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AT A GLANCE

Measles: Post-exposure Prophylaxis for Contacts

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Introduction

This document outlines considerations for the administration of post-exposure prophylaxis (PEP) for individuals identified as a contact of a confirmed case of measles. It is intended for use by public health units (PHU) and health care providers (HCP). This document is a supplement to Appendix 1 of Ontario's Infectious Disease Protocol and a companion document to At a Glance: Measles Information for Health Care Providers.

For additional information about measles, including surveillance, immunization, testing, and infection control practices, please visit PHO's measles webpage.

Background

The local PHU is responsible for the follow-up of any measles case, including contact identification and management, which may include recommendations for measles PEP, and/or exclusion from work, school and other high-risk settings for susceptible contacts.

PEP involves the timely administration of measles, mumps and rubella (MMR) vaccine or immunoglobulin (Ig) to susceptible individuals following measles exposure. Ig may be administered intramuscularly (IMIg) or intravenously (IVIg). IVIg is generally administered in hospital settings and typically involves coordination with the local PHU and local hospital staff.

The goals of PEP are to lower the risk of infection or reduce the severity of illness if measles infection occurs. The literature in the area of the effectiveness of measles PEP is quite variable due to several factors including small sample sizes, differences in exposure intensity, variation in timing of PEP administration relative to time since exposure, and differences in anti-measles Ig titres and/or dosage of Ig products used.[1-10] Despite this, there are high quality studies demonstrating its impact. For example, a study examining the effectiveness of measles PEP among children during a measles outbreak in New York City in 2013 showed that administration of MMR vaccine within 72 hours or Ig within 6 days of exposure in susceptible children had a reported effectiveness of up to 83.4% and 100%, respectively.[1]

Contact Identification and Management

The local PHU is responsible for contact identification and management; however PHUs may contact HCPs to request assistance in determining a patient's susceptibility to measles, and providing measles vaccine to known contacts for PEP for patients in their practices.

In addition, PHUs may issue media advisories to communicate with the public about community locations where unidentified individuals may have been exposed to measles. These individuals may present to HCPs to receive advice and may be eligible for measles PEP.

If an individual presents to an HCP and identifies themselves as a known or possible contact of a case of measles:

- Assess for signs and symptoms of illness and if present, manage as a suspect case and ensure appropriate infection prevention and control (IPAC) measures are put in place
- If asymptomatic, review the time since measles exposure, the individual's birth date, and susceptibility to measles to determine whether PEP is indicated (see Table 1).
- Susceptibility assessment:
  - Individuals ≥12 months and born on or after January 1, 1970 are considered non-susceptible to measles (and PEP is not indicated) if they meet any one of the following:
    - Documented evidence of vaccination with two doses of measles-containing vaccine received at 12 months of age and older, and given at least 28 days apart
    - Measles IgG positive serology
    - Documented evidence of past lab-confirmed measles infection
  - Individuals born before 1970 are considered immune (except for health care workers)
- Provide patient education to watch for signs and symptoms of measles for 21 days following exposure, even if they have received PEP as it is not 100% effective. PHUs may advise a longer period of monitoring of 28 days for immunocompromised people who have received Ig as PEP.

Measles Post-Exposure Prophylaxis

MMR vaccine should be given within 72 hours of exposure to unvaccinated or under-vaccinated contacts to reduce the risk of measles. If MMR vaccine is given to infants <12 months of age, two additional doses of measles-containing vaccine at least 28 days apart are still required on or after the first birthday for long-term protection. If susceptible contacts are identified >72 hours after exposure, MMR vaccine is no longer considered to be PEP; however, the vaccine should still be offered to susceptible contacts 12 months of age and older as it represents an opportunity to update the individual's vaccination status and provides protection for any future measles exposures.

Ig can be given up to 6 days post-exposure to susceptible contacts who are at high risk of complications from measles, which include unvaccinated or under-vaccinated pregnant individuals and immunocompromised individuals.

Table 1 provides a summary of measles PEP guidance. HCPs may consult with their local PHU on how to access Ig or for additional guidance.

Table 1: Summary of measles post-exposure prophylaxis guidance for susceptible immunocompetent, pregnant, and immunocompromised contacts[11,12]

Age	Measles immunity status	Time since exposure: ≤72 hours (≤3 days)	Time since exposure: 73 hours to 6 days
<6 months	Considered non-immune due to age	IMIg (0.5 mL/kg)[a]	IMIg (0.5 mL/kg)[a]
6 – 11 months	Considered non-immune due to age	MMR	IMIg (0.5 mL/kg)[a]
≥12 months and born on or after 1970	Unknown history of vaccination, zero, or 1 dose of MMR vaccine	MMR	Too late for vaccine to work as PEP[b]
Pregnant individuals	Unknown history of vaccination, zero, 1 dose of MMR[c]	IMIg (0.5 mL/kg), limited protection if body weight ≥30 kg or IVIg (400 mg/kg)	IMIg (0.5 mL/kg), limited protection if body weight ≥30 kg or IVIg (400 mg/kg)
Immunocompromised individuals, particularly moderately to severely immunocompromised individuals	Specialist consultation may be required to evaluate the susceptibility of this group[d] • Examples of severely immunocompromised contacts who should receive IVIg, regardless of vaccination status, include:[e] • Hematopoietic stem cell transplant (HSCT) recipients (unless vaccinated post-HSCT and have adequate measles antibody titre) • HIV infection with severe immunosuppression	IMIg (0.5 mL/kg), limited protection if body weight ≥30 kg or IVIg (400 mg/kg) if body weight ≥30 kg	IMIg (0.5 mL/kg), limited protection if body weight ≥30 kg or IVIg (400 mg/kg) if body weight ≥30 kg

[a] If injection volume is a concern, IVIg (400 mg/kg) may be considered

[b] Susceptible immunocompetent non-pregnant individuals 12 months of age and older who are born on/after 1970 are not recommended by NACI to receive Ig PEP due to lower relative risk of disease complications and practical challenges of Ig access and administration.

[c] The 2018 NACI guidance on IVIg as PEP used the Canadian Immunization Guide (CIG) definition of immunity of at least 1 dose of measles-containing vaccine for adults born on or after 1970. Therefore, recommendations for PEP using IVIg for pregnant adults, should consider the intensity and duration of the measles exposure, and the immunization status (0 versus 1 dose) of the contact. Serology may also play a role in supporting decisions for IVIg if it can be obtained in a timely fashion[11]

[d] Some immunocompromising conditions make it unlikely for an individual to have developed or maintained protective levels of anti-measles antibodies, despite previous vaccination

[e] This is not a comprehensive list. Please refer to the UK Health Security Agency's National Measles Guidelines for more details.[13]

Other Considerations Regarding the Use of Ig as Measles Post-Exposure Prophylaxis

Contraindications to Ig

Ig should not be given to people with known isolated IgA deficiency unless the benefit outweighs the risk, in which case the product should be given with caution and under close observation.[14] Persons with IgA deficiencies have the potential for developing antibodies to IgA and therefore could experience an anaphylactic reaction when Ig is administered.[14] Ig is contraindicated in those with a history of anaphylactic reaction to a previous dose of Ig.

Vaccinations Following Ig as PEP

Infants who receive Ig PEP require two doses of measles-containing vaccine for long-term protection. Doses should be at least 28 days apart, and given after the first birthday and after the appropriate interval following receipt of Ig.[15]

Susceptible immunocompetent pregnant individuals given Ig PEP should start or complete their MMR vaccine series postpartum to ensure long-term protection, after the appropriate interval following receipt of Ig.

Vaccination with live attenuated vaccines (MMR, MMRV, and monovalent varicella) should be delayed after the receipt of Ig preparations using an interval of 6 months following IMIg at 0.5 ml/kg and using an interval of 8 months following IVIg at 400 mg/kg.

There is no need to delay other routine vaccinations, including oral rotavirus vaccine, following the receipt of Ig for measles PEP.

References

1. Arciuolo RJ, Jablonski RR, Zucker JR, Rosen JB. Effectiveness of measles vaccination and immune globulin post-exposure prophylaxis in an outbreak setting - New York City, 2013. Clin Infect Dis. 2017;65(11):1843-7. Available from: https://doi.org/10.1093/cid/cix639
2. Sheppeard V, Forssman B, Ferson MJ, Moreira C, Campbell-Lloyd S, Dwyer DE, et al. The effectiveness of prophylaxis for measles contacts in NSW. N S W Public Health Bull. 2009;20(5-6):81-5. Available from: https://doi.org/10.1071/nb08014
3. Ruuskanen O, Salmi TT, Halonen P. Measles vaccination after exposure to natural measles. J Pediatr. 1978;93(1):43-6. Available from: https://doi.org/10.1016/s0022-3476(78)80597-6
4. Barrabeing I, Rovira A, Ruis C, Muñoz P, Soldevila N, Batalla J, et al. Effectiveness of measles vaccination for control of exposed children. Pediatr Infect Dis J. 2011;30(1):78-80. Available from: https://pubmed.ncbi.nlm.nih.gov/20844460/
5. Kohlmaier B, Holzmann H, Stiasny K, Leitner M, Zurl C, Strenger V, et al. Effectiveness and safety of an intravenous immune globulin (IVIG) preparation in post-exposure prophylaxis (PEP) against measles in infants. Front Pediatr. 2021;9:762793. Available from: https://doi.org/10.3389/fped.2021.762793
6. Endo A, Izumi H, Miyashita M, Taniguchi K, Okubo O, Harada K. Current efficacy of postexposure prophylaxis against measles with immunoglobulin. J Pediatr. 2001;138(6):926-8. Available from: https://doi.org/10.1067/mpd.2001.113710
7. Bigham M, Murti M, Fung C, Hemming F, Loadman S, Stam R, et al. Estimated protective effectiveness of intramuscular immune serum globulin post-exposure prophylaxis during a measles outbreak in British Columbia, Canada, 2014. Vaccine. 2017;35(20):2723-7. Available from: https://doi.org/10.1016/j.vaccine.2017.03.069
8. Sakuta H, Sawada S, Kuroki Y. Severity of measles among patients with incidental postexposure vaccination. Jpn J Infect Dis. 2008;61(4):304-6. Available from: https://www.niid.go.jp/niid/images/JJID/61/304.pdf
9. King GE, Markowitz LE, Patriarca PA, Dales LG. Clinical efficacy of measles vaccine during the 1990 measles epidemic. Pediatr Infect Dis J. 1991;10(12):883-8. Available from: https://doi.org/10.1097/00006454-199112000-00001
10. Rice P, Young Y, Cohen B, Ramsay M. MMR immunisation after contact with measles virus. Lancet. 2004;363(9408):569-70. Available from: https://doi.org/10.1016/s0140-6736(04)15553-0
11. Ontario. Ministry of Health. Ontario public health standards: requirements for programs, services, and accountability. Infectious disease protocol. Appendix 1: case definitions and disease specific information. Disease: measles. Effective: March 2024 [Internet]. Toronto, ON: King's Printer for Ontario; 2024 [cited 2024 May 28]. Available from: https://www.ontario.ca/files/2024-03/moh-measles-appendix-en-2024-03-19.pdf
12. Tunis MC, Salvadori MI, Dubey V, Baclic O; National Advisory Committee on Immunization (NACI). Updated NACI recommendation for measles post-exposure prophylaxis. Can Commun Dis Rep. 2018;44(9):226-30. Available from: https://doi.org/10.14745/ccdr.v44i09a07

13. UK Health Security Agency. National measles guidelines [Internet]. London: Crown copyright; 2024 [cited 2024 May 28]. Available from: https://assets.publishing.service.gov.uk/media/65ddd0e9f1cab3001afc4774/national-measles-guidelines-Feb-2024.pdf

14. Public Health Agency of Canada; National Advisory Committee on Immunization; Committee to Advice on Tropical Medicine and Travel. Measles vaccines: Canadian immunization guide [Internet]. Evergreen ed. Ottawa, ON: Government of Canada; 2020 [modified 2020 Sep; cited 2024 May 30]. Part 4, Immunizing agents. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-12-measles-vaccine.html

15. Public Health Agency of Canada; National Advisory Committee on Immunization; Committee to Advice on Tropical Medicine and Travel. Blood products, human immunoglobulin and timing of immunization: Canadian immunization guide [Internet]. Evergreen ed. Ottawa, ON: Government of Canada; 2013 [modified 2024 Jun; cited 2024 June 28]. Table 1: Guidelines for the interval between administration of immunoglobulin (Ig) preparations or blood products and measles-mumps-rubella (MMR), measles-mumps-rubella-varicella (MMRV) or monovalent varicella vaccine to maximize immunization effectiveness. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-1-key-immunization-information/page-11-blood-products-human-immune-globulin-timing-immunization.html#p1c10t1

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