



Measles: Skin Assessment Guidance

This guidance document is intended to enhance measles response efforts. It was created by the Center for Outbreak Response Innovation (CORI), in collaboration with state and local health departments. The document includes background information on measles, descriptions of measles rash on different skin tones, instructions for conducting a measles-specific skin assessment, and a form template for both patients and healthcare providers to complete.

This document was compiled by Alanna Fogarty, MPH, MSc; Eric Toner, MD; and Caitlin Rivers, PhD, MPH, with funding support from the US Centers for Disease Control and Prevention.



Measles: Skin Assessment Guidance

Contents	
Purpose	2
Measles	2
Measles Rash.....	3
Measles Rash on Different Skin Tones	4
Elements of a Comprehensive Skin Assessment	7
Temperature	7
Turgor (Firmness).....	7
Color.....	7
Moisture Level.....	7
Skin Integrity.....	7
References.....	9



Purpose

This guidance document is intended to enhance measles response efforts. It was created by the Center for Outbreak Response Innovation (CORI), in collaboration with state and local health departments. The document includes background information on measles, descriptions of measles rash on different skin tones, and instructions for conducting a measles-specific skin assessment.

Measles

Measles is caused by a virus of the *Paramyxoviridae* family, specifically in the *Morbillivirus* genus.¹ Measles is known for its exceptionally high transmissibility among human infectious diseases, primarily spreading through airborne transmission.² The incubation period for measles is typically 10–14 days from exposure to onset of symptoms. However, the incubation period can range from 7–23 days.¹

Early (prodromal) signs and symptoms include the 3 Cs (cough, coryza, and conjunctivitis), fever, malaise, and characteristic Koplik spots. A morbilliform (maculopapular) rash develops about one week after the onset of prodromal symptoms. People with measles are most contagious from 4 days before the rash appears to 4 days after it erupts.¹

Koplik spots are highly specific for measles and usually appear in the prodromal phase of the illness before the rash. These spots are found on the inner surface of the cheeks (buccal mucosa) and have a white center with red borders.³ They disappear as the cutaneous rash develops.

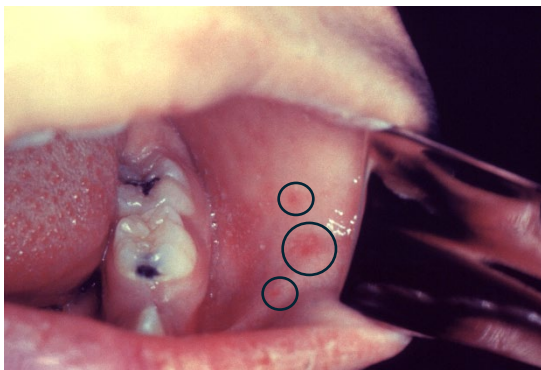


Figure 1. Image of Koplik spots from the Centers for Disease Control and Prevention

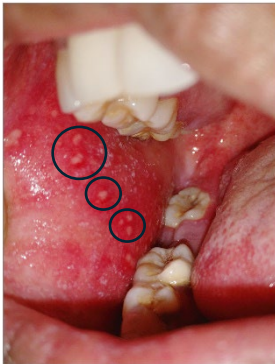


Figure 2. Image of Koplik spots from Jayasree et al.

Measles Rash

The characteristic rash of measles in infected individuals is a maculopapular rash, consisting of both macules and papules.¹ Macules are flat, nonpalpable red, brown, white, or tan marks on the skin, whereas papules are the primary skin lesions, elevated spots that are palpable and firm.⁵ The rash, often described as feeling like sandpaper, typically starts first at the base of the forehead and then spreads downward to the rest of the body.⁶ The macule lesions may be difficult to see in individuals with darker skin complexions. However, the sandpaper-like papule lesions should still be apparent.

Certain other infectious diseases (e.g., rubella, parvovirus B19, roseola, hand-foot-mouth disease, scarlet fever, and Rocky Mountain spotted fever) and noninfectious conditions (e.g., autoimmune conditions and allergic reactions) can cause similar rashes, which can make clinical diagnosis of measles challenging.⁷

Table 1. Rash differences among measles, chickenpox, and mpox⁶⁻⁹

	Measles	Chickenpox	Mpox
Rash Development	Rapid	Rapid	Slow
Rash Distribution	Starts on face then spreads downward; May reach hands and feet	More concentrated on torso; Absent on palms and sole	More concentrated on face; Present on palms and soles
Types of Lesions	Macules and papules	Papules that progress to vesicles; vesicles eventually crust	Macules and papules that progress to vesicles and pustules; vesicles and pustules eventually crust
Itchy	Not typically	Yes	Yes
Painful	Not typically	Not typically	Yes



Measles Rash on Different Skin Tones



Figure 3. Image from Skinsight



Figure 4. Image from the Centers for Disease Control and Prevention



Figure 5. Image from the World Health Organization Regional Office for Africa



Figure 6. Image from Immunize



Figure 7. Image from the Centers for Disease Control and Prevention



Figure 8. Image from Immunize



Figure 9. Image from the Centers for Disease Control and Prevention



Elements of a Comprehensive Skin Assessment

When conducting a skin assessment, healthcare providers should consider the following skin assessment parameters^{5,16-17}

Temperature

Is the affected skin area warmer or cooler than the surrounding skin?

Turgor (Firmness)

Does the skin quickly return to its normal state when it is stretched?

Color

Does the skin appear to be red, pink, violet, brown, black, grey, blue, orange, yellow, or white in color?

Moisture Level

Is the skin too dry or too wet?

Skin Integrity

Is the skin intact or broken?

If the skin is broken, is it due to infection, injury, or another underlying issue?

If the skin is broken, is there a single area of altered skin (lesion) or a widespread area of lesions (rash)?

If lesions are present, what are the characteristics? Are they flat, elevated, or depressed? Are they soft, firm, hard, fluctuant, or scarred? Are they red, pink, violet, brown, black, grey, blue, orange, yellow, or white in color? Are they warmer or cooler than the surrounding skin? Are they mobile or immobile?



Table 2. List of different types of skin lesions^{5, 17-18}

Primary Lesions	
Macule	A flat, nonpalpable lesion that can be brown, red, white, or tan in color. Macules can be up to 1 cm in diameter.
Patch	A macule, but with a diameter that is 1 cm or larger.
Papule	An elevated, palpable, firm lesion up to 1 cm in diameter.
Plaque	An elevated, flat-topped, firm, rough, superficial lesion with a diameter that is 1 cm or larger. Plaques may be formed from a coalescence of papules.
Nodule	An elevated, palpable, firm lesion with a diameter that is smaller than 1 cm. Nodules are typically firmer than a papule and primarily located in the deeper layers of the skin.
Cyst	A fluctuant nodule filled with liquid or semisolid material.
Vesicle	An elevated, palpable blister up to 1 cm in diameter. Vesicles contain liquid.
Bulla	A vesicle, but with a diameter that is 1 cm or larger.
Pustule	A vesicle, but the vesicle is filled with pus rather than liquid.
Wheal	A relatively transient, elevated, irregularly shaped area of localized skin edema that can be red, pale pink, or white in color.
Secondary Lesions	
Scale	A thin flake of dead skin on the skin surface.
Crust	The dried residue of serum, pus, or blood on the skin surface.
Lichenification	Visible and palpable thickening of the skin surface and roughening of the skin with increased skin markings and scaling. Lichenification is caused by chronic rubbing.
Excoriation	Linear or punctuate loss of skin, usually due to scratching.



References

1. World Health Organization. Measles Outbreak Guide. Geneva: World Health Organization; 2022. Accessed May 21, 2024. <https://www.who.int/publications-detail-redirect/9789240052079>
2. Adalja A. *Dissecting Pandemic-Prone Viral Families, Volume 2: The Paramyxoviridae*. Baltimore, MD: Johns Hopkins Center for Health Security; 2024.
3. Sudhakar S. Measles cases have been reported in 19 states this year. What does a measles rash look like? *TODAY*. Updated April 30, 2024. Accessed June 11, 2024. <https://www.today.com/health/disease/measles-rash-images-rcna142421>
4. Jayasree P, Ashique KT, Kaliyadan F. Koplik Spots. *JAMA Dermatology*. 2021;157(4):456. doi:10.1001/jamadermatol.2020.4397
4. Hess CT. Performing a skin assessment. *Nursing*. 2010;40(7):66. doi:10.1097/01.NURSE.0000383457.86400.cc
5. Casilao JL. What's the difference between monkeypox, chickenpox, and measles? GMA News Online. Published May 24, 2022. Accessed May 23, 2024. <https://www.gmanetwork.com/news/topstories/nation/832727/what-s-the-difference-between-monkeypox-chickenpox-and-measles/story/>
6. Mount Sinai. Measles. Undated. Accessed June 11, 2024. <https://www.mountsinai.org/health-library/condition/measles>
7. Mount Sinai. Chickenpox. Undated. Accessed June 11, 2024. <https://www.mountsinai.org/health-library/diseases-conditions/chickenpox>
8. Mount Sinai. Monkeypox. Undated. Accessed June 11, 2024. <https://www.mountsinai.org/health-library/diseases-conditions/monkeypox>
9. Skinsight. Measles (Rubeola). Updated October 6, 2023. Accessed May 22, 2024. <https://skinsight.com/skin-conditions/rubeola-measles/>
10. Public Health Image Library(PHIL). Details. Published 1969. Accessed May 23, 2024. <https://phil.cdc.gov/Details.aspx?pid=18083>
11. World Health Organization. WHO supports Government to mitigate measles, rubella outbreaks nationwide. WHO | Regional Office for Africa. Published February 28, 2019. Accessed May 23, 2024. <https://www.afro.who.int/news/who-supports-government-mitigate-measles-rubella-outbreaks-nationwide>
12. Immunize. Measles Images. Immunize.org. Published October 18, 2023. Accessed May 23, 2024. <https://www.immunize.org/clinical/image-library/measles/>



13. Public Health Image Library(PHIL). Details. Published 1968. Accessed May 23, 2024. <https://phil.cdc.gov/Details.aspx?pid=13322>
14. Public Health Image Library(PHIL). Details. Published 2014. Accessed May 23, 2024. <https://phil.cdc.gov/Details.aspx?pid=17980>
16. Buenaventura P. Skin Assessments. Carepatron. Updated July 2, 2024. Accessed May 22, 2024. <https://www.carepatron.com/templates/skin-assessments>
17. Oakley A. Terminology in dermatology. DermNet. Published 1997. Accessed May 22, 2024. <https://dermnetnz.org/topics/terminology>
18. Lawton S. Assessing the patient with a skin condition. *J Tissue Viability*. 2001;11(3):113-115. Full text access available at <http://www.worldwidewounds.com/2002/may/Lawton/Skin-Assessment-Dermatology-Patient.html>

Funding Acknowledgment

The Center for Outbreak Response Innovation is supported through Cooperative Agreement NU38FT000004 between CDC's Center for Forecasting and Outbreak Analytics and Johns Hopkins University's Bloomberg School of Public Health.

Feedback Survey

We would love your feedback on this guidance document and how it has been incorporated in your work. Please complete the five-question survey to provide your feedback [here](#).