

Measles Resurgence: A Dermatologist's Guide

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Measles, also known as rubeola, is a highly contagious paramyxovirus that has neared elimination in the United States since 2000 due to widespread adoption of the measles vaccine; however, measles recently has made a comeback, with outbreaks reported in more than 60 countries. In the United States, vaccine hesitancy coupled with decreasing vaccination rates, international travel to endemic areas, and decreased funding and resources for monitoring and immunization programs likely led to a re-emergence of measles cases.^{1,2} The resurgence of measles is troubling given its infectiousness and potential severity in at-risk populations. Since measles has a basic reproduction number of 12 to 18 (ie, 1 infected individual will on average infect 12 to 18 others³), it has the capacity to spread quickly. This is why, prior to the development of the measles vaccine in the 1960s, it was responsible for millions of deaths across the globe.

Prior to the introduction of the measles vaccine, both physicians and the public generally were aware of the signs and symptoms of measles due to its prevalence; however, since there have been so few cases in recent decades, images and descriptions of patients presenting with measles can be found only in textbooks, and many physicians are ill-prepared to diagnose the disease.⁴ In response to the recent surge in measles cases, dermatologists—who often are among the first medical professionals to encounter febrile patients with rashes—must be prepared to bridge this divide. Herein, we review the clinical signs, diagnostic approach, operational precautions, and public health responsibilities that dermatologists must relearn amid the current measles outbreak.

Background

Measles is primarily transmitted via respiratory droplets and may remain airborne for up to 2 hours.⁵ It also can be

transmitted through direct contact with secretions such as mucus. Indirect transmission via fomites, while certainly plausible, is thought to be the least effective mechanism of transmission.⁶ Following exposure, the incubation period ranges from 7 to 21 days, during which the virus replicates asymptomatically before causing clinical disease.⁷ Herd immunity for measles requires 93% immunity in the population; public health agencies typically target greater than 95% immunity.⁸ Humans are the only reservoir for the measles virus, making eradication possible.

The road to eradication began with the introduction of the measles vaccine in 1963 and subsequent development of the combined measles-mumps-rubella (MMR) vaccine in 1971. As MMR is a live vaccine, 2 doses confer approximately 97% protection.⁹ The first dose is given at 12 to 15 months of age, and the second dose is given at 4 to 6 years of age. Immunity is considered lifelong, and the Centers for Disease Control and Prevention and the World Health Organization do not recommend routine measles boosters for individuals who have completed the primary 2-dose series.^{10,11}

Widespread vaccination led to a dramatic reduction in incidence, with many countries eliminating measles infections.⁷ The United States declared measles eliminated in 2000, with confirmed cases between 2000 and 2020 ranging from 37 to 1282.¹² Vaccination progress stalled in the late 1990s due to vaccine hesitancy resulting from (subsequently debunked) reports of an association between the MMR vaccine and autism.¹³ Despite efforts to correct this misinformation, many patients continue to espouse these concerns.

Recognizing Measles: Clinical Presentation

Measles, which most often manifests in childhood but also can occur in adults, follows a distinctive clinical course. The prodromal phase is characterized by high fever, cough,

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coryza (nasal congestion), and conjunctivitis—the 3 “Cs” that serve as early warning signs of the disease. Patients may develop small white macules on the buccal mucosa known as Koplik spots (phonetically the fourth “C”), which appear just before the rash. Three to 5 days after the onset of systemic symptoms, patients will develop a classic morbilliform exanthem. In some cases, the exanthem manifests on the head and neck (Figure 1)—first behind the ears and along the hairline, then spreading caudally to the trunk and extremities. The lesions may become confluent, with patients presenting with diffuse erythema. The exanthem fades over several days to weeks, often accompanied by superficial desquamation.¹⁴

Given the nonspecificity of the early symptoms of measles, a high index of suspicion is needed for patients presenting with a febrile illness and a morbilliform eruption (Figure 2). Consideration of MMR vaccination status, exposure history, and local outbreak patterns can help guide risk stratification and the need for testing. Immunocompromised individuals, including those receiving immunosuppressive therapies for dermatologic conditions, may present atypically, lacking the prototypical exanthem or displaying milder signs and further complicating the diagnosis.¹⁵ The differential diagnosis for measles includes a drug reaction or other viral exanthem, and a detailed history may help elucidate the culprit.

Evaluation and Diagnosis

Definitive diagnosis of measles relies on both molecular and serologic testing. Nasopharyngeal swabs for measles polymerase chain reaction testing are obtained using synthetic (noncotton) swabs placed in a viral transport medium. Serum samples also should be collected for measles IgM and IgG antibody testing. Importantly, measles is a reportable illness, and testing may be coordinated with local departments of health.

Determining a patient's immune status may be important for certain populations. Patients with documented 2-dose MMR vaccination, positive measles IgG serology,



FIGURE 1. Exanthem on the cheek in a child with measles during an outbreak in 2024. Image courtesy of Tatiana Lanzieri, MD, MPH/Centers for Disease Control and Prevention.



FIGURE 2. Measles-induced morbilliform eruption on the trunk. Image courtesy of Heinz F. Eichenwald, MD/Centers for Disease Control and Prevention.

or a prior confirmed measles infection are considered immune. While a positive measles IgG indicates immunity, a negative result in an exposed patient should prompt consideration of postexposure prophylaxis with intravenous immunoglobulin.

Many patients, specifically those presenting to dermatology, are taking immunomodulatory or immunosuppressive medications—a contraindication for vaccination with the live MMR vaccine. At the time of publication, there was a single reported case of a patient taking a tumor necrosis factor α inhibitor for rheumatoid arthritis who had acquired measles.¹⁶ While the benefits of titer assessment in patients who are starting or continuing immunomodulatory therapy are not known and currently it is not recommended by the Centers for Disease Control and Prevention, dermatologists might consider checking MMR titers and vaccinating (or referring for vaccination) nonimmune patients.¹⁷

Infection Control

Early identification of a suspected measles case is paramount. Patients in whom measles is a possibility should be isolated as quickly as possible, and the patient and accompanying caregivers should be masked. Clinical staff should don appropriate personal protective equipment, including an N95 mask. Coordination with the local department of health must occur as soon as measles is suspected.

If testing is an option in the outpatient setting, a nasopharyngeal viral swab and serologic titers can be obtained. If testing is not available on site, patients should be sent to appropriate care facilities; prenotification is critical to prevent nosocomial outbreaks. Patients should be encouraged to isolate and avoid public spaces and/or public transport for 4 days following development of an exanthem.¹⁸ Offices should develop clinical protocols for suspected measles cases with training for clinical and office staff.

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Final Thoughts

As measles outbreaks become more prevalent, it is incumbent upon physicians to remind ourselves of the signs and symptoms of this largely eliminated disease so that we may pursue early detection and intervention strategies. The primary cutaneous manifestations of measles make dermatologists critical to early recognition and containment efforts. Dermatologists should prepare for the arrival of patients with measles by maintaining vigilance for the classic signs of the disease, implementing stringent isolation protocols, verifying patient immunity when appropriate, and partnering closely with public health authorities.

More broadly, efforts to contain and re-establish a paradigm for eliminating measles outbreaks must be pursued. Encouraging vaccination and developing programs to help combat misinformation surrounding vaccines are critical to this effort. In an era of vaccine hesitancy, measles is a multidisciplinary public health emergency. Dermatologists must remain ready.

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