NEJM Evidence

Published May 13, 2026

DOI: 10.1056/EVIDpha2600093

PUBLIC HEALTH ALERTS | IN PARTNERSHIP WITH CIDRAP

Intramuscular Immunoglobulin for Measles Postexposure Prophylaxis

Angela Weil, M.S.N.,[1] Anna Jones, M.D.,[1,2] Kelly Mansfield, Ph.D.,[3] Andrew T. Pavia, M.D.,[4] Angie White, M.S.,[5] and Leisha D. Nolen, M.D., Ph.D.[1]

Abstract

Intramuscular immunoglobulin (IMIG) administered at a dose of 0.5 ml/kg is an option for prophylaxis in infants after exposure to measles. The weight-based dosing volumes require multiple or large-volume injections; however, no clear administration guidelines exist. In 2025, the Utah Department of Health and Human Services (DHHS) assisted with coordination of IMIG administration after an exposure event at a pediatric clinic. Utah DHHS worked with the local health department and health care facility to develop a plan for administration that has been used in subsequent exposure events in Utah.

The Public Health Alerts section in *NEJM Evidence* is in partnership with the Center for Infectious Disease Research and Policy (CIDRAP) at the University of Minnesota.

Introduction

Utah is experiencing the state's largest measles outbreak in 40 years. Numerous people have been exposed to measles at public locations and health care facilities. Postexposure prophylaxis (PEP) recommendations differ by age, medical comorbidities, and time since the exposure event. The American Academy of Pediatrics (AAP) recommends giving PEP to infants less than 12 months of age because they are too young to routinely receive the measles, mumps, and rubella (MMR) vaccine and are at risk for severe disease.[1] An MMR vaccine can be given as PEP if the infant is 6 months of age or older and fewer than 72 hours have passed since the exposure event.[2,3] Otherwise, intramuscular immunoglobulin (IMIG) is used.[2,3]

Administering IMIG can be logistically challenging. The recommended dose of IMIG is 0.5 ml/kg.[1,2] Traditional practice defines a maximum of 1 ml volume per vastus lateralis muscle in infants, although data supporting this volume are lacking.[4,5] Ventrogluteal muscles can be an option in larger infants; deltoid muscles are usually avoided in infants because of insufficient muscle mass.[4,6] The ventrogluteal muscle should be used cautiously because of proximity to the sciatic nerve.[6] Infants weighing more than 4 kg, including most infants more than 2 months old, require greater than 2 ml of IMIG. No widely available guidance exists on how to administer larger volumes of IMIG.[7] AAP recommends a range of injection volumes from 1 to 5 ml, leaving the decision to the professional judgment of the health care provider based on the infant's muscle size.[8,9] The most common serious complications of large or inappropriately placed intramuscular injections in children include muscle contracture and nerve damage.[6]

The author affiliations are listed at the end of the article.

Anna Jones can be contacted at annajones1@utah.gov.

A large-scale measles exposure occurred in Utah in a pediatric health care facility in September 2025, prompting the Utah Department of Health and Human Services (DHHS) to develop a protocol for infant PEP administration for statewide use. This report highlights the challenges of administering PEP, strategies implemented for administration, and lessons learned from this event.

Investigation and Findings

On September 19, 2025, Utah DHHS received notification of a measles exposure in a large pediatric clinic that had occurred approximately 84 hours before it was reported. An unimmunized child with fever, sore throat, cough, and coryza was brought to the clinic for care for 1.25 hours on the day the child developed a rash. The diagnosis of measles was confirmed when test results returned several days later. Utah DHHS worked with the local health department and health care facility to evaluate the exposure, identify contacts who were in the waiting area at the same time as the infected child, confirm their measles immunization status, and call nonimmunized people to assess their need for PEP. Because of the time that had elapsed since exposure, IMIG was considered the only PEP option. The initial list of PEP-eligible people included nine unvaccinated infants; family members identified two additional infants who had been present in the waiting room. Median weight of these infants was 6.7 kg (range: 5.17–10.6 kg).

Public Health Response

To administer the appropriate dose to infants, public health staff worked with health care partners to determine a strategy. Public health providers administered up to 1.5 ml in each vastus lateralis to accommodate total doses up to 3 ml. Administration was more challenging for infants with weights less than 6 kg. Providers gave three infants a third injection of up to 1.5 ml in an alternate vastus lateralis site separated 1 inch or more from the first injection. In four infants, the provider opted to administer a lower dose (76%–96% of total weight-based dose) to prevent an additional injection. Providers referred two infants weighing more than 8 kg to a local hospital for intravenous immunoglobulin to preclude large-volume intramuscular administration. No parents declined IMIG for their infant. No serious localized or systemic adverse events were observed during administration or reported in follow-up calls with parents. None of the infants who received PEP contracted measles within the 21-day monitoring period.

Public Health Lessons

In the period following the initial event, local health departments and health care systems have reported that at least 60 additional infants have received IMIG as measles PEP in Utah. Some providers have administered injection volumes as large as 2.1 ml in a vastus lateralis muscle, although the majority of providers chose to divide total doses exceeding 3 ml into three or four injections of 1.5 ml or less. Third and fourth injections have been given as additional vastus lateralis injections or ventrogluteal injections. We have not received any reports of serious adverse reactions in any infants who received IMIG as measles PEP. No Utah providers have reported administering deltoid injections to infants.

The lack of clear guidance on safe volumes of IMIG per injection site and the potentially large volumes that may be required pose a challenge for using IMIG as PEP in infants. This report describes the experience in Utah administering IMIG as a volume of 1.5 ml or less per injection in the vastus lateralis, for up to four injections. Additional data regarding the safety of larger volumes and clear guidance on administering adequate volumes of IMIG for measles PEP are needed during the worldwide resurgence of measles.

Disclosures

Author disclosures are available at evidence.nejm.org.

Author Affiliations

[1] Utah Department of Health and Human Services, Salt Lake City, UT, USA

[2] Epidemic Intelligence Service, Centers for Disease Control and Prevention, Atlanta, GA, USA

[3] Intermountain Health, Salt Lake City, UT, USA

[4] Division of Pediatric Infectious Diseases, University of Utah, Salt Lake City, UT, USA

[5] Bear River Health Department, Logan, UT, USA

References

1. Committee on Infectious Diseases. Measles. In: Kimberlin DW, Banerjee R, Barnett ED, Lynfield R, Sawyer MH, eds. Red book: 2024–2027 report of the Committee on Infectious Diseases. Itasca, IL: American Academy of Pediatrics, 2024.

2. McLean HQ, Fiebelkorn AP, Temte JL, Wallace GS. Prevention of measles, rubella, congenital rubella syndrome, and mumps, 2013: summary recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep 2013;62:1-34.

3. Filardo TD, Mathis A, Raines K, et al. Chapter 7: measles. In: manual for the surveillance of vaccine-preventable diseases. CDC. June 3, 2025 (https://www.cdc.gov/surv-manual/php/table-of-contents/chapter-7-measles.html).

4. BC Centre for Disease Control. Communicable disease control manual. Chapter 2: immunization. Appendix B — administration of biological products. June 2022 (https://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/Epid/CD%20Manual/Chapter%202%20-%20Imms/Appendix_B_Administration.pdf).

5. Immunize.org. Vaccine recommendations: is there a strict limit to the volume of vaccine and/or monoclonal antibody that can be administered in a single limb (deltoid or thigh) at one immunization visit? August 24, 2025 (https://www.immunize.org/ask-experts/topic/vaccine-recs/?q=intramuscular+injections).

6. Bergeson PS, Singer SA, Kaplan AM. Intramuscular injections in children. Pediatrics 1982;70:944-948. DOI: 10.1542/peds.70.6.944.

7. Philips L, Young MK, Wallace J, Dobinson HC. Clinical experience of intramuscular immunoglobulin for measles prophylaxis in children: is it practical? J Paediatr Child Health 2020;56:364-366. DOI: 10.1111/jpc.14800.

8. Centers for Disease Control and Prevention. Vaccine administration. June 18, 2024 (https://www.cdc.gov/vaccines/hcp/imz-best-practices/vaccine-administration.html#cdc_report_pub_study_section_2-route-of-administration).

9. American Academy of Pediatrics. RSV immunization administration frequently asked questions. December 17, 2025 (https://www.aap.org/en/patient-care/respiratory-syncytial-virus-rsv-prevention/rsv-frequently-asked-questions/?srsltid=AfmBOormWbqFRy8d7pTR1vK-t3HcizJfI_OxgwkRmqed5S6QYN8x9eVk).