Measles in People with HIV

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Disclaimer

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AETC AIDS Education & Training Center Program Mountain West

Measles in People with HIV: Outline

- Epidemiology
- Clinical Manifestations
- Vaccine Safety and Efficacy
- Screening and Vaccine Recommendations

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Measles Epidemiology

U.S. Cases in 2025

Total cases

301

Age
Under 5 years: **103 (34%)**
5-19 years: **126 (42%)**
20+ years: **63 (21%)**
Age unknown: **9 (3%)**

Vaccination Status
Unvaccinated or Unknown: **95%**
One MMR dose: **3%**
Two MMR doses: **2%**

U.S. Hospitalizations in 2025

17%

17% of cases hospitalized (50 of 301).

Percent of Age Group Hospitalized
Under 5 years: **27% (28 of 103)**
5-19 years: **10% (13 of 126)**
20+ years: **13% (8 of 63)**
Age unknown: **11% (1 of 9)**

U.S. Deaths in 2025

2

Source: *www.cdc.gov/measles/data-research/#cdc_data_surveillance_section_10-measles-cases-in-2025*

Measles: Clinical Manifestations

- Fever, cough, conjunctivitis, coryza (3 Cs)
- Koplik spots
- Rash

- Potential serious complications
  - Encephalitis (1/1000)
  - Pneumonia (1/20)
  - Subacute sclerosing panencephalitis (SSPE) (1/1000)
  - Death (1-2/1000)

Source:
From Hillary Liss

Measles: Clinical Manifestations of Measles in People with HIV

- Subacute myoclonic encephalitis
  - Cluster of cases in children during a measles outbreak in Romania
    - 36 patients during 4 different outbreaks (1996-1998, 2005-2008, 2010-2011, 2016-2018)
    - Most with low CD4 count, only 3 survived (and they were noted to have higher CD4 counts)

Source:
Ene L et al. Front Cell Neurosci 2023

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Measles: Transmission

- Incubation period 7-21 days
- Contagious 4 days before to 4 days after the rash appears
- 9/10 susceptible people with close contact develop measles
- Spread by direct or airborne contact with infectious droplets
- Measles virus can remain infectious on surfaces and in the air for up to 2 hours after an infected person leaves an area

Source:
From Hillary Liss

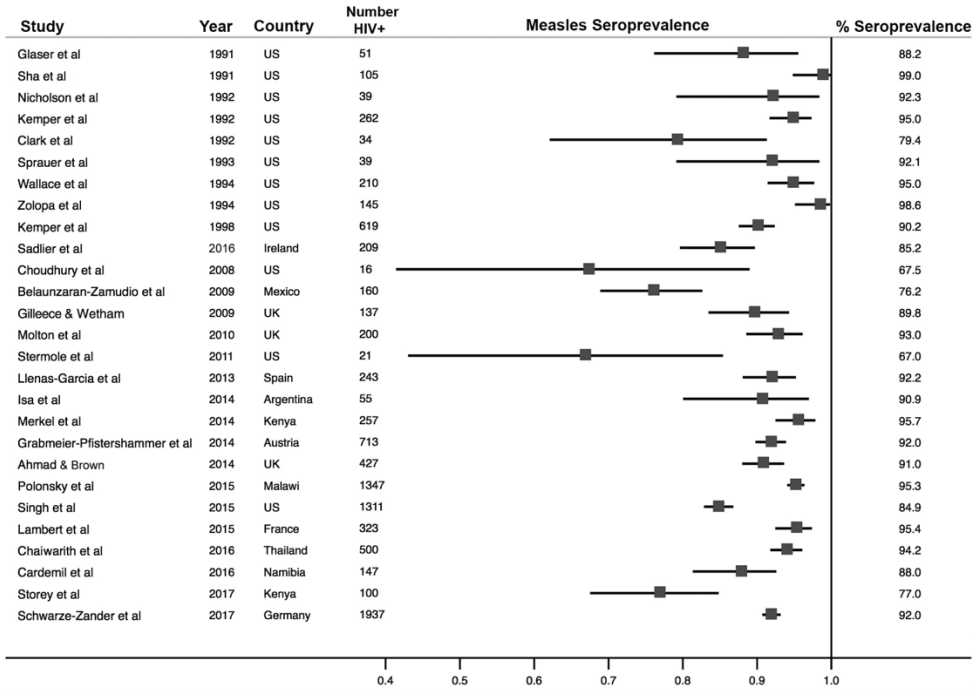
Measles: Diagnosis

- Consider with febrile exanthem with recent international travel or suspicious exposure within 21 days
- Report suspected cases to Public Health
- Laboratory confirmation
  - Measles-specific IgM antibody from serum
  - Measles RNA by RT-PCR from throat or nasopharyngeal swab or urine (preferred if >7 days since onset of rash)

Source:
From Hillary Liss

Measles Seroprevalence in People with HIV

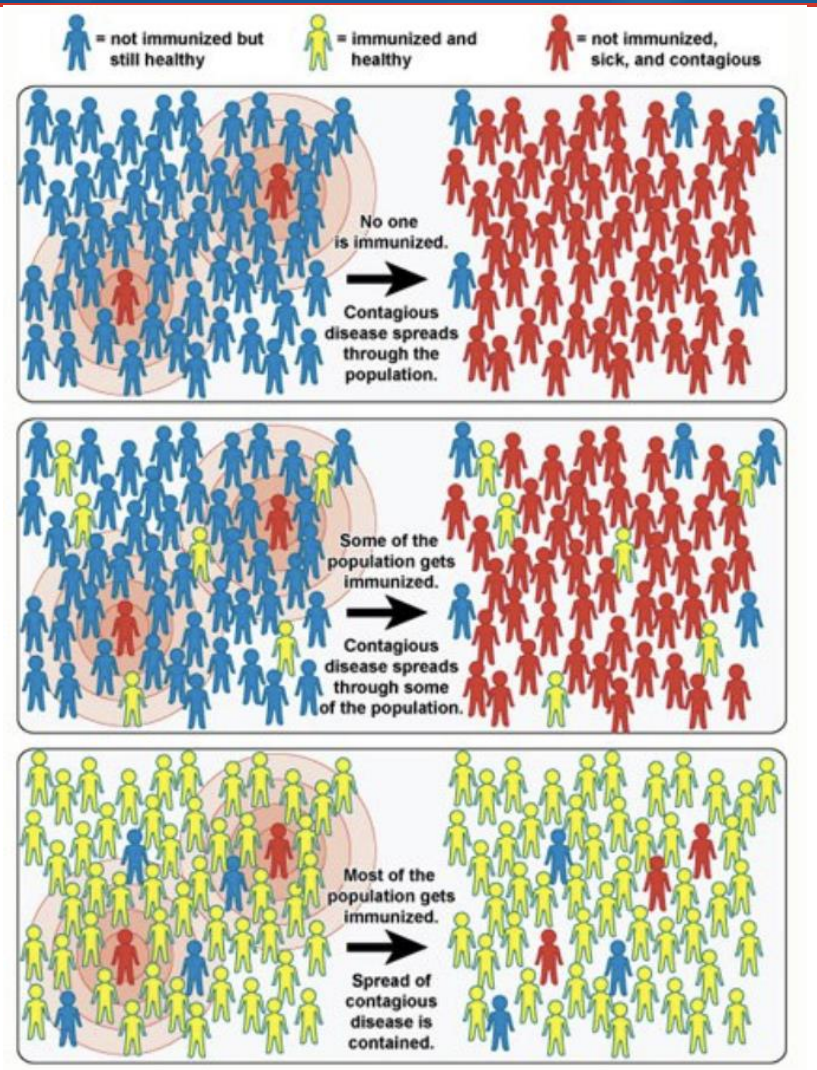
- Systematic reviews and meta-analyses –
  - 39 studies in children (1987-2008):
    - measles vaccine is safe,
  - 30 studies in adults and adolescents (-2017)
    - **Measles seroprevalence high** – no difference compared to people without HIV



Source:
Scott P et al. J Infect Dis 2011
Loevinsohn et al Clin Infect Dis 2019

Measles Seroprevalence in People with HIV

- Cross sectional study in HIV clinic in Nebraska
- 351 patients – seroprevalence 70.3%
- Younger age associated with seronegativity
- Lower than the rate needed for herd immunity (95%)



Source:
Rearigh L et al. Open Forum Infect Dis 2020
https://www.pbs.org/wgbh/nova/article/herd-immunity/

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Who Should Be Screening For Measles Immunity

Screen everyone vs targeting for risk factors that predict seronegativity?

- Cross-sectional seroprevalence study in people with HIV in Paris suburb (2018-2020)
  - N= 268; 55% from sub-Saharan Africa, 23% European
  - 91.4% seropositive
  - No factors associated with seronegative status (ie no association with CD4 count, sex, country of origin)

Source:
Kolakowska A et al Vaccine 2023

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Measles: Screening for Immunity in People with HIV

All people with HIV should be assessed for immunity or prior vaccination

What is evidence of immunity? One of the following:

- Being born before 1957
- Documented evidence of two doses of the MMR vaccine
- Presence of positive antibody titers.

Source: https://clinicalinfo.hiv.gov/en/guidelines/hiv-clinical-guidelines-adult-and-adolescent-opportunistic-infections/immunizations

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Measles: Questionable Immunity 1963-1967

Live measles vaccine became available in the US in 1963

There was also an inactivated measles vaccine 1963-1967

If patient received MMR between 1963-1967 and are unsure what type or if it was inactivated, then considered invalid, then would receive repeat vaccination

If patient can confirm they received live vaccination, then no repeat vaccination needed.

Source: CDC

Measles: Vaccine Safety in People with HIV

Vaccine-induced pneumonitis:

- 20 year old man with HIV received MMR 9/1992 to enter college
- CD4 0, not on ART, no PJP prophy
- 10/1992 – dx'ed with PJP, got better with IV pentamidine
- 7/1993 – cough, chills. Received empiric PJP treatment
- 8/1993 – symptoms progressed, w/u negative
- 10/1993 – open lung biopsy – path c/w measles, measles virus was isolated
- 11/1993 – continued to do poorly and died 12/1993

Source:
CDC. MMWR 1996

Measles: Vaccine Safety and Immunogenicity

- 30 studies in adults and adolescents (-2017)
  - Measles seroprevalence high – no difference compared to people without HIV
  - 6 studies evaluated immunogenicity of vaccines who were seronegative – **seropositivity at follow-up only 0-56%**
  - **Waning immunity**
  - **No adverse reactions**

Study	No. Vaccinated		% HIV+ on ART	Follow-up	No. Seropositive at End of Follow-up		*P* Value	No. Seropositive at Interim Timepoints	Severe AEs
	HIV+	HIV−			HIV+	HIV−			
Sprauer et al (1993) [34]	3	2	NR	3 wk	0/3 (0%)	1/2 (50%)	>.05	…	None
Wallace et al (1994) [37]	6	0	NR	1 y	2/6 (33%)	…	…	HIV+: 4/6 (67%) at 3 mo	None
Belaunzarán-Zamudio et al (2009) [11]	26	21	84.6	1 y	9/26 (35%)	17/21 (81%)	.002[a]	HIV+: 21/26 (81%) at 3 mo HIV−: 19/22 (86%) at 3 mo	None
Stermole et al (2011) [35]	7	0	NR	Max = 24 mo	3/7 (43%)	…	…	…	NR
Singh et al (2015) [33]	40	0	NR	Mean = 7.2 mo	21/40 (53%)	…	…	…	NR
Chaiwarith et al (2016) [14]	27	2	100	48 wk	15/27 (56%)	1/2 (50%)	>.05	HIV+: 20/27 (74%) at 8–12 wk HIV−: 2/2 (100%) at 8–12 wk	None

Source:
Loevinsohn et al Clin Infect Dis 2019

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Measles: Vaccine Safety and Immunogenicity

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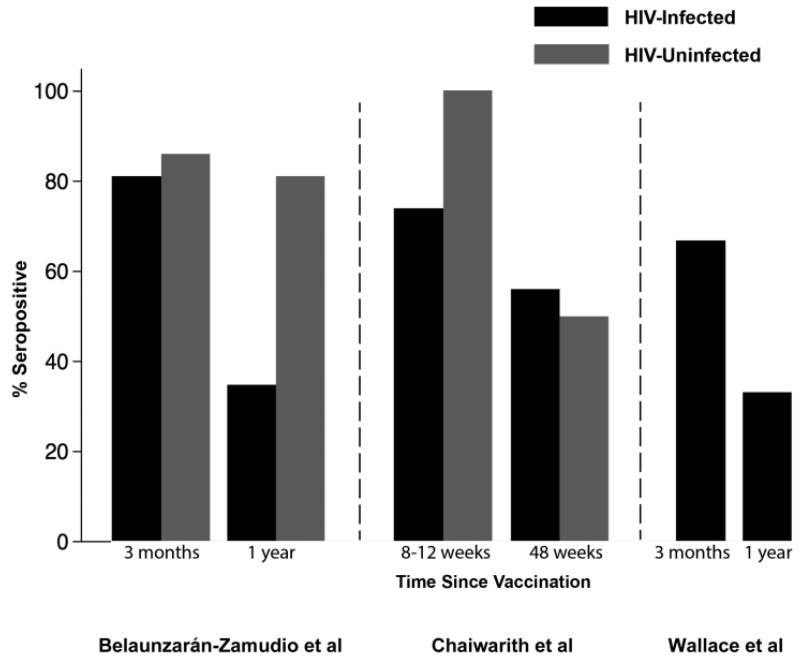
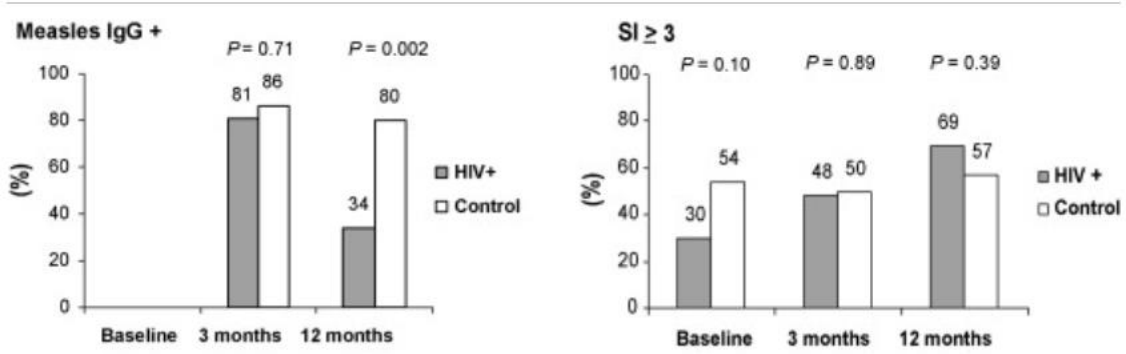


Figure 4. Postvaccination waning immunity in human immunodeficiency virus (HIV)–infected and HIV-uninfected adults and adolescents.

Source:
Loevinsohn et al Clin Infect Dis 2019

Measles: Waning Immunity to Vaccine in People with HIV

- Cross-sectional study of measles seronegative adults with HIV (n=26) vs controls who were HIV negative (n=22) who received measles vaccine
- Median CD4 count ~500, nearly all on ART
- No difference in initial humoral (antibody) responses, but declined over time
- No differences in cellular immune response



Source:
Belaunzaran-Zamudio P et al. Vaccine 2009

Measles Vaccine for Infants Born to People with HIV

Systematic review of 71 studies

Vaccination at 6 months led to similar sero-responses to vaccine compared to infants without HIV

Conclusion: early vaccination at age 6 months may provide protection to infants and mothers with HIV

Source: Mutsawerts E et al. eClinical Medicine 2018

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Measles Vaccine Recommendations in People with HIV

- Administer two doses of MMR vaccine at least 1 month apart to people with a CD4 count ≥200 cells/mm^3 and who have no evidence of immunity to MMR **(AIII)**
- The MMR vaccine **is not recommended** during pregnancy
- Women of childbearing potential who get the MMR vaccine should wait 4 weeks before getting pregnant
- For pregnant women without immunity to rubella, **delay immunization until after pregnancy,** and then administer two doses of the MMR vaccine at least 1 month apart if the CD4 count is ≥200 cells/mm^3 and on combination antiretroviral therapy (ART) **(AIII)**
- If no serologic evidence of immunity exists after two doses of MMR vaccine, consider repeating the two-dose MMR vaccine series, especially if the person is vaccinated while not virologically suppressed **(CIII)**
- **Do not administer** MMR vaccine to people with HIV with CD4 count <200 cells/mm^3 or uncontrolled HIV (not on ART or virologic failure) **(AIII)**

Source: https://clinicalinfo.hiv.gov/en/guidelines/hiv-clinical-guidelines-adult-and-adolescent-opportunistic-infections/immunizations

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Measles: Post Exposure Prophylaxis

- For measles exposure of nonimmune individuals with CD4 count ≥200 cells/mm^3, administer the MMR vaccine within 72 hours of exposure **or** immunoglobulin (IG) within 6 days of exposure. Do not administer the MMR vaccine and IG simultaneously.
- For measles exposure of nonimmune individuals with CD4 count <200 cells/mm^3 or those who are pregnant, administer IG within 6 days of exposure.

Source: https://clinicalinfo.hiv.gov/en/guidelines/hiv-clinical-guidelines-adult-and-adolescent-opportunistic-infections/immunizations

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Questions?

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