchment area for the major Portland metropolitan area hospitals, which included a six county region in northwest Oregon (Multnomah, Washington, Clackamas, Columbia, Clatsop, and Tillamook counties) and Clark County in Washington State. Age group specific population estimates for Oregon Counties were from the Portland State University Population Research Center, with similar age-specific growth rate estimates applied to Clark County 2000 census data. Specific age groups considered were under 1 year, 1 to 4 years old, 5 to 19 years old, 20 to 44 years old, 45 to 64 years old, and over 64 years.

We used the Oregon Behavioral Risk Factor Surveillance System and literature review to divide the population into high and low risk groups based on prevalence of chronic disease that might affect influenza related hospitalization rates. Chronic diseases assessed included COPD, asthma, and diabetes. High and low risk segments of the population as estimated based on chronic disease prevalence were followed separately through the model steps from infection onward – i.e., we assumed that this segment of the population was no more likely to be infected then the segment without a chronic disease condition, but that they would have different outcomes once they were.

Translating 1918 findings into a modern day scenario was discussed by a working group that included the modelers, physicians, and a systems analyst. It was determined that proportion of the population needing hospitalization care would be estimated based on the proportion of cases with moderate or severe illness. Subsets based on severity were followed separately from illness on. That is to say that severity was only assessed after "symptom onset." The population needing ICU care would be estimated by the number dead based on 1918 parameters using 2007 population numbers. This approach assumed that anyone ill enough to die in 1918 would be eligible for ICU care as provided in a modern hospital.

Calculations using the case-estimating approach developed here were done with ModelMaker© software (version 4.0 from Cherwell Scientific Ltd, Oxford, U.K. or http://www.modelkinetix.com). Results of this case estimation approach were compared to calculations made using the CDC Flu Surge model [REF] to see how well they meet the need for a local 1918-like scenario.

Results

Calibrating to 1918 mortality

The approach used to calculate cases was first assessed for a 1918 Multnomah County scenario, looking specifically at cases resulting in death as deaths were well-characterized. In comparing weekly calculated values to weekly actual values for an 8 week epidemic period (Figure 1), it is evident that the use of a Gaussian peak equation provides a reasonable estimate of early case numbers (weeks one thru six), with later weeks being underestimated due to the drop off in the estimation curve. The total calculated case count for deaths is somewhat greater than the observed case count in the first six weeks (N=557 calculated; N=540 actual), but underestimates the count for the entire 8 week period (N=598 calculated; N=658 actual). By calculating a 12 week local epidemic, the case numbers are shifted toward later weeks, with the first six weeks becoming somewhat more accurate (N=547 calculated; N=540 actual) and the 8 week period only slightly more undervalued (N=595 calculated; N=658 actual). The first 8 weeks of a 12 week local epidemic is discussed below.

A review of age-specific calculations showed that the model most closely estimated the numbers of people ill in the 20-44 year old age group (389 cases calculated; 468 actual). Younger age groups were underestimated (for all age groups <20 years old: 18 cases calculated; 112 actual); and older age groups were overestimated (for all age groups >44 years old: 170 cases calculated; 78 actual)

Calculated case numbers in the absence of any intervention and application to exercise scenario

Applying the 1918-like scenario to the roughly 2.1 million people living in the seven-county area considered, 513,091 people could have had influenza – ranging from very mild to fatal – in the first 8 weeks of a local epidemic from among (Table 3). With a complete lack of treatment beyond that which would be available in 1918, at least 4,972 influenza-related deaths would be expected. The tendency of the model to underestimate means that even this number of deaths would be low for a 1918 scenario, as the case numbers add up to an overall attack rate of 24% and CFR of 1%, compared to the targeted 1918 values of 30% and 2%, respectively. The majority of illness, and thus death, derived from the high risk populations, which accounted for 93% of the moderately or severely ill case values.

Translating this scenario to a situation wherein modern medical care is available, up to 35,091 people (all moderately and severely ill; Table 3) could potentially require hospitalization, though given the availability of antiviral and antibiotic medications, the number would likely be closer to the 11,007 people with complicated influenza (Table 3). The 4,972 influenza-related deaths would translate into presumptive need for that many ICU beds.

Comparison to Flu Serge Model
The total numbers ill based on the current calculations are of the same magnitude as the number ill calculated in Flu Surge for the high-end of the most severe scenario: the range of 11,007-35,292 hospitalizations includes the Flu Surge high-end value of 12,903 (Table 4). Comparisons of mortality are limited by the different underlying assumptions for calculating deaths (no treatment compared to hospital treatment), but values are of the same magnitude, with the values calculated here being about two-and-a-half times greater then those from Flu Surge (Table 4).

Discussion

A known epidemic mortality curve in conjunction with attack rates was used to directly calculate numbers of incident cases at a point in time during a local influenza epidemic. The equation describing the curve provided a time sensitive flow accounting for the disease characteristics of the Portland area mimicking the 1918 pandemic. This model succeeded in many of the areas needed, including representation of multiple pediatric age groups and risk groups based on underlying chronic disease; allowing for changes in population numbers, severity, magnitude, and duration of event; and allow for reports that included daily, weekly, or total case numbers for different time points during the local epidemic scenario.

Calculations for the pediatric groups did appear to be underestimated. This underestimation likely stemmed from the various sources used to estimate parameters: information on hospitalization of high and low risk people was primarily available for endemic influenza, likely biasing this information to more modern-day population distributions where the majority of severe and complicated cases are in the elderly.

As for developing case numbers based on a 1918-type of pandemic scenario, the case calculation approach succeeded in that the case numbers estimated clearly represented a worst-case scenario – easily overwhelming the number of locally available hospital and ICU beds within days. However, even these high case numbers appeared to be an underestimate of what would be required to reach the 1918 estimated case fatality rate of 2% and attack rates in the population approaching 30%. These underestimates appear to be primarily due to undervaluing the last third of the epidemic period under the assumption of a Gaussian peak to fit the data. Other distributions were investigated, but the Gaussian peak optimized the parameter estimates.

The approach used was perhaps weakest in achieving the outcome of being able to estimate case numbers for three levels of cases – those treated at home or outpatient (not hospitalized); those needing hospital inpatient care; and those needing intensive care unit (ICU) support. The greatest limitation here was the conceptual difficulty of translating 1918 parameters to a 21st century setting. While we were able to calculate how much of the population was affected with different levels of severity as defined in 1918, these levels did not equate to those expected in a setting with antiviral and antibiotic medication. For example, people hospitalized in 1918 might well never have required hospitalization if they could have received a timely does of Tamiflu®. And the numbers of persons with complications – not to mention the improved outcome of those complications – would likely be vastly fewer with antibiotic treatment. Based on these differences, it is reasonable to suppose that the numbers requiring hospitalization would look more like the number of severely ill (N=11,007) rather then the numbers of moderately and severely ill (N=35,091). The numbers actually dying in a 20th century setting would need to be obtained with an additional calculation of case fatality rate from 21st century data.

Other assumptions also affect the use of this method. We assumed that a morbidity curve would be similar in shape to a mortality curve. We did account in our model for a delay in the onset of epidemic-related deaths, and had no reason to expect a difference in the case fatality rate over time. Recent pandemic data will be reviewed to further assess this assumption. The choice of a deterministic approach to the calculations was made due to the limited time available to build the model, the outputs required, and the areas in which flexibility was needed. Stochastic models are generally considered superior for understanding transmission and spread of epidemics (Bailey, 1950; Crandall, *et al.*, 2003). However, the need here was simply different strata of case estimates. There were also limitations to estimating the parameters used. Attack rates by age group were taken from a literature review of records contemporary to the 1918 pandemic as well as later retrospective assessments. Age groupings were only sometimes comparable as not all records looked at demographics typical for a metropolitan area. For example, most of the detailed information came from Army camps where men age 20 -45 years old were the preponderance of the population.

Overall, we were able to quickly develop a relatively flexible approach to calculating numbers of people affected by pandemic influenza in a local setting. However, the use of a 1918-like scenario could not be clearly interpreted in a 21st century setting where the medical technology was so different from 1918. Planners should consider using definitions for a "worst-case" scenario that can better account for technological advances made in the last 90 years.

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Table 1: Parameter estimates used in calculations for age group, *i*, risk group, *j*, and severity, *k* for 12 week local epidemic of a pandemic influenza strain using a 1918-like scenario.

Parameter	Parameter estimates		Relevant References
Attack rate (a_i)	<1 year old	0.200	Frost
	1-4 years old	0.320	Genugten, *et al.*
	5-19 years old	0.375	Glezen
	20-45 years old	0.305	Longini, *et al.*
	45-64 years old	0.155	Meltzer
	>65 years old	0.113	Reid & Taubenburber.
			Sydenstricker
			Taubenberger & Morens
Incubation period (ds1)		2 days	
Duration of illness (ds2)		7 days	
Prevalence of underlying conditions (r_i)	<1 year old	0	Oregon BRFSS
	1-4 years old	0.08	
	5-19 years old	0.01	
	20-45 years old	0.12	
	45-64 years old	0.15	
	>65 years old	0.31	
Likelihood of hospitalization			
High risk ($Hosp_{ij}$)	<1 year old	0.06	Brundage (Camp Funston)
	1-4 years old	0.06	Genugten, *et al.*
	5-19 years old	0.03	Meltzer
	20-45 years old	0.20	Mollooly & Baker
	45-64 years old	0.20	*NEJM* 2000
	>65 years old	0.10	Neuzil, *et al.*
			O'Brian, *et al.*
Low risk ($Hosp_{ij}$)	<1 year old	0.00060	Thompson, *et al.*
	1-4 years old	0.00060	
	5-19 years old	0.00015	
	20-45 years old	0.00100	
	45-64 years old	0.00100	
	>65 years old	0.00050	
Likelihood of developing complications			Brundage
			Connolly
High risk hospitalized ($comp_{jk}$)		0.50	Conner
Low risk hospitalized ($comp_{jk}$)		0.05	Dauer, Frost, Soper
Case fatality rate			Genugten, et al.
Moderately ill (cfr_{ik})	<1 year old	0.030	Morens & Fauci
	1-4 years old	0.014	Murray
	5-19 years old	0.090	Reid & Taubenburber
	20-45 years old	0.028	Sydenstricker
	45-64 years old	0.024	Taubenberger & Morens
	>65 years old	0.030	
Severely ill (cfr_{ik})		0.400	Brundage
			Frost
			Soper (Hong Kong 1968)
Gaussian constants,			
k_0		0.001	
k_1		0.216	
k_2		25.739	
k_3		13.500	

Table 2: Formulas used in calculations, for age group, *i*, risk group, *j*, and severity, k

Calculation for…	**Calculation**
Compartment	
Number susceptible at time, *t* ($Susc_i$)	$-InfRate_{ij}$
Number infected at time, *t* (Inf_{ij})	$InfRate_{ij}-\Sigma dPrg_{ijk}-RecvInf_{ij}$
Number ill at time, *t* (Ill_{ijk})	$dPrg_{ijk}-Recv_{ijk}-Mort_{ijk}$
Number recovered at time, *t* ($Recov_i$)	$\Sigma Recv_{ijk} + \Sigma RecvInf_{ij}$
Number dead at time, *t* (Di)	$\Sigma Mort_{ijk}$
Flow	
Infection ($Susc_i$ to Inf_{ij}, $InfRate_{ij}$)	$Susc_i * r_i * \left(k_0 + k_1 e\left[-\left(\frac{t-k_2^2}{k_3^2} \right)^2 \right] \right)$
Infection to Illness (Inf_{ij} to Ill_{ij}, $dPrg_{ijk}$)	$Hosp_{ij} * comp_{jk} * ds1 * Inf_{ij}$ where $comp_{jk}=1$ for moderately ill
Recovery, outpatient (Inf_{ij} to $Recov_i$, $RecvInf_{ij}$)	$(1-(Hosp_{ij}+(hosp_{ij} * comp_{jk}))) * (ds1 * ds2) * Inf_{ij}$
Recovery, hopsitalized (Ill_{ijk} to $Recov_i$, $Recv_{ijk}$)	$ds2 * Ill_{ijk} * (1-cfr_{ik})$
Mortality ($Mort_{ijk}$; Ill_{ijk} to D_i, $Mort_{ijk}$)	$cfr_{ik} * ds2 * Ill_{ijk}$

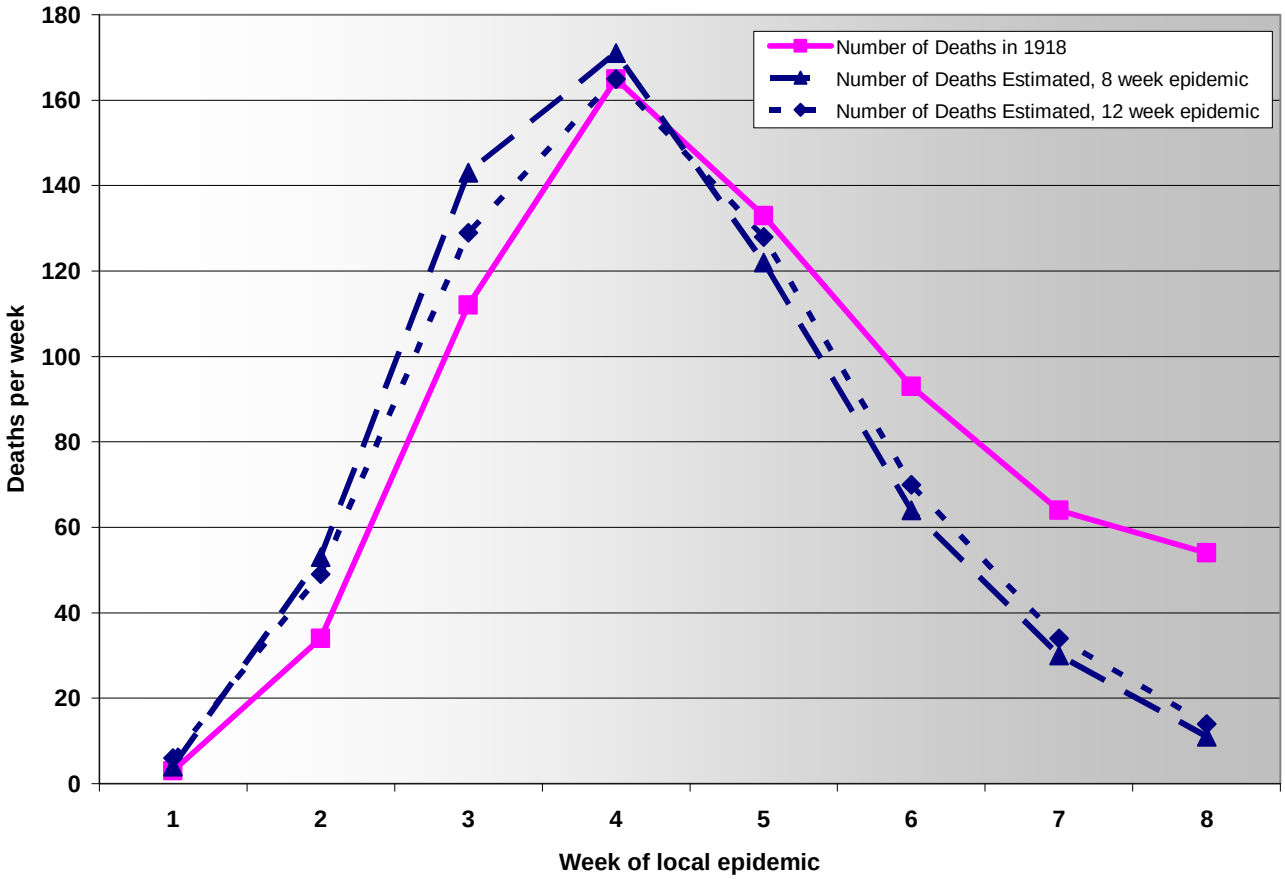
Table 3: Calculated values for morbidity and mortality in the absence of intervention based on a 1918-like scenario using 2007 population estimates. Seven-county area of northwest Oregon and southwest Washington.

	Age (Years)						
Values	**<1**	**1 to 4**	**5 to 19**	**20 to 44**	**Over 45**		**Total**
Target Values							
CFR	-	-	-	-	-	-	2%
1918 Multnomah Co.							
Mortality Rate (per 100,000 pop.)	260.7	202.9	107.2	381.4	113.5		238.5
	<1	**1 to 4**	**5 to 19**	**20 to 44**	**45 to 64**	**>64**	**Total**
2007 Population 7-county area	29,353	113,717	421,027	775,232	572,840	216,782	2,128,951
First 8 weeks, calculated							
Mild illness (number)	5,258	33,541	146,146	201,814	72,735	18,530	478,000
Moderately ill (number)							
Low risk population	32	140	152	1,403	495	52	2,274
High risk population	123	94	252	11,797	6,643	2,901	21,810
Severely Ill (number)							
Low risk population	0	3	3	65	20	0	115
High risk population	61	44	124	5,895	3,320	1,448	10,892
Recovered	5,443	33,797	146,592	218,272	81,730	22,284	508,118
Dead	30	25	85	2,702	1,482	648	4,972
Total Dead & Recovered	*5,474*	*33,822*	*146,677*	*220,974*	*83,213*	*22,931*	*513,091*
CFR (back calculated)	0.5%	0.1%	0.1%	1.2%	1.8%	2.8%	1.0%
Mortality Rate (per 100,000 pop.)	102.5	22.2	20.2	348.5	258.8	298.8	233.6
Attack Rates	19%	30%	35%	29%	15%	11%	24%

Table 4: Comparison of modeling approaches.

	Current Calculations			Flu Surge	
Measure	**Inpatient**	**Potential ICU**	**Total**	**Minimum**	**Maximum**
Hospitalized	11,007 to 35,091	4,972	15,979	3,508	12,903
Dead			4,972	957	1,834
Mortality (per 100,000 pop.)	235 deaths/100,000			45-86 deaths/100,000	
Comments	• 11,007 based on severely ill group (with complications); as high as 35,091 if included moderately ill. • Number dead assumes absence of ICU care leading to fatality; approximates 1918 population mortality of 238.5 deaths per 100,000			Deaths assume hospitalization/ treatment	

Figure 1: Comparison of actual and estimated influenza-related deaths for the first eight weeks of a local epidemic



The numeric output of a typical epidemic curve from the model

Beds Occupied (Cumulative Daily Totals)

	Medical/Surgical Beds								ICU Beds											
Day	Under 1	1 to 4	5 to 19	20 to 44	45 to 64	Over 64	Total M/S		Under 1	1 to 4	5 to 19	20 to 44	45 to 64	Over 64	Total ICU		*TOTAL BEDS*		Day	Total M/S	Total ICU
0																			0		
1	0	1	1	1	1	1	4		0	0	0	0	0	0	1		*5*		1	4	1
2	1	1	1	6	3	2	14		0	0	0	1	1	0	3		*17*		2	14	3
3	1	1	2	19	9	4	36		0	0	0	3	2	1	7		*43*		3	36	7
4	1	2	3	40	20	9	75		0	0	0	7	4	2	15		*90*		4	75	15
5	2	4	4	74	36	16	137		0	0	1	14	7	4	26		*163*		5	137	26
6	2	6	7	123	60	26	225		0	1	1	23	12	6	43		*268*		6	225	43
7	3	9	10	190	92	40	345		1	1	1	35	19	10	67		*411*		7	345	67
8	4	12	15	278	135	59	502		1	1	2	51	28	14	97		*599*		8	502	97
9	5	17	21	388	188	82	702		1	2	2	72	39	20	136		*837*		9	702	136
10	7	23	28	525	254	110	947		1	2	3	97	53	27	183		*1131*		10	947	183
11	9	30	37	689	333	144	1242		2	3	4	128	69	36	241		*1483*		11	1242	241
12	12	38	47	881	425	184	1587		2	3	5	163	88	46	308		*1895*		12	1587	308
13	15	48	59	1100	530	229	1981		3	4	7	204	110	57	385		*2365*		13	1981	385
14	18	58	72	1344	647	279	2418		3	5	8	250	135	69	471		*2889*		14	2418	471
15	22	70	86	1609	774	333	2894		4	6	10	299	161	83	564		*3457*		15	2894	564
16	25	82	101	1890	907	390	3396		5	7	12	352	189	98	662		*4058*		16	3396	662
17	29	95	117	2178	1044	448	3912		5	9	13	406	219	113	764		*4676*		17	3912	764
18	33	108	133	2467	1181	506	4428		6	10	15	460	248	127	866		*5294*		18	4428	866
19	37	121	148	2748	1314	561	4929		7	11	17	513	276	142	966		*5895*		19	4929	966
20	40	133	163	3012	1438	613	5400		7	12	19	563	303	156	1060		*6460*		20	5400	1060
21	44	144	177	3253	1550	660	5827		8	13	21	609	327	168	1146		*6973*		21	5827	1146
22	47	154	189	3463	1647	700	6200		9	14	22	649	349	179	1221		*7421*		22	6200	1221
23	49	163	199	3639	1728	732	6511		9	15	24	683	366	188	1285		*7795*		23	6511	1285
24	51	170	208	3778	1790	757	6754		9	16	25	710	381	195	1335		*8089*		24	6754	1335
25	52	176	215	3878	1834	773	6928		10	16	26	729	391	200	1372		*8300*		25	6928	1372
26	53	180	219	3941	1859	782	7033		10	17	26	742	397	203	1396		*8429*		26	7033	1396
27	54	182	222	3967	1867	783	7074		10	17	27	748	400	204	1406		*8480*		27	7074	1406
28	54	183	223	3959	1859	777	7055		10	17	27	747	400	204	1405		*8460*		28	7055	1405
29	53	182	222	3922	1837	765	6982		10	17	27	741	396	202	1393		*8375*		29	6982	1393
30	53	180	220	3858	1803	749	6862		10	17	27	729	390	198	1372		*8234*		30	6862	1372
31	52	178	216	3772	1758	727	6703		10	17	27	714	381	194	1342		*8045*		31	6703	1342
32	50	174	212	3668	1705	703	6511		10	17	27	695	370	188	1306		*7817*		32	6511	1306

33	49	170	206	3549	1645	676	6294		9	16	26	672	358	182	1264		*7558*			33	6294	1264
34	47	165	200	3418	1580	646	6056		9	16	25	648	345	175	1218		*7274*			34	6056	1218
35	45	159	193	3279	1511	616	5804		9	15	25	622	331	167	1169		*6973*			35	5804	1169
36	44	154	186	3134	1440	585	5543		9	15	24	595	316	160	1118		*6660*			36	5543	1118
37	42	148	179	2986	1368	553	5276		8	14	23	567	301	152	1065		*6341*			37	5276	1065
38	40	142	171	2837	1296	521	5007		8	14	22	539	286	144	1012		*6019*			38	5007	1012
39	38	135	164	2688	1224	490	4740		7	13	22	510	270	136	959		*5698*			39	4740	959
40	36	129	156	2541	1154	460	4476		7	13	21	482	255	128	906		*5382*			40	4476	906
41	34	123	149	2397	1085	431	4217		7	12	20	455	240	120	854		*5072*			41	4217	854
42	32	117	141	2256	1018	402	3966		6	12	19	428	226	113	804		*4770*			42	3966	804
43	30	111	134	2120	954	375	3723		6	11	18	402	212	106	755		*4478*			43	3723	755
44	28	105	127	1989	892	349	3489		6	10	17	377	198	99	707		*4197*			44	3489	707
45	27	99	120	1863	833	324	3266		5	10	16	353	185	92	662		*3927*			45	3266	662
46	25	94	113	1743	777	300	3052		5	9	15	330	173	86	618		*3670*			46	3052	618
47	24	88	107	1629	723	278	2849		5	9	15	308	161	80	577		*3426*			47	2849	577
48	22	83	101	1520	673	257	2656		4	8	14	287	150	74	538		*3193*			48	2656	538
49	21	78	95	1417	625	238	2474		4	8	13	267	140	69	500		*2974*			49	2474	500
50	19	74	89	1320	580	219	2302		4	8	12	248	130	64	465		*2767*			50	2302	465
51	18	69	84	1228	538	202	2140		4	7	12	230	120	59	432		*2572*			51	2140	432
52	17	65	79	1142	499	186	1988		3	7	11	214	111	54	401		*2388*			52	1988	401
53	16	61	74	1061	462	172	1845		3	6	10	198	103	50	371		*2216*			53	1845	371
54	15	57	69	985	428	158	1711		3	6	10	184	95	46	344		*2055*			54	1711	344
55	14	54	65	914	395	145	1587		3	6	9	170	88	43	318		*1905*			55	1587	318
56	13	50	61	848	365	133	1470		3	5	9	157	81	39	294		*1764*			56	1470	294
57	12	47	57	786	338	122	1361		2	5	8	145	75	36	272		*1633*			57	1361	272
58	11	44	53	728	312	112	1260		2	5	8	134	69	33	251		*1511*			58	1260	251
59	10	41	50	674	288	103	1165		2	4	7	124	64	31	232		*1397*			59	1165	232
60	9	39	47	624	265	94	1078		2	4	7	114	59	28	214		*1291*			60	1078	214
61	9	36	44	577	245	86	996		2	4	6	105	54	26	197		*1193*			61	996	197
62	8	34	41	534	226	79	921		2	4	6	97	50	24	181		*1102*			62	921	181
63	8	31	38	494	208	72	851		2	3	5	89	46	22	167		*1018*			63	851	167
64	7	29	35	456	192	66	786		1	3	5	82	42	20	154		*939*			64	786	154
65	7	27	33	422	176	60	725		1	3	5	76	39	18	142		*867*			65	725	142
66	6	26	31	390	162	55	670		1	3	4	70	35	17	130		*800*			66	670	130
67	6	24	29	360	150	50	618		1	3	4	64	32	15	120		*738*			67	618	120
68	5	22	27	333	138	46	570		1	2	4	59	30	14	110		*680*			68	570	110
69	5	21	25	307	127	42	526		1	2	4	54	27	13	101		*627*			69	526	101
70	4	19	23	283	117	38	485		1	2	3	50	25	12	93		*578*			70	485	93

ORGANIZATIONAL QUALITY ASSOCIATES INCORPORATED

Health/Medical Multi-Agency Coordinating (MAC) Group Exercise Plan

Fall Exercise Series

September 16th, 2009
October 7th, 2009
October 29th, 2009

I. INTRODUCTION

A. Purpose and Scope

The purpose of these three exercises is to provide participants knowledge and experience in the activation and management of a regional Multi-Agency Coordinating (MAC) Group whose purpose is to make health/medical policy decisions and allocation of critical health/medical resources in a simulated severe Index 5 pandemic flu event. Regions involved in this exercise series are comprised of a six-county area within Region 1 of the Northwest (NW) Oregon Health Preparedness Organization (HPO) and a four-county area within Region IV in Southwest (SW) Washington. Both of these areas are shown in the MAC Group Operations Handbook, Appendix 1.

The exercises will be conducted on September 16, October 7 and October 29, 2009. Each separate exercise will represent real-time events in the course of the pandemic.

Public health and healthcare leaders can anticipate the following assumptions regarding a Severity Index 5 pandemic influenza incident:

1) A twelve-week pandemic wave will create a significant new volume of demand for healthcare services (e.g., 2,000 or more additional hospital admissions per week at peak);
2) The demand for some non-pandemic services may be decreased, but care for many health conditions cannot be avoided without the threat of serious adverse individual and community health consequences;
3) Availability of healthcare delivery staff will be significantly decreased (~40-50 percent); other healthcare resources (e.g., medical supplies) will also be significantly decreased;
4) The goals of pandemic-era healthcare delivery will be:
    a. To minimize human-related disability and death among citizens within the region to the extent practical; and
    b. To conduct healthcare delivery in a way that supports the return to an intact community following the pandemic—i.e., one that is poised to resume normal life physically, socially/economically, emotionally and spiritually following the pandemic. Return to an intact community requires that local healthcare systems:
        i. Use available healthcare resources effectively and efficiently;
        ii. Address influenza and non-influenza health conditions in a balanced way;
        iii. Act in ways that are not perceived by community members as ethical and appropriate under the circumstances; and
        iv. Achieve reasonable operational and financial equity among hospitals/health systems, clinicians and other providers.

B. Objectives

Participants
Upon completion of these exercises, participants will have an understanding of:

1. The roles and responsibilities of the Agency Representatives and the health/medical MAC Group Coordinator.

2. The use of a comprehensive situation status summary and other relevant information to develop decision criteria for reaching consensus on health/medical policy decisions and the allocation of critical health/medical resources.

3. The processes and procedures of a MAC Group required for reaching consensus on health/medical policy issues and allocation of critical resources based on decision criteria and ethical principles described in the Ethical Framework outlined in the MAC Group Handbook, Appendix 14.

4. The relationship of a MAC Group with other entities in a complex multi-agency, multi-county health/medical emergency.

Observers
Upon completion of the second and third exercises, observers will have an understanding of:

1. The purpose of a regional health/medical MAC Group.

2. The types of people/organizations comprising a regional health/medical MAC Group.

3. How ethical principles described in the Ethical Framework are used by the regional health/medical MAC Group when making decisions.

C. Outputs

1. Organize and perform as a health/medical MAC Group.

2. Develop common decision criteria and make decisions based on those criteria.

3. Develop new policies to address emerging health/medical issues.

4. Document the relevant decisions.

5. Develop contact lists to facilitate the appropriate dissemination of decisions made.

6. Respond to injects (new information or challenges added to the scenario).

7. Collect observer feedback from surveys and debrief observer "fishbowl" discussions.

D. Participants

Participants in the exercise series include representatives from hospitals and hospital systems, local public health and the clinical community. These participants will serve as Agency Representatives. NW Oregon HPO Region 1 personnel and others as assigned, will serve as MAC Group Coordinators.

In addition, there will be up to 50 observers during the second and third exercises. The observers will not be participants in the MAC Group deliberations, but will be observing how the MAC Group decisions are made and documented. All observers will have an additional opportunity to provide oral and written feedback at various points during each exercise.

E. Rules for Exercise Play

1. All injects and correspondence with the "outside world" will be in written form; no telecommunications devices are required.

2. All injects will be given in written format to the MAC Group Coordinator.

3. All MAC Group exercise work products must be in written form and submitted to the instructors.

4. The instructors may call a "time-out" to facilitate group understanding and keep the group on track.

5. Participants are to turn off audible features (ring tones, etc.) of electronic devices during the course.

6. Exercise time is not compressed; the exercises reflect actual clock time.

7. Real emergencies will take precedence over the exercise and those involved are asked to leave the room to deal with them.

8. There will be no scheduled breaks during the exercises.

F. Description of Healthcare Delivery System

NW Oregon HPO Region 1's three urban and three rural counties effectively create two sub-regions, urban and rural. Technical aspects of the medical response to a large-scale health emergency differ between the urban and rural sub-regions. In addition, the

geographic separation of Clatsop and Tillamook counties from the rest of the region by the coastal mountain range necessitates special consideration in the context of a regional response.

Hospitals. There are 20 hospitals in the NW Oregon HPO Region 1/SW Washington, Region IV area. The hospitals are a mix of large systems with multiple hospitals, independent community hospitals, and critical access hospitals. Many of the systems have hospitals located in multiple counties. The smallest hospitals in the region have 25 beds while the largest hospital has over 700 beds. There are approximately 4,500 hospital beds in the region including 3,400 medical/surgical beds, 640 Intensive Care Unit (ICU) beds, and about 450 Emergency Department (ED) beds. There is wide variation in the types of services provided at each hospital. A few hospitals in the Portland metro area have unique capabilities (e.g. trauma, burn care, children's inpatient care) and receive many patient transports from across Oregon and Washington. On a daily basis, Regional Hospital, which is located at OHSU, provides regional coordination of ambulance patient distribution. Regional Hospital will manage and distribute patients to area hospitals and serve as a trauma coordination center in a large-scale health emergency.

The Regional Hospital Emergency Communications Center is located in the OHSU Emergency Department and is the central community hub for regional communication among hospital emergency departments in the Portland metro area. As of August 2009, communications between the Regional Hospital Emergency Communications Center and hospitals in the region's coastal counties are under development.

Region 1 hospitals have a high-level mutual aid agreement in place.

Public Health Departments. There are ten local Public Health Departments in the region which vary widely in size, capacity, and services. The largest local Public Health Department in the region employs over 900 personnel; the smallest has four staff, most of who have multiple responsibilities. By Oregon law, local Public Health is responsible for ensuring the delivery of health and medical services in the event of an emergency.

Clinics. The clinical system for ambulatory care is very dispersed and decentralized. There are about 1,350 medical clinics in the region, and thousands of physicians. Forty-three percent of physicians in Oregon may be classified as primary care (i.e. family medicine, internal medicine, pediatrics, obstetrics & gynecology). Clinic characteristics include the following: hospital-affiliated, large independent practices with 50 providers, and single physician offices. There is no formal organization of the clinical system that connects all these different types of clinics together.

In a large-scale health emergency, private medical clinics are expected to provide general medicine patient care in existing facilities. They are not legally obligated to remain open or operate in a prescribed manner.

Safety net clinics are private non-profit or public healthcare facilities that routinely provide basic healthcare to people with no other source of care. There are 31 Safety Net clinics in NW Oregon HPO Region 1. Clinics vary in size from a neighborhood center with volunteer staff to large Federally Qualified Health Centers. Safety net clinics routinely operate at capacity.

Mental Health. The mental health system in the region is fragmented. While legal responsibility for services is delegated to the County, most Counties contract services for care with local community-based organizations. The system is very fragile as it has been under funded for many years. Community Mental Health Programs' resources are stretched thin during regular (non-emergency) circumstances. Service delivery is focused on individual clients.

In a large-scale health emergency county Community Mental Health Programs are responsible for maintaining services to existing clients, as well as assessing requests for and activating a community behavioral health response. Each county Community Mental Health Program will have a list of willing and qualified behavioral health responders to draw upon. Community Mental Health Program capacity to deliver these additional services is unknown.

Emergency Medical Services (EMS). EMS has the capability to provide triage, transportation and patient tracking during a surge event. Mechanisms are in place for transporting patients from an incident scene or from local hospitals to appropriate healthcare facilities. EMS provides medical care during transport. In a mass casualty event involving 10 or more patients Regional Hospital is utilized as a communication hub for routing ambulances to hospitals.

American Medical Response and Metro West Ambulance are private companies that provide the overwhelming majority of ambulance transport services for the region's metropolitan area. Coastal EMS services are provided by Medix Ambulance Service and Tillamook Hospital Ambulance. Agencies routinely provide mutual aid to one another. There are about 2,600 medical technicians in NW Oregon HPO Region 1.

G. Scenario

The scenario involves a wave of Severity Index 5 pandemic flu resulting from a novel strain of influenza. Transmission originally started on the East Coast of the United States and has since spread to the West Coast. By day 10 of its arrival in the Pacific Northwest, the pandemic is affecting all hospitals and clinics in the six-county area of NW Oregon HPO Region 1 and the four-county area of SW Washington, Region IV.

H. Exercise Time Frame

The three exercises are structured to present real time in the course of the flu pandemic. Exercise No. 1 is planned to represent day 10 of the 12 week epidemiological curve of the pandemic within NW Oregon HPO Region 1 and SW

Washington, Region IV. Exercise No. 2 presents the situation twenty-one days after Exercise No. 1, and Exercise No. 3 presents the situation 21 days after Exercise No. 2.

All three exercises will begin at 0830 hours and will end at 1130 hours. The schedule will include:

- Exercise introduction, overview, and instructions (30 minutes).
- The exercise itself (90 minutes).
- Exercise evaluation utilizing a "fishbowl" technique to discuss and document lessons learned (60 minutes).

II. BASE SCENARIO

A. Exercise No. 1

Transmission of the Severity Index 5 pandemic flu virus strain was recognized on the East Coast of the United States several days ago. The virus has spread to the West Coast, maintaining Severity Index 5 pandemic characteristics. Over the past several days, hospitals and clinics NW Oregon HPO Region 1 and SW Washington, Region IV have begun seeing an increase in respiratory illness and higher than usual patterns of healthcare utilization. The pandemic influenza virus is spread by respiratory droplets; it is spreading quickly and easily in the community. It is estimated that at least 25 percent of the community will get sick with this novel strain of influenza. Based on historical patterns of influenza outbreaks in the past, waves of pandemic virus transmission typically last between 8-12 weeks. Without intervention (vaccine) or treatment (hospital care), it is expected that two percent of the population may die. No vaccinations are available at this time, as it typically takes several months for the development and distribution of a vaccine for a new influenza strain.

Based on the epidemiologic curve for this pandemic (see Exhibit A), we expect to see a significant increase in the prevalence of illness within the community over the next several weeks, and an increased need for flu evaluation and hospital-level care.

Impact on Community Activities
Attendance at public gatherings such as churches, concerts, etc., has declined. Local public health authorities have recommended cancelling all public gatherings and community-wide social events. School districts with confirmed cases of the influenza virus have been advised to cancel classes and other schools are voluntarily choosing to close. In turn, it is anticipated that there will be hospital staff shortages throughout the region, since healthcare workers may have to stay home to care for their children. Increased rates of absenteeism are negatively impacting transportation and public works (water, fire, electric, etc.) systems.

Impact on Hospitals and Clinics
The emergency involves all hospitals and clinics in all counties described as part of the region. While there are 20 hospitals and numerous clinics within the multi-county area of NW Oregon HPO Region I and SW Washington, Region IV, this exercise will only address issues and impacts of seven hospitals and two clinics in an effort to prevent the complexity of the exercise from becoming too great.

Hospitals in the Portland/Vancouver metro area normally operate between 85 – 90 percent of capacity; currently, hospital Emergency Departments (EDs) are currently overwhelmed and many hospitals have an eight-hour waiting room wait to be evaluated. Intensive Care Unit beds are near, if not beyond, capacity throughout the region, with some hospitals being disproportionally impacted by patients needing ICU care. Limited capacity within medical/surgical units remains. Fifteen percent of healthcare workers are ill and not reporting to work, resulting in serious staff shortages.

People are seeking flu evaluation at both public and private clinics. An Access to Care Program has been activated to ensure patients who are underinsured or uninsured can obtain access to flu evaluation care. Clinics are running out of personal protective equipment (PPE).

Health/Medical Resources
Due to the high demand for health/medical supplies, pharmaceuticals, IV fluids, PPE, equipment, etc., inventories are being depleted and all hospitals in the region are experiencing delays in getting new supplies.

Mutual Aid
The Regional Memorandum of Understanding (MOU) for mutual aid is being used to share resources, personnel, and supplies due to supply and staffing shortages. A copy of this MOU is attached as Exhibit B.

Community Response to the Pandemic
Oregon and Washington State Public Health have activated their response organizations. All county Emergency Coordination Centers (ECCs) in NW Oregon HPO Region 1 and SW Washington, Region IV have been activated to support public health response activities. Public health departments are focused on epidemiology and surveillance, public information and community mitigation activities. All hospitals have activated their Incident Management Teams (IMTs). As of yesterday (September 15), all hospitals have implemented their in-patient surge plans.

A Joint Information Center (JIC) has been established to handle multi-county/multi-agency public information.

B. Exercises No. 2 and 3

The background information for Exercises 2 and 3 will be emailed to participants along with other pre-reading materials about one week prior to the exercise.

Three exercises have been developed by Organizational Quality Associates, Inc. (OQA) of Tucson, Arizona (www.orgquality.com) for the NW Oregon Health Preparedness Organization Region 1.

The exercises will utilize a base scenario of response to an Index 5 influenza pandemic. The exercises will be conducted on three separate days on September 16, October 7, and October 29, 2009.

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EXHIBIT A
Epidemiological Curve

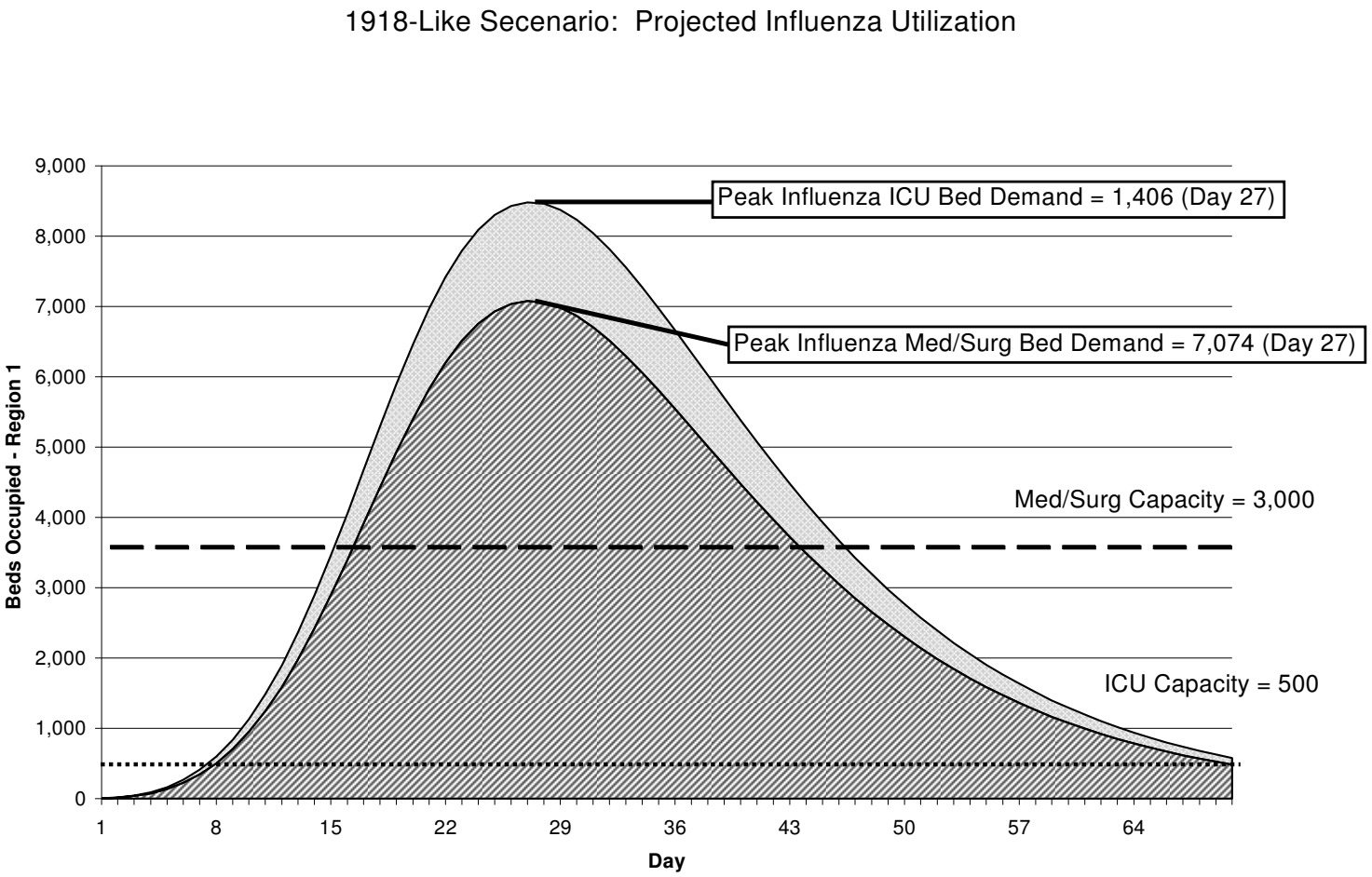

EXHIBIT B
Regional Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING

Hospital/Health System Facility Emergency Mutual Aid

Created by:

Healthcare Preparedness Region 1

September 2009

Memorandum of Understanding
Hospital/Health System Facility Emergency Mutual Aid
NW Oregon Health Preparedness Organization
Healthcare Preparedness Region 1

I. INTRODUCTION

Northwest Oregon is susceptible to disasters, both natural and human-made, that could severely tax or exceed the capabilities of the region's hospitals and health systems. A disaster could result from a large-scale incident generating an overwhelming number of patients (e.g., major transportation accident or act of terrorism), or from an incident generating a smaller number of patients whose specialized medical requirements exceed the resources of the Impacted Facility (e.g., hazmat, pulmonary, or traumatic injuries), or from incidents such as hospital building or physical plant problems resulting in the need for partial or complete evacuation of a hospital/health system facility.

II. PURPOSE

This Memorandum of Understanding (MOU) is a voluntary agreement among the hospital/health system facilities in Northwest Oregon Healthcare Preparedness Region 1 (and Southwest Washington) listed on Exhibit A for the purpose of 1) coordinating emergency planning; 2) preparing for a coordinated health sector response to large-scale emergencies; 3) facilitating communications; and 4) providing mutual aid at the time of a medical disaster.

For purposes of this MOU, a **medical disaster** is defined as an overwhelming incident that **exceeds the effective response capability** of the impacted hospital/health system facility or facilities. The disaster may be an "external" or "internal" event for hospital/health system facilities and assumes that each affected hospital/health system facility's emergency management plans have been fully implemented.

This MOU is not a legally binding contract; rather, it signifies the belief and commitment of the participating hospital/health system facilities that in the event of a disaster, the medical needs of the community will be best met if the hospital/health system facilities cooperate with each other and coordinate their response efforts. By signing this MOU, each hospital/health system facility is evidencing its intent to abide by the terms of the MOU in the event of a medical disaster as described above. The terms of this MOU are to be incorporated into the hospital/health system facilities' emergency management plans.

This MOU is not intended to replace individual hospital/health system facilities' disaster plans. Each hospital/health system facility has the responsibility for maintaining its own emergency management plan that includes, at a minimum, provisions for the care of patients in an emergency or disaster situation, maintenance of disaster equipment, appropriate training of staff and the implementation of an

internal incident command system based on the principles of the Hospital Incident Command System (HICS) and compliant with the National Incident Management System (NIMS).

III. DEFINITION OF TERMS

Health Alert Network (HAN)	A State of Oregon sponsored web-based system designed to broadcast warnings of impending or current disasters affecting the ability of health officials and healthcare providers to provide disaster response services to the public. The HAN is also used to push routine and emergency health information to partners and contains an access controlled online information library and public health directory.
NW Oregon Health Preparedness Organization (HPO)	A public/private planning partnership to prepare the health sector to respond to large-scale emergencies. The HPO serves as the regional health preparedness board for northwest Oregon and covers six counties including Clackamas, Clatsop, Columbia, Multnomah, Tillamook and Washington.
Impacted Facility	A hospital/health system facility where the disaster occurred or where disaster victims are being treated. Referred to as the "Recipient Facility" when pharmaceuticals, supplies, equipment, and/or personnel are requested or as the "Patient-Transferring Facility" when the evacuation of patients is required.
Medical Disaster	An incident that exceeds the response capability of one or more participating hospital/health system facilities that cannot appropriately resolve the incident solely by using its own resources. Such disasters will create the need for additional medical and support personnel, pharmaceuticals, supplies, and/or equipment from another facility, and may require the emergent evacuation of patients.
Participating Hospital/Health System Facility	A hospital/health system facility that has fully committed to and signed the MOU. A list of Participating Hospital/Health System Facilities will be maintained and disseminated by the HPO.
Patient-Transferring Facility	An Impacted Facility where patients must be evacuated from due to a disaster.
Patient-Receiving Facility	A responding Participating Hospital/Health System Facility that receives patient transfers from an Impacted Facility.
Recipient Facility	The Impacted Facility. The hospital facility where disaster patients are being treated and have requested pharmaceuticals, supplies, equipment and/or personnel from another facility.

Regional Hospital	A communication hub for all hospitals in the Portland metropolitan area that is responsible for coordinating patient destination during mass casualty incidents (MCI) and other emergency or disaster situations.
Resource-Transferring Facility	A responding Participating Hospital/Health System Facility that sends pharmaceuticals, supplies, equipment and/or personnel to the Recipient Facility or receives patient transfers/evacuations.

IV. AGREEMENT

A. Participation in Regional Health Sector Emergency Preparedness Planning

1. Each Participating Hospital/Health System Facility will designate a representative to the NW Oregon Health Preparedness Organization (HPO) Steering Committee. The designee will have authority to speak on behalf of the organization s/he is representing and contribute to the development of regional operational procedures and coordination of mutual aid initiatives. Participation on the HPO Steering Committee will foster coordination with other disaster relief and emergency medical providers and public agencies involved in disaster response efforts.

2. Each Participating Hospital/Health System Facility will designate appropriate representatives to participate in regional hospital-related emergency management groups including but not limited to the NW Hospital Emergency Management Committee and the ED Nurse Managers Committee.

Communication

1. Each Participating Hospital/Health System Facility will report equipment, bed capacity, and other regional health resource information during drills or disasters to the State's web-based hospital capacity reporting system. In the event of a medical disaster, this system is used by all hospitals in the region to report open/closed/divert status in real-time. Data requests and reporting via the system can be collected and disseminated to all hospitals simultaneously.

2. Each Participating Hospital/Health System Facility agrees to use, maintain, and upgrade when necessary the equipment necessary to participate in the following communication systems, where applicable:

   a. <u>Routine Communications</u> – Each Participating Hospital/Health System Facility will:
      i. Communicate utilizing the routine communication guidelines identified in the Healthcare Preparedness Region 1 Communications Plan.

   b. <u>Emergency Communications</u> – Each Participating Hospital/Health System Facility will:

ii. Communicate and coordinate efforts to respond to a medical disaster primarily via their liaison officers, public information officers, and incident commanders.
iii. Utilize Regional Hospital and/or the Health Alert Network to receive alert information regarding any medical disaster or other special incidents.
iv. Communicate with each other's Emergency Operations Centers (EOC) by phone, fax, email, and maintain radio capability to communicate with Regional Hospital as a minimum back-up.
v. Communicate utilizing the emergency communication guidelines identified in the Healthcare Preparedness Region 1 Communications Plan.

B. Mutual Aid Received by or Provided to Participating Hospital/Health System Facilities

1. Authority and Communication

The scenario and impact of a medical disaster or emergency will determine how requests for assistance are made between Participating Hospital/Health System Facilities.

a. <u>One hospital impacted by an event</u>
i. If one Participating Hospital/Health System Facility experiences a medical disaster, only a Hospital Administrator or designee of that facility which has a need for staff or equipment ("Recipient Facility") has the authority to initiate the request for transfer of patients or receipt of personnel and/or material resources pursuant to this MOU. The request for pharmaceuticals, supplies, equipment and/or personnel must be made to Hospital Administration at the Resource-Transferring Facility.
ii. Requests may initially be made verbally to Hospital Administration but must be followed by written documentation specifying more detail (See section 4.C.3 Transfer of Pharmaceuticals, Supplies and/or Equipment). Hospital Administrator or designee of the Recipient Facility will deliver this request to the other Participating Hospital/Health System Facility and coordinate the response with staff from the Resource-Transferring Facility.

b. <u>Multiple hospitals impacted by an event</u>
i. If multiple Participating Hospital/Health System Facilities experience a medical disaster, it is assumed that each facility will be organized to respond under the Hospital Incident Command System (HICS). In this circumstance, only Command Staff (likely the Liaison Officer) or designees of the Recipient Facility have the authority to initiate the request for transfer of patients or receipt of personnel and/or material resources pursuant to this MOU. The request for pharmaceuticals,

supplies, equipment and/or personnel must be made to Command Staff at the Resource-Transferring Facility.

ii. Requests may initially be made verbally to Command Staff but must be followed by written documentation specifying more detail (See section 4.C.3 Transfer of Pharmaceuticals, Supplies and/or Equipment). Command Staff or designees of the Recipient Facility will deliver this request to the other Participating Hospital/Health System Facility and coordinate the response with staff from the Resource-Transferring Facility.

iii. If multiple Participating Hospital/Health System Facilities are experiencing a medical disaster or emergency which result in requesting assistance from other hospitals in the region, Command Staff will notify County Emergency Management and County Public Health of the event and any anticipated future needs for support.

2. Personnel (and Volunteers)

Personnel employed by, contracted with or on the staff of the Resource-Transferring Facility who are dispatched to the Recipient Facility shall be limited to staff that are certified, licensed, privileged and/or credentialed in the Resource-Transferring Facility, as appropriate, given such staffs' professional scope of practice. Resource-Transferring Facility employees who are dispatched to a Recipient Facility shall provide proof of their professional licensure (e.g. RN, MD) to the Recipient Facility.

The Recipient Facility's Labor Pool Unit Leader or designee will identify where and to whom emergency Resource-Transferring Facility Personnel are to report and who will direct and/or supervise them. This supervisor will brief the personnel of the situation and their assignments. The Recipient Facility will provide and coordinate any necessary demobilization and post-event stress debriefing. If needed or requested, the Recipient Hospital is responsible for providing the Resource-Transferring Facility Personnel with transportation for their return to the Resource-Transferring Facility.

In compliance with Joint Commission standards, when the Recipient Facility's emergency management plan has been activated, the Labor Pool Unit Leader or designee may grant emergency privileges to licensed independent practitioners with evidence of appropriate identification. Acceptable sources of identification include a current professional license in the State in which the Recipient Facility is located, a current facility ID plus license number or verification of the subject practitioner's identity by a current medical staff member. (See JOINT COMMISSION EC.4.10.14 and HR.4.35).

3. Transfer of Pharmaceuticals, Supplies and/or Equipment

The request for the transfer of pharmaceuticals, supplies, and/or equipment initially can be made verbally but must be followed by written documentation specifying the following:

a. Quantity and exact type of requested items;

b. An estimate of how quickly the pharmaceuticals, supplies and/or equipment is needed;

c. Time period for which the pharmaceuticals, supplies and/or equipment will be needed;

d. Location and person or staff position to which the pharmaceuticals, supplies and/or equipment should be delivered.

The Resource-Transferring Facility is responsible for tracking the transferred inventory, including the items involved, the condition of the equipment (if applicable), and the responsible parties for the borrowed materials, including return of inventory if applicable.

The Recipient Facility is responsible for appropriate safeguards, use, protection and maintenance of all transferred pharmaceuticals, supplies, and/or equipment. Upon conclusion of the event, the Recipient Facility will promptly return equipment and unexpended supplies and/or pharmaceuticals to the Resource-Transferring Facility.

4. Transfer / Evacuation of Patients

In the event a partial or full evacuation of a Participating Hospital/Health System Facility is necessary, it is recognized that multiple hospitals/health systems in the community may need to assist in the orderly evacuation of patients by providing care to as many evacuated patients as possible. This care may be provided temporarily as patients are staged for transportation to other hospitals or long term care facilities, or until evacuated patients can be returned to the care of their primary facility.

The Patient-Transferring Facility (impacted hospital) must specify the following:

a. The number of patients needed to be transferred;

b. The general nature of their illness or condition;

c. Any type of specialized services required, e.g., ICU bed, burn bed, trauma care, etc.

The Patient-Transferring Facility (impacted hospital) requesting transfer of one or more of its patients is responsible for providing the Patient-Receiving Facility (assisting hospital) with copies of the patient's pertinent medical records, registration information, insurance and other information necessary for care.

The Patient-Transferring Facility is responsible for notifying both the patient's family or guardian and the patient's attending or personal physician of the transfer. The Patient-Receiving Facility may assist in notifying the patient's family and personal physician.

Once the patient arrives to the Patient-Receiving Facility, such facility becomes responsible for the care of the patient. If requested, the facility that assumes the care of the transferred patients may grant temporary medical staff privileges or emergency privileges, in accordance with its medical staff bylaws, to the patient's original attending physician.

Once the transferred patient is discharged, the Patient-Receiving Facility will return all original medical records, including X-ray films and labs, back to the Patient-Transferring Facility.

V. MISCELLANEOUS PROVISIONS

A. Term and Termination

This MOU shall commence upon execution by an authorized officer of the Participating Hospital/Health System Facility and shall continue until terminated. Any Participating Hospital/Health System Facility may terminate its participation in this MOU at any time by providing 30 days written notice to all other Participating Hospital/Health System Facilities on this signed agreement (see Exhibit A).

B. Confidentiality

Each Participating Hospital/Health System Facility shall maintain the confidentiality of all patient health information and medical records in accordance with applicable State and Federal laws, including, but not limited to, the Health Insurance Portability and Accountability Act (HIPAA) privacy regulations.

C. Insurance

Each Participating Hospital/Health System Facility shall maintain, at its own expense, professional, workers' compensation and general liability insurance coverage or programs of self-insurance for itself and its respective employees and, where the Participating Hospital/Health System Facility is a Recipient Facility, it also agrees to extend its professional and general liability coverage to loaned personnel consistent with its existing coverage for other employed

Volunteers for claims arising out of services provided by such Volunteers on behalf of the Recipient Facility.

D. Defense and Indemnification

The Recipient Facility shall assume the defense and indemnification for liability claims arising from or asserting the negligent acts and omissions of Personnel who are employed by and otherwise covered by the Resource-Transferring Facility. Volunteers who are licensed independent practitioners and who are not employees of a Participating or Resource-Transferring Facility will procure their own professional and general liability coverage and the Recipient Facility shall not assume the liability, defense or indemnification obligation for such independent Volunteers arising out of participation in this MOU.

E. Hold Harmless Condition

The Recipient Facility should hold harmless the Resource-Transferring Facility for any general or professional liability claims, expenses, and damages including reasonable attorneys' fees or other costs resulting solely from the acts or omissions of personnel covered by the Recipient Facility while such personnel are providing services for the Recipient Facility pursuant to this MOU. The Resource-Transferring Facility, however, is responsible for appropriate credentialing of personnel and for the safety and integrity of the equipment and supplies provided for use at the Recipient Facility.

F. Certification

A signed copy of this MOU signature page shall be sent via facsimile or mail to the HPO.

Executed below by an authorized officer of Participating Hospital/Health System Facility:

_____ _____
Name Date

_____
Signature

_____
Title

_____
Hospital/Health System Facility

_____
County/State

Memorandum Of Understanding - EXHIBIT A

Hospital/Health System Facilities in NW Oregon HPO Region 1

**Adventist Medical Center
**Columbia Memorial Hospital
**Kaiser Sunnyside Hospital
**Legacy – Emanuel Hospital & Health Center
**Legacy – Good Samaritan Hospital & Health Center
**Legacy – Meridian Park Hospital & Health Center
**Legacy – Mt. Hood Medical Center
**Oregon Health & Sciences University
**Portland Veterans Administration Medical Center
**Providence Portland Service Area – Milwaukie Hospital
**Providence Portland Service Area – Portland Hospital
**Providence Portland Service Area – St. Vincent Hospital
**Providence Seaside Hospital
**Tillamook County General Hospital
**Tuality Healthcare – Community Hospital
**Tuality Healthcare – Forest Grove Hospital
**Willamette Falls Hospital

Hospital/Health System Facilities in Southwest Washington

**Legacy – Salmon Creek Hospital
**SW Washington Medical Center

** St. John Medical Center

**Indicates hospital/health system facility has signed the MOU and is a Participating Hospital/Health System Facility; MOU agreement applies to all hospital/health system facilities that have signed the document.

CDC Pandemic Influenza MAC Group Exercise #1
AGENDA
September 16, 2009
Oregon Convention Center, Rm. 150/151
Portland, OR

Goals: To give participants and observers knowledge and experience in the management of a multi-agency coordination (MAC) Group for a regional health/medical Severity Index 5 Pandemic Influenza event.

Activity	Facilitator	Location	Time
Registration	HPO Staff	Room F150	0800-0830
Welcome Remarks	Gary Oxman, M.D., M.P.H.	Room F150	0830-0835
Orientation to Day's Events	Mike Edrington, Organizational Quality Associates (OQA)	Room F150	0835 – 0850
Break/Move to exercise rooms	***All Attendees***		***0850-0900***
Exercise	*MAC Group Coordinators:* Christine Bernsten, Kathryn Richer *MAC Group Coaches:* Mike Edrington, OQA & Roy Montgomery, OQA	A Group: Room F150 B Group: Room F151	0900-1030
MAC Group Self Evaluation	Mike Edrington & Linda Dodge OQA	A Group: Room F150 B Group: Room F151	1030-1050
Combine two groups in Room F150	***All Attendees***		***1050- 1055***
Observer Fishbowl	Mike Edrington & Linda Dodge OQA	Room F150	1055-1115
Identification of Similarities & Closing Comments	Mike Edrington, OQA	Room F150	1115- 1130

1st Exercise

HEALTH/MEDICAL MAC GROUP MEETING INJECT

Inject #	1	**Inject Time**	0900
Meeting Phase	Organize	**End Time**	0920

Group Exercise:
1. Review and become familiar with the Base Scenario, hospital data and maps.

2. Review and become familiar with the Ethical Framework (see MACG Handbook, Appendix 14).

3. Establish a meeting schedule for today's MAC Group Meeting in conformance with NIMS standards and the MAC Checklist. Include topics and tentative time frames.

1st Exercise

HEALTH/MEDICAL MAC GROUP MEETING INJECT

Inject #	2	**Inject Time**	0920
Meeting Phase	Decision	**End Time**	0940

All hospitals in all counties are experiencing staff and supply shortages, including antibiotics, PPE, IV fluids, etc., and their orders are not being filled in a timely manner. All mutual aid agreements have been invoked. Is it appropriate for hospitals to continue to use the mutual aid agreements to obtain resources from other hospitals, and if so what is the criteria for using mutual aid resources?

1st Exercise

HEALTH/MEDICAL MAC GROUP MEETING INJECT

Inject #	3	**Inject Time**	0940
Meeting Phase	Incident Prioritization	**End Time**	1010

All hospitals in all counties are experiencing staff and supply shortages and delays in filling orders with all hospitals being impacted about the same. Some of the hospitals provide unique and critical services (see attached Hospital List) not related to the flu pandemic, and this capability may give them the flexibility and potential to do more than hospitals which do not have this capability.

Develop criteria for identifying the hospitals with the potential to provide heavier treatment workload. Using this criteria list the hospitals in order of their treatment capabilities.

(This will be used later to help in the process of allocating critical resources when they become available.)

1st Exercise

HEALTH/MEDICAL MAC GROUP MEETING INJECT

Inject #	4	**Inject Time**	1010
Meeting Phase	Resource Allocation	**End Time**	1040

The hospitals have ordered resources as shown in the table below; the available resources are also shown below. Based on previous criteria and decisions, information from the Situation Report and other information provided, any new criteria, and local knowledge, allocate the critical resources. Document your rationale.

Summary of Ordered and Available Resources

Ordered

	The Portland Clinic	Virginia Garcia	Adventist	Tillamook General	Legacy Emanuel	OHSU	Providence St. Vincent	Tuality Community	Willamette Falls	**Total**	**Actual Available**
Doctors: ED			1	1	2	2	2	1	1	**10**	**7**
Nurses: ED	0	0	4	1	4	6	6	2	3	**26**	**19**
Nurses: ICU	0	0	4	2	10	11	10	2	2	**41**	**31**
Inter-Hospital Ambulances *	0	0	6	2	0	0	0	0	2	**10**	**7**
N95 respirator (20 count)	3	1	7	3	22	28	20	4	5	**95**	**71**
Surgical masks (50 count)	3	1	3	2	5	3	6	2	2	**54**	**40**
Gloves (Nitrile 1000 count)	6	2	3	2	5	7	6	2	2	**35**	**26**

Allocation

	The Portland Clinic	Virgina Garcia	Adventist	Tillamook General	Legacy Emanuel	OHSU	Providence St. Vincent	Tuality Community	Willamette Falls	Total	Available for Allocation
Doctors: ED	N/A	N/A									
Nurses: ED	N/A	N/A									
Nurses: ICU	N/A	N/A									
Inter-Hospital Ambulances *	N/A	N/A									
N95 respirator (20 count)											
Surgical masks (50 count)											
Gloves (Nitrile 1000 count)											

* The assignment of ambulances (ALS/BLS) is only for the inter-hospital transport of patients.

NW Oregon Health Preparedness Organization

Public Health
Prevent. Promote. Protect.
Region IV Public Health
Clark, Cowlitz, Skamania, Wahkiakum counties

Summary of Ordered and Available Resources

Ordered

	The Portland Clinic	Virginia Garcia	Adventist	Legacy Emanuel	OHSU	Providence St. Vincent	Tillamook General	Tuality Community	Willamette Falls	**Total**	**Actual Available**
Doctors: ED			1	2	2	2	1	1	1	**10**	**7**
Nurses: ED	0	0	4	4	6	6	1	2	3	**26**	**19**
Nurses: ICU	0	0	4	10	11	10	2	2	2	**41**	**31**
Inter-Hospital Ambulances *	0	0	4	0	0	0	2	0	2	**8**	**6**
N95 respirator (20 count)	3	1	7	22	28	20	3	4	5	**95**	**71**
Surgical masks (50 count)	3	1	3	5	3	6	2	2	2	**54**	**40**
Gloves (Nitrile 1000 count)	6	2	3	5	7	6	2	2	2	**35**	**26**

Allocation

	The Portland Clinic	Virginia Garcia	Adventist	Legacy Emanuel	OHSU	Providence St. Vincent	Tillamook General	Tuality Community	Willamette Falls	**Total**	**Available for Allocation**
Doctors: ED	N/A	N/A									
Nurses: ED	N/A	N/A									
Nurses: ICU	N/A	N/A									
Inter-Hospital Ambulances *	N/A	N/A									
N95 respirator (20 count)											
Surgical masks (50 count)											
Gloves (Nitrile 1000 count)											

Pandemic Influenza Healthcare Delivery and Decision Making:

A Community Discussion

Prepared for:

Development of the Ethics Framework
Pandemic Influenza Healthcare Delivery and Decision Making

Prepared by:

Sandy Johnson, PhD
Health Assessment and Evaluation
Multnomah County Health Department

July 2009

Public Health
Prevent. Promote. Protect.

Special thanks to the residents of

Clackamas County Oregon
Clatsop County Oregon
Clark County Washington
Columbia County Oregon
Multnomah County Oregon
Tillamook County Oregon
Washington County Oregon

for providing the information for this report.

This report presents findings from a series of five group discussions conducted in Portland, Seaside, and Wilsonville, OR and Vancouver, WA to explore community reactions to curtailing hospital services during a severe influenza pandemic. The purpose of these discussions was to identify community values and priorities related to provision of medical services. This information will be used in the development of an ethics framework to guide decision makers in the event of a severe influenza pandemic.

The discussion groups were guided by four premises: (1) Policy makers want decisions that are made during an influenza pandemic to be based on a consideration of community values as well as on science. (2) In order to include community values in the decision-making process, decision makers must understand the beliefs and values held by community members with regard to provision of medical services during an influenza pandemic. (3) Engagement of community members in discussions about curtailment or modification of in-hospital medical services during a severe influenza pandemic will reveal community beliefs and values. (4) There will be insufficient time to engage community input during a severe pandemic.

Participants in the discussions were presented four scenarios to stimulate discussion. Each scenario described the experience of a patient whose planned in-hospital treatment would be delayed or redirected to another hospital during a severe influenza pandemic. After hearing each scenario, discussion participants were asked to describe their reactions from three different perspectives: (1) the perspective of the patient who may have his or her treatment delayed, (2) the perspective of the public health officials responsible for making decisions to curtail or alter services, and (3) the perspective of community members who are at risk of serious complications if they contract the influenza.

Specific objectives were to uncover community values and preferences as they relate to:

- Allocation of benefits and burdens
- Priority access to services
- Needs for support
- Communication

A brief summary of findings is presented below followed by a description of the methodology used and detailed findings.

SUMMARY OF FINDINGS

Allocation of benefits and burdens

Delays in surgery for non life-threatening conditions were seen as offering both benefits and burdens to patients. Most of the discussion participants felt that surgical patients as well as mothers and their newborns would benefit from staying away from hospitals where they might be exposed to the influenza virus. Those with severe cases of influenza would also benefit from the increased number of hospital beds made available by delaying in-hospital treatment. The benefits of delaying surgery for non life-threatening conditions were generally seen as outweighing the frustrations and disappointment that delays would cause.

Not surprisingly, when participants perceived the condition needing surgery as more life threatening, they were less likely to see the "good of the community" as outweighing the individual needs of potential surgical patients. For example, those who believed that colon cancer is life threatening were opposed to delaying colon cancer surgeries. Even though the scenario described patient's risk of death from cancer due to the delay as "very low, but not nonzero," participants in the group discussions saw the situation as too unpredictable to postpone surgery. Many stressed the need to triage each individual rather than to decide to delay all prostate or colon cancer surgeries that had not spread.

Diverting mothers in labor to specific hospitals reserved for labor and delivery was generally seen as protective of both mothers and infants. A few said that the safety of the child was far more important than the inconvenience of not being able to go to the hospital chosen by the mother.

Delaying in-hospital treatment for mental health conditions was seen as far too risky to postpone by most of the group participants. The burden on public safety outweighed the benefit of freeing beds for those with other life-threatening conditions.

Priority access to services

Although no particular groups were identified as needing priority access to services during an influenza pandemic, many of the group participants suggested that special outreach efforts would be needed to connect services to vulnerable groups such as those with disabilities, the homeless, and those who are non-English speaking. Most participants were against delaying access to in-hospital treatment to mental health patients who are seen as a particularly underserved group.

In addition to clearly stating the need for linking vulnerable populations to information and services, most of the group participants also made it clear that no groups should be denied services based on income, age, race, the presence of chronic conditions, or power. One group engaged in a discussion indicating their desire for equitable enforcement of limitations across all groups, but acknowledged that while they wanted equitable

enforcement, they did not believe it would happen. They feared that those with money would be able to go to private providers and hospitals for services that others could not receive.

The only groups to which participants appeared to be open to priority services were mothers and children. The possibility of reserving hospitals for labor and delivery appealed to some since it would help to protect the next generation.

Need for support

Some of the respondents noted that patients who were denied access to in-hospital services would need to be supported while they waited for treatment. Participants suggested that some would need pain management services, wheel chairs, assistance with transportation, or assistance with household tasks. The general concern was that such assistance might not be covered by health insurance and would not be available to all.

Communication

Participants advised that credible spokespersons should be identified to deliver educational messages as well as information about the pandemic. Educational messages should include information about how individuals can protect themselves and determine when care is needed. These spokespersons should also provide information on resources and influenza severity. Sources of information should be reported and coordinated at the federal, state, and local levels.

Communications about decisions that affect the public should be clearly stated and provide details about how the decisions were made and their potential outcomes. Participants also felt that decisions would be better accepted with up-front education and communication about the types of decisions that will need to be made.

Values

A number of community values emerged from the discussions. Including: for the good of everyone, community, transparency, honesty, equity, fairness, inclusiveness, self-reliance, protection of mothers and children, protection of vulnerable populations, and public safety.

Group participants felt strongly that decisions made for the good of the community would be defensible decisions. They expressed a desire for a decision-making process that is transparent and inclusive of community members. Transparency included explaining why decisions were made, the basis for the decisions, and the potential outcomes of the decisions.

Participants want decisions to be equitably enforced across all groups and free from politics, bias, prejudice, and financial considerations. They would like decisions to be independent of income levels, age, disability, and chronic conditions. Mentions of fairness appeared to relate to truthfulness and honesty as well as equity.

Many group participants expressed a strong belief in self-reliance and personal responsibility. They expressed a desire for information about how to protect themselves and their communities.

Protection of vulnerable populations emerged in the discussions regarding the need for outreach to homeless populations, people with disabilities, non-English speaking populations, and those with mental health problems to assure that they received information and services.

Public safety provided the basis for resistance to delaying in-hospital mental health treatment during an influenza pandemic. Nearly all felt that assuring the public safety was as important as treating those severely ill with influenza.

METHODOLOGY

Five focus groups were held during June 2009. Two of the groups were conducted in Portland; one with a Health Department citizen advisory group, and a second with community residents. The remaining groups were conducted in Seaside, Wilsonville, and Vancouver, Washington.

Participants in the group discussions included 24 women and 18 men with ages ranging from 22 to 81 years. Efforts were made to recruit participants with diverse backgrounds and experiences. These efforts resulted in a mix of participants who were 14% African American, 5% Asian, 9% Hispanic, and 67% White. The participants also included 14% with no health insurance, 5% with no regular healthcare provider, 36% who reported having a disability, and 55% who reported having a chronic health condition. See Appendix A for demographic details.

Participants were provided with background information on the purpose of the focus groups and were then read a series of four scenarios and asked to take three different perspectives in responding to the questions. Following each scenario, participants were asked how they would feel if they were the patient in the scenario, what their concerns would be if they were one of the decision-makers who decided to curtail hospital services, and how they would feel if they were one of the community members most vulnerable to becoming seriously ill. Before closing the discussion, each participant was asked what he or she would like to tell the decisions-makers. The discussion guide, including the scenarios, appears in Appendix B.

FINDINGS

Patient Perspective

When asked to take the patient's perspective overall reactions to the postponement of hospital services depended on the scenario. Not surprisingly, scenarios with greater perceived risk of death for the patient or that threatened the safety of the public prompted stronger reactions from the group participants.

Feelings

Scenario One - Hip Replacement Surgery: Delaying hip replacement surgery was seen by most as "a realistic sacrifice" which would be "for the good of everyone." Many believed that it was best for surgery patients to be kept away from those who were ill with influenza. "Best for surgery patient and best for public."

Some of the participants said that they would feel disappointed, worried or afraid if their surgery was postponed. A few said they would worry about how long it would take to get the surgery and whether it would ever happen. Others worried that delaying surgery might interfere with mobility. Nonetheless, nearly all agreed that delaying surgeries such as hip replacement was in the best interests of both the surgical patients and those in need of hospital services due to influenza or other life threatening conditions.

Scenario Two – Prostate or Colon Cancer Surgery: The prospect of facing postponement of surgery to treat colon cancer (or for one group prostate cancer) created greater concern for some of the participants. One participant said "I'm not in favor of postponing the surgery because cancer is a different situation than a low-need surgery." Another noted that there was no assurance that the cancer would not spread. "Low probability that the cancer will spread is still just a probability. He should be able to get cancer surgery right away."

Others indicated that they would feel frustrated and angry if colon cancer surgery were delayed. One said, "It's colon cancer which can really spread rapidly. There will be a ton of people going to emergency rooms who aren't that sick. If people can get triaged for that, they can get triaged for cancer surgery. I would want that right."

Several participants said they would prefer that patients were individually triaged to determine whether it was appropriate to delay their treatment. "Diseases should be triaged and not the type of people."

Despite the perception that the need for cancer surgery was much greater than for hip replacement surgery, many of the respondents believed that delaying surgery, might still be protective for the cancer patients or that it was in the best interests of the larger community.

"I would be relieved to stay away from the hospital. I would take the 2-3 months (the delay) instead of being in the hospital with all the sick people."

"If I thought I was getting the "real skinny" (truth about the severity of the need for hospital beds) I would realize I was part of the larger community and put that first."

"I would hope the better nature would come out and people would be willing to wait."

Scenario 3 – Relocating Labor and Delivery: When asked how they would feel if they were sent to another hospital for labor and delivery, nearly all of the participants found this to be a beneficial alternative saying it was safer for the infant and the mother.

"Keep mothers and children as far away from sick as possible."

"The health of the child is most important."

Scenario 4 – Mental Health In-Hospital Treatment: Delaying hospitalization for mental health treatment was seen by nearly all of the participants as creating a very high risk situation. Delay of hospitalization was seen as life threatening for the patient as well as for the patient's family and, in some cases, the public.

"I would not allow it to happen. It's not OK. He may harm himself."

"If I were the mother in that scenario, I wouldn't accept no. I would rather my son be in jail getting the medications than not getting the medicine at all."

"This needs to be addressed immediately. Each patient needs to be evaluated individually or it may eventually become a threat to others."

Participants justified their beliefs that mental health treatment should not be delayed by describing the stigma that mental health patients experience and the already taxed mental health system.

"It seems like this is a serious situation. It seems like a lot of people who are marginalized or homeless are stigmatized. A lot of people with mental illness have a hard time keeping employment and they don't have healthcare. I think it is important to keep mental healthcare a priority so that they have care."

"Mental health gets swept under the rug so anything that can be done, should be done."

> "During a pandemic mentally ill and disabled will be the last people helped and should be the first helped."

Some felt that more resources should be allocated to the treatment of mental health patients during a pandemic because of the unpredictability of their response to increased levels of anxiety and fear caused by the pandemic.

A few felt that family members or friends could help if treatment had to be delayed. "Maybe there is a way to teach the mother to administer the drugs and what to look for in an event."

General comments about delaying or altering hospital treatment

In reflecting on the set of scenarios, one woman felt that whatever actions would be needed to provide care for those who are seriously ill with influenza or are injured during a pandemic should be taken.

> "There are some things that can't be compromised. I know that historically we are due for another pandemic like 1918. . . We have nothing in our experience to let us even imagine what it would mean. Some things can't be compromised and if it means inconveniencing people to help others who are sick or injured, I think it would be a small sacrifice."

Another participant felt that if surgeries needed to be postponed, patients would feel respected if their surgeries were rescheduled. "Schedule the surgery for some time in the future, even if it has to be rescheduled later. It gives a sense of control, a degree of respect and a practical resolution."

Patient Needs for Support

Some of the respondents noted that patients who are asked to delay in-hospital medical treatment would benefit if other services were made available. Among the types of assistance that participants felt may be needed were pain management, wheel chairs, mental health support, help with transportation, individualized home care, and help with daily living.

> "There needs to be some accommodations for the person who is asked to wait – wheel chairs, help with transportation, and some kind of assistance in their homes."

Others worried that people who work don't have access to individualized home care. "A lot of insurances just don't cover that kind of care."

Volunteering

When asked whether having the option to volunteer to postpone in-hospital treatment would change their feelings, participants' responses were mixed. Some felt that being given the option to delay treatment was more compassionate, empowering, and respectful than being told what to do. A few felt that volunteering would provide for public buy-in or create a sense of community.

> "It would be nice to have the option to volunteer. It seems more compassionate."
>
> "When there is adequate information and patients are asked to volunteer, it is going to show the patients that providers care for them."
>
> "People like being given a choice rather than just being told. It is more empowering to be given a choice rather than just being told."

Many others felt that it would be difficult to get enough volunteers and that being offered the choice to volunteer would create confusion and negative feelings between those who volunteered and those who did not volunteer. Some believed that if too few volunteered to delay treatment, decision makers would have to mandate delays which would result in a loss of credibility.

> "Real people, in real situations are going to put themselves first. Their baby, their cancer, they won't be thinking about everybody else. Don't ask me if I'm going to volunteer. Tell me what is going to happen because that is what I am going to act on. A lot of times you ask people to volunteer and they think 'let someone else volunteer.'"
>
> "The downside is that the public health people don't have control and are at the mercy of the public if they don't get enough volunteers. They lose credibility if they don't get volunteers and will have to mandate delays in treatment."
>
> "I think it would create too much confusion in an already chaotic situation. I would just want the decision to be made and that's it."
>
> "I think if I was asked to volunteer and then I was told that I was not chosen, I would feel like I was lied to and then it would make matters worse."

Decision-Makers' Perspective

When asked to take the perspective of the decision makers, participants discussed the decision makers' potential concerns, what they might be hoping for, and what they

wanted patients to know about the decisions made. In addition, participants described what they felt should be communicated to the public and how these communications should be made.

Concerns/Hopes

Many of the participants indicated that decision makers would be concerned about public fear, anger, and potential panicking. Most felt that information would be of central importance in keeping the public calm and to fostering acceptance of the decisions made. Several mentioned the need to provide information to vulnerable populations.

> "What I see as the most important thing about keeping everyone relaxed and calm is the continuous updating of current information. . . This is top priority. Information needs to be standardized and available to the disabled, to non-English speaking, and those without a voice. Honest, reputable, current information to all people is the most important thing."

Concern over the spread of the disease was also frequently mentioned. Many felt that efforts to contain the disease would be difficult which added to their concerns. "We've heard how they close schools and try to contain it, but kids play in the street. Lot's of people can't keep their kids at home; they have to go to work."

Another participant felt that decision-makers would be concerned about the public trust. "Health officials have to balance over-reacting and under-reacting. If you under-react, you have the magnitude of 1918. If you over-react you run the risk of losing the public trust. Their credibility is at stake." An alternative view was that "By providing enough information, decision makers could let the public know what they are balancing without losing the public trust."

In one group, participants felt decision-makers should be concerned about the competence of those who would determine what conditions were life threatening and would therefore receive hospital treatment. Another was concerned about making sure that the information provided to those who would be delaying treatment to others be completely understood.

> "I'd be concerned about the competency of the folks making the decisions about what is life threatening and what is not. You're depending on somebody else, so you want those folks to be very competent. Sometimes people makes mistakes about what is life threatening and what is not."

> "I'd be concerned that dissemination of information going to the people who were refusing services to others be completely understood by those making the decisions."

Most participants agreed that decision-makers would be hoping for containment of the disease and public acceptance of the decisions that were made. Most felt that acceptance

would be possible through clear communications about why the decisions were made. "Decisions need to be backed by why they were made. If people understand why the decision was made it will seem more fair to them."

What decision makers want patients to understand

When asked what decision-makers would want the patients who were affected by their decisions to understand, many felt decision-makers would want patients to understand both the benefits and the potential risks of the decisions made.

> "Be clear with people about what the issues are around having surgery now versus later. If you don't have surgery the illness may get worse, if you do being in close contact with others in the hospital may expose you to the flu."

> "People need to understand the benefits (avoiding exposure in the hospital) as well as the risks (the condition may worsen) and what their options are. Knowing empowers people. It keeps them from fearing the unknown."

A few participants indicated that it wouldn't matter how clear the issues were made, saying, "I don't think you could get me to understand the postponement of cancer surgeries," and "I don't think you could expect understanding. To put a lock on healthcare except for certain kinds of sickness – that wouldn't work."

Others wanted patients to understand that decisions to delay in-hospital treatments were temporary and that decisions would be equitably enforced across the board. A few indicated that although they wanted to expect equitable treatment, they didn't really believe it would happen.

Communication

Although participants were not asked specifically how the decision-makers and public health officials should communicate with the public, many offered advice on the content and delivery of communications. The general feeling seemed to be that communication during the early days of the H1N1 outbreak could have been handled better.

> "Communication about H1N1 has been very vague. We need continuous updating of relevant, current information."

> "All this information about swine flu is being repeated and creating fear. I don't want this. I just want to know how to take care of myself and my family."

> "The news media has sensationalized the situation. There has been fear blasting from the television and newspaper."

Participants expressed a desire for advance planning about how to explain the situation. They suggested that when information about the situation is communicated it be backed by numbers and facts that would help the public understand the "tough" decisions.

> "I would say to really have a solid plan before this get's out. When the media gets a hold of this there will be false information and rumors and that causes panic. Of course it is difficult, get the plan down and have solid information that is delivered with empathy. And, educate people, not just on how many have gotten sick, but on ways to prevent contracting it. Education lowers fear."

> "I think they need to plan ahead to explain the situation. Maybe back it up with numbers or just with facts to help people understand why this tough decision was made and that it wasn't done without a lot of thought. They need to communicate empathy and have people skills to share all the thought behind the decision."

Many felt that people need to understand the seriousness of the situation. Most called for "clear, concise, accurate information that will let them fully understand the situation." One respondent felt a type of Richter scale should be created and communicated in advance with information about the types of measures that might be implemented at each level on the scale.

A few participants felt that information should be "balanced" or even "filtered" to avoid the risk of creating greater fear and anxiety.

Participants also provided advice on the source of information and the spokesperson. They felt strongly that they need to know where the information is from and want to know if it is from local, state, or federal sources. Some felt that information as well as decisions needs to be localized. Others felt information needs to be consistent with that provided in other states and by the Centers for Disease Control.

Many thought that a trusted local spokesperson should be identified in advance and that it is important to hear from health officials not from news people. Others felt the information should come from trusted community members.

> "I think it is important that a consistent message be going out constantly and that identified people in the community would disseminate the information. To have an unknown person tell you that they are not doing any surgeries doesn't give you any buy in from the public. So they have got to get that out by people who have the trust of the community, by people who are trustworthy."

At-Risk Community Members Perspective

When asked how they would feel if they were one of the community members who was likely to become "seriously ill" if they came down with the flu, some participants reported feelings of gratitude or relief that others might forego in-hospital treatments so that they could be served. A few even felt that knowing that someone else would be giving up a bed would make them a little more cautious.

> "If I know I am going to get sick, knowing there is a bed for me because someone gave up their elective bed, I am a little more at ease and maybe don't go out unprotected. I'm a little more cautious and maybe use hand sanitizer."

Other participants interpreted the questions about being at-risk of serious illness as suggesting that treatment would be withheld from some on the basis of their personal characteristics.

> "If they said people with diabetes and hip replacements who are 18-35 years old would be turned away from treatment, but healthy 35 year-olds can get treatment, I would be really angry."

> "Sounds like we are talking about the survival of many rather than the survival of one. I would be upset if I didn't have access to the care I need. I have health insurance and I should be able to get the care I need."

Others expressed concerns that if the larger population didn't understand the situations of others, they would not be concerned about whether they received treatment.

> "I'm appalled at how people are treated. Services (for the mentally ill) have declined dramatically in the past two years. Ours is a medically based system versus a mental health system. The public has been even further removed from understanding what's going on. The danger to the community and to the people themselves is dramatic. Most people don't understand. If most people don't understand, they don't care about it."

Values

Participants in the group discussions were not asked directly about the values underlying their responses. Rather, their values emerged during discussion of the situations presented in the scenarios. For example, as participants discussed the sacrifices that would be made when in-hospital treatments were delayed, they spoke of the "greater good" and of "doing what is best for the community." A list of the values that emerged from the group discussions and supporting quotations follows:

For the good of everyone/Community

"I feel it is a realistic sacrifice – for the good of everyone."

"She's doing something for the good of the community, for the good of many."

"Let people know that decisions are being made for the greater good."

"If I thought I was getting the real 'skinny,' I think I would realize I was part of the larger community and I would put that first."

"We have a certain responsibility to our community. We need to learn how to protect ourselves and to care for one another."

"With designated hospitals, they are looking out for the best interests of the community."

"Everybody wants to do what is best for the community."

Transparency/Honesty

"The public should be able to understand the decision-making process and why decisions are being made. This would help them better accept the decisions that are being made."

"I need 100% of the truth. I need to know if there is a cure. I need to know what I can do to postpone catching it and if I'm going to catch it. I need to know my children get the same information that I have from their schools. I'd rather know what I'm facing and what the end result might be. Give it all to me off the top. I need the good information, the bad information, so I can figure out how to take care of me and my own."

"Transparency will empower the population."

"Be fair, be honest and let me know what is going on."

"I would prefer triage of individuals to keep the system honest."

"I would want to know the exact process they (the decision-makers) went through, how much planning, who was involved, the steps they took, what they think wouldn't work. I want to know everything. Tell the whole truth."

"Be transparent. Tell people what the rules are and that it has been determined that the rules are for the greater good."

"If public health officials don't carry this off with openness and transparency, they will get a lot of pushback. I would resent decisions if I don't know anything about them."

Equity

"I'd like to hear that people who make less than $10,000 are getting the same treatment as those making more."

"Take politics out of it, take bias, prejudice, financial considerations out."

"Entitlements go out the window."

"If they said people with diabetes and hip replacements who are 18-35 years old would be turned away from treatment, but healthy 35 year olds can get treatments, I would be really angry."

"Decisions need to be equitably enforced across the board."

"I'm concerned that priorities are made by the privileged class. Money would negate the plans. The rich would go to a private physician. The hospitals would be for poor folks so the rich can get fixed."

Fairness

"Be fair, honest, let me know what's going on."

"Come out with fair statements. Tell us what the rules will be. Be fair, truthful and honest."

"Fairness is key. The rich are getting rich and the poor are dying. That's our health system right now. This should be fair."

Inclusiveness

"Sometimes I hear in conversations that people get upset over government making decisions. Bringing people into the conversation is important."

"The public should be included in the planning process. Policy makers need to make sure that the outcomes mesh with the input given. If it wasn't used, why not?"

"I would have a concern about those that are non-English speaking. I know all the TV is in English and they do have some Spanish channels,

but what about those that are non-English and Spanish? How are they going to get that information to them?"

Self-Reliance/Personal Responsibility

"We need self-reliance. What can I do even though I may be at risk, what can I do to make sure I don't become infected. What can I actively do? I don't have to buy into the whole craziness of the event."

"We have a certain responsibility to our community."

"We have a personal responsibility to inform ourselves, learn how to stay healthy, what to do if we get sick. Each community will need to care for themselves."

Protection of mothers and children

"It's a good decision. It's best for mom, and best for baby."

"Good decision. They are thinking about protecting mothers and infants. Our job is to keep society going for another generation – to keep the next generation safe."

Protection of vulnerable populations

"Need a communication plan to reach the homeless."

"Mental health should be an important consideration. They are swept under the rug."

"Those with mental health problems are the last people helped and the first to need help."

"Train the people to provide information to give out information to other cultures."

Public safety

"To have mental health pushed aside is not safe for anyone. . .not fair if put into that situation. It's a public safety issue."

"Public safety is most important."

"I'd want to tell them that it was done in the name of public safety."

Messages for Decision Makers

At the close of each group discussion, participants were asked what they would like to tell the public health leaders who will be making decisions. Most of the comments made reinforced what had already been expressed in earlier parts of the discussions and has been included in earlier sections of this report. However, a few of the comments had not been expressed earlier and are included below.

> "Decision makers need to think outside of the box and they need to be from different walks of life. The public should be included in the planning process because they are on the front lines. It's comforting to know that we are being included in the process. Policy makers need to make sure that the outcomes need to mesh with the input given. If there are different outcomes, the community needs to know why. Policy makers need to be able to explain how input was used and if it wasn't used, and why?"

> "Try to avoid all or nothing thinking. All these scenarios say this population gets service this population doesn't. Study and set up a variety of models of recovery or practice that would support the situation. Think creatively. Mental health – a hotel could be set up for triage of mental health. You need to think outside the box. Think of other places for service. Include mental health, hospital service persons, the private sector and community, too."

> "Add natural medicine providers. There's a lot that they can contribute."

> "I would like decision makers to please treat this as if your first born, your own child is at risk."

APPENDIX A
Pandemic Influenza Focus Groups

Focus Group Participants		
	Number	**Percent**
Gender		
Female	24	57
Male	18	43
Age		
21-34	8	19
35-44	9	21
45-54	14	34
55-64	8	19
65 and over	3	7
Race		
African American	6	14
Asian	2	5
Hispanic	4	9
White	28	67
Refused	2	5
Sexual Orientation		
Heterosexual	25	60
Gay	5	12
GLBT	2	5
Refused	10	24
Health Insurance		
Yes	36	86
No	6	14
Regular Provider or Clinic		
Yes	39	93
No	2	5
Refused	1	2
Disability		
Yes	15	36
No	26	62
Refused	1	2
Chronic Condition		
Yes	23	55
No	19	45

APPENDIX B

Pandemic Influenza
Discussion Guide
June 2009

Pandemic Influenza
Discussion Guide
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Introduction

Welcome. Introductions and warm up. Name and two things in your life that are very important to you.

We have invited you here today to participate in a group discussion that will help Public Health and healthcare leaders plan for a possible influenza pandemic – worldwide spread of a new strain of influenza virus. The importance of influenza outbreaks became clear as we watched and listened to the news during the recent H1N1 (or swine flu) outbreak in the United States and other countries. The importance that the Centers for Disease Control and public health leaders have given that outbreak made it clear that the potential exists for a much more serious influenza epidemic in the United States and throughout the world.

In 1918, the world experienced a horrible influenza pandemic. In the US, millions became ill, and about 700,000 people died. Worldwide, about 50 million people died. Although we all hope that we never experience influenza similar to the 1918 pandemic, public health leaders agree that we need to be prepared for that possibility.

When a flu pandemic occurs, public health leaders will make decisions that affect the public based on the best available data and science. They will be getting and using information from experts about the effectiveness of medical treatments and the availability of resources needed to provide those treatments. In addition to using data and science, public health leaders want their decisions about providing healthcare in these dire circumstances to be fair, respectful of personal choices, and to promote a sense of community responsibility. In order to be fair and respectful of personal choices, leaders need to understand the community's values and priorities about decisions that might limit healthcare services. This is your opportunity to be heard by public health leaders, and to help them do their part to prepare our community.

We are going to ask you your opinions about some of the decisions that health leaders will need to make during a serious influenza epidemic. We'll take that information back to public health planners so that they can weigh it in their decision making processes along with the other information they receive

Do you have any questions?

Scenario One

Janice is a woman in her mid-fifties who has always enjoyed an active lifestyle. She works full-time as a bookkeeper, and used to enjoy dancing, long walks, and bike riding in her free time. In recent years she has found it increasingly difficult to enjoy these activities because of hip pain due to chronic arthritis. Recently even walking through the supermarket has become difficult. She decided several months ago to have hip replacement surgery. Nearly two months ago she made arrangements to have surgery. It is supposed to take place this week.

A major flu epidemic is underway in the region where Janice lives. Normally, there are plenty of hospital beds in her region that are available to care for people undergoing hip replacement and other surgery for medical conditions that are not immediately life threatening. But in order to free up hospital space for people who are severely sick with influenza, health decision makers are considering postponing planned, non-emergency surgeries until the epidemic passes – probably in two to three months.

Suppose you were in Janice's situation and learned that your surgery would have to be postponed, how would you feel? What would you be concerned about? What would you be hoping for? [Follow with "why" questions to understand values.]

Suppose you were in Janice's situation and the policy makers asked people who were scheduled for hip replacement surgery to volunteer to postpone their surgeries. How would you feel about that? [Follow with "why" questions to understand values.]

Suppose you were one of the public health decision makers, what would you be concerned about or hoping for? What would you want people like Janice to understand about your decision? [Follow with several "why" questions to help with articulation of values.]

Suppose you were a member of the community and according to the news stories about the pandemic, you were likely to be one of the "seriously ill" people if you came down with the flu. How would you feel about this postponing the surgery? [Follow with "why" questions to get at underlying values.]

Scenario Two

Jack has recently been diagnosed with colon cancer after a routine colonoscopy and biopsy.[1] Jack has been conscientious about being screened since his father died from colon cancer 17 years ago. Jack is a physically active and otherwise healthy 62 year-old.

[1] In the first of the five group discussions this scenario described Jack as having prostate cancer. Due to the similarity of responses for Scenarios One and Two, Scenario Two was rewritten focusing on colon cancer which is perceived as more serious by group participants.

His colon cancer is relatively small, and based on x-rays and other tests, his doctor believes that the cancer probably has not spread. But they won't know for sure until Jack can have an operation to find out if there are signs of spread. Knowing if there is spread will affect whether Jack should have chemotherapy in addition to surgery. It will also make a difference in how long Jack might live.

Since Jack lost his father to colon cancer, he is understandably very anxious. His doctor has discussed with him that his surgery might have to wait because all the hospitals in the region are very busy with influenza patients and other immediately life-threatening illnesses. The long-term risk of Jack dying or becoming disabled if his surgery is postponed for several weeks is low, but not zero.

If you were in Jack's situation, how would you feel about the decision to postpone surgery? What would you be concerned about? Hoping for? [Follow with "why" questions to get at underlying values.]

Suppose you were in Jack's situation and the policy makers asked people who were scheduled for surgery for colon cancer to volunteer to postpone their surgery. How would you feel about that? [Follow with "why" questions to get at underlying values.]

Suppose you were one of the public health decision-makers. What would you be concerned about or hoping for in deciding to have surgeries like Jack's postponed? What would you want people like Jack to understand about this decision? [Follow with "why" questions to get at underlying values.]

Suppose you were a member of the community and according to the news stories about the pandemic, you were likely to be one of the "seriously ill" people if you came down with the flu. How would you feel about this postponing the surgery? [Follow with "why" questions to get at underlying values.]

Scenario Three

Diana is a young woman in her mid twenties and is pregnant with her first child. Diana and her husband have attended child birth classes and are eagerly awaiting their child's birth. There is every indication that she will have a normal delivery and a healthy child. Because there is a severe flu outbreak in the region where Diana lives many of the hospital rooms that would normally be used for delivering mothers are instead being used to treat influenza patients. As a result, pregnant women are being directed to specific hospitals designated for labor and delivery and are being discharged from the hospital earlier than under normal circumstances. Diana will be unable to deliver at the hospital of her choice and will need to be cared for by someone other than regular physician. In addition, there is a small risk of complications if she is released from the hospital too early.

If you were in Diana's situation, or were Diana's husband, how would you feel about the decision to relocate to a different hospital for the delivery? What would you be concerned about? Hoping for? [Follow with "why" questions" to help articulate underlying values.]

Suppose you were in Diana's situation and women who were scheduled for normal delivery were asked to volunteer to change hospitals. How would you feel about that? [Follow with "why" questions" to help articulate underlying values.]

If you were one of the public health decision makers what would you be concerned about or hoping for in deciding to have normal deliveries relocated? What would you want people like Diana and her husband to understand about the decision? [Follow with "why" questions" to help articulate underlying values.]

Suppose you were a member of the community and according to the news stories about the pandemic, you were likely to be one of the "seriously ill" people if you came down with the flu. How would you feel about the decision to relocate women for delivery of their babies? Would it change your feelings if the women had been asked to volunteer to relocate for delivery?

Scenario Four

Carol is the mother of a 28 year old son, Jeff. Jeff has been diagnosed with bipolar disorder which can be a severe mental health problem. He has been taking medication for this, and his symptoms had been under good control for about 14 months. In the past few days Jeff has been talking so fast that it is hard to understand him. He jumps from topic to topic and simply isn't making sense. In addition he has not eaten or slept for several days. He is easily agitated and flies into a rage. Carol doesn't believe Jeff will hurt her, but she hates to see him so agitated and fears he might hurt himself. Jeff has had similar difficulties once before and was admitted to the hospital while his medications were adjusted. Now, because of a severe influenza epidemic, some mental health patients are being asked to wait for treatment until the epidemic passes – up to two or three months. Other patients are being sent to temporary treatment facilities or are being cared for in the community – with a lot of help from family and friends. Carol doesn't think either of these approaches will work. She is concerned that Jeff's behavior will get more out of control, and that something bad will happen to him.

If you were in Carol's situation, how would you feel about the decision to postpone in patient treatment? What would you be concerned about? Hoping for? [Follow with several "why" questions to help articulate underlying values.]

Suppose you were in Carol's situation and the policy makers asked families to volunteer to postpone in-patient treatment for their mentally ill family members. How would you feel about that? [Follow with some "why" questions to help articulate underlying values.]

Suppose you were one of the public health decision-makers. What would you be concerned about or hoping for in deciding to have in-hospital mental health treatment postponed? What would you want people like Carol to understand about this decision? [Follow with "why" questions to get at underlying values.]

Suppose you were a member of the community and, according to the news stories about the pandemic, you were likely to be one of the "seriously ill" people if you came down with the flu. How would you feel about this decision to postpone mental health treatment for some patients? [Follow with several "why" questions to get at underlying values.]

Closing

If you got a chance to talk with the public health leaders who will be making these kinds of decisions, what would you like to tell them?

Thank you.

AREA OF INTEREST: ETHICS

Kass NE, Otto J, O'Brien D, Minson M. Ethics and severe pandemic influenza: Maintaining essential functions through a fair and considered response. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*. 2008;6(3):227-236.

Abstract
The response to severe pandemic influenza will be managed by experts in public health and infectious disease and by government officials to whom the public will turn for information and direction. Nonetheless, there remain important ethical considerations that can shape what goals are given priority, how scarce resources are distributed, how the public is included, and how we treat the most vulnerable in our response to a pandemic. This article assumes that the secondary consequences of severe pandemic influenza could be greater than deaths and illness from influenza itself. Response plans, then, must consider threats to societal as well as medical infrastructures. While some have suggested that scarce medical countermeasures be allocated primarily to first responders and then to the sickest, we suggest that an ethical public health response should set priorities based on essential functions. An ethical response also will engage the public, will coordinate interdependent sectors as a core preparedness priority, and will address how plans affect and can be understood by the least well off.

Main points

- Recommends a "continuity of operations plan" approach—gives priority to vaccine manufacturers and health care professionals but also considers utility workers, communications personnel and truck drivers.
- Underlying goal because of its potential to enhance recovery from a pandemic and minimizing burden of disease and lives lost during a pandemic.
- Health care personnel cannot do the work without clean water, ambulances, fire, police, sewage, electricity, telecommunications, etc.
- Functioning infrastructure is essential.
- This underlying goal both maximizes the "good" and is "fair" and "equitable."
- Needs of vulnerable populations should always be a primary consideration.
- Few plans elaborate on the guiding ethics rules or principles on which they were designed.
- Public health responses must be fair in design and implementation.

Stand on guard for thee: Ethical considerations in preparedness planning for pandemic influenza. 2005. A report of the University of Toronto Joint Centre for Bioethics Pandemic Influenza Working Group.

Main points

- Plans need to be founded on ethical values and the community should understand the types of decisions that need to be made.

- Decision makers and the public need to be engaged with ethical discussions and planning.
- Working group identified four key ethical issues to be addressed in pan flu planning:
    - Duty to treat
    - Restricting liberty in infection control measures
    - Priority setting (allocation of scarce resources)
    - Global governance implications (i.e. travel)
- Ethical guide proposed for planning:
    - 10 ethical values: individual liberty, protection of the public from harm, proportionality, privacy, duty to treat, reciprocity, equity, trust, solidarity, stewardship
    - 5 procedural values: reasonable, open and transparent, inclusive, responsive, accountable
- Key recommendations were made.

Letts J. Ethical challenges in planning for an influenza pandemic. NSW Public Health Bulletin. 17(9-10):131-134.

Abstract
Pandemics have devastated humankind throughout history and the threat they pose is just as great now, at the beginning of the 21st century. Managing a public health emergency of the scale and complexity of a pandemic, and with the potential societal ramifications, poses enormous challenges. Public health planners must grapple with the intersection of competing values and priorities. This article provides a preliminary discussion of some of these ethical issues, specifically the necessary limitations on individual liberty posed by quarantine, the unavoidable need to prioritise health care resources, and the complexities associated with the obligations of health care professionals.

Main points

- Public health responses must be necessary and effective, restrict as little as possible, be transparent, flexible, responsive to a changing pandemic and consistent.
- Possible allocation approaches may include according to level of risk, potential for individual benefit, age, social utility, greatest medical utility, workforce position within society.
- First-come first-serve system is unlikely to provide an equitable or effective use of resources in conditions of extreme scarcity.

Rosoff PM. The ethics of care: Social workers in an influenza pandemic. Social Work in Health Care. 2008;47(1):49-59.

Abstract
Many healthcare organizations and government agencies are making detailed preparations for the possibility of a pandemic of highly virulent influenza. All plans to date have recognized that there will undoubtedly be a greater need for medical resources

than will be available. Thus, we will be faced with a situation in which not all will be offered curative care, even if they could benefit from it. Even if there were sufficient amounts of vaccines, hospital beds, ventilators, and antibiotics, there are still expected to be large numbers of deaths as well as stress due to the overwhelming nature of the pandemic. The challenges of caring for the incurable, the uncured, healthcare workers, and the survivors and their families will place almost unprecedented demands on mental health workers. In this article, I discuss these ethical and medical challenges and the role that social workers will be called on to play.

Main points

- We must ensure that we are providing adequate resources for supportive care and mental health care during a pandemic.
- No studies to date on the mental of physical health of social workers involved in patient care during a pandemic.
- There will be great psychological trauma as a result of a pandemic, and a clear need for mental health workers.
- Do social workers have a "duty to treat"?

Singer PA, Benatar SR, Bernstein M, Daar AS, Dickens BM, MacRae SK, Upshur REG, Wright L, Shaul RZ. Ethics and SARS: lessons from Toronto. British Medical Journal. 2003;327:1342-1344.

Main points

- Formed a working group to identify key ethical issues and values related to SARS epidemic.
- Final list was agreed upon by consensus and included five major ethical issues faced by decision makers and 10 key ethical values, including: individual liberty, protection of the public from harm, proportionality, reciprocity, transparency, privacy, protection of communities from undue stigmatization, duty to provide care, equity, solidarity.
- Consensus was not reached re: issue of duty to care.
- Authorities had to make hard decisions re: essential medical services.
- Decisions should be made in a fair manner, with equity between SARS patients and non-SARS patients.
- A review of professional codes and legislation would help clarify the role of health professionals during a public health emergency.

Tuohey J. A matrix for ethical decision making in a pandemic. *Health Progress*. 2007;20-25.

Main points

- Wide variety in ethical principles and how they are defined in plans and in the literature.
- Plans should consider who should be involved in decision making processes.

- Relationships of high quality are created through a reliable decision making model that demonstrates consistency and the accountability in the honesty, reliability, and fairness of decisions.
- Public health, not personal health, is the value at risk in a pandemic.
- Decision-making matrix should include the following values: social solidarity, professionalism and justice.

Selgelid MJ. Pandethics. *Public Health*. 2009;1-5. [E pub ahead of print.]

Abstract
This paper explains the ethical importance of infectious diseases, and reviews four major ethical issues associated with pandemic influenza: the obligation of individuals to avoid infecting others, healthcare workers' 'duty to treat', allocation of scarce resources, and coercive social distancing measures. In each case, ways in which the ethical issues turn on both philosophical and empirical questions are highlighted. The paper concludes that ethicists should play a greater role in identifying ethically important empirical questions, and that scientists should take the ethical as well as the scientific importance of such questions into consideration when choosing research projects.

Main points

- Four major ethical principles that should be followed:
    - Obligation to avoid infecting others: what is the individual duty and to what extent should the duty be reinforced?
    - Duty to treat: healthcare providers are expected to provide care; what is the limit to the duty to treat? The more likely the treatment is to save a patients life, the greater level of risk healthcare providers should be willing to make.
    - Allocation of scarce resources: what principles should determine the allocation of scarce resources and how should they be prioritized?
        - Social utility?
        - Life-cycle principle?
    - Coercive social distancing: individual freedoms might need to be over-ridden when the danger to society as a whole is great; the greater amount of utility that is threatened, the lesser amount of evidence needed to require social distancing.
- Sound policy around ethical ramifications is needed for pandemic response.

Garrett JE, Vawter DE, Prehn AW, DeBruin DA, Gervais KG. Ethical considerations in pandemic influenza planning. *Minn Med.* 2008 Apr;91(4):37-9.

Abstract
Although the timing and severity of the next influenza pandemic is impossible to predict, there is broad agreement that one will occur. Preparation is vital to mitigating its effects. A severe influenza pandemic like that which began in 1918 would be unlike other disasters in nature, scale, and duration. It could cripple normal business operations and disrupt global distribution of essential goods and services. It could force ethical decisions

that many in a country accustomed to relative abundance are poorly prepared to make. Although sound evidence and clinical and public health expertise are needed to make informed decisions, so is an understanding of our common and diverse values. This article outlines some of the challenges the state would face during a pandemic, especially concerning the rationing of resources and care. It also describes a process currently underway to develop guidelines for how the state should approach the ethical questions that would arise.

Main points

- It is important to determine ethical considerations and questions. (i.e. who should get vaccines and medial treatment first and why: Who should get care in hospitals and who should be moved to other settings? When should patients be removed from mechanical ventilation in order to give others who are likely to respond better, a chance? Should some groups be given priority over other groups based on age? Who should stockpile?
- Individual rights and freedoms may be challenged: non-pharmacological interventions (i.e. quarantine, isolation, social distancing).
- All ethical decisions require thoughtful public dialogue and should be based on clinical, public health and scientific evidence.
- There is a need for community collaboration around ethical issues—issues that are too complex for one entity to decide on, alone.

Additional insights/notes/question

- Possible resource: Minnesota Pandemic Ethics Project—brings together more than 100 Minnesotans from all sectors (public, private, academic, nonprofit) to develop recommendations for rationing health resources.
- What are opportunities for citizen involvement in Region 1 in terms of the development of an ethical framework?

O'Laughlin DT, Hick JL. Ethical issues in resource triage. *Respiratory Care*. 2008; 53(2)190-200.

Abstact

Mass-care events, such as pandemic influenza, could reach such devastating proportions that there will be the need to make difficult triage decisions that will ultimately result in the deaths or severe disability of patients in large numbers. The method by which we determine how triage of scarce health care resources will be performed must be clearly defined prior to a disaster event. This paper will discuss several of the ethical principles that must be weighed in developing a mass-care triage plan, as well as steps to facilitate its implementation. Development of triage policies in such an event should be developed in an open and transparent manner, be reasonable in design, include the views of the critical stakeholders, and be responsive to and provide a mechanism for accountability, with a clearly defined goal of the just triage of limited health care resources. Planning failure will result in increased deaths from poor triage processes and substantial mistrust of the health care system and its practitioners.

Main points

- Financially unrealistic for most hospitals in the U.S. to purchase and store extra supplies (i.e. ventilators) in quantities needed to prevent triage during a pandemic.
- Ethics & disasters use two ethical theories:
    - Utilitarianism (consequentialism): "the greatest good for the greatest number."
        - How is the "greatest good" defined?
        - How is "greatest" defined?
    - Egalitarianism: equality amongst all as well as equal distribution of resources
- 4 main ethical principles:
    - Respect for Autonomy: the ability for a person to hold views, make choices and take actions based on personal values and beliefs
    - Nonmaleficence: "Above all, do no harm"
    - Beneficence: Weigh risks and benefits to provide the best outcome for the patient.
    - Justice: relates to justice of the individual and social justice – fair, equitable and appropriate distribution based on the norms of social cooperation
- Possible ethical dilemmas:
    - Patient/doctor relationship
    - Withdrawing and withholding care
- Tools for triage decisions
    - SOFA (Sequential organ Failure Assessment) scores
- Implementation of triage plans are at facility levels, but protocols and standards or care are consistent across geographic regions.

Additional insights/notes/question

- Will there be a plan in place to inform the public re: triage/resource allocation in advance?

Levin PJ, Gebbie EN, Qureshi K. Can the health-care system meet the challenge of pandemic flu? Planning, ethical, and workforce considerations. *Public Health Reports*. 2007;122:573-578.

Abstract

The federal pandemic influenza plan predicts that 30% of the population could be infected. The impact of this pandemic would quickly overwhelm the public health and health-care delivery systems in the U.S. and throughout the world. Surge capacity for staffing, availability of drugs and supplies, and alternate means to provide care must be included in detailed plans that are tested and drilled ahead of time. Accurate information on the disease must be made available to health-care staff and the public to reduce fear. Spokespersons must provide clear, consistent messages about the disease, including actions to be taken to contain its spread and treat the afflicted. Home care will be especially important, as hospitals will be quickly overwhelmed. Staff must be prepared ahead of time to assure their ability and willingness to report to work, and public health

must plan ahead to adequately confront ethical issues that will arise concerning the availability of treatment resources. The entire community must work together to meet the challenges posed by an epidemic. Identification and resolution of these challenges and issues are essential to achieve adequate public health preparedness.

Main points

- Possible solution to dealing with surge: plan for care to be given in the home setting.
- Efforts must be made ahead of time to include home-care agencies, pharmacies, VA, etc.
- Public health pan flu planning must be linked with home-care agencies and community-level volunteer organizations (Medical Reserve Corps).

Bensimon CM, Upshur REG. Evidence and effectiveness in descionmaking for quarantine. *American Journal of Public Health*. 2007;97(S1):S44-S48.

Abstract
When public health decisionmakers turned to quarantine during the recent severe acute respiratory syndrome (SARS) epidemic, difficult questions were raised about the legitimacy and acceptability of restrictive measures to attain public health goals. SARS also brought to light how scientific uncertainty can permeate public health decisionmaking, leading us to think about the relationship between the adequacy of evidence of the effectiveness of an intervention and its role in the justification of public health action. In this article, we critically examine the role of evidence and effectiveness in decision-making for quarantine. It is our contention that the effectiveness of a public health intervention should not be defined exclusively in (absolute and objective) scientific terms but rather conceptualized relationally and normatively in public health decision-making.

Main points

- Individuals have a right NOT to respect infection control restrictive measures.
- Enforcing quarantine measures raised the question regarding the justification of an intervention that may or may not be effective.
- How can quarantine be justified based on a lack of scientific evidence of its effectiveness or lack of consensus about what constitutes and effective quarantine?
- Public health ethics framework proposed by Upshur et al.: *harm principle, proportionality, reciprocity and least restrictive measures.*
- Interventions should be justified based on their effectiveness.
- Important questions rasied:
    - When should we regard a proposition as proven?
    - How do we establish that something is effective, or ineffective?
    - In what sense are clinical and policy decisions objective?
- Uncertainty is never fully resolved.

Thompson AK, Faith K, Gibson JL, Upshur REG. Pandemic influenza preparedness: an ethical framework to guide decision-making. *BMC Medical Ethics*. 2006;7(12).

Abstract
ABSTRACT: BACKGROUND: Planning for the next pandemic influenza outbreak is underway in hospitals across the world. The global SARS experience has taught us that ethical frameworks to guide decision-making may help to reduce collateral damage and increase trust and solidarity within and between health care organisations. Good pandemic planning requires reflection on values because science alone cannot tell us how to prepare for a public health crisis. DISCUSSION: In this paper, we present an ethical framework for pandemic influenza planning. The ethical framework was developed with expertise from clinical, organisational and public health ethics and validated through a stakeholder engagement process. The ethical framework includes both substantive and procedural elements for ethical pandemic influenza planning. The incorporation of ethics into pandemic planning can be helped by senior hospital administrators sponsoring its use, by having stakeholders vet the framework, and by designing or identifying decision review processes. We discuss the merits and limits of an applied ethical framework for hospital decision-making, as well as the robustness of the framework. SUMMARY: The need for reflection on the ethical issues raised by the spectre of a pandemic influenza outbreak is great. Our efforts to address the normative aspects of pandemic planning in hospitals have generated interest from other hospitals and from the governmental sector. The framework will require re-evaluation and refinement and we hope that this paper will generate feedback on how to make it even more robust.

Main points

- The cost of not addressing ethical concerns may result in loss of trust, low staff morale, confusion about roles and responsibilities, stigmatization and misinformation.
- Developed an ethical framework with two main points:
    - Planning should be guided by ethical decision-making processes and
    - Should be informed by ethical values
- Framework was based on the “accountability for reasonableness” model (Daniels & Sabin, 2000).
- Ethical issues include the following:
    - Prioritizing populations for vaccines
    - ICU and bed assignment
    - Duty to care
    - Staff allocation
    - Visit restrictions
    - Communications and how reviews of decisions will be handled
- Implementing an ethical framework includes:
    - Agreement by hospital administration
    - Vetting framework with key stakeholders
    - Decision review process

Thomas JC, Dasgupta N, Martinot A. Ethics in a pandemic: A survey of the state pandemic influenza plans. American Journal of Public Health. 2007;97(S1):S26-SS31.

Abstract
A pandemic of highly pathogenic influenza would threaten the lives of hundreds of thousands in the United States and confront governments and organizations, with ethical issues having wide-ranging implications. The Department of Health and Human Services and all states have published pandemic influenza plans. We analyzed the federal and state plans, available on the Internet, for evidence of ethical guidance as judged by the presence of ethical terms. The most striking finding was an absence of ethical language. Although some states acknowledged the need for ethical decisionmaking, very few prescribed how it should happen. If faced by a pandemic in the near future, we stand the risk of making many unjust and regrettable decisions.

Main points

- Competence required for understanding ethical challenges include:
    - Recognizing that an ethical issue exists
    - Identifying specific ethical concerns
    - Identifying guidelines and tools
    - Deciding who makes decisions
    - Preparing for ethical decision making
    - Implementing plans
    - Evaluating action for intended results

Responding to pandemic influenza: The ethical framework for policy and planning. Department of Health. 2007.

Abstract
The ethical framework is designed to assist planners and strategic policy makers with ethical aspects of decisions they face before, during and after an influenza pandemic. It may also help clinicians and other health and social care professionals with decisions they need to make in the same context.

Main points

- Equal concern and respect is the major them outlining the ethical framework
    - Everyone matters
    - Everyone matters equally
    - Interests of all people are the concern of all of us and society
    - Minimizing harm in a pandemic is of central concern
- Determining whether or not a decision is ethically appropriate needs to be judged in relation to the situation at the time the decision was made.
- Ethical principles include:
    - Respect
    - Minimizing harm
    - Fairness

  - Working together
  - Reciprocity
  - Proportionality
  - Flexibility
  - Good decision-making
    - Openness and transparency
    - Inclusiveness
    - Accountability
    - reasonableness

Indiana University Center for Bioethics (2007). Pandemic flu preparedness: Ethical issues and recommendations to the Indiana State Department of Health.

Main Points

- Provides recommendations to the Indiana DOH in four key areas:
  - Management of the healthcare workforce
    - State must identify all healthcare workers who are deemed critically necessary during the pandemic
    - State and healthcare organizations should adopt a "high expectations, no punishment" approach to absenteeism
    - State should set and communicate expectations that healthcare institutions have adequate medical supplies and that these institutions ensure these supplies be made available to all personnel expected to interact with patients
    - State should encourage healthcare institutions to establish clear policies for determining sanctions for noncompliance with expected responsibilities that are fair and responsive to exceptional circumstances.
  - Triage and allocation of scarce medical resources
    - State should adopt NY state workgroup's framework for ventilator triage, which rejects the consideration of social role and age as triage inclusion and exclusion criteria in favor of a system of allocation based solely on physiologic prognosis
    - State should encourage all acute care facilities to adopt a common procedure for addressing how to allocate scarce resources
    - State should require all acute care facilities to adopt a common procedure to conduct a daily respective review of all triage decisions in order to identify flaws in the protocol and to provide accountability.
  - Necessary alterations to the standard of care provided by healthcare professionals
    - State should develop a protocol which would take effect for all healthcare institutions upon declaration of a statewide pandemic influenza emergency by the Governor
    - State should begin immediately to engage leadership of all healthcare facilities in discussions about the impact of a statewide protocol for altered standards of care, including the selection of alternate care sites

  - State should develop a database of healthcare workers and volunteers that can be accessed efficiently to provide surge capacity during the pandemic
  - State should ensure that a comprehensive program is developed and implemented to provide all healthcare workers with adequate training and information regarding pan flu and their anticipated responsibilities
  - State should establish minimal standards for modified documentation procedures which can be implemented efficiently at the time of the pandemic for all healthcare institutions, mortuaries, and others.

- Allocation of scarce vaccines and antiretroviral medications
  - State should adopt a system similar to the California dept. of health services' and construct a prioritization list based on its implementation
  - State should develop an education module for county health departments regarding the criteria by which the prioritization plan is developed, and counties should be instructed as to how prioritization decisions will be made.

* All recommendations were based on an ethical framework entitled *Points to Consider*, which contains 7 key considerations.

- Consistency with the Mission of Indiana State Dept of Health and other healthcare organizations in general
- Transparency
- Public Accountability
- Responsiveness
- Proportionality
- Reciprocity
- Uniformity of Implementation

New Jersey Hospital Association. Planning today for a pandemic Tomorrow: Ethics module.

Main Points

Ethics module is one of 10 in this guide. The guide discusses the composition of an ethics subcommittee for the planning of an ethical framework. How to think about "buckets", seeing as a number of and variety of decisions will fall within these "buckets". These "buckets" should be reflective of a facility's core values. They are not reflective of any order of importance as it is up to each organization to determine the priority of one value over another. Values can be associated with:

- The process by which decisions are made
- What is in the best interest of the organization/facility?
- What is in the best interest of the community?
- What is in the best interest of the individual?

Reflected in each bucket are examples of different values that may be considered when developing policies on behalf of the facility.

The second section discusses a framework for decision making. Discusses 7 steps:

- Determine who should be heard, present at the table, final decision maker
- Gather information including: who, what, when, where, why, and how
- Identify the specific issue and determine: values conflict & what creates that conflict
- Review core commitments
- Identify Alternatives
- Make a decision
- Evaluate impacts of decision made and if not appropriate determine other alternatives

AREA OF INTEREST: ALLOCATION OF SCARCE RESOURCES/TRIAGE

Bostick NA, Subbarao I, Burkle FM, Hsu EB, Armstrong JH, James JJ. Disaster triage systems for large-scale catastrophic events. 2008. *Disaster Medicine and Public Health Preparedness*. 2(Suppl 1):S35-S39.

Abstract
Large-scale catastrophic events typically result in a scarcity of essential medical resources and accordingly necessitate the implementation of triage management policies to minimize preventable morbidity and mortality. Accomplishing this goal requires a reconceptualization of triage as a population-based systemic process that integrates care at all points of interaction between patients and the health care system. This system identifies at minimum 4 orders of contact: first order, the community; second order, prehospital; third order, facility; and fourth order, regional level. Adopting this approach will ensure that disaster response activities will occur in a comprehensive fashion that minimizes the patient care burden at each subsequent order of intervention and reduces the overall need to ration care. The seamless integration of all orders of intervention within this systems-based model of disaster-specific triage, coordinated through health emergency operations centers, can ensure that disaster response measures are undertaken in a manner that is effective, just, and equitable.

Main points

- Allocation of essential resources within a comprehensive triage management framework is critical.
- Triage systems should include telephone hotlines to assess potential exposure risks, the need for care, the best place to seek care and to underscore the importance of social distancing measures.
- Alternative care sites are important for caring for people whose needs cannot be met at a given hospital or facility.
- Triage systems should seek to reduce barriers that would cause delay or denial of services (i.e. designation of pan flu hospitals).

- Regional health emergency operations centers (HEOC) are needed to evaluate resources needs and allocations strategies—they deal with the operational aspects of health emergencies.

Paranthaman K, Conlon CP, Parker C, McCarthy N. Resource allocation during an influenza pandemic. Emerging Infectious Diseases. 2008;14(3):520-521.

No abstract available.

Main points

- Resource allocation requires the following:
  - Making clear societal decisions on the goal for resources;
  - Doing research to establish evidence related to these goals;
  - Developing systems to learn from new information in a pandemic and being able to respond to an evolving situation.
- Communities must understand the ethical issues raised during a pandemic, discuss them and provide feedback on values that should be considered.

White DB, Katz MH, Luce JM, Lo B. Who should receive life support during a public health emergency? Using ethical principles to improve allocation decisions. ***Annals of Internal Medicine*****. 2009;150(2):132-139.**

Abstract
A public health emergency, such as an influenza pandemic, will lead to shortages of mechanical ventilators, critical care beds, and other potentially life-saving treatments. Difficult decisions about who will and will not receive these scarce resources will have to be made. Existing recommendations reflect a narrow utilitarian perspective, in which allocation decisions are based primarily on patients' chances of survival to hospital discharge. Certain patient groups, such as the elderly and those with functional impairment, are denied access to potentially life-saving treatments on the basis of additional allocation criteria. We analyze the ethical principles that could guide allocation and propose an allocation strategy that incorporates and balances multiple morally relevant considerations, including saving the most lives, maximizing the number of "life-years" saved, and prioritizing patients who have had the least chance to live through life's stages. We also argue that these principles are relevant to all patients and therefore should be applied to all patients, rather than selectively to the elderly, those with functional impairment, and those with certain chronic conditions. We discuss strategies to engage the public in setting the priorities that will guide allocation of scarce life-sustaining treatments during a public health emergency.

Main points

- Public health operates to promote the common good over protecting individual autonomy.
- There is no evidence to suggest that one mortality prediction model is better than another—SOFA is easiest to implement and requires the fewest tests.
- Principles of allocation:

  - Broad social value – person's overall worth to society
  - "Multiplier Effect" – vaccinating health care providers and other workers, first
  - Life years – years of life saved, instead of number of lives saved
  - Life-cycle principle – priority for younger individuals over older individuals
- During a public health crisis, there will be no time to create complex decision models or algorithms.
- Strategy should include a combination of the above principles – saving the most lives and life-years, and securing life stages of individuals.

Vawter DE, Gervais KG, Garrett E. Allocating pandemic influenza vaccines in Minnesota: Recommendations of the pandemic influenza ethics work group. *Vaccine*. 2007;25:6522-6536.

Abstract
A public-private, multidisciplinary work group developed recommendations for rationing vaccines in Minnesota during a worst-case influenza pandemic. The recommendations encompass an ethical framework of principles, goals, and strategies. The primary goal is to maximize Minnesotans' chances of surviving both the pandemic and the years immediately thereafter and to limit two major causes of death: (a) influenza and complications of influenza, and (b) disruption of basic health care, public health, and public safety infrastructures. The work group also developed a sample rationing plan, but stressed that any final plan must reflect the best available evidence during an actual pandemic.

Main points
- Minnesota Center for Health Care Ethics convened a workgroup of 35 people with expertise and experience in: health care ethics and public health ethics; public health; infectious disease; health system; health plan and academic administration; spiritual health and faith-health collaborations; health journalism; health care economics; health law; community service.
- Work group agreed to develop an ethical framework comprising principles, goals and strategies to guide allocation of vaccines.
- Proposals to the work group were informed by a literature review (public health disasters, previous pandemics, SARS outbreak, rationing, triage, and public health ethics) and other vaccine allocation plans.
- Used audience response technology to rank potential goals for vaccine allocation plan.
- Goals for allocation included:
  - Prevent geographic spread of flu through strategic use of vaccine
  - Minimize flu-related morbidity and mortality
  - Minimize social disruption
  - Minimize economic hardship
  - Maximize life-years saved
  - Minimize the number of persons contracting the flu

    - Give all an equal chance to be vaccinated
    - Use incentives to urge essential workers to report to work
- Several model frameworks were drafted focusing on medical need, minimizing mortality, social and economic stability, equal access, and a blend of multiple ethical commitments—ethical framework was built from these.
- Several assumptions regarding impact, vaccine effectiveness and data collection.
- No one size fits all ethical framework—they must be context specific.

Christian MD, Devereaux AV, Dichter JR, Geiling JA, Rubinson L. Definitive care for the critically ill during a disaster: current capabilities and limitations. *Chest.* 2008;133(5):8S-17S.

Abstract
In the twentieth century, rarely have mass casualty events yielded hundreds or thousands of critically ill patients requiring definitive critical care. However, future catastrophic natural disasters, epidemics or pandemics, nuclear device detonations, or large chemical exposures may change usual disaster epidemiology and require a large critical care response. This article reviews the existing state of emergency preparedness for mass critical illness and presents an analysis of limitations to support the suggestions of the Task Force on Mass Casualty Critical Care, which are presented in subsequent articles. Baseline shortages of specialized resources such as critical care staff, medical supplies, and treatment spaces are likely to limit the number of critically ill victims who can receive life-sustaining interventions. The deficiency in critical care surge capacity is exacerbated by lack of a sufficient framework to integrate critical care within the overall institutional response and coordination of critical care across local institutions and broader geographic areas.

Main points
- The three needs within response include: stuff, staff and space.

Major themes
- There is a lack of a critical care framework for mass casualty events to integrate with a coordinated response across jurisdictions and geographic areas.

Christian MD, Hawryluck L, Wax RS, Cook T, Lazar NM, Herridge MS, Muller MP, Gowans DR, Fortier W, Burkle FM. Development of a triage protocol for critical care during an influenza pandemic. CMAJ. 2006;175(110:1377-1381.

Abstract
BACKGROUND: The recent outbreaks of avian influenza (H5N1) have placed a renewed emphasis on preparing for an influenza pandemic in humans. Of particular concern in this planning is the allocation of resources, such as ventilators and antiviral medications, which will likely become scarce during a pandemic. METHODS: We applied a collaborative process using best evidence, expert panels, stakeholder consultations and ethical principles to develop a triage protocol for prioritizing access to critical care resources, including mechanical ventilation, during a pandemic. RESULTS:

The triage protocol uses the Sequential Organ Failure Assessment score and has 4 main components: inclusion criteria, exclusion criteria, minimum qualifications for survival and a prioritization tool. INTERPRETATION: This protocol is intended to provide guidance for making triage decisions during the initial days to weeks of an influenza pandemic if the critical care system becomes overwhelmed. Although we designed this protocol for use during an influenza pandemic, the triage protocol would apply to patients both with and without influenza, since all patients must share a single pool of critical care resources.

Main points

- Uses Sequential Organ Failure Assessment (SOFA) as a triage protocol based on its physiologic parameters, ease of calculation, requirement for simple laboratory tests and its validation for use in patients with a wide variety of conditions requiring critical care.
- Triage protocol should apply to all patients receiving critical care and not just influenza patients.
- Exclusion category: end-stage cancer, severe burns, severe trauma, reoccurring cardiac arrests, baseline SOFA score <11 who have more than a 90% risk of mortality.
- Blue/black = should not receive critical care
- Red = highest priority for ventilation and critical care
- Yellow = very sick and may or may not benefit from critical care; receive care if resources are available but not at the expense of dying individuals in red category
- Green = well enough to be cared for without mechanical ventilation or other ICU interventions

Kasten MJ, Poland GA. Influenza vaccination and the elderly. Drugs Aging. 2008;25(3):179-186.

Abstract
Seasonal influenza causes significant morbidity and mortality in the elderly, the very young and those with chronic illness, despite the availability of effective vaccines. The mortality and morbidity attributed annually to seasonal influenza are small in comparison to the potential mortality and morbidity of a novel highly pathogenic human influenza A virus strain. The current influenza A/H5N1 virus that has caused epidemics in poultry and is evolving to find new niches needs only to become more efficiently transmitted from human to human to cause the next pandemic. Vaccination is the intervention with the potential to save the most lives when a pandemic occurs. Pandemic awareness and preparedness are essential to decrease the predicted chaos, death and illness arising from the next influenza pandemic.

Main points

- 36,000 in U.S. and 500,000 worldwide die from influenza-related illness each year.
- People **≥65** years or older account for >90% of deaths from the flu and complications.

- Presumed that the clinical attach rate of pan flu will be ~30% with half seeking medical care.
- Persons >65 yrs, with chronic conditions, receiving long-term care are considered high-priority groups for flu vaccine.

Talmor D, Jones AE, Rubinson L, Howell MD, Shapiro NS. Simple triage scoring system predicting death and the need for critical care resources for use during epidemics. Critical Care in Medicine. 2007;35(5):1251-1256.

Abstract
OBJECTIVES: In the event of pandemic influenza, the number of critically ill victims will likely overwhelm critical care capacity. To date, no standardized method for allocating scarce resources when the number of patients in need far exceeds capacity exists. We sought to derive and validate such a triage scheme. DESIGN:: Retrospective analysis of prospectively collected data. SETTING: Emergency departments of two urban tertiary care hospitals. PATIENTS: Three separate cohorts of emergency department patients with suspected infection, comprising a total of 5,133 patients. INTERVENTIONS: None. MEASUREMENTS: A triage decision rule for use in an epidemic was developed using only those vital signs and patient characteristics that were readily available at initial presentation to the emergency department. The triage schema was derived from a cohort at center 1, validated on a second cohort from center 1, and then validated on a third cohort of patients from center 2. The primary outcome for the analysis was in-hospital mortality. Secondary outcomes were intensive care unit admission and use of mechanical ventilation. MAIN RESULTS: Multiple logistic regression demonstrated the following as independent predictors of death: a) age of >65 yrs, b) altered mental status, c) respiratory rate of >30 breaths/min, d) low oxygen saturation, and e) shock index of >1 (heart rate > blood pressure). This model had an area under the receiver operating characteristic curve of 0.80 in the derivation set and 0.74 and 0.76 in the validation sets. When converted to a simple rule assigning 1 point per covariate, the discrimination of the model remained essentially unchanged. The model was equally effective at predicting need for intensive care unit admission and mechanical ventilation. CONCLUSIONS: If, as expected, patient demand far exceeds the capability to provide critical care services in an epidemic, a fair and just system to allocate limited resources will be essential. The triage rule we have developed can serve as an initial guide for such a process.

Main points

- Healthcare systems should have a standardized method for allocating scarce resources. The workgroup in this paper recommended resources to be guided by patients' likelihood to benefit.
- Despite the wealth of pandemic preparedness guidance there is still a lack of sufficient guidelines to accurately and fairly prioritize patients in hope of maximizing patient survival.
- Triage models include: Hick and O'Laughlin (mechanical ventilators), Ontario Health Plan (SOFA).

- Primary outcome of analysis was in-hospital mortality and secondary outcomes were ICU admission at any point and the use of mechanical ventilation.
- Patients may be categorized based on chance of survival with hospitalization based on age >65, altered mental status, respiratory rate >30breaths/min, low oxygen saturation and shock index >1. These variables also predict consumption of hospital critical care resources (e.g., beds and vents).
- Excluded laboratory testing in tool development as such testing is resource intensive and will delay triage decisions.
- Triage protocols must be developed, validated and available before a crisis and input is needed from community members, emergency management officials, hospital officials, critical care experts, public health officials and ethicists.

AREA OF INTEREST: COORDINATED RESPONSE

Lurie N, Dausey DJ, Knighton T, Moore M, Zakowski S, Deyton L. Community planning for pandemic influenza: Lessons from the VA health care system. *Disaster Medicine and Public Health Preparedness*. 2008;2(4):251-257.

Abstract
BACKGROUND: Coordination and communication among community partners-including health departments, emergency management agencies, and hospitals-are essential for effective pandemic influenza planning and response. As the nation's largest integrated health care system, the US Department of Veterans Affairs (VA) could be a key component of community planning. PURPOSE: To identify issues relevant to VA-community pandemic influenza preparedness. METHODS: As part of a VA-community planning process, we developed and pilot-tested a series of tabletop exercises for use throughout the VA system. These included exercises for facilities, regions (Veterans Integrated Service Networks), and the VA Central Office. In each, VA and community participants, including representatives from local health care facilities and public health agencies, were presented with a 3-step scenario about an unfolding pandemic and were required to discuss issues and make decisions about how the situation would be handled. We report the lessons learned from these pilot tests. RESULTS: Existing communication and coordination for pandemic influenza between VA health care system representatives and local and regional emergency planners are limited. Areas identified that would benefit from better collaborative planning include response coordination, resource sharing, uneven resource distribution, surge capacity, standards of care, workforce policies, and communication with the public. CONCLUSIONS: The VA health system and communities throughout the United States have limited understanding of one another's plans and needs in the event of a pandemic. Proactive joint VA-community planning and coordination-including exercises, followed by deliberate actions to address the issues that arise-will likely improve pandemic influenza preparedness and will be mutually beneficial. Most of the issues identified are not unique to VA, but are applicable to all integrated care systems.

Main points

- Coordination between VA and public health, hospitals, nonhospitals and other emergency response agencies needs to be improved.
- VA and other organizations are not aware of each other's resources**.**
- Limited understanding, communication, and coordination between VA and other emergency planners**.**
- Conduct of exercises does not lead to better preparedness—it's implementing the "lessons learned" that do.

Eyck RT. Ability of regional hospitals to meet projected avian flu pandemic surge capacity requirements. *Prehospital and Disaster Medicine*. 2008;23(2):103-112.

Abstract
INTRODUCTION: Hospital surge capacity is a crucial part of community disaster preparedness planning, which focuses on the requirements for additional beds, equipment, personnel, and special capabilities. The scope and urgency of these requirements must be balanced with a practical approach addressing cost and space concerns. Renewed concerns for infectious disease threats, particularly from a potential avian flu pandemic perspective, have emphasized the need to be prepared for a prolonged surge that could last six to eight weeks. NULL HYPOTHESIS: The surge capacity that realistically would be generated by the cumulative Greater Dayton Area Hospital Association (GDAHA) plan is sufficient to meet the demands of an avian influenza pandemic as predicted by the [US] Centers for Disease Control and Prevention (CDC) models. METHODS: Using a standardized data form, surge response plans for each hospital in the GDAHA were assessed. The cumulative results were compared to the demand projected for an avian influenza pandemic using the CDC's FluAid and FluSurge models. RESULTS: The cumulative GDAHA capacity is sufficient to meet the projected demand for bed space, intensive care unit beds, ventilators, morgue space, and initial personal protective equipment (PPE) use. There is a shortage of negative pressure rooms, some basic equipment, and neuraminidase inhibitors. Many facilities lack a complete set of written surge policies, including screening plans to segregate contaminated patients and staff prior to entering the hospital. Few hospitals have agreements with nursing homes or home healthcare agencies to provide care for patients discharged in order to clear surge beds. If some of the assumptions in the CDC's models are changed to match the morbidity and mortality rates reported from the 1918 pandemic, the surge capacity of GDAHA facilities would not meet the projected demand. CONCLUSIONS: The GDAHA hospitals should test their regional distributors' ability to resupply PPE for multiple facilities simultaneously. Facilities should retrofit current air exchange systems to increase the number of potential negative pressure rooms and include such designs in all future construction. Neuraminidase inhibitor supplies should be increased to provide treatment for healthcare workers exposed in the course of their duties. Each hospital should have a complete set of policies to address the special considerations for a prolonged surge. Additional capacity is required to meet the predicted demands of a threat similar to the 1918 pandemic.

Main points

- Most important component of surge capacity is beds.
- Failure to address a given area within surge response can create a bottleneck in all other areas.
- "Real time" plans are needed to evaluate the medical response.
- Agreements should be made with home healthcare and skilled nursing facilities so that additional beds can become available.

Markel H., Stern AM, Cetron MS. Non-pharmaceutical interventions employed by major American cities during the 1918-19 influenza pandemic. *Transactions of the American Clinical and Climatological Association.* 2008;119:129-142.

Abstract
A critical question in pandemic influenza planning is the role that non-pharmaceutical interventions (NPI) such as isolation and quarantine, social distancing, and school closure, might play in delaying the temporal impact of a pandemic, reducing the overall and peak attack rate, and reducing the number of cumulative deaths. Such measures could potentially provide valuable time for pandemic-strain vaccine and antiviral medication production and distribution. Optimally, appropriate NPI implementation would decrease the burden on healthcare services and critical infrastructure. These public health measures, however, are often associated with enormous social and economic costs. Therefore, it is imperative to assess past applications of NPIs in order to better understand how they might (or might not) be employed during future pandemics in an effective, legal, ethical manner that inspires confidence and compliance in the public at large.

Main points

- Non-pharmaceutical interventions (NPIs) may have significance and policy implications for preparedness planning and policy development.
- Social context, authority structure and agency coordination, health profile and history, and community compliance may all effect the degree of morbidity and mortality within communities.

Edwards JC, Kang J, Silenas R. Promoting regional disaster preparedness among rural hospitals. *The Journal of Rural Health.* 2008;24(3):321-325.

Abstract
CONTEXT AND PURPOSE: Rural communities face substantial risks of natural disasters but rural hospitals face multiple obstacles to preparedness. The objective was to create and implement a simple and effective training and planning exercise to assist individual rural hospitals to improve disaster preparedness, as well as to enhance regional collaboration among these hospitals. METHODS: The exercise was offered to rural hospitals enrolled with the Rural and Community Health Institute of the Texas A&M University System Health Science Center, and 17 participated. A 3-hour tabletop exercise emphasizing regional issues in a pandemic avian influenza scenario followed by a 1-hour debriefing was implemented in 3 geographic clusters of hospitals. Trained emergency preparedness evaluators documented observations of the exercise on a standard form.

Participants were debriefed after the exercise and provided written feedback. RESULTS: Observations included having insufficient staff for incident command, facility constraints, the need to further develop regional cooperation, and operational and ethical challenges in a pandemic. CONCLUSIONS: The tabletop exercise gave evidence of being a simple and acceptable tool for rural medical planners. It lends itself well to improving medical preparedness, analysis of weak spots, development of regional teamwork, and rapid response.

Main points

- Series of tabletop exercises to assess rural preparedness in Texas.
- A greater mix of players during the exercises resulted in a greater understanding of roles and relations.
- One-size-fits-all approaches may not be suitable for rural hospitals.
- Regionalization of response is essential for limiting resources in rural areas in a public health emergency.

AREA OF INTEREST: IMPACT OF SARS ON ESSENTIAL SERVICES

Chapter 8: Clinical and public health systems issues arising from the outbreak of SARS in Toronto. Learnings from SARS: Renewal of public health in Canada. October 2003. Accessed at: http://www.phac-aspc.gc.ca/publicat/sars-sras/pdf/sars-e.pdf.

Main points

- Toronto public health system was not able to manage SARS and carry on its day-to-day business. The system was overwhelmed due to no surge capacity within hospitals and a plan for sharing resources.
- Nurses were restricted from working at multiple institutions as a means to control infection.
- By the end of March, hospitals were told to restrict access only to critically ill patients, with no elective surgeries (most surgery admissions are elective).
- Ambulatory visits and services were reduced or eliminated as a result of restricting access to critically ill patients.

Hwang SW, Cheung AM, Moineddin R, Bell CM. Population mortality during the outbreak of Severe Acute Respiratory Syndrome in Toronto. BMC Public health. 2007;7(93).

Abstract

BACKGROUND: Extraordinary infection control measures limited access to medical care in the Greater Toronto Area during the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak. The objective of this study was to determine if the period of these infection control measures was associated with changes in overall population mortality due to causes other than SARS. METHODS: Observational study of death registry data,

using Poisson regression and interrupted time-series analysis to examine all-cause mortality rates (excluding deaths due to SARS) before, during, and after the SARS outbreak. The population of Ontario was grouped into the Greater Toronto Area (N = 2.9 million) and the rest of Ontario (N = 9.3 million) based upon the level of restrictions on delivery of clinical services during the SARS outbreak. RESULTS: There was no significant change in mortality in the Greater Toronto Area before, during, and after the period of the SARS outbreak in 2003 compared to the corresponding time periods in 2002 and 2001. The rate ratio for all-cause mortality during the SARS outbreak was 0.99 [95% Confidence Interval (CI) 0.93-1.06] compared to 2002 and 0.96 [95% CI 0.90-1.03] compared to 2001. An interrupted time series analysis found no significant change in mortality rates in the Greater Toronto Area associated with the period of the SARS outbreak. CONCLUSION: Limitations on access to medical services during the 2003 SARS outbreak in Toronto had no observable impact on short-term population mortality. Effects on morbidity and long-term mortality were not assessed. Efforts to contain future infectious disease outbreaks due to influenza or other agents must consider effects on access to essential health care services.

Main points

- Actions to control SARS in Toronto included: closure of 4 hospitals, cancellation of all non-emergency surgeries, curtailment of patient transfers, postponement of most hospital-based outpatient clinics.
- Access to physicians, hospital labs, imaging studies and other technology-related services were limited by infection control.
- No significant change in mortality rates due to altered access compared with corresponding periods in previous years.
- Infection control DID result in dramatic decreases in non-emergency procedures and surgeries, diagnostic tests and overall physician visits.
- Patients with severe illness were still able to receive life-saving services during the SARS outbreak.
- Study focused only on short-term mortality and not morbidity.
- Coordinated response should include a balance between infection control mandates and the need to ensure access to essential health services.

Lee J, Holden L, Fung K, Danjoux C, Chow E, Gillies C. Impact of severe acute repiratory syndrome on patient access to palliative radiation therapy. Supportive Cancer Therapy. 2005;2(2):109-115.

Abstract

This study evaluated the impact of the severe acute respiratory syndrome (SARS) epidemic on access and utilization of palliative radiation therapy (RT) at a single institution using a retrospective chart review. A total of 649 patients seen between January and May 2002 and between January and May 2003 were evaluated. Treatment characteristics and waiting times were recorded. March 20 to May 30, 2003, was defined as the peak period of incidence and was compared with the same period in 2002. During the SARS epidemic, there was a 21% decrease in the number of patient consultations and a 15% reduction in the number of patients treated with RT. There was no significant

change in the tumor type or reason for referral. Short fractionation schedules were employed for 35% of treated patients compared with 34% in 2002. Patient waiting times between referral and treatment decreased during the period of interest, from 16 days to 8 days (P = 0.021). This study demonstrates a reduction in palliative RT services that is similar in magnitude to decreases observed in other essential cancer services during the SARS epidemic. Use of single-fraction RT and delayed follow-up visits may help to minimize hospital transfers and visits in the event of future infectious disease outbreaks.

Main points

- Many studies have demonstrated the negative impact of SARS on access to health care services such as ER visits, cardiac surgery, lumpectomy/mastectomy and chemotherapy.
- The number of patients evaluated for and receiving palliative radiation therapy decreased by 21% and 15%, respectively, in April and May of 2003 compared to the same time during 2002.
- Article argues for supportive cancer therapy to be maintained while other hospital restrictions are in place.

Midmer D. The impact of SARS on childbirth education. The Journal of Perinatal Education. 2003;12(3):1-6.

Abstract

The SARS (Severe Acute Respiratory Syndrome) crisis in Toronto in the spring of 2003 had major consequences for prenatal learners. Classes in hospitals were cancelled; many couples were left without any prenatal education. This paper outlines the decision-making process of one programme that was determined to keep classes open. The impact of SARS on hospital procedures is also described. Childbirth educators are encouraged to prepare for future public health emergencies. Strategies to prepare for conducting childbirth education classes during times of crisis are outlined.

Main points

- Measures were implemented during SARS to curtail access to hospitals in order to stop a widespread outbreak.
- Elective surgery was postponed, clinics closed and access to providers was limited and screening measures were implemented on the front lines.
- Patients, including expectant couples, were left with few medical resources.

Zimrin A, Hess J. Planning for pandemic influenza: effect of a pandemic on the supply and demand for blood products in the United States. Transfusion. 2007; 47(1071-1079).

Abstract

BACKGROUND: Influenza causes episodic pandemics when viral antigens shift in ways that elude herd immunity.Avian influenza A H5N1, currently epizootic in bird populations in Asia and Europe, appears to have pandemic potential.

STUDY DESIGN AND METHODS: The virology of influenza, the history of the 1918 pandemic, and the structure of the health care and the blood transfusion systems are briefly reviewed. Morbidity and mortality experience from the 1918 pandemic are projected onto the current health care structure to predict points of failure that are likely in a modern pandemic.
RESULTS: Blood donor centers are likely to experience loss of donors, workers, and reliable transport of specimens to national testing laboratories and degradation of response times from national testing labs. Transfusion services are likely to experience critical losses of workers and of reagent red cells (RBCs) that will make their automated procedures unworkable. Loss of medical directors, supervisors, and lead technicians may make alternative procedures unworkable as well.
CONCLUSIONS: Lower blood collection capacity and transfusion service support capability will reduce the availability of RBCs and especially of platelets. Plans for rationing medical care need to take the vulnerability of the blood transfusion system into account.

Main Points:

- Divides blood supply system into two distinct components: blood donation/collection centers and transfusion services
- Describes impact to blood supply system at various points in a pandemic influenza event
- Describes role of hospital medical directors in determining triage for limited blood supply
- Discusses suggestions for relaxing of blood collection standards of care in a crisis, such as after September 11 attacks.
- Suggests the cross training of blood transfusion services staff to help counter balance the effects of decreased staff presence on blood supply chain.
- Blood supply system is very dependent on rapid exchange of goods and services and in the failure of a supply chain, back-up methods for cross typing, testing, etc.
- Describes ways that in Serbian conflict, Beruit in the 1970's, and Somalia how blood donations continued while not being able to have donation drives
- Presents scenarios for designing triage schemes to control access and usage of a limited blood supply (trauma needs, thalasemmia major, sickle cell anemia, cancer, organ transplants)

Weinstein RA. Planning for epidemics—the lessons of SARS. New England Journal of Medicine. 2004;350(23):2332-2334.

Main points

- Obvious lessons include: animal pathogens can pose great risks to human health; globalization enhances the problem; molecular virology is a much needed field; epidemiological histories are needed to trace transmission; organizations should work together to enhance surge capacity; one person can have a big impact.
- Randomized, controlled trials are not possible, and therefore, critical evaluations of approaches are essential in preparing communities.

- Key lessons include recognizing that all public health is local, there is a clear need for increasing surge capacity, accurate and consistent messaging with the public and using objective measure for risk assessment.
- Healthcare must meet, plan and hold local drills, now.

AREA OF INTEREST: EFFECTIVE COMMUNICATION/RISK COMMUNICATION

Reynolds B, Quinn SC. Effective communication during an influenza pandemic: the value of using a crisis and emergency risk communication framework. Health Promotion Practice. 2008; 9(13S).

Abstract
During a crisis, an open and empathetic style of communication that engenders the public's trust is the most effective when officials are attempting to galvanize the population to take a positive action or refrain from a harmful act. Although trust is imperative in a crisis, public suspicions of scientific experts and government are increasing for a variety of reasons, including access to more sources of conflicting information, a reduction in the use of scientific reasoning in decision making, and political infighting. Trust and credibility--which are demonstrated through empathy and caring, competence and expertise, honesty and openness, and dedication and commitment--are essential elements of persuasive communication.

Main Points

- During the pandemic period, well-coordinated health communications to support health interventions and nonpharmaceutical interventions (NPI's) will be required to limit morbidity and mortality
- Employing the tenets of the Crisis and Emergency Risk Communication (CERC) is a vital component of our response to a pandemic
- 7 Key risk communication concepts were listed.
- Anticipation of the specific phases of the pandemic can allow health educators to create messages that are matched to the unique informational requirements of the media, stakeholders, and the general public

Taylor L, Miro S, Bookbinder S, Slater, T. Innovative infrastructure in New Jersey: Using health education professionals to inform and educate during a crisis. Health Promotion Practice. 2008; 9(4); 88S-95S.
Abstract

Federal funding supports the growth and development of public health infrastructure and preparedness. The New Jersey Department of Health and Senior Services used federal funds to increase local public health infrastructure that included the hiring of health educators or risk communicators (HERCs). The HERCs are a diverse group of health and communications professionals trained in emergency communication. They provide crisis

information regarding pubic health threats. Over the years, the role and duties of HERCs have expanded from bioterrorism to all-hazards approach and emerging infections public health preparedness, including pandemic influenza. This article describes how HERCs are used in the New Jersey public health infrastructure.

Main Points:

- Focus is on a protocol of *One Message, One Voice*.
- Discussed use of HERC's to support pandemic preparedness via health education about flu myths and facts pre-event and to act as a risk communicator in an event
- Discusses community apathy in preparing risk communication and prevention campaigns. HERC's are appropriate messengers to relay prevention and personal preparedness communications and include influenza preparedness messages on to existing prevention and public health programs.

Duley, MGK. The next pandemic: Anticipating an overwhelmed health care system. Yale Journal of Biology and Medicine. 2005; 78(351-358).

Abstract (partial)

In September 2005, an overview of current health care system planning efforts was presented to the audience at the Yale University Ethics Symposium on Avian and Pandemic Influenza. The speaker, also the author of this article, provided the audience with a summary of what was being undertaken with the use of federal preparedness funds to improve the overall infrastructure of the health care system. Descriptive information was obtained through the author's observations and personal experiences, in addition to governmental guidance, reports, and plans. The "all-hazards" planning currently being undertaken by the key health care system partners in Connecticut as a result of federal funding for preparedness post 9/11 has fostered great working relationships between these entities and their local, regional, and statewide planning counterparts. Many of the specific grant dollars being provided to these facilities can assist in the planning that must be done for pandemic flu.

Main Points (communications):

- There are four main messages that the need to be communicated over and over:
  - Approaches to prevent being infected
  - When is it actually necessary to come to a facility for influenza-related care
  - Appropriate sites for outpatient triage and care
  - Options for self-care.
- Another important message is to get out to the public that they are still there to provide the cardiac and cancer patients the care they need.
- In order to avoid massive panic, it is necessary to promote public acceptance wherever and whenever possible, and well in advance of the crisis

Vingilis E, Brown U, Koeppen R, Hennen B, et al. Evaluation of a cold/flu self-care public education campaign. Health Education Research: Theory & Practice. 1998; 13(1); 33-46.

Abstract
The purpose of the study was to evaluate an Ontario Ministry of Health (MOH) cold/flu self-care public education campaign to reduce unnecessary patient visits to doctors. The MOH campaign consisted of an information booklet delivered to every household in an Ontario city, newspaper ads and radio spots. The program ran during January–March 1994. The evaluation consisted of: (1) 232 telephone survey in London (experimental area) and Windsor (comparison area), before and during the campaign; and (2) a telephone survey of London family practitioners during the campaign. In addition, data on the incidence of cold/flu visitsto three hospital emergency departments and a sample of family physicians' offices were gathered. The data suggest that program rationale may have been questionable because the majority of the surveyed public were knowledgeable and self-reported appropriate doctor visits for cold/flu. Campaign evaluation showed limited impact. Message penetration was low; only one-third of London residents knew of the campaign or read the booklet. Only two of 10 questions showed increases in knowledge in London and no changes were found for beliefs, attitudes, acquisition of new health practices or self-reported visits to the doctor. The physician survey, emergency room and family physician office visit data were consistent with the public survey findings.

Main Points:

- Discusses utilization of health care for colds/flu for appropriateness of self-referral and what segments of the population (and their underlying associated chronic conditions) are more likely to be "worried well"
- Re-iterates that mass public education campaigns may need to be more selective and work more with health educators and physicians to ensure that the materials are paired with person to person interaction for the most compliance.
- Worried well will continue to still clog up our health care system. In this study, it was cited that 17% of the population is worried well, and that they represent 43% of inappropriate medical visits. More complex programs will be needed to adjust their behaviors/perception of risk to illness, knowledge is not enough.

Paton D, Parkes B, Daly M, Smith L. Fighting the flu: Developing Sustained Community Resilience and Preparedness. Health Promotion Practice. 2008; 9(4); 45S-53S.

Abstract
A pandemic will impose considerable demands on communities over a period of several weeks; thus, people must develop means to facilitate their resilience in such an event. This article describes the development and testing of a model to inform public education strategies to facilitate the sustained adoption of the preparedness and protective measures that underpin community resilience. The model is derived from the premise that decisions to act reflect how people interpret information to make it meaningful to them. The model describes how this outcome reflects the interaction among personal beliefs about preparing, community characteristics influencing how risk beliefs and

risk management strategies are developed, and the relationship between the community and health information sources. It highlights a need to distinguish those who decide not to prepare from those who accept a need to prepare but need guidance. Implications for developing pandemic public education and risk communication programs are discussed.

Main Points:

- Resilience will be a function of the level of people's pandemic knowledge, the resources available to facilitate self-reliance, the development of neighbor and community relationships to provide social support and the development of the plans require to use the knowledge and resources to adapt to the consequences of a pandemic
- Discusses the belief that levels of risk acceptance and people's willingness to take responsibility for their own safety is increased and decisions to prepare more likely, if people believe that relationship with formal agencies is fair and empowering. If this relationship is not perceived as fair the consequence is a loss of trust in the agency, which is the source of information for the public.
- Discusses the need of a positive pre-existing relationship for the most successful pandemic messaging

AREA OF INTEREST: NON-PHARMACOLOGICAL INTERVENTIONS

Markel H., Stern AM, Cetron MS. Non-pharmaceutical interventions employed by major American cities during the 1918-19 influenza pandemic. *Transactions of the American Clinical and Climatological Association.* 2008;119:129-142.

Abstract
A critical question in pandemic influenza planning is the role that non-pharmaceutical interventions (NPI) such as isolation and quarantine, social distancing, and school closure, might play in delaying the temporal impact of a pandemic, reducing the overall and peak attack rate, and reducing the number of cumulative deaths. Such measures could potentially provide valuable time for pandemic-strain vaccine and antiviral medication production and distribution. Optimally, appropriate NPI implementation would decrease the burden on healthcare services and critical infrastructure. These public health measures, however, are often associated with enormous social and economic costs. Therefore, it is imperative to assess past applications of NPIs in order to better understand how they might (or might not) be employed during future pandemics in an effective, legal, ethical manner that inspires confidence and compliance in the public at large.

Main points

- Non-pharmaceutical interventions (NPIs) may have significance and policy implications for preparedness planning and policy development.

- Social context, authority structure and agency coordination, health profile and history, and community compliance may all effect the degree of morbidity and mortality within communities.

AREA OF INTEREST: GENERAL PANDEMIC PREPAREDNESS

Cutter, J. Preparing for an influenza pandemic in Singapore. *Annals Academy of Medicine*. 2008;37(6):497-503.

Abstract
The national strategy against pandemic influenza essentially consists of 3 prongs: (i) effective surveillance, (ii) mitigation of the pandemic's impact, and (iii) render the population immune through vaccination. When the pandemic hits Singapore, the response plan aims to achieve the following 3 outcomes: (i) maintenance of essential services to limit social and economic disruption, (ii) reduction of morbidity and mortality through antiviral treatment, and (iii) slow and limit the spread of influenza to reduce the surge on healthcare services. The biggest challenge will come from managing the surge of demand on healthcare services. A high level of preparedness will help healthcare services better cope with the surge.

Main points

- Healthcare facilities will likely be overwhelmed.
- It was planned to provide outpatient care at all private clinics (versus at designated “flu clinics”) for 2 reasons:
    - patients would have to travel to flu clinics to get flu treatment and could spread the flu along the way
    - patients seeking treatment for non-flu care might still be infected and could spread the flu at non-flu clinics
- Hospitals will postpone elective procedures and discharge as many patients as they can in order to increase the number of beds.
- There will be a shortage of ICU beds and trained personnel.
- Border control (temperature and health screening) will help delay the spread of pan flu to Singapore, although it is unclear how effective this will be as pre-symptomatic persons will still pass through.
- Social distancing measures will be enforced through closures of most public places and public events.
- Infrastructure (healthcare, energy, water, waste, law) workers will be given Tamiflu for 6 weeks and staff absenteeism similar to holiday absenteeism was considered.
- Weak links include private hospitals, community hospitals and nursing homes and command and control issues may arise.
- Exercises are necessary to fine-tune plans.

Rebmann T. Preparing for pandemic influenza. *Journal of Perinatal and Neonatal Nursing.* 2008;22(3):191-202.

Abstract
Influenza is a highly contagious, acute febrile respiratory illness that results in global morbidity and mortality annually. Avian influenza (H5N1) has the potential to cause a pandemic. Avian influenza's epidemiology and clinical description, including common signs/symptoms, transmission, vaccination, and treatment, are presented. Recommended isolation practices for labor and delivery, and proper procedures for identifying and managing infected patients are provided. Potential maternal and newborn outcomes related to influenza and avian influenza are discussed. Pandemic planning issues are outlined, including hospital surge capacity, medical equipment and staffing availability, and the need for altered standards of care. Communities need to designate sites (whether in hospital or in alternative care centers) for labor and delivery services as part of their disaster plan. Pregnant women and newborns are vulnerable groups during routine times and are expected to be disproportionately affected during a pandemic in terms of morbidity and mortality. Therefore, it is essential that hospitals and communities take steps to protect these vulnerable groups as part of the disaster planning process. It is not known whether or when a pandemic will occur, but perinatal and neonatal nurses should become familiar with avian influenza's clinical description and proper infection control procedures to halt potential disease spread.

Main points

- Seasonal influenza results in 25-50 million cases of flu, 226,000 hospitalizations and 36,000 deaths per year.
- It is projected that mortality would be approximately 30% resulting in 89,000 to 270,000 deaths and up to $166,000,000,000 in related costs.
- Mortality of pregnant women during the 1918 pandemic was 30-50%.
- Only about half of all hospitals have a plan to obtain extra workers during an emergency—this should be a top priority for hospitals.
- Planning requires a coordinated approach between local, regional and federal agencies.

AREA OF INTEREST: MORBIDITY/ MORTALITY PROJECTIONS

Murray CL, Lopez AD, Chin B, Feehan D, Hill KH. Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918-20 pandemic: a quantitative analysis. The Lancet. 2006;368(December 23/30):2211-2218.

Abstract
BACKGROUND: The threat of an avian influenza pandemic is causing widespread public concern and health policy response, especially in high-income countries. Our aim was to use high-quality vital registration data gathered during the 1918-20 pandemic to

estimate global mortality should such a pandemic occur today. METHODS: We identified all countries with high-quality vital registration data for the 1918-20 pandemic and used these data to calculate excess mortality. We developed ordinary least squares regression models that related excess mortality to per-head income and absolute latitude and used these models to estimate mortality had there been an influenza pandemic in 2004. FINDINGS: Excess mortality data show that, even in 1918-20, population mortality varied over 30-fold across countries. Per-head income explained a large fraction of this variation in mortality. Extrapolation of 1918-20 mortality rates to the worldwide population of 2004 indicates that an estimated 62 million people (10th-90th percentile range 51 million-81 million) would be killed by a similar influenza pandemic; 96% (95% CI 95-98) of these deaths would occur in the developing world. If this mortality were concentrated in a single year, it would increase global mortality by 114%. INTERPRETATION: This analysis of the empirical record of the 1918-20 pandemic provides a plausible upper bound on pandemic mortality. Most deaths will occur in poor countries--ie, in societies whose scarce health resources are already stretched by existing health priorities.

Main points

- Various pan flu projection models have been developed that make strong assumptions about attack rate and fatality rates.
- Analysis included all vital registration data from 1915-1923 from populations where data is 80% or more complete
    - Data taken from Berkeley Human Mortality DatabaseB R Mitchell's International Historical Statistics Series
- Estimated that a strain similar to the 1918-20 pandemic would kill 51-81 million individuals, worldwide.
- Deaths may be concentrated in 0-14, 15-19 and 30-44 age-groups.
- Factors including immune function, nutritional status, acquired immunity, comorbid conditions, population density and mixing rates, access to health care, quality of care and the physical environment could all play a role in case-fatality rate.

Doshi P. Trends in recorded influenza mortality: United States, 1900-2004. American Journal of Public Health. 2008;98(5):939-945.

Abstract

OBJECTIVES: I sought to describe trends in historical influenza mortality data in the United States since 1900 and compare pandemic with nonpandemic influenza seasons. METHODS: I compiled a database of monthly influenza-classed death rates from official US mortality tables for the years 1900 to 2004 (1905-1909 excluded), from which I calculated adjusted influenza season (July 1-June 30) mortality rates. RESULTS: An overall and substantial decline in influenza-classed mortality was observed during the 20th century, from an average seasonal rate of 10.2 deaths per 100 000 population in the 1940s to 0.56 per 100 000 by the 1990s. The 1918-1919 pandemic stands out as an exceptional outlier. The 1957-1958 and 1968-1969 influenza pandemic seasons, by contrast, displayed substantial overlap in both degree of mortality and timing compared with nonpandemic seasons. CONCLUSIONS: The considerable similarity in mortality

seen in pandemic and non-pandemic influenza seasons challenges common beliefs about the severity of pandemic influenza. The historical decline in influenza-classed mortality rates suggests that public health and ecological factors may play a role in influenza mortality risk. Nevertheless, the actual number of influenza-attributable deaths remains in doubt.

Main points

- Monthly influenza and all-cause mortality data was obtained for 1900-1904 and 1910-2004.
- Flu death rates substantially declined over the 20th century and each pandemic season was less lethal than the last one.
- Non-pandemic years and pandemic years were hard to distinguish from one another.
- Decline in mortality from influenza over the 20th century is not due to vaccines, but due to social changes such as living conditions and naturally acquired immunity, public health measures, health status and access to care.
- Limitations include the lack of looking at age-specific mortality rates.
- The next pandemic influenza period may be far from a catastrophic event.

AREA OF INTEREST: HEALTHCARE FINANCE

Achonu C, Laporte A, Gardam M. The financial impact of controlling a respiratory virus outbreak in a teaching hospital. Canadian Journal of Public Health. (2005); 96(1); 52-24.

Abstract
Background: Outbreaks of Severe Acute Respiratory Syndrome (SARS) in 2003 and renewed concerns regarding pandemic influenza have resulted in widespread planning for future respiratory disease outbreaks. Such planning should include accurate cost estimates for any proposed disease control strategies. From the acute care hospital perspective, such estimates typically take into account the cost of supplies and equipment, but rarely consider indirect costs such as lost revenue due to the scaling down of programs.
Methods: Retrospective cost analysis. Costs and savings were calculated from the hospital perspective using financial records. Costs were categorized to determine the major areas of expenditure and savings.
Results: We report that controlling a SARS outbreak in a teaching hospital over an 8-week period cost $12 million Canadian. Lost revenue and labour accounted for two thirds of the costs incurred while excess spending on services, materials, supplies and renovation of existing space accounted for the remaining one third.
Conclusions: Cost estimates that consider only excess expenditures may considerably underestimate the true cost of infection control strategies.

Main Points:

- Retrospective financial analysis of lost revenue to hospitals (i.e patient care related, non-pt care related, labor, excess material/services) and savings
- Discussed staffing models and their financial impact
- By limiting access to the hospital, closing retail establishments in the hospital revenue generation was extremely limited
- Increased the number of negative pressure rooms (increased cost)
- Discussed the outcomes that airborne control measures may have played a less-important role in containing this outbreak

Matheny, J, Toner E, Waldhorn R. Financial Effects of an influenza pandemic on US hospitals. Journal of Health Care Finance. (2007); 34(1); 58-63.

Abstract
We estimate the financial effects of an influenza pandemic on US hospitals, including the cost of deferring elective admissions and the cost of uncompensated care for uninsured patients. Using US pandemic planning assumptions and national data on health care costs and revenues, a 1918-like pandemic would cause US hospitals to absorb a net loss of $3.9 billion, or an average $784,592 per hospital. Policymakers should consider contingencies to ensure that hospitals do not become insolvent as a result of a severe pandemic.

Main Points:

- Reflects on the lost revenues of the 2001 World Trade Center's attack ($200 million), when public agencies directed area hospitals to cancel elective services, and not reimbursed by the government
- In 2003 SARS Outbreaks in Toronto hospitals anticipated a surge of SARS admissions and were directed to defer elective cases. In the first 8 weeks of the restrictions, the rates of most urgent surgical admissions went unchanged; elective noncardiac surgery rates decreased 22% and elective cardiac surgery rates decreased 66%. Limiting entry in these weeks cost Toronto's University Health Network an estimated 4.7 million in lost revenue, almost twice the direct cost of excess supplies and services provided.
- Discusses uncompensated care patients and their impact on the finance system.
- Suggests that hospitals should include their financial personnel in pandemic planning.
- Most hospital's financial loss is not reimbursable.

AREA OF INTEREST: ALTERNATIVE CARE SITES/MEDICAL CARE POINTS

Waldhorn R. Commentary: What role can alternative care facilities play in an influenza pandemic? Biosecurity and Bioterrorism. (2008); 6(4); 357-3588.

No Abstract Available

Main Points:

- Commentary on a journal articles previously published.
- Highlighted issues in making an Alternative care point workable/feasible
- Discusses a proposed scope of care, logistics, and requirements for a 200-250 person alternative care site in Michigan
- Identifies 7 types of alternative care points in the literature
    - Overflow hospitals providing a full range of care
    - Patient isolation and an alternative to home care for infectious patients
    - Expanded ambulatory care
    - Provision of care to recovering non-infectious patients
    - For limited supportive care for non-critical patients
    - Primary triage and rapid patient screening centers
    - Quarantine
- Suggests that hospitals remain the focal point for all critically ill patients
- Alternative Care Facilities would be most useful as primary triage and screening sites for initial assessment and/or as sites for providing limited supportive care for suspected influenza patients
- Medical care for large numbers of sick patients, including oxygen delivery with or without mechanical ventilation, would be more feasible to deliver in hospitals than in Alternative Care Centers.
- Recommended that hospitals would need to make major adjustments in operations, including changing staffing patterns, using converted clinics, flat spaces, and diagnostic suites within the hospital structure; and more aggressively increasing surge capacity to 150% to 200% of normal capacity, rather than switching to use of an alternate care facility.

Lam C, Waldhorn R, Toner E, Inglesby T, O'Toole T. The prospect of using alternative medical care facilities in an influenza pandemic. Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science. 4(4); 384-390.

Abstract
Alternative care facilities (ACFs) have been widely proposed in state, local, and national pandemic preparedness plans as a way to address the expected shortage of available medical facilities during an influenza pandemic. These plans describe many types of ACFs, but their function and roles are unclear and need to be carefully considered because of the limited resources available and the reduced treatment options likely to be provided in a pandemic. Federal and state pandemic plans and the medical literature were reviewed, and models for ACFs being considered were defined and categorized. Applicability of these models to an influenza pandemic was analyzed, and recommendations are offered for future ACF use. ACFs may be best suited to function as primary triage sites, providing limited supportive care, offering alternative isolation locations to influenza patients, and serving as recovery clinics to assist in expediting the discharge of patients from hospitals.

Main Points

- Describes "hospital surge capacity" as the ability of a hospital in a mass casualty incident to augment bed availability by maximizing resources and discharging as many patients as possible
- Describes "community surge capacity" as the local or regional-level activities undertaken to bolster the response of a community's healthcare facilities to mass casualties.
- Suggests that ACFs could serve as a component in augmenting the surge capacity of hospitals or communities.
- Makes suggestions on how to operationally execute the 7 different options described in the literature for ACFs.
    - *Overflow hospitals providing a full range of care*
        - These ACFs would be intended to bolster community surge capacity by replicating a full range of hospital services. They could be fully functional, mobile hospital units or formerly shuttered hospitals that would be rapidly opened during health emergencies.
    - *Patient isolation and an alternative to home care for infectious patients*
        - Commonly envisioned as a motel-like environment for influenza patients who require minimal, if any, medical care. These facilities would be intended to support patients who would otherwise return home but could not do so (unable to care for self, share a residence with an immunocompromised individual). Food, laundry, and other living necessities would be provided to patients.
    - *Expanded ambulatory care*
        - Based on the concept that "a system of effective outpatient management may reduce the demand for inpatient care"
        - Opening outpatient ACFs in this model would be intended to facilitate the rapid distribution of necessary medications and vaccines, assist in caring for the "walking wounded" and better manage a community's non acute patients who are seeking care.
        - In New Jersey and Ohio ACFs for influenza patients geared to receive hydration, IV antibiotics, and monitoring at "short stay" outpatient sites.
    - *Provision of care to recovering non-infectious patients*
        - Hospitals could establish policies that expedite the discharge of patients not infected with influenza to an alternative care site that are created specifically to serve as a "step-down" unit for the care of stable/recovering patients who aren't ready for home discharge
        - Based on the premise that hospital bed capacity could rapidly be increased by discharging patients who are near accepted discharge standards.
    - *For limited supportive care for non-critical patients*
        - *Non hospital site to provide non critical supportive care during a mass casualty event.*
        - *Patients have initial triage and screen at a hospital emergency dept.*

- *Those with critical medical conditions such as heart attack, trauma, severe exacerbations of chronic medical conditions would be treated in hospitals.*
- *Patients with lesser or specific injuries would be immediately transferred from triage to an acute care center.*

▪ *4 restricted areas of care: Antibiotics, Hydration, bronchodilators, and pain management*

- *Primary triage and rapid patient screening centers*
  - *Primary triage site that would provide rapid medical screening of possible influenza patients.*
  - *Ideally located near, but physically separate from hospital ED's to minimize exposure of hospital patients to influenza.*
  - *All patients with "influenza like illness" would be sent to "fever clinics" where they would go through an initial assessment*
  - *Critically ill patients would be transferred to hospitals for care*
  - *Other flu patients would be sent home, provided supportive care, or transferred to another health care facility, depending on the community's established response protocol.*

- *Quarantine*
  - *Might use hotels to separate populations, but seen as ineffective for pandemic purposes*

- To be most effective a community care plan with multiple models of ACF's that are integrated into the care system is suggested.

Chapter 3: Framework and guiding principles when planning for health and medical care in a mass casualty event. Agency for Healthcare Research and Quality. Available at: http://www.ahrq.gov/research/altstand/altstand3.htm. Accessed on: March 12, 2009.

Main points

- Medical care response to mass casualty event should be:
  - capable of integrating with day-to-day operations
  - applicable to a broad spectrum of event types
  - flexible
  - tested to identify gaps in the framework
- Five principles should guide the development of plans during an MCE:
  - Aim should be to keep the healthcare system functioning at a level to preserve as many lives as possible
  - Health/medical response should be comprehensive, community-based and coordinated
  - Adequate legal framework for providing health/medical care in MCE
  - Protect the rights of individuals to the extent possible and reasonable
  - Clear communication with the public at all stages of a MCE

Seeking observers to provide feedback during exercises that will test a decision making process that could be used during a pandemic influenza event

Observers Requested

Observers from a variety of backgrounds are needed to provide feedback on a new decision making process that may be used during a pandemic influenza event. To participate, observers do not need to have expereince with pandemic influenza (flu) nor healthcare systems, but must be available to commit to at least five hours during October, 2009. It is preferred that observers attend both exercises. This would increase the time commitment to 8 to10 hours.

If you are interested, please contact Beth McGinnis, the Project Coordinator at 503-988-3663 extension 24322 or beth.mcginnis@co.multnomah.or.us by September 21, 2009 to register. Space is limited and in order to include the widest array of commuinty members, we may not be able to invite every volunteer to participate.

Project Background

The Multnomah County Health Department received a grant from the Centers for Disease Control and Prevention to test a decision making process for an influenza event that has been used successfully for years during fire and natural disasters. The decision making process is conducted by a Multi Agency Coordination (MAC) group. The MAC group is a part of a much larger response system to a disaster but is specifically responsible for making recommendations on resource allocation during an event.

The use of a MAC group for decision making has not been used for medical events and Multnomah County is one of the first sites in the Nation to test its effectiveness in this type of situation. The MAC group that will be used in the pandemic influenza tests will be comprised of representatives from hospital systems, public health, and other expertise as needed. In a severe influenza epidemic and the increased demand for health care services, is it likely that there will be shortages of medical resources, including staff (due to illness).

Examples of the types of decisions the MAC group will make include: 1) how to allocate health care resources in order to ensure that patients who develop serious cases of the flu along with patients with other serious health conditions receive the necessary medical care; 2) what types of medical procedures could be delayed for weeks or months without resulting in significant health problems; and 3) what ethical considerations need to be made in order to ensure that everyone in the community has been treated fairly and that after the influenza event the community will trust health care systems, government and other decision makers.

Observer Role

Observers will be asked to provide feedback on how well the MAC group used its formal decision making process and whether the appropriate ethical considerations were made. Additionally, observers will be asked to identify any unintended consequences of the decisions made. The feedback provided by observers will be used to inform the subsequent exercise in order to improve the MAC group's process.

Observers will be asked to participate in a two hour training session during which they will learn about MAC groups and how to use the feedback survey they will complete during the exercises. Additionally, observers may be invited to participate in a debriefing as part of the exercises. There will also be opportunities to participate in follow-up interviews and focus groups in November for those observers interested. These additional activities are optional and not included in the time commitment of 8-10 hours as stated above.

Observer Time Commitment

Observer Training:	October 1, 2009 9:00 am-11:00 am **OR** 1:00 pm-3:00 pm
First Exercise with Observers:	October 7, 2009 8:15 am-11:30 am
Second Exercise with Observers:	October 29th, 2009 8:15 am-11:30 am
Interviews & Focused Group Discussions:	November, optional and dates to be determined.

Health Medical Multi-Agency Coordination (MAC) Group Observer Survey

October 29, 2009

Please indicate which best describes you, or the group you are representing today:

- ☐ Behavioral Health
- ☐ Emergency Management
- ☐ Public Information Officer
- ☐ Hospital
- ☐ Community Leader
- ☐ Local Public Health
- ☐ State Public Health
- ☐ Multnomah County Health Department's Community Connectors
- ☐ Multnomah County Health Department's Diversity and Quality Team
- ☐ Patient Advocate/Hospital Ethics
- ☐ Political Representative
- ☐ Skilled Nursing Facility
- ☐ Education
- ☐ Medical Reserve Corps
- ☐ EMS Medical Directors/ Administrators
- ☐ Clinical Community Private/Safety Net
- ☐ Labor Union
- ☐ Project/Grant Contractor
- ☐ CDC Grant Staff
- ☐ Other_____

Purpose for Observation

As observers, we would like to learn whether you were able to understand how a regional Multi Agency Coordination (MAC) Group makes decisions during a health/medical event such as a pandemic influenza event.

Because this is a new model, we want your assessment on how the group carried out specific parts of its work. You will be able to listen to MAC Group members evaluate themselves as well. Your assessment and their self evaluation will help the MAC Group members improve their skills for the next exercises and for any possible health/medical event.

The MAC Group's decisions in this exercise are to be made with the intent to minimize death and disability due to influenza and other significant health conditions given available resources—and at the same time maintain an intact community. One that is able to return to normal life physically, socially, economically, emotionally, and spiritually after the event.

After the exercise, you will be asked to share your opinions about the decisions made and any unintended consequences that could occur as a result. You will also be asked about the decisions' affect on the community's ability to recover after the event.

Understanding a MAC Group's Role

The MAC Group is comprised of Agency Representatives who have delegated authority to speak and commit resources for their organizations. Examples of who participates on MAC Group include: Health Department Administrators /Health Officers or designees, Hospital Administrators or designees, and Community Clinical Representatives (physician, clinic manager).

Members of the MAC Group are committed to work as a group to make decisions that will benefit the entire community, rather than prioritize their own organizations.

The role of the regional MAC Group is to develop and recommend interagency policy and prioritize the allocation of critical resources for hospitals, public health and other care facilities within the region.

1. **Please circle all of the responsibilities you saw demonstrated during the second "issue."**

   - Prioritization of care facilities
   - Allocation of critical resources
   - Development of interagency policy recommendations
   - None of these
   - Not applicable
   - I don't know

Comments

_____

_____

_____

_____

Understanding How a MAC Group Makes Decisions

When performing its responsibilities, the MAC Group uses specific criteria, unless otherwise agreed upon by the group. Some of these criteria include: the potential for loss of life, potential to cause injury or suffering, and potential to hinder public health efforts to contain the spread of disease.

2. After observing the process for the second "issue," how strongly do you agree with the following statements?

The MAC Group considered the potential for loss of life of responders.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

The MAC Group considered the potential for loss of life of the public.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

The MAC Group considered the potential to cause injury to human life or cause suffering.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

The MAC Group considered the potential to hinder public health efforts to contain the disease.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

The MAC Group considered the potential to harm community infrastructure (economic viability).

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

The MAC Group considered the potential to harm long-term social structure.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

Assessing the Ethical Framework

In addition to the MAC Group using the previously described criteria in its decision-making process, it is expected that decisions will be made within a set of ethical principles. These principles 1) common good, 2) justice, 3) prudence, and 4) respect comprise an Ethical Framework that was developed based on a series of community discussions in NW Oregon and SW Washington during the summer of 2009.

The discussions were designed to identify community values and priorities related to the provision of medical services during a severe influenza pandemic. There are some common areas between the Ethical Framework and the decision-making criteria described earlier; however, in an additional effort to ensure community recovery after an event, these four principles will be assessed separately.

3. After observing the process for the second "issue," how strongly do you agree with the following statements?

The MAC Group considered the need to protect the health and wellbeing of the whole population and the continuing functioning of society. (Common Good)

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

4. Please give an example of what was said / discussed that makes you think this?

_____

5. The MAC Group considered the need to provide a fair distribution of health related benefits and burdens that result from public health activities. (Justice)

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

6. Please give an example of what was said / discussed that makes you think this?

_____

7. The MAC Group used the best and most relevant expertise / data available. (Prudence)

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

8. Please give an example of what was said / discussed that makes you think this?

_____

9. The MAC Group considered the need to protect the rights of individuals to knowledge, autonomy, and dignity. (Respect)

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

10. Please give an example of what was said / discussed that makes you think this?

_____

11. Are there any other values / ethical issues that you would like to see in the ethical framework? If so, what are they? Please define them.

_____

_____

_____

Assessing Community Recovery after a Pandemic Influenza Event

In addition to minimizing death and disability, The MAC Group is also responsible for making decisions that are transparent and acceptable to the overall community. It is critical that the decisions made will facilitate the community's return to normal life after the event.

After observing the process for the second "issue," how strongly do you agree with the following statements?

12. I am confident that the MAC Group will make decisions in the best interests of the public.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

13. What did you hear/see that makes you think this?

_____

_____

14. The MAC Group considered the needs of people who are not usually able to speak up for themselves.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

15. If not, please describe whose needs would / were not considered:

_____

_____

16. The decisions that were made would benefit all groups of people equally.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

17. If some groups of people would not benefit as much as others, please describe who and how.

_____

_____

18. If other community members understand how a MAC Group works, I think that most would trust that decisions would be made in the best interests of the community.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

19. Why or why not?

_____

_____

20. Did you attend the Observer Training?

Yes No

21. Any other comments you'd like to make?

_____

_____

_____

_____

_____

_____

CDC Pan Flu Grant
Focused Group Discussion Guide

Welcome: (Time, bathrooms, taping, confidential, and my role to keep us moving along and giving everyone opportunity to participate.)

Introductions and warm up: Name,
How many exercises/meetings did you observe, and
Whether you or anyone you know has gotten sick with the flu this year.

Collect consent forms:

We have invited you here today to participate in a group discussion that will help the Multnomah County Health Department's CDC Pandemic Flu Grant evaluate the acceptability of the use of a Mutli-Agency Coordination Group (MAC Group) to make decisions about health care resources during a medical emergency such as a pandemic flu event.

As you recall, the MAC Group is comprised of representatives of the hospital systems and public health from several counties in Oregon and in SW Washington. MAC Groups have not been used for health and medical emergencies, but have been used effectively for decades in natural disaster responses such as fires and hurricanes.

It is the hope of this project that we can develop a successful MAC Group model that could be replicated by other communities for health and medical emergencies. Part of evaluating the success of a health and medical MAC Group model is whether it is accepted by community members.

You have all observed at least one exercise or real-time meeting of the MAC Group and have already provided feedback on what you observed this group do. What we want to learn during this discussion today is:

- What type of improvement you saw in the MAC Group process during the grant,
- Ideas you may have that could help the MAC Group identify and avoid unintended consequences of decisions, and
- Suggestions on how to communicate relevant health messages to the public that will help people stay healthy and will encourage the general public to trust decisions being made by the MAC Group.

Do you have any questions?

I would like to start by discussing the development and growth of the Multi-Agency Coordination (MAC) Group.

1. **What improvement did you see during the meeting or meetings you observed? What do you think happened that made this improvement possible?** *(Group dynamics, right people at the table, more relevant information provided, I understood the process better, and fewer injects to deal with, real instead of exercise?)*

2. **What challenges did you see during the meeting(s) that you observed? What improvements did you see during or between meetings? What ideas do you have for the MAC Group and/or staff that could help address these challenges?**

3. **What did you find confusing when you were observing the MAC Group?** *(Not counting the clinical/technical information, things like: what the group's decisions would mean for the public, what power/authority the group has, etc. What could be done to prepare observers to make this easier? This would be used by other communities.)*

Now I would like you to take a minute and think about what you would do if you or someone in your family got sick with something like the flu…add to the scenario that hundreds of people, including people from a variety of community groups, are getting sick with the same thing at the same time.

Given this situation there would be the need to encourage people to practice self care and discourage the use of medical intervention unless absolutely necessary.

4. **What would be some helpful communication messages and methods that could be used to accomplish this? What are some of the issues that need to be considered when trying to reach a wide array of community groups?** *(media, hotlines, websites, community connectors, etc, health practices)*

I would like to ask another question about diverse community groups. In general, observers completing surveys were not able to answer whether decisions made by the MAC group would affect some groups of the community less favorably than other groups.

We have the ethics framework developed and I am handing out a copy to you all for reference. For the next two questions, think about how this framework would help and whether it is enough.

5. **How might the MAC Group anticipate whether their decisions would affect community groups differently? For example, are there questions they should be asking themselves?** *(How would ethics framework help? Is it enough? Is it issue specific? health practices, language, past illness in home countries, lack of mobility or cognitive understanding)*

6. **How could the MAC Group identify possible unintended consequences of their decisions?** *(How would ethics framework help? Is it enough? Is it issue specific?)*

The last part of the discussion is about what the public needs to know in order to trust decisions made by the MAC Group. We discussed this with observers to some extent at each meeting; however we would like to explore it in more depth.

7. **Imagine that you were a member of the MAC Group that you observed. What would you want the public to know about the decisions you made? Why is it important that the public know these things?** *(different community groups as well)*

8. **What haven't I asked that I should have?**

Health/Medical
Multi-Agency Coordination (MAC)
Group Handbook

Prepared by:
Region 1 NW Oregon Health Preparedness Organization
Working Copy January 13, 2010

Preface

This Handbook has been developed by the NW Oregon Health Preparedness Organization as part of a CDC Pandemic Influenza Planning grant. This tool primarily describes the role and operations of a regional health/medical Multi-Agency Coordination Group.

This Handbook is written to be inclusive of all counties in Oregon Healthcare Preparedness Region 1 and Washington Region IV. During emergencies, this region utilizes a host County Emergency Coordination Center (ECC) to provide specific regional health/medication coordination functions (e.g. regional situational awareness, health/medical resource ordering). City and County ECCs/Emergency Operation Centers still provide significant support for health responders for all other response activities.

We would like to acknowledge the Pacific Northwest Wildfire Coordinating Group (PNWCG) for offering its Northwest Multi-Agency Coordination (MAC) Handbook as an example to use when developing this resource. We extend our utmost thanks and gratitude to Mike Edrington and Roy Montgomery, Organizational Quality Associates, for the invaluable expertise, direction and guidance they provided for the development of this tool.

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OVERVIEW

Health/medical policy decisions are made by local public health officials at the jurisdictional level. In the event of a large-scale regional health emergency, the health/medical Multi-Agency Coordination (MAC) Group is convened when responding to public health emergencies involving more than one county. Recent H1N1 Influenza (formerly known as Swine Flu) events provided an opportunity for broad regional coordination of health/medical efforts between public health officials, area hospitals, community health clinics, emergency management and State officials, in order to ensure efficient and effective response to a possible pandemic event. This multi-agency coordination was a key component in order to develop policy-level decisions and directives that were then disseminated to affected communities and target populations. Participants agreed on the need for regional coordination during an emergency with significant health impacts and endorsed the concept of establishing a health/medical MAC Group.

This MAC Group Handbook provides the framework to guide MAC Group activities during a public health emergency with significant regional impacts [Oregon Region 1, Washington Region IV] *(see Appendix 1 for a map of the region).*

Mission
When activated, the MAC Group will provide a structure for public health and healthcare leaders to come together to discuss policy decision-making and prioritization. Specifically, the MAC Group will provide:

- Regional representation and participation in incident prioritization decisions related to a strained healthcare delivery system;
- Ethically-based regional strategies related to the allocation/re-allocation of critical resources;
- Proposed altered standards of care and alternative care systems;
- Community mitigation approaches to limit transmission of disease in the community; approaches will be based in ethical guidance and considerations;
- Management of consistent and accurate information concerning the health emergency within the region.

MAC Group Authorities
The MAC Group is established under the state statutes and laws of the State of Oregon and State of Washington and codes of participating counties *(See Appendix 2*).

MAC Group Overview
A MAC Group is part of the Multi-Agency Coordination System (MACS) under the National Incident Management System (NIMS) and is comprised of agency representatives who have jurisdictional, functional or significant supportive responsibilities in an incident or incidents. Health/medical MAC Group membership may vary during emergencies and will be tailored to the jurisdictions and agencies impacted by the event.

Agency Administrators will appoint and authorize MAC Group Agency Representatives, through a written letter of delegation of authority, to commit their agency funds and resources; have authority to speak on behalf of their organization; make decisions for the prioritization of critical resources; resolve issues, and propose new interagency policy during an emergency. The MAC Group responsibilities include the prioritization of incidents, allocation of critical resources to ICS organizations and strategic planning. Assisting and cooperating agencies may attend MAC Group meetings for technical input or to gain information, but will not participate in the decision-making process. It is always a good idea to have trained back-up MAC Group Representatives available in case of a public health emergency. *Appendix 3* offers additional information for training that is strongly encouraged for all MAC Group Representatives and Coordinators.

MAC Group Agency Representatives may include:

- Health Department Administrator/Health Officer or designee
- Hospital Administrator or designee
- Community Clinical Representative (physician, clinic manager)

MAC GROUP ORGANIZATION

The regional health/medical MAC Group consists of designated Agency Representatives and a MAC Group Coordinator, and is hosted at a County Emergency Coordination Center (ECC). The host County ECC facilitates regional coordination of health/medical functions including health/medical situation status, critical health/medical resource ordering and allocation and hosting the health/medical MAC Group. The host County ECC provides the MAC Group with the needed Incident Support Organization (ISO) including technical specialists, as the situation warrants.

The hosting County ECC may need additional staffing in the following positions to support the MAC Group:

- Planning Section Chief (PSC)
  - Resource Unit Leader (RESL)
  - Situation Unit Leader (SITL)
  - Documentation Unit Leader (DOCL)
  - Technical Specialists (THSP)
- Logistics Section Chief (LSC)
  - Communications Unit Leader (COML)
  - Facilities Unit Leader (FACL)
  - Expanded Resource Ordering Group Leader (EROL)
  - Fully staffed Expanded Resource Ordering Group
- Public Information Officer (PIO)

Each General or Command Staff Unit will fill additional positions within the unit as needed.

The diagrams in *Appendix 4* and *5* display the flow of information between the MAC Group and the host County ECC, other county ECCs and State ECCs.

ROLES & RESPONSIBILITIES

Agency Administrators

- Approve the activation of the MAC Group
- Appoint Agency Representatives through a written delegation of authority *(see Appendix 6)*.
- Recommend issues needing MAC Group action.
- Implement MAC Group decisions and recommendations.
- Provide approval of MAC Group policy proposals.

MAC Group Agency Representatives

- Develop strategies to alleviate critical resource shortages and meet anticipated health/medical resource demands.
- Establish priorities for the allocation or re-allocation of critical health/medical resources within the region.
- Communicate MAC Group decisions to agency administrators.
- Maintain a dialogue with host County ECC, local Public Health (LPH), Hospital Incident Command Posts (ICP), Hospital Coordination Centers, ECCs and others, when necessary.
- Ensure that agency IMTs provide requested situation status reports *(see Appendix 7)* and other MAC Group information, as requested.

MAC Group Coordinator

The MAC Group Coordinator manages the MAC Group needs and requests and disseminates decisions made by the MAC Group through the Incident Support Organization provided by the host County ECC. The MAC Group Coordinator also facilitates MAC Group decision-making and implementation. The MAC Group Coordinator should have credibility with the Agency Administrators and be knowledgeable of ICS and MACS within NIMS. Finally, the MAC Group Coordinator should be qualified for the position and pre-selected by Public Health Administrators to do the following:

- Coordinate all MAC Group requests and needs with the host County ECC Manager.
- Establish a daily schedule for meetings and conference calls and provide schedule and agenda information *(see Appendix 8, 9, 10)* to all MAC Group participants.
- Facilitate all conference calls and MAC Group meetings.
- Screen issues to evaluate if they are appropriate for MAC Group consideration *(see Appendix 11).*
- Obtain health/medical intelligence information to support MAC Group activities.
- Provide regular and timely updates for the host County ECC Manager.
- Ensure subject matter expertise is available to MAC Group (e.g., epidemiology & surveillance, clinician).
- Coordinate official approval of MAC Group decisions.
- Document and disseminate MAC Group decisions to the host County ECC Manager and other agencies.
- Provide records of MAC Group activities and decisions to the Documentation Unit Leader.
- Maintain dialogue with Hospital Command Centers, Hospital and Public Health Incident Command Posts and other healthcare response organizations.

MAC Group Incident Support Organization (ISO)

MAC Group support will be provided by and integrated with the host County ECC ISO.

Host County ECC Logistics Section

- Arranges work area for MAC Group and MAC Group ISO for meetings and operations *(see Appendix 12).*
- Ensures adequate equipment and supplies are available for MAC Group and MAC Group ISO meetings and operations *(see Appendix12).*
- Reserves conference call times and provides schedule and access information to all participants.
- Supervises and manages the Expanded Resource Ordering Group (EROG).

Host County ECC Planning Section

- Provides recommendations for the allocation, reallocation and release of critical resources.
- Collects the Situation Status Reports and any additional information needed by the MAC Group for prioritization and allocation of critical resources and decision-making.
- Maintains and inputs incident information into the database and display matrix for incident prioritization.
- Tracks incident critical resource needs (orders) through the EROG and visually displays the allocation of critical resources during each operational period.
- Assesses and recommends additional staffing, changes to procedures and data needs to the MAC Group to provide for efficient, accurate and timely information for decision-making.
- As needed, contacts Incident Management Teams (IMTs) for clarification and updates on incident status and needs.
- Provides short term, strategic and contingency planning to meet MAC Group needs.
- Supervises any technical specialists requested by the MAC Group.
- Develops and displays all needed schedules, tables, data sheets or other information.
- Organizes, files and maintains all MAC Group records and notes.
- Keeps accurate email distribution lists and other contact information for distribution of documents and decisions.
- Records meeting minutes.
- Ensures accurate MAC Group membership contact information.

Host County ECC Public Information Officer

- Communicates MAC Group decisions to Joint Information Center (JIC) and maintains appropriate dissemination of information to public.

OPERATIONAL GUIDELINES

Activation

- MAC Group functions are executed by Public Health Department Administrators/Health Officers during low activity.
- The MAC Group and MAC Group Coordinator will primarily meet via conference calls and in person, as necessary, during moderate to high levels of activity impacting Public Health and Healthcare Delivery System response operations.
- During very high to extraordinary levels of activity impacting Public Health and Healthcare Delivery System response operations, the MAC Group functions are executed by Public Health Department Administrators/Health Officers and Healthcare Delivery System Agency Representatives (e.g. Hospital Administrator on Duty, Clinicians, etc.). The MAC Group will meet via conference calls and in person, as necessary. The MAC Group will be supported by a host County ECC ISO and a MAC Group Coordinator.

Activation Procedures

Agency Administrators will approve activation of the MAC Group. The MAC Group Coordinator will contact pre-designated Agency Representatives. If pre-designated Representatives have not been chosen or are not available, the respective Agency Administrator will be asked to identify an appropriate substitute for MAC Group representation.

Working Guidelines

- MAC Group Coordinator will facilitate all conference calls and meetings. Conference calls will be scheduled as necessary *(see Appendix 9 and10 for standard conference call agendas).*
- All routine meetings will begin at predetermined times.
- MAC Group meetings should last no longer than 2 hours.
- Coordination/information sharing between the ISO, MAC Group Coordinator and the MAC Group Representatives should happen prior to the MAC Group meetings to ensure issues are clearly and concisely described and managed.
- Recommended issues for discussion during MAC Group meetings will be summarized by MAC Group Representatives in writing in advance of all meetings by the person who has identified the issue. The Representative raising the issue will facilitate the discussion at the MAC Group meeting.
- All briefing materials will be included in the permanent MAC Group record.

MAC Group Meeting Objectives

- Provide an informational update on the regional situation status.
- Prioritize incidents *(see Appendix 13)*.
- Identify, clarify and resolve regional issues (pro-active).
- Recommend new or adjusted policy to Agency Administrators.
- Allocate critical health/medical resources.
- Make and document all health/medical related decisions.
- Determine need for contingency plans as appropriate.
- Provide/recommend overall MAC Group objectives to Agency Administrators.

Attendance

The MAC Group Agency Representatives, MAC Group Coordinator and other personnel requested by the MAC Group should attend all MAC Group meetings in person or by teleconferencing.

MAC GROUP DECISION-MAKING

MAC Group decisions should always consider and strive to maintain essential health services and be aligned with an ethical framework. Key elements of the ethical framework include common good, justice, prudence and respect *(see Appendix 14)*. To facilitate the MAC Group decision-making process, each meeting will be organized in the following manner:

1) Briefing Portion:
   - Current situation update, probable future situation (e.g. assessment of the current healthcare system for event and non-event related illness, projected demand surge from event, related illness and related resource needs, projected reduction of available space, staff and other response capability [e.g. equipment/supplies]);
   - Current issues described;
   - New issues introduced; and
   - Questions/clarification.

2) Discussion/Decision Portion:
   - Review identified and new issues;
   - Review criteria for establishing incident priorities and prioritize incidents (see Appendix 13). This includes the maintaining of essential services and unique capabilities of the total health care system;
   - Discussions and decisions on issues; ensure alignment with ethical framework *(see Appendix 14);*
   - Review situation status reports provided by the IMTs for background information to allocate critical resources *(see Appendix 7)*;
   - Allocate critical resources;
   - Discuss how to resolve media and VIP interface issues; and
   - Consider needs for contingency and strategic planning.

3) Output Portion:
   - Decisions/priorities/allocations determined and communicated to affected parties;
   - Decision action *(see below)* is identified and documented;
   - Draft new policy or revised policy; communicate with Agency Administrators for approval, as necessary; and
   - Plan in place for media interfacing.

All decisions will be made via group consensus and will result in one of the following actions:
- Option 1: Make a collaborative decision and assign responsibility for implementation;
- Option 2: Defer decision for consideration at a later date (e.g., until more information has been collected).
- Option 3: Determine if the issue is outside of the MAC Group's responsibilities and mission. If so, defer the issue to the appropriate organization or individual.
- Option 4: Defer decisions that are beyond the scope and responsibility of the Agency Administrators in the Region to the State.

Record Keeping & Documentation

The following should be documented and retained by appointed staff:

- Attendance at all MAC Group meetings.
- All information presented at MAC Group meetings.
- MAC Group decisions and supporting documentation.
- All daily critical resource allocation documents, signed by the MAC Group Coordinator.
- All decision criteria used by the MAC Group to prioritize incidents and allocate critical resources.
- All notes taken during MAC Group meetings and conference calls (*these materials are subject to external requests*).

The documentation package will be developed by the ECC Documentation Unit Leader, unless otherwise indicated, and will be retained by the host County ECC Manager.

Communicating MAC Group Decisions

- All official decisions will be printed on MAC Group letterhead (template to be developed and agreed upon by appointed MAC Group Representatives) and signed by the MAC Group Coordinator.
- All MAC Group decision documents will be promptly disseminated to the host County ECC Manager, other public ECC Managers and other agency and organizations' leadership (via email, print, conference call, Web sites, etc.), as identified.
- MAC Group decisions and other information will be disseminated to Agency Administrators by Agency Representatives.
- MAC Group decisions will be made available to the public through the host County PIO who will coordinate with the JIC.

Appendix 15 illustrates a matrix of various potential communication and information exchange pathways between individuals, agencies and organizations related to the health/medical MAC group.

Reviewing MAC Group Decisions

Agency Administrators should route issues or concerns about MAC Group decisions through their Agency Representative, who will bring it to the MAC Group Coordinator, for further discussion and review.

Appendices

1) Map of Oregon Region 1 and Washington Region IV Hospitals

2) Health/Medical Authority for Emergency Response in the States of States of Oregon and Washington

3) MAC Group Training and Training Assignments

4) Health/Medical Resource Ordering and Information Flow between the IMTs, County ECCs, Host County ECC and the State ECC.

5) Health/Medical Resource Ordering and Information Flow between the IMTs, the ISO of the Host County ECC and the MAC Group.

6) Sample Letter of Delegation of Authority

7) Situation Status Report (provided by the IMTs)

8) MAC Group Meeting Agenda Checklist

9) MAC Group Coordinator / MAC Group Representatives Conference Call Template

10) MAC Group / Incident Commander Conference Call Template

11) At-A-Glance Comparison of Coordination and Command

12) MAC Group Logistical Needs within the Host County ECC

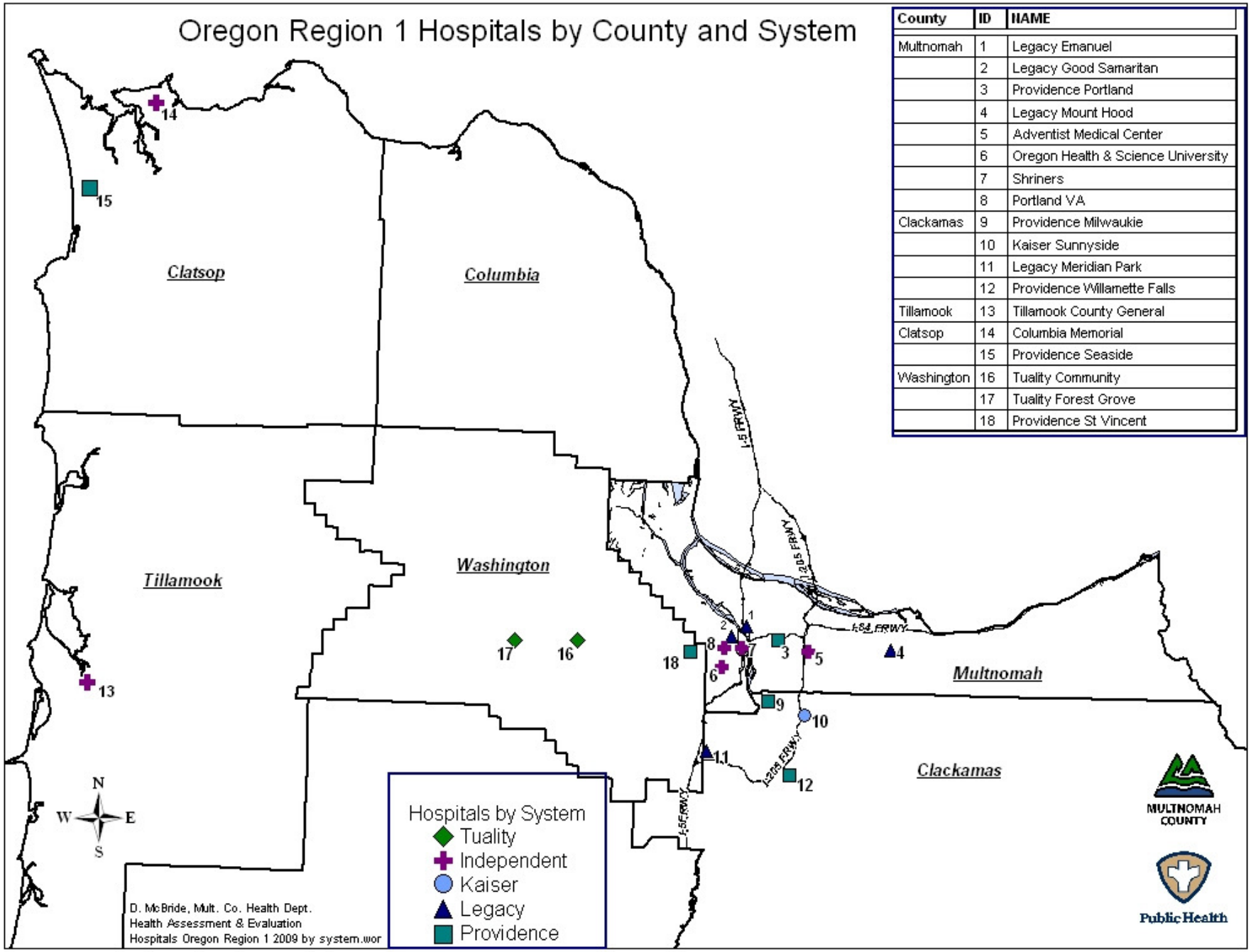
13) Incident Prioritization Criteria

14) Ethical Framework and Criteria

15) Information Exchange of Organizations Associated with the Health/Medical MAC Group

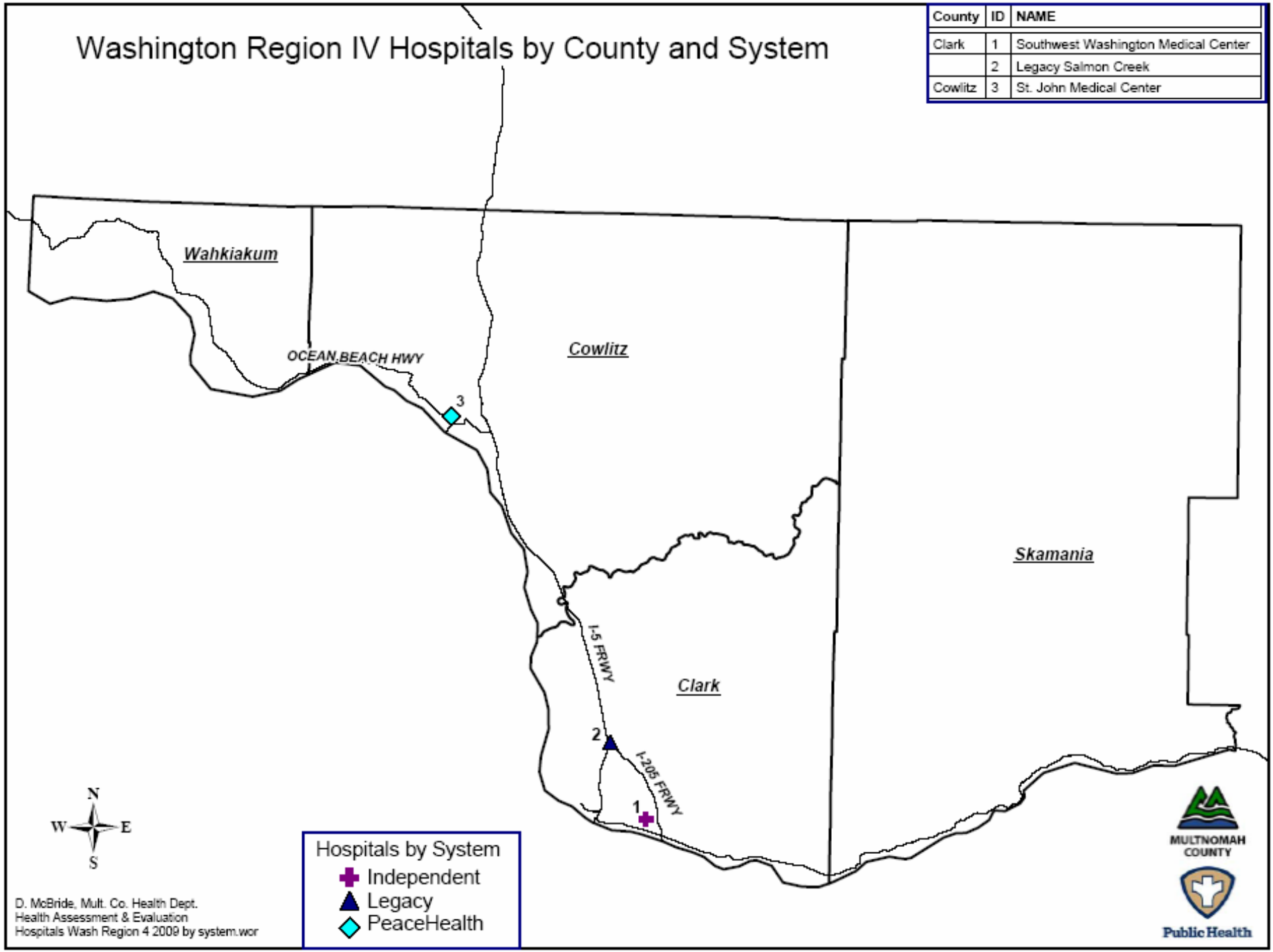
16) Glossary of Terms

APPENDIX 1
Maps of Oregon Region 1 and Washington Region IV: 1 of 3



County	ID	NAME
Multnomah	1	Legacy Emanuel
	2	Legacy Good Samaritan
	3	Providence Portland
	4	Legacy Mount Hood
	5	Adventist Medical Center
	6	Oregon Health & Science University
	7	Shriners
	8	Portland VA
Clackamas	9	Providence Milwaukie
	10	Kaiser Sunnyside
	11	Legacy Meridian Park
	12	Providence Willamette Falls
Tillamook	13	Tillamook County General
Clatsop	14	Columbia Memorial
	15	Providence Seaside
Washington	16	Tuality Community
	17	Tuality Forest Grove
	18	Providence St Vincent

APPENDIX 1, CONT: 2 of 3



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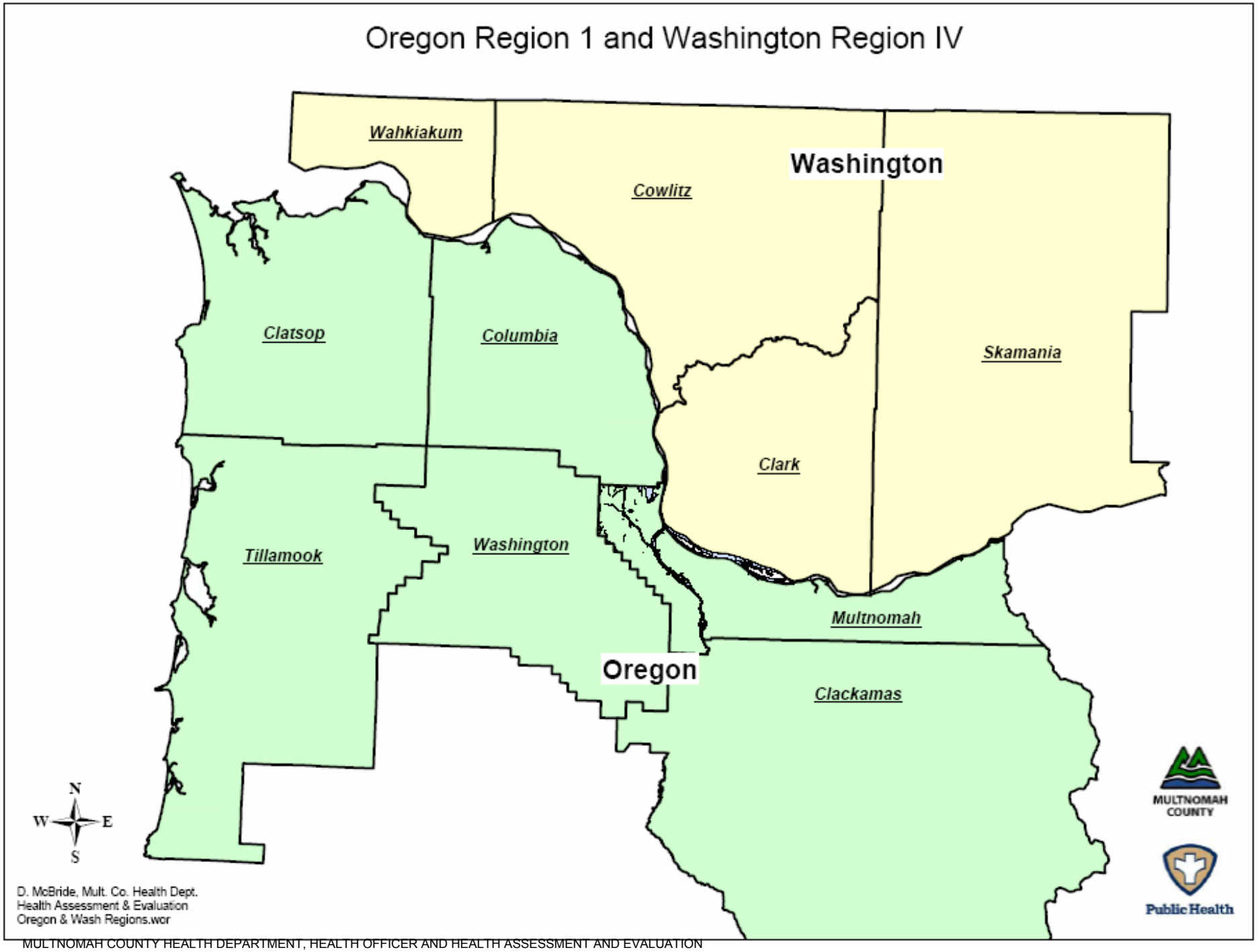


APPENDIX 2
Health/medical Authority for Emergency Response in the States of Oregon and Washington

State of Oregon

401.309 Declaration of state of emergency by local government; procedures; mandatory evacuations.
(1) Each county, city or other municipal corporation in this state may, by ordinance or resolution, establish procedures to prepare for and carry out any activity to prevent, minimize, respond to or recover from an emergency. The ordinance or resolution shall describe the conditions required for the declaration of a state of emergency within the jurisdiction and the agency or individual authorized to declare that a state of emergency exists.

401.315 City or county authorized to incur obligations for emergency services; county determination of emergency.
In carrying out the provisions of ORS 401.015 to 401.107, 401.257 to 401.325 and 401.355 to 401.584, counties or cities may enter into contracts and incur obligations necessary to mitigate, prepare for, respond to or recover from emergencies or major disaster. A county shall assess whether an emergency exists. [1983 c.586 §13; 1991 c.418 2]

431.415 Powers and duties of local health boards; rules; fee schedules.
(1) The district or county board of health is the policymaking body of the county or district in implementing the duties of local departments of health under ORS 431.416.

431.416 Local public health authority or health district; duties.
The local public health authority or health district shall:

(1) Administer and enforce the rules of the local public health authority or the health district and public health laws and rules of the Department of Human Services.

(2) Assure activities necessary for the preservation of health or prevention of disease in the area under its jurisdiction as provided in the annual plan of the authority or district are performed. These activities shall include but not be limited to:

(a) Epidemiology and control of preventable diseases and disorders;

(b) Parent and child health services, including family planning clinics as described in ORS 435.205;

(c) Collection and reporting of health statistics;

(d) Health information and referral services; and

(e) Environmental health services. [1961 c.610 §8; 1973 c.829 §23; 1977 c.582 §28; 1983 c.398 §4; 2001 c.900 §150]

431.530 Authority of local health administrator in emergency.
(1) The local public health administrator may take any action which the Department of Human Services or its director could have taken, if an emergency endangering the public health occurs within the jurisdiction of any local public health administrator and:

(a) The circumstances of the emergency are such that the department or its director cannot take action in time to meet the emergency; and

(b) Delay in taking action to meet the emergency will increase the hazard to public health.

(2) Any local public health administrator who acts under subsection (1) of this section shall report the facts constituting the emergency and any action taken under the authority granted by subsection (1) of this section to the Director of Human Services by the fastest possible means. [1973 c.829 §9; 1977 c.582 §31]

433.443 Authority of Public Health Director during public health emergency; penalties; access to and use of individually identifiable health information; rules. (1)(a) During a public health emergency proclaimed under ORS 433.441, the Public Health Director may, as necessary to appropriately respond to the public health emergency:

(A) Adopt reporting requirements for and provide notice of those requirements to health care providers, institutions and facilities for the purpose of obtaining information directly related to the public health emergency;

(B) After consultation with appropriate medical experts, create and require the use of diagnostic and treatment protocols to respond to the public health emergency and provide notice of those protocols to health care providers, institutions and facilities;

(C) Order, or authorize local public health administrators to order, public health measures appropriate to the public health threat presented;

(D) Upon approval of the Governor, take other actions necessary to address the public health emergency and provide notice of those actions to health care providers, institutions and facilities, including public health actions authorized by ORS 431.264;

(E) Take any enforcement action authorized by ORS 431.262, including the imposition of civil penalties of up to $500 per day against individuals, institutions or facilities that knowingly fail to comply with requirements resulting from actions taken in accordance with the powers granted to the Public Health Director under subparagraphs (A), (B) and (D) of this paragraph; and

(F) The authority granted to the Public Health Director under this section:

(i) Supersedes any authority granted to a local public health authority if the local public health authority acts in a manner inconsistent with guidelines established or rules adopted by the director under this section; and

(ii) Does not supersede the general authority granted to a local public health authority or a local public health administrator except as authorized by law or necessary to respond to a public health emergency.

(b) The authority of the Public Health Director to take administrative action, and the effectiveness of any action taken, under paragraph (a)(A), (B), (D), (E) and (F) of this subsection terminates upon the expiration of the proclaimed state of public health emergency, unless the actions are continued under other applicable law.

State of Washington

RCW 43.06.010: General powers and duties

(12) The governor may, after finding that a public disorder, disaster, energy emergency, or riot exists within this state or any part thereof which affects life, health, property, or the public peace, proclaim a state of emergency in the area affected, and the powers granted the governor during a state of emergency shall be effective only within the area described in the proclamation;

RCW 70.05.060: Powers and duties of local board of health

Each local board of health shall have supervision over all matters pertaining to the preservation of the life and health of the people within its jurisdiction and shall:

(1) Enforce through the local health officer or the administrative officer appointed under RCW 70.05.040, if any, the public health statutes of the state and rules promulgated by the state board of health and the secretary of health;

(2) Supervise the maintenance of all health and sanitary measures for the protection of the public health within its jurisdiction;

(3) Enact such local rules and regulations as are necessary in order to preserve, promote and improve the public health and provide for the enforcement thereof;

(4) Provide for the control and prevention of any dangerous, contagious or infectious disease within the jurisdiction of the local health department;

RCW 70.05.070: Local health officer—Powers and duties

The local health officer, acting under the direction of the local board of health or under direction of the administrative officer appointed under RCW 70.05.040 or 70.05.035, if any, shall:

(2) Take such action as is necessary to maintain health and sanitation supervision over the territory within his or her jurisdiction;

(3) Control and prevent the spread of any dangerous, contagious or infectious diseases that may occur within his or her jurisdiction;

(4) Inform the public as to the causes, nature, and prevention of disease and disability and the preservation, promotion and improvement of health within his or her jurisdiction;

(5) Prevent, control or abate nuisances which are detrimental to the public health;

(9) Take such measures as he or she deems necessary in order to promote the public health, to participate in the establishment of health educational or training activities, and to authorize the

attendance of employees of the local health department or individuals engaged in community health programs related to or part of the programs of the local health department.

RCW 43.20.050: **Powers and duties of state board of health — State public health report — Delegation of authority — Enforcement of rules.**
(d) Adopt rules for the imposition and use of isolation and quarantine;

(e) Adopt rules for the prevention and control of infectious and noninfectious diseases, including food and vector borne illness, and rules governing the receipt and conveyance of remains of deceased persons, and such other sanitary matters as admit of and may best be controlled by universal rule; and

WAC 246-100-036: Responsibilities and duties – Local health officers.
(1) The local health officer shall establish, in consultation with local health care providers, health facilities, emergency management personnel, law enforcement agencies, and any other entity he or she deems necessary, plans, policies, and procedures for instituting emergency measures necessary to prevent the spread of communicable disease or contamination.

Official Collaboration
Overlapping state and local authorities in the two-state area covered by Region 1 and Region 4 will necessitate close coordination among key officials to ensure decisions and response actions are clear and consistent.

Hospital Standards
The Joint Commission (TJC) Standard EM.02, requires hospitals to develop emergency operations plans that coordinate communications, resources and patient clinical support activities during emergencies.

APPENDIX 3
MAC Group Training and Training Assignments

Trainees, using the shadowing process are encouraged for the MAC Group Coordinator and Agency Representative positions. Trainees should be limited to no more than three at any one time and coordinated through the MAC Group Coordinator.

NOTE: I-100 through 400 *should* be taken before filling the MAC Group Agency Representative and Coordinator positions.

The following additional courses are available and will help in the background training for MAC Group positions:

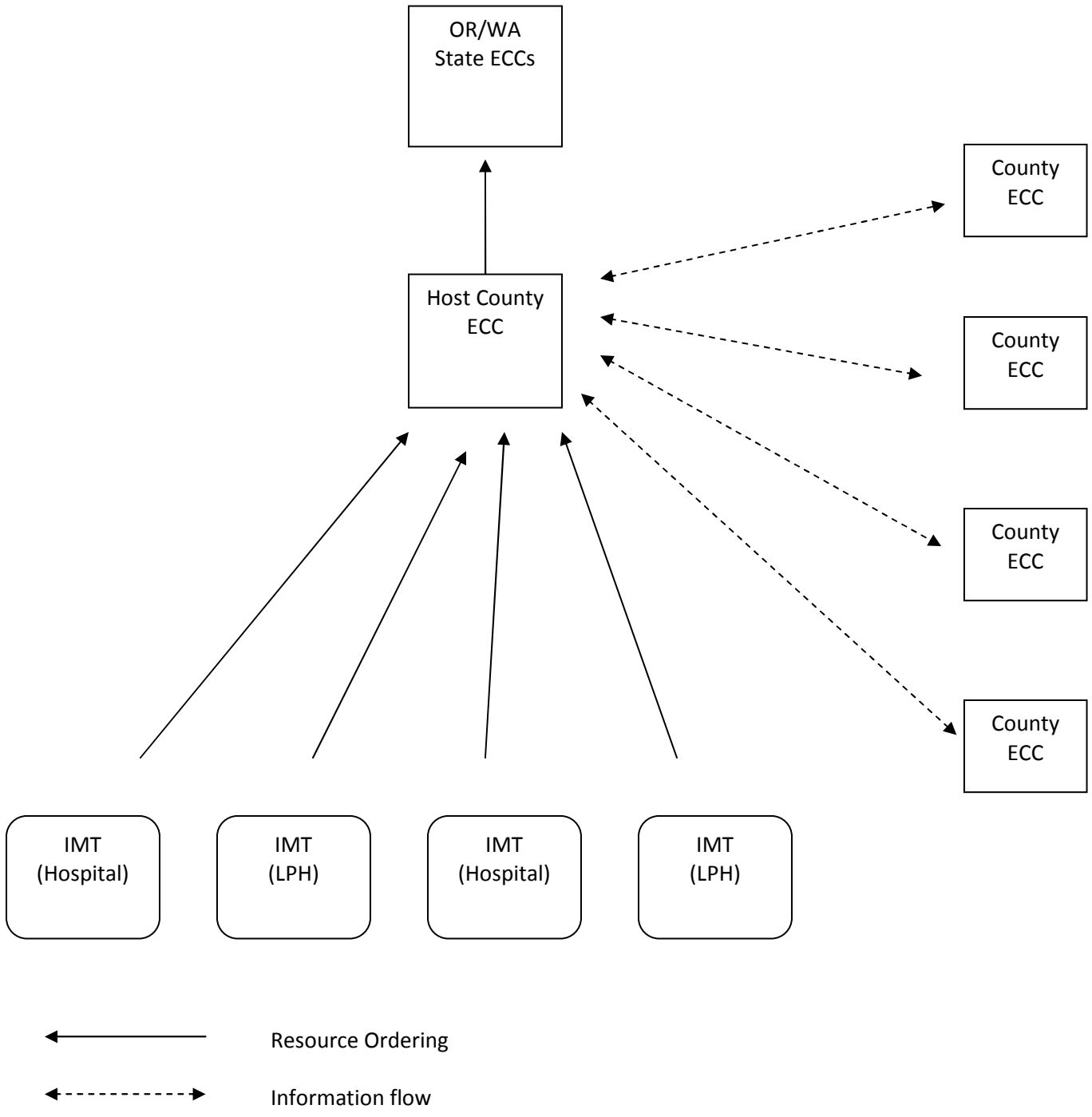
- M-480 – Multi-Agency Groups – Eight hour course with classroom instruction and exercises for MAC Group Representatives and MAC Group Coordinators.

- I-401 – Multi-Agency Coordination and MAC Groups – Seven hour course with classroom instruction and exercises for MAC Group Representatives and MAC Group Coordinators.

- IS-701 – Multi-Agency Coordination Systems – Online and classroom course and exercises for broad understanding of the NIMS coordination system.

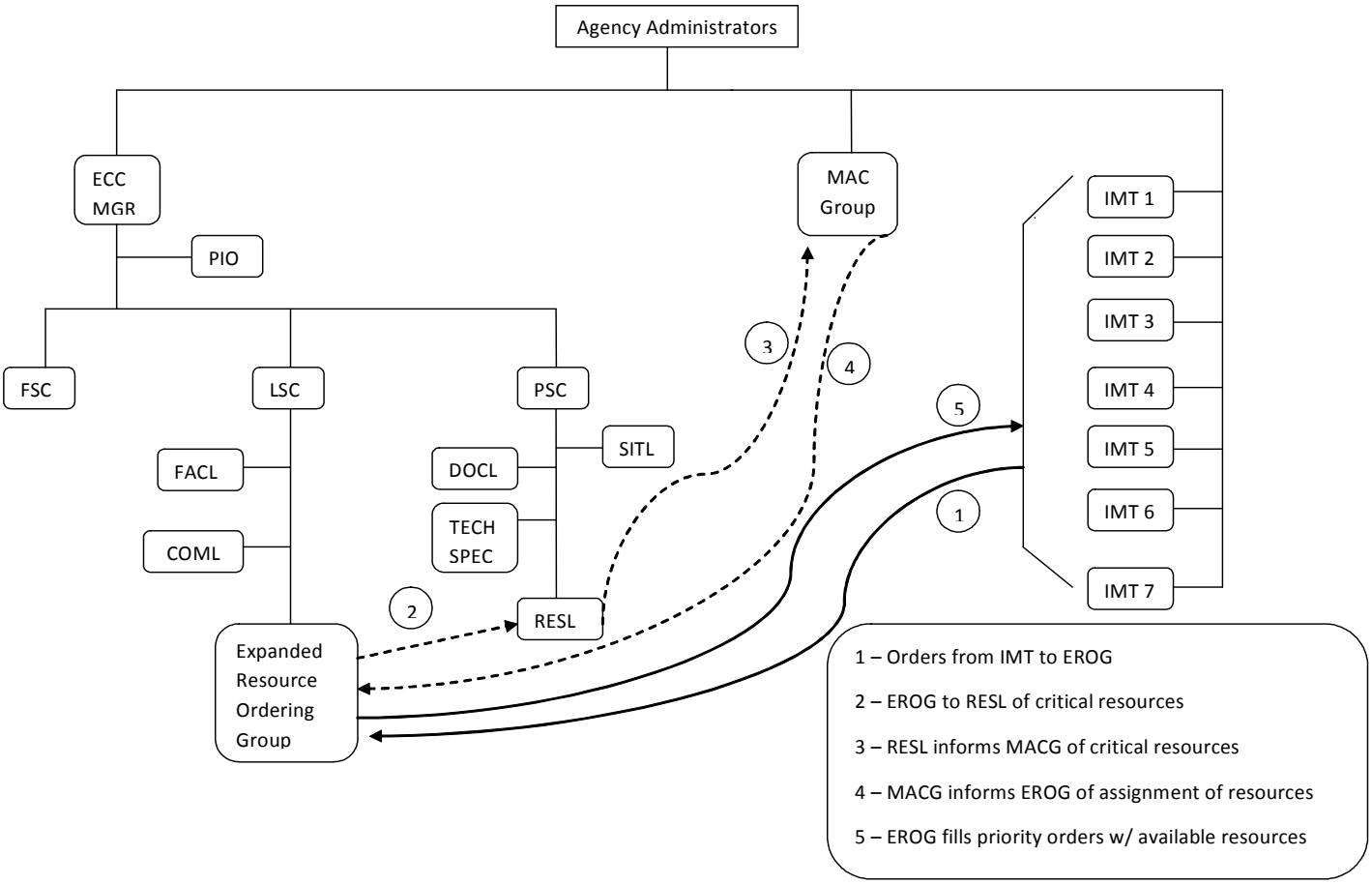
APPENDIX 4
Health/medical Resource Ordering and Information Flow between IMTs, the Host County ECC, County ECCs and the State ECC

County ECCs will continue to support all non-medical incidents while the host County ECC supports all health/medical incidents.



APPENDIX 5

Resource Information and Ordering Flow for Host County ISO, MACG and IMTs



Incident Support Organization Positions:

- PSC – Planning Section Chief
- RESL – Resource Unit Leader
- SITL – Situation Unit Leader
- DOCL – Documentation Unit Leader
- THSP – Technical Specialists
- LSC – Logistics Section Chief
- COML – Communications Unit Leader
- FACL – Facilities Unit Leader
- EROG – Expanded Resource Ordering Group
- PIO – Public Information Officer

APPENDIX 6
Sample Letter of Delegation of Authority
For Health/Medical MAC Group Representatives

(On Agency or Organization Letterhead)

Date: Current Date

Subject: Agency Health/Medical Multi-Agency Coordination (MAC) Group Representative Appointment

To: Name of MAC Group Representative

You are hereby delegated to act on my behalf as a representative on the regional health/medical MAC Group. In that capacity, you are authorized to represent [name of your agency/organization's] interests in MAC Group deliberations to do, as necessary, any/all of the following:

1. Establish interagency strategies to alleviate critical resource shortages and meet anticipated health/medical resource demands.

2. Establish priorities for the allocation or re-allocation of critical health/medical resources within the region.

3. Contribute to the development of region-wide policy recommendations/guidance.

4. Identify regional health/medical issues and help develop interagency solutions.

5. Commit agency health/medical resources (e.g., staff, money, supplies, etc.).

This delegation is effective the date of this document and will remain effective until the health/medical MAC Group completes its work, or until relieved of your assignment, whichever comes first.

I ask that you brief myself or my designee daily on the current situation, any policy decisions that have been agreed upon or any major changes of events.

Print name:

_____

Agency Administrator

Signature:

_____

Agency Administrator

APPENDIX 7
Sample Situation Status Report

HOSPITAL/CLINIC NAME: _____
SITUATION REPORT FOR _____ (date) & _____ (time)

TO: Hospitals in Oregon Region 1/Washington Region IV
FROM: Oregon Region 1/Washington Region IV Health/Medical MAC Group

1) Please estimate the number of people seeking care for influenza evaluation in your Emergency Department and the subsequent impact (i.e. 50 patients with flu-like symptoms seeking evaluation; result is the loss of timely evaluation causing 16 hour wait):

2) Complete the following table describing the effects of not having your critical resource orders filled within the requested reporting time:

What will happen if your resource request is not filled in the next 24 hours?			
	ED MDs REQUESTED:	**ED RNs REQUESTED:**	**ICU RNs REQESTED:**
PERSONNEL	Impact on hospital operations:	Impact on hospital operations:	Impact on hospital operations:
	Impact on patient survival:	Impact on patient survival:	Impact on patient survival:
	AMBULANCES REQUESTED:		
EQUIPMENT	# of bed not staffed:		
	Impact on patient survival:		
	N95s (20 ct) REQUESTED:	**SURG. MASKS (50 ct) REQUESETD:**	**GLOVES(1000 ct) REQUESTED:**
PERSONAL PROTECTIVE EQUIPMENT	Implications for staff:	Implications for staff:	Implications for staff:
	Implications for patients:	Implications for patients:	Implications for patients:

3) What are your organization's 3 most critical issues/concerns?

4) Has your organization activated its Incident Command Post and/or Incident Management Team?
☐Yes ☐No

APPENDIX 8
MAC Group Meeting Agenda Checklist

1) MAC Group members notified.

2) Time and location determined and communicated.

3) Meeting agenda and MAC Group issues prepared by MAC Group Coordinator.

Briefing Portion

- Current situation update, probable future situation (e.g. assessment of the current healthcare system for event and non-event related illness, projected demand surge from event, related illness and related resource needs, projected reduction of available space, staff and other response capability [e.g. equipment/supplies]);
- Current issues described;
- New issues introduced;
- Questions/clarification.

Discussion/Decision Portion

- Review identified and new issues;
- Review criteria for establishing incident priorities and prioritize incidents *(see Appendix 13)*. This includes the maintaining of essential services and unique capabilities of the total healthcare system;
- Discussions and decisions on issues; ensure alignment with ethical framework *(see Appendix 14)*;
- Review situation status reports provided by the IMTs for background information to allocate critical resources *(see Appendix 7);*
- Allocate critical resources;
- Discuss how to resolve media and VIP interface issues;
- Consider needs for contingency and strategic specific plans.

MAC Group Meeting Outputs

- Decisions/priorities/allocations determined and communicated to affected parties;
- Decision action *(see p.8)* is identified and documented;
- Draft new policy or revised policy; communicate with Agency Administrators for approval, as necessary;
- Plan in place for media interfacing.

APPENDIX 9
MAC Group Coordinator / MAC Group Representatives Conference Call Template

[Date & Time]

Roll call [MAC Group members at the host ECC MAC] **MAC Group Coordinator**

Roll call [MAC Group members present via phone]

National Update **MAC Group Coordinator**

MAC Group Update **MAC Group Coordinator**

- [Short bullet statements with key points or information items (e.g. incident updates, VIP visits, new or ongoing key initiatives, etc.)].

Report on Critical Resources **MAC Group Coordinator/ECC Manager**

- [Short bullet statement(s) related to the flow/availability of resources].

Outlook **Incident Support Organization Technical Specialists**

- Projections for the next X hours or X days.

Report on Incidents **Incident Support Organization Situation Leader**

- Current incident information presented in priority order.
- New activity(s).

Recommendations of Critical Resource Allocation **MAC Group Coordinator**

- Discussion of proposed allocations by MAC Group Representatives and MAC Group Coordinator with Representatives on the phone.

Issue Identification/Resolution **All**

- **Issue:** Name of individual presenting the issue followed by a short issue statement.
- **Decision:** Document the decision.

Necessary Actions/Follow up **MAC Group Coordinator**

Schedule Next Conference Call

Date: _____, _____ - _____, 2009

Time: _____

APPENDIX 10
MAC Group / Incident Commander Conference Call Template

[Date & Time]

Roll Call [Names of individuals – Incident or Agency Office they represent] **MAC Group Coordinator**

Summary of Oregon and Washington situation
MAC Group Coordinator

MAC GROUP Update **MAC Group Coordinator**

IC Update [Presented in order of MAC Group priority] **Incident Commanders**

In 3 minutes or less, address the following:

- Incident objectives for the day and the probability of success
- Critical resources needs not listed in the last situation report/IPW:
  - Identify threats to be mitigated
  - Critical objectives to be accomplished with resources
  - Consequences of not receiving critical resources
- Additional items of interest for the MAC Group and/or the other ICs

Resource Status Report **MAC Group Coordinator/ECC Manager**

Final IC Issues or Concerns Not Covered Yet **Incident Commanders**

Wrap-up with ACs or ICs **MAC Group Coordinator**

The call with the ICs is now complete. If an Agency Administrator or State ECC conference call is to follow, ICs are invited to remain on the line at their discretion.

Schedule Next Conference **MAC Group Coordinator**

Date: _____, _____ - _____, 2009

Time: _____

APPENDIX 11
At-A-Glance Comparison of Coordination and Command

Off–Site Coordination	On–Site Command
Coordination occurs off the incident site	On site direct control and management
Does not require the use of ICS, although similar functions (planning, logistics, PIO) may be utilized	Requires use of the Incident Command System (ICS)
Does not command but does have ECC Managers and/or MAC Group Coordinator	There is one Incident Commander or Unified Command
Has no Operations Section as there is no on-site tactical operations to oversee	Has an Operations Section and Operations Section Chief to oversee tactical operations
The Command and General Staff duties are done by an Incident Support Organization (ECC staff)	The Command and General Staff duties are done by an Incident Management Team
Terms associated with off-site Coordination	**Terms associated with on-site Command**
Emergency Coordination Center (ECC)	Incident Command Post (ICP)
Multi-Agency Coordination (MAC) and MAC Group	ICS and Incident Management Team (IMT)
ECC Daily Action Plan	Incident Action Plan (IAP)
Joint Information Center (JIC)	Incident Management Team's PIO
Expanded Resource Ordering Group (EROG)	Support branch of a Logistics section of an IMT

APPENDIX 12
MAC Group Logistical Needs Within the Host ECC

The following should be available or assembled to support a MAC Group operation:

Telephones:
- 1 phone line for voice for each MAC Group Representative
- 1 phone line for voice for the MAC Group Coordinator
- 2 conference phones

Computers:
- DSL or similar system networked for each MAC Group Representative's lap top
- Ability to network MAC Group Representatives lap tops to ECC printers

Work Areas:
- Tables and/or desks for each MAC Group Representatives and MAC Group Coordinator
- Closed meeting room with table and chairs for size of MAC Group

(Includes white boards, room for easel boards, space to post information on walls)

Electronic Display Board:
- 1 four panel white board with copy capability & dry board markers

Copy Machine:
- Access to a copy machine

FAX Machine:
- Access to a FAX machine that doesn't interfere with ECC activities

TV Monitor and VCR/DVD:
- Access to VCR/DVD with monitor

Office Supplies:
- Paper, pencils, pens, paper clips, masking tape, file folders, markers, file boxes, local telephone directory, easel boards, dry markers easel pads

Miscellaneous:
- MAC Group Incident Status Summary and Prioritization Forms (wall display size)
- Health/Medical MAC Group Handbook

APPENDIX 13
Incident Prioritization Criteria

MAC Group Prioritization Criteria

A health/medical mass casualty emergency or disease epidemic that affects the counties in Oregon Region 1 or Washington Region IV are considered “incidents”. The role of the regional MAC Group is to prioritize hospital, public health and other care facilities within the region for response/recovery activities, and if necessary, prioritize the allocation of critical resources.

The following criteria are to be used in establishing priorities unless otherwise agreed to by the MAC Group:

1. Potential for loss of life of responders.

2. Potential for loss of life of the public.

3. Potential to cause injury to human life or cause suffering

4. Potential to harm:

    i. Communities and their long-term social structure.

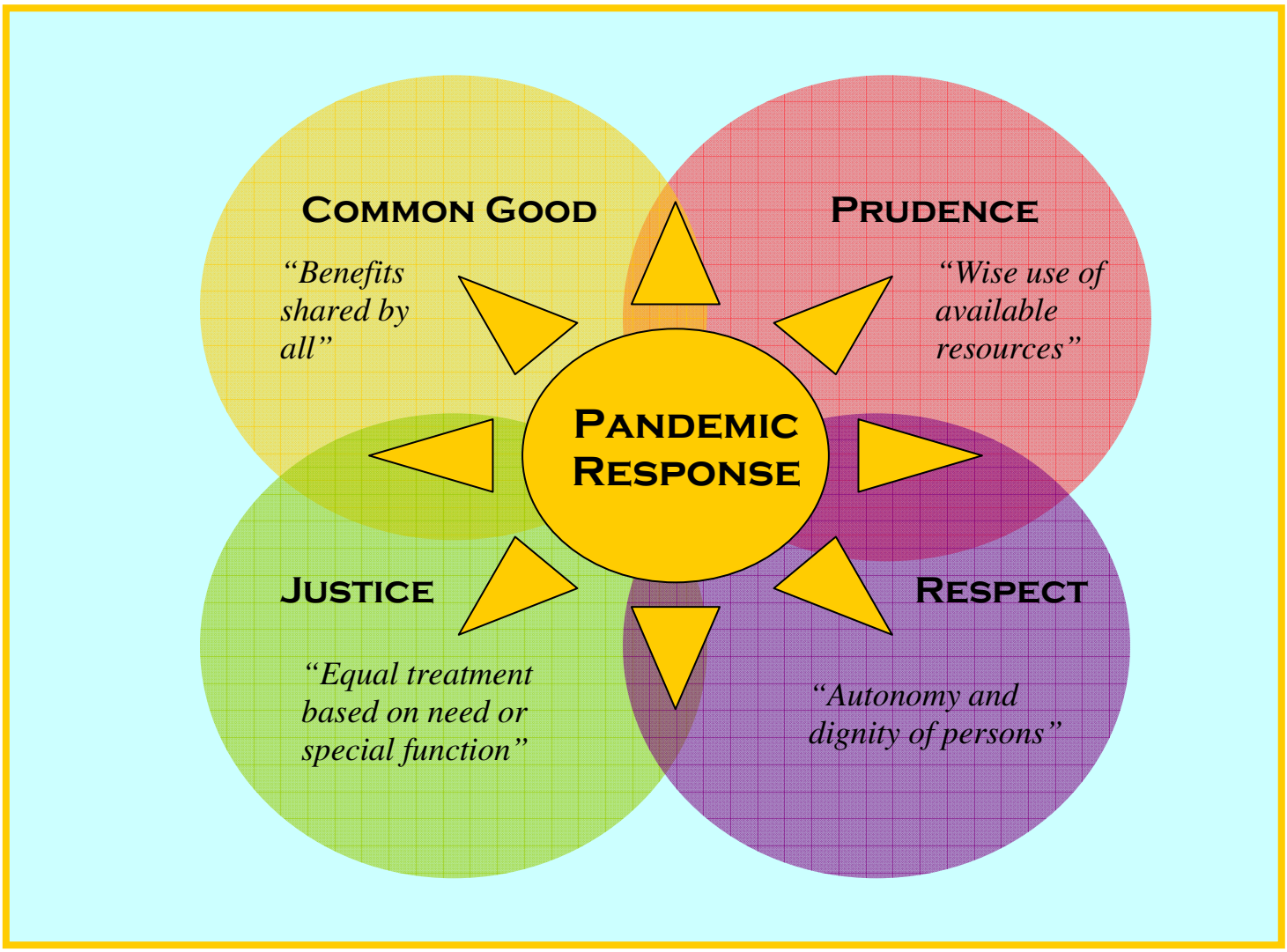
    ii. Community infrastructure (including long-term effects to economic sustainability and viability).

    iii. Commercial and economic structure within the regions.

    iv. Public Health efforts to contain the spread of the disease.

APPENDIX 14
Ethical Framework and Criteria

Illustrated below is an ethical framework based on a series of community discussions in NW Oregon and SW Washington during the Summer of 2009. The discussions were designed to identify community values and priorities related to the provision of medical services during a Level V pandemic influenza. Additionally, this framework was compared against existing literature in the field of health ethics for consistency and alignment purposes. It is the synthesis of these two components that yields the following framework.



Ethics Framework for Pandemic Flu Response Strategy

These principles provide a foundation for specific decisions about allocation of clinical resources and facilities during the phases of the pandemic event.

1. **Common good**: design the response to protect the health related wellbeing of the whole population and the continuing functioning of society.
    - Minimize the total illness and death that is likely to result from pandemic flu.
    - Design the response to protect essential societal functions.
    - Minimize the negative effects of the pandemic on the general functioning of society.
2. **Justice**: design the response to provide a fair distribution of health related benefits and burdens that result from public health activities.
    - Seek an equitable distribution of opportunity for health benefits relative to the capacity for benefit.
        - Life saving
        - Illness minimization
    - Seek an equitable distribution of burdens relative to the capacity to bear burden.
        - Risk of death
        - Risk of injury
        - Inconvenience
    - Seek equity across socioeconomic spectrum: adjust for effects of poverty, language and ethnicity on health and access to services.
    - Conflict of interest:
        - Personal conflicts: decision makers declare any potential conflicts and remove themselves from decision control when appropriate.
        - Institutional conflicts: institutional leaders share responsibility for decisions.
3. **Prudence**: use relevant expert inputs while designing and implementing the public health response.
    - Epidemiologic and medical science
    - Effectiveness of interventions to achieve goals
    - Efficiency in the use of resources
    - Agility in response to evolving epidemic
4. **Respect:** maintain communication and procedures to respect autonomy and dignity.
    - Transparency: explain the rationale for the response and state reasons for unequal distribution of benefits and burdens likely to occur.
    - Autonomy: offer the opportunity for members of the community to be in accord with the actions of the public health authority.
    - Coercion: act with respect when it is necessary to override the wishes of some members of the community for personal health services.

Questions to Guide Decision Process

Decision makers can use the following questions to apply the above ethical principles to policy development and implementation. Consensus based answers to these questions will form the ethical dimension of ongoing decisions and communication with the community about the public health response to the pandemic.

1. **Common good**: In what way will all members of the community share equally in the societal well being hoped for in this strategy? What social functions does this strategy seek to protect?

2. **Justice**: In what way are the several norms of justice being met?
    - Equality: What categories did we consider in applying the equality norm? In what ways is the plan based on equality among persons with similar characteristics of age, health potential, gender, social status?
    - Inequality: What rationales did we use to justify unequal treatment among selected members of the community?
        - What compensatory aid did we set up for persons with special needs? What categories of special need have we considered, included, and excluded (with statement of rationale for inclusion, exclusion decisions)?
        - Merit: what groups were given priority based on their essential social role?
    - Exclusions: What is the rationale for excluding specific persons from the outreach effort?
    - Conflict of interest: What potential conflicts of interest have been considered and how are they being dealt with?

3. **Prudence**: What categories of expertise did this strategy incorporate into planning? What expertise are we consulting during implementation?

4. **Respect**: Are we producing appropriately brief, clear, and simple statements of how the pandemic strategy protects the general well being of society? How does this strategy respect the rights of individuals to knowledge, autonomy, and dignity?

APPENDIX 15
Information Exchange of Organizations Associated with the Health/Medical MAC Group

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
MAC Group																		
• Representatives	A	X	X					X	X			X			X			X
• Coordinator	B	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X
Host ECC																		
• Manager	C		X	X	X	X	X	X	X	X	X	X			X	X	X	X
• Logistics Section Chief	D		X	X	X	X												
• Expanded Resource Ordering Group	E		X	X	X	X			X	X			X				X	
• Planning Section Chief	F		X	X			X	X	X	X	X		X				X	
• Situation Unit Leader	G	X	X	X			X	X	X	X	X		X					
• Resource Unit Leader	H	X	X	X		X	X	X	X	X	X		X					
• Documentation Unit Leader	I		X	X		X	X	X	X	X	X							
• Public Information Officer	J		X	X			X	X	X	X	X	X	X	X				
Incident Management Teams																		
• Incident Commander	K	X	X									X	X	X				X
• Command & General Staff	L					X	X	X	X		X	X	X	X				
Joint Information Center																		
• Public Information Officer	M			X							X		X	X				
County ECCs																		
• ECC Manager	N	X	X	X											X	X		X
State ECC																		
• ECC Manager	O		X	X											X	X		
• Expanded Resource Ordering Group	P		X	X		X												
Responding Agencies																		
Agency Administrators	Q	X	X	X								X			X		X	X

APPENDIX 16
Glossary of Terms

Agency Administrator – Person(s) in charge of the agency/agencies or jurisdiction(s) that has responsibility to respond to an incident.

Critical Resources – Resources ordered by an incident which cannot be filled within the requested reporting time. Often also called scarce resources.

Delegation of Authority – A statement provided to the Agency Representative on a Multi-Agency Coordination (MAC) Group by the Agency Administrator delegating authority and assigning responsibility. This can include objectives, priorities, expectations, constraints and other considerations or guidelines as needed.

ECC – [Emergency Coordination Center] – Facility which houses the coordination organizations such as a jurisdiction's emergency manager and their Incident Support Organization (ISO) and a MAC Group.

ECC Manager – Supervises the ISO and other organizations in the ECC, except for the MAC Group.

EROG – [Expanded Resource Ordering Group] – A centralized group of ordering specialists who receive and fill all orders from a number of incidents.

IAP – [Incident Action Plan] – Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. It may include incident objectives, organizational assignment list, division assignments, communication plan medical plan, traffic plan, safety plan and incident map.

ICP – [Incident Command Post] – Location at which primary command functions are executed; may be co-located at the incident base or other incident facilities.

ICS – [Incident Command System] – A standard on-scene emergency management concept designed to allow users to adopt an integrated organizational structure equal to the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries.

IMT – [Incident Management Team] – The Incident Commander and appropriate Command and General Staff personnel assigned to an incident.

ISO – [Incident Support Organization] – May includes Planning, Logistics, Administration/Finance sections and Public Information Officer positions to support the operation of an ECC and MAC Group.

JIC – [Joint Information Center] – An off-site facility housing an interagency group of PIOs who provide public and media information from an interagency perspective.

JIS – [Joint Information System] – Integrates incident information and public affairs into a cohesive organization to provide consistent, coordinated, accurate, accessible, timely and complete information

during incident operations. Provides a structure and system for developing and delivery of coordinated interagency messages.

MAC Group – [Multi-Agency Coordination Group] – A generalized term which describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritization of incidents and the assignment of critical resources.

MAC Group Objectives – Broad interagency objectives that apply to all the incidents involved within the MAC Group's geographic area of responsibility.

MAC Group Agency Representative – An individual assigned to a MAC Group with delegated authority to represent their agency in carrying out the roles and responsibilities of the group.

Multi-Agency Coordination Systems – Provides the structure to support coordination for incident prioritization, critical resource allocation, communications systems integration and information coordination. The elements of Multi-Agency coordination systems include facilities, equipment, personnel, procedures and communications. The two most commonly used elements are ECCs and MAC Groups.

NIMS – [National Incident Management System] – System that provides for a consistent nationwide approach for Federal, State, local and tribal governments; the private sector, and nongovernmental organizations to work together effectively and efficiently to prepare for, respond to and recover from domestic incidents, regardless of cause, size or complexity. NIMS includes a core set of concepts, principles and terminology. These are ICS, MAC Systems, training; identification, typing and management of resources; qualification and certification; and the collection and tracking and reporting of incident information and incident resources.

Resources – Personnel, equipment, services and supplies available for assignment to an incident.

Health/Medical Multi-Agency Coordination Group

Representatives Present: John Evans, Medical Society of Metropolitan Portland; Judy Guzman-Cottrill, OHSU; Janice Hogue, Adventist; Jodi Joyce, Legacy; Pricilla Lewis, Providence; Christie Little, Kaiser Permanente; Chaz Lopez, OHSU; Cindy Miller, SW Washington Medical Center; Kathleen O'Leary, Washington County Public Health; Lillian Shirley, Multnomah County Health Department; Marni Storey, Clark County Public Health

Technical Advisors: Health Officers - Paul Lewis, Gary Oxman

Health/Medical MAC Group Coordinators: Christine Bernsten, Kathryn Richer

Others: Joe Cramer, Providence; Victoria Cross, NW Oregon Health Preparedness Organization; Mike Edrington, OQA; Richard Leman, State of Oregon; Chris Sorvari, Multnomah County Health Department; Aron Stephens, NW Oregon Health Preparedness Organization

Issues and Decisions – October 22, 2009

ISSUE, RATIONALE & RECOMMENDATION	H/M MAC GROUP DECISION(S) & RATIONALE
Issue: Distribution of Tamiflu Suspension Of the two influenza antiviral medications effective against H1N1 influenza, only Tamiflu Suspension is produced as a powder and is suitable for use in young children. The metro region has approximately 1,200 doses of Tamiflu Suspension, which is inadequate for the anticipated need. There is a need to determine sites to receive Tamiflu Suspension for distribution. **Recommendation** 1. Immediately make Tamiflu Suspension available to facilities providing outpatient urgent/emergency care to children for use for patients seen at the facility. The amount distributed will be in proportion to the number of pediatric visits at the facility compared with the total for the Portland metro area total. Determine whether these facilities can also fill prescriptions from other clinicians for Tamiflu Suspension. 2. Make SNS Tamiflu Suspension available to Access to Care sites serving pediatric patients to support the mission of providing flu care to the uninsured and underinsured. 3. Continue to explore deployment of SNS Tamiflu Suspension to large regional retailer; this will include: (a) clarifying billing and	**Decision** Offer 1,200 doses of Tamiflu Suspension only to identified clinics participating in the Access to Care project (clinics are being determined). Hospitals/Health Systems opted out of having SNS cache Tamiflu Suspension sent to the EDs due to the low volume to be shared across all hospitals/health systems. When people enter EDs, they will receive a prescription. However, some hospitals/health systems have the ability to fill the prescription on-site; other patients will be referred to commercial venues. This decision only applies to the current SNS cache Counties have received. As additional Tamiflu Suspension becomes available, we anticipate distributing this medication through commercial pharmacies. **Rationale** Many hospitals are already compounding the Tamiflu Suspension at their facilities or through their pharmacies and have the drug on hand. It would not make logistical sense to allocate such a small amount of Tamiflu Suspension (1,200 doses) throughout the region, when there is going to be a great need among the underinsured/uninsured population. It is more prudent to send all of the doses directly to the Access to Care program and let hospitals deal with patients who present at their emergency departments.

record keeping requirements, (b) polling pediatric and family practice clinics for input, and (c) determining whether Suspension from a compounding pharmacy is acceptable.	
Issue: Regional mask use policy recommendation. Hospitals/health systems are concerned about their current and future supply of masks. The State cache of masks from the SNS stockpile has been released to the Multnomah County Emergency Coordination Center (MC ECC); however, it is a limited supply so we want to be certain these resources are distributed in a thoughtful and equitable way. This week, the MC ECC Planning Section polled regional hospitals/health systems on both their mask supply situation, and their current mask use policy. In addition, the Health/Medical MAC Group Coordinators conducted an Infection Control Technical Specialist Group meeting to further discuss the mask supply situation including current use. The Group found that mask use practices across the region have little variation. Further, the Group determined that a regional mask use policy recommendation would be of benefit to the community. **Rationale for Creating a Regional Policy Recommendation for Mask Use in the Face of a Pandemic that Creates a Scarce Resource Situation** 1. A regional mask use policy ensures a community standard for how masks are used. This will help inform those in the position of making scarce resource allocation decisions do so with confidence that mask utilization is the same across hospitals. 2. A regional mask use policy helps to conserve scarce resources in the community, while optimizing the safety of staff, patients, and the community at large. 3. By adopting an aligned community standard, State policy will be more easily influenced. **Policy Recommendation** 1. Precautions: For ILI patients (suspect and confirmed), hospitals use droplet precautions at a minimum. 2. Mask Use for Droplet Precautions: For droplet precautions for healthcare personnel in close contact with ILI patients (suspect and confirmed), hospitals use a combination of 1) Procedure Masks	**Decision:** Rationale accepted (as adjusted). **Decisions:** ➢ The Health/Medical MAC Group adopted policy recommendations #1 and #2. ➢ The Health/Medical MAC Group requested that Coordinators convene the Infection Control Technical Group before October 29th to develop more specificity on recommendations (e.g., what should be included in aerosol-generating procedures in #3, mask use for the public, groups of workers included in component #6). ➢ The Health/Medical MAC Group members will bring the policy recommendation criteria (1-7) to their institutional leadership in preparation for discussion on the 29th. ➢ Before the policy is finalized next week, representatives agreed to utilize the existing mutual aid agreement to support each other's mask shortages. ➢ The Health/Medical MAC Group will finalize the policy recommendation on Thursday, October 29th.

(paper w/ear loops); 2) Surgical Masks (with ties) as a back-up if procedure mask supply is limited; and 3) Surgical Cone Masks. Choice of which procedural/surgical mask to use may be based on mask need and availability. CDC defines close contact as within 6 feet of the patient or entering into a small enclosed airspace shared with the patient. 3. Mask Use for High-Risk Procedures: Use N95 respirators or PAPRs only for high-risk procedures. Definition of high-risk is based on CDC guidance and may include intubation, open suctioning, sputum induction and bronchoscopy. 4. Changing Masks: Masks are not to be re-used after performing high-risk procedures. No change required if no direct patient care/contact. 5. Mask Use for Patients/Public: Procedure masks for patients with ILI symptoms who have to leave isolation and/or if immuno-compromised. Mask patients presenting to ED or admitted with ILI symptoms. 6. Healthcare Worker/Patient Interactions: Only healthcare workers critical to care enter patient rooms; others are excluded.	

Health/Medical Multi-Agency Coordination Group

MAC Group Representatives: Christie Little, Curtis Hesse, Linda Cochran, KaRin Johnson, Marni Storey, Janice Hogue, Mike Patterson, David Miller, Cindy Miller, Gary Oxman, Chaz Lopez, Karen Ladd, Priscilla Lewis, Judy Guzman, John Evans

Technical Advisors: Paul Lewis, Gary Oxman, Judy Guzman
MAC Group Coordinators: Christine Bernsten, Kathryn Richer
MAC Group Coach: Mike Edrington
Others: Victoria Cross, Aron Stephens, Beth McGinnis, Chris Sorvari, Linda Dodge, Sandy Johnson, CDC Grant contractors, observers

The Health/Medical Multi-Agency Coordination Group (HM MAC) grounds its decisions in the following ethical components developed through community conversations in NW Oregon and SW Washington, as well as health ethics literature:
Common Good, Justice, Prudence & Respect

The HM MAC Group also considers the following criteria when making decisions: What is the potential for loss of life of responders or the public? What is the potential to cause injury to human life or cause suffering? What is the potential to harm communities and their long-term social structure, infrastructure or economic structure? What is the potential to harm Public Health efforts to contain the spread of disease?

Issues and Decisions – October 29, 2009

ISSUE, RATIONALE & POLICY RECOMMENDATION	HM MAC GROUP DECISIONS & RATIONALE
Issue: Regional Hospital Mask Use Policy Recommendation. Hospitals/health systems are concerned about their current and future supply of masks. The State cache of masks from the SNS stockpile has been released to the Multnomah County Emergency Coordination Center (MC ECC); however, it is a limited supply so we want to be certain these resources are distributed in a thoughtful and equitable way. **Rationale for Creating a Regional Policy Recommendation for Mask Use in the Face of a Pandemic that Creates a Scarce Resource Situation** 1. A regional hospital mask use policy optimizes the safety of staff, patients and the community at large, while helping to conserve scarce resources in the community. 2. A regional hospital mask use policy ensures a community standard for how masks are used. This will help inform those in the position of making scarce resource allocation decisions do so with confidence that mask utilization is the same across hospitals.	**Decision for Rationale for Policy:** • Approved as revised.

3. By adopting an aligned community standard, State policy will be more easily influenced.	
Regional Mask Use Policy Recommendation ***NOTE:*** *The following policy recommendations are made in acknowledgment of the latest CDC Interim Guidance on Infection Control Measures for 2009 H1N1 (October 14, 2009), as well as the State of Oregon's guidance which is in alignment with OR OSHA. In addition, it is recognized that the State of Washington OSHA is more bound by Federal OSHA than the State of Oregon. This is a fluid situation; the policy may change.*	**Decision on addition of NOTE**: • Approved.
1. Precautions: For ILI patients (suspect and confirmed), hospitals use droplet precautions at a minimum.	**(#1 previously approved)**
2. Mask Use for Droplet Precautions: For droplet precautions for healthcare personnel in close contact with ILI patients (suspect and confirmed), hospitals use a combination of 1) procedure masks (paper w/ear loops); 2) surgical masks (with ties) as a back-up if procedure mask supply is limited; and 3) surgical cone masks. Choice of which procedural/surgical mask to use may be based on mask need and availability. *CDC defines close contact as within 6 feet of the patient or entering into a small enclosed airspace shared with the patient.* a. Changing and Re-Using Procedure/Surgical Masks (Droplet Precautions): i. No mask change is required if there is not direct patient care, contact, or concern of contamination from respiratory droplets of an actively coughing patient. ii. Staff can continue to use mask when going from room to room, practicing good hand hygiene, and for as long as the integrity of the mask is not compromised (wet, soiled, damaged).	**Decisions for #2: Mask Use for Droplet Precautions:** • For clarity, delete #2. a. i.; add language to former point #2. a. ii., (which will become #2. a. i.) "A mask should be changed if there is not concern about contamination from droplets." • Move "*NOTE*" re frequent hand hygiene to front of document.
3. Respiratory Protection for Aerosol-Generating Procedures: Use respiratory protection (defined as protection with a level of protection N95 and above) only for aerosol-generating procedures on patients with suspected or confirmed H1N1influenza or provision of care to patients with other infections for which respiratory protection is strongly indicated (e.g., tuberculosis). The definition of aerosol-generating procedures is in alignment with CDC guidance (e.g., bronchoscopy, sputum induction, endotracheal intubation and extubation, open suctioning of airways, cardiopulmonary resuscitation,	**Decisions for #3: Respiratory Protection for Aerosol-Generating Procedures:** • Delete last sentence in main paragraph • Delete #3. a.

autopsies). Respiratory protection may also be used for nasopharyngeal swabs, CPAP and BiPAP, with the understanding that if respirator supplies are low this practice will be discontinued until respiratory stock is replenished. a. Re-Using Respirator Masks: i. Re-using respirator masks after performing aerosol-generating procedures is not recommended. ii. If respirator masks are used for non-aerosol-generating procedures (in the case of procedure/surgical mask shortages) they can be re-used by washing hands before and after putting on/taking off the masks, storing in a clean Ziploc plastic bag with name on it, not storing in pockets, lab coats, or hooks outside of isolation rooms, and discarding once they are wet or soiled. Respirator masks may be worn for a total of 8 hours of active filtering use. NOTE: *In general, healthcare personnel are to perform frequent hand hygiene, including before and after all patient contact, contact with respiratory secretions, and before putting on and upon removal of PPE.*	
4. <u>Mask Use for Patients</u>: Patients presenting for medical care with ILI symptoms are to be masked with procedure masks (or surgical if out of procedure) until placed in a private room. Procedure masks (or surgical if out of procedure) are to be used if patients have ILI symptoms and have to leave a private room (e.g. for transfer, trips to radiology, etc.), and/or if severely immuno-compromised (e.g., bone marrow transplant patients).	**<u>Decision for #4: Mask Use for Patients:</u>** • Approved as is.
5. <u>Mask Use for the Public</u>: If visitors with ILI symptoms are unable to leave the hospital, they may be provided a procedure (or surgical if out of procedure) mask.	**<u>Decision for #5: Mask Use for the Public:</u>** • Revise to read "Visitors with ILI symptoms may be provided a procedure (or surgical if out of procedure) mask."
6. <u>Healthcare Worker/Patient Interactions</u>: "Healthcare personnel entering the room of a patient in isolation should be limited to those truly necessary for performing patient care activities" *(as per CDC Interim Guidance referenced above).*	**<u>Decision for #6: Mask Use for Patients:</u>** • Approved as is.
7. <u>Before Accessing SNS Stockpile Resources</u>: Hospitals/Health Systems must demonstrate that their mask use practices are in alignment with the policy recommendations, and be at a level of supply where they anticipate a shortage within 5-7 days. They must also ensure that they first:	**<u>Decisions for #7: Before Accessing SNS Stockpile Resources:</u>** • Add "respirator and PAPR." • Revise #7 a. to read: "Exhaust resources and modify mask use and respiratory protection as per the policy recommendation."

a. Exhaust internal resources b. Exhaust available caches c. Exhaust commercial supplier availability d. Exhaust mutual aid agreements	**Rationale for #7:** Institutions need to be able to back off institutional preference for mask/respirator/PAPR use, and align with regional policy recommendations in order to make requests for scarce resources. **New Decision re Protection for High-Risk Workers:** • Add another number to address this, based on CDC guidance. **Rationale for New Decision:** Nothing was stated, initially, around the protection of healthcare workers who are at an elevated risk of complications if they contract H1N1. Although it may be assumed that this population is covered within this policy recommendation, there was agreement for the need of an explicit statement in the document.
ISSUE & POLICY RECOMMENDATION	**HM MAC GROUP DECISION(S) & RATIONALE**
Issue: Postponement of Elective Procedures, Elective Surgeries and Admissions In mid-October, Florida health officials were drawing up guidelines that recommend barring patients with incurable cancer, end-state multiple sclerosis and other conditions from being admitted to hospitals if the state is overwhelmed by flu cases. The plan also calls for doctors to remove patients with a poor prognosis from ventilators to treat those with better chances of survival. The goal is to focus care on patients whose lives could be saved and who would be most likely to function better if they are given whatever resources are available. Right now, Rogue Valley Hospital in Medford (Josephine County), and St. Charles Hospital in Bend (Deschutes County) are triaging elective surgeries. The performance of surgeries is tied to staffing levels (i.e. patients are called if there is enough staff to conduct the elective surgeries). **Rationale for Creating a Regional Policy Recommendation for the Postponement of Elective Procedures, Elective Surgery and Admissions** Data analysis and qualitative research conducted as part of the CDC Pandemic Influenza planning grant suggested that postponement of elective procedures, elective surgery and admissions at hospitals in Oregon Region 1 and Washington Region IV could potentially free up as many as 500 med/surg beds per day (i.e., ~15 percent of usual region-wide med/surg capacity). Lesser degrees of postponement would free up smaller numbers of beds. Because some of the	**Decision:** The question to address is how we increase and maintain essential services across the community. In order to determine if the HM MAC is going to take this on, the HM MAC Coordinators need to provide: • Foreshadowing of the situation • Understanding of State's intention on this issue If the HM MAC decides to move forward, they would need to identify people for technical work group. The technical group would need to provide clarity on the implications of changes that increasing and maintaining essential services on a regional basis would result in. HM MAC Coordinators will poll the group on perceptions of urgent issues as we move forward. **Rationale:** Although there was agreement this is a pertinent issue, there were concerns around taking on a complex, time and resource-intense issue if it is not currently urgent.

postponed procedures also involve significant stays in post-anesthesia recover (PAR) and ICU settings, the work group estimates this strategy would also free up as many as 50 ICU-capable beds per day (including PAR beds) – this is the equivalent of approximately eight percent of usual region-wide ICU capacity. In the event the region needs to create additional bed space for patients with influenza, the Health/Medical MAC Group may be asked to approve a regional policy recommendation to postpone certain types of elective procedures, elective surgeries and admission. **Policy Recommendation** 1. Understand background under which this recommendation was created 2. Reach consensus on whether to create a regional policy recommendation for Postponement of Elective Procedures, Elective Surgery and Admissions 3. Consider if this is the most pressing issue for hospitals/health systems to address at this time 4. Determine rationale for the decision 5. Develop a list of criteria you would want a technical work group to consider when developing a policy recommendation	