

Measles resurgence in early 2025: Transatlantic outbreak dynamics and urgent public health imperative

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Abstract

Early 2025 witnessed a troubling return of measles in the United States (647 first quarter cases, a 5.8-fold jump) and the European Union/European Economic Area (EU/EEA) (1,279 first quarter cases, a 9% climb). Driven by insufficient vaccination, outbreaks were most intense in Texas and Romania, with young children most vulnerable. This analysis highlights the urgent necessity for targeted actions to bolster population immunity, protect at-risk individuals, and halt ongoing transatlantic transmission.

Keywords: Measles; Vaccine Coverage; United States; European Union/ European Economic Area; Epidemiology; Outbreaks

1. Introduction

A concerning measles resurgence emerged in the first quarter of 2025 in the United States (U.S.) and the European Union/European Economic Area (EU/EEA) [1,2], placing renewed pressure on measles elimination goals. The analysis focuses on the first quarter (Q1) of 2025 versus Q1 of 2024; the latest European Centre for Disease Control March data defined the first quarter comparison for regional consistency. This study aims to analyze the early 2025 US/EU measles outbreaks, informing an urgent response.

2. Methods

This study is a comparative analysis of publicly available, aggregated surveillance data. Data for the United States, including weekly case counts, geographical distribution, kindergarten vaccination coverage, and hospitalization statistics, were obtained from the U.S. Centers for Disease Control and Prevention (CDC) and its reporting systems [1,3,4,5]. European Union/European Economic Area data, including monthly case counts, geographical distribution, regional vaccination coverage estimates, and age-specific incidence, were sourced from European Centre for Disease Prevention and Control (ECDC) reports [2, 6]. The analysis involved descriptive summaries of epidemiological data, including case numbers, geographical concentrations, vaccination coverage trends, and age-specific health outcomes.

3. Results

The U.S. experienced a measles outbreak, with 647 reported cases, a figure 5.8 times higher than in early 2024[1]. This rapid increase created a steep upward trend in weekly case reports (Figure 1). Across the Atlantic, the European Union/European Economic Area (EU/EEA) had 1,279 cases, a 9% rise [2], showing a declining monthly trend by March (Figure 2), highlighting distinct control challenges.

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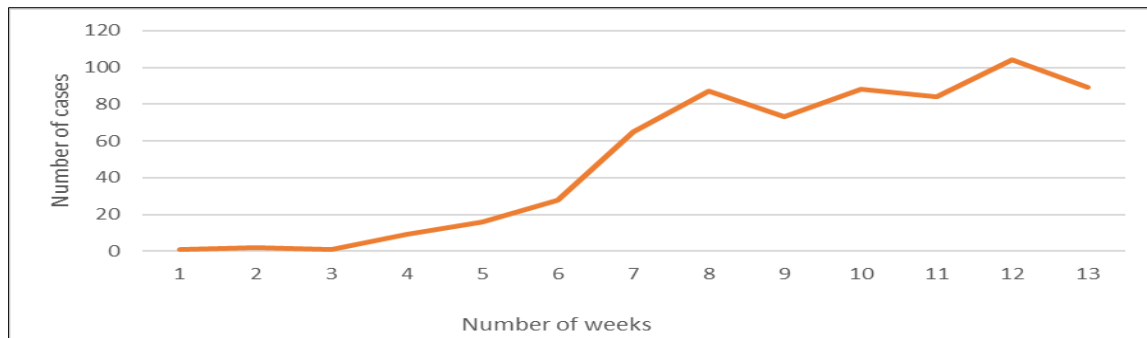


Figure 1 Weekly reported measles cases, United States, epidemiological weeks 1–13 2025 (n=647)

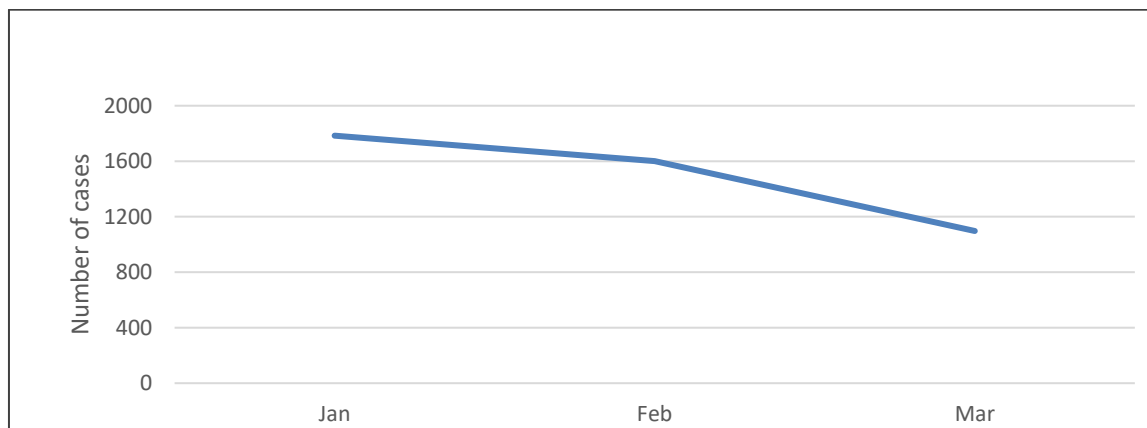


Figure 2 Monthly reported measles cases, EU/EEA, January–March 2025 (n=1,297)

The 2025 measles surge has been characterized by intense geographical clustering in the United States. Of the 647 cases reported nationwide by the end of March 2025, 536 cases (82.8%) were concentrated in Texas [1,3]. This outbreak in Texas has been substantial, with additional smaller clusters and sporadic cases reported in New Mexico, Kansas, and Ohio, alongside pockets of cases in several other states [4]. This distribution points to specific communities or regions with significant immunity gaps driving the national increase.

Within the EU/EEA, a persistent pattern of geographical concentration at the national level continues to influence regional epidemiology. Romania, one of the thirty EU member states, accounted for 71.46% of all measles cases reported in the EU/EEA between January and March 2025 [2]. This follows a similar trend where Romania was responsible for 80.16% of cases during the same period in 2024 [2]. The sustained high burden in a single Member State significantly impacts the overall EU/EEA figures and highlights ongoing, deeply entrenched transmission challenges within specific European regions.

Achieving and maintaining high population immunity through robust two-dose measles-mumps-rubella (MMR) vaccination coverage is the cornerstone of measles prevention. However, recent data reveal vulnerabilities in both regions. In the EU/EEA, between 2022 and 2023, coverage for the first dose (MMR1) decreased slightly from 94.2% to 93.9%, while second dose (MMR2) coverage fell from 89.3% to 88.8% [2]. Critically, only four EU/EEA countries (Hungary, Malta, Portugal, and Slovakia) reported achieving the WHO-recommended target of at least 95% coverage for MMR1 and MMR2 in 2023 [2]. This indicates that most European countries have suboptimal population protection.

In the United States, national data for kindergarten children also suggests challenges. Two-dose MMR coverage among kindergarteners was 93.1% for the 2022-2023 school year, slightly decreasing to 92.7% for the 2023-2024 school year [1,5]. While these national averages are close to the 95% target, they often mask significant sub-national variations and pockets of under-vaccination that can sustain outbreaks, as evidenced by the current situation in Texas.

The impact of these outbreaks is disproportionately felt by the youngest and most vulnerable. In the U.S., of the 1,024 total cases reported as of May 16, 2025, 13% (128 cases) required hospitalization [1]. This severity was most pronounced in children under five years of age, where 23% (69 of 303 cases) were hospitalized. Hospitalization rates were lower for older groups, at 9% for those aged 5-19 years (33 of 388 cases) and 8% for adults aged 20 years and older (25 of 325 cases) [1].

In the EU/EEA, infants under one year of age who are too young for the first routine MMR dose experienced the highest incidence rate for the epidemiological year April 2024 – March 2025, at approximately 850 cases per 1,000,000 population. This group accounted for 48.6% of all reported cases. Children aged 1–4 years were the next most affected group, representing 26.7% of total cases [2]. These figures underscore the need to protect young children who have not yet completed their recommended vaccination schedule.

4. Discussion

First-quarter 2025 data show a convergent measles resurgence in the U.S. and EU/EEA, concentrated in low-coverage pockets, with pronounced severity in young children. The U.S. surge was rapid and clustered; Europe's higher case numbers were driven mainly by Romania. Neither region meets the 95% MMR2 threshold for herd immunity. The resurgence of measles demands immediate and targeted public health interventions. Based on the current outbreak characteristics and established best practices, the following five safeguards are recommended:

Intensified Outbreak Response in Hotspot Regions: A focused and intensified outbreak response is crucial for areas like Texas in the U.S. and regions with persistently high transmission in the EU/EEA. This includes active case finding, rapid contact tracing, and deployment of supplementary immunization activities (SIAs) targeting susceptible populations, particularly in affected communities [7,8].

Enhanced Protection for Infants and Young Children: Given the high incidence and severity in children under five, strategies to protect this group must be prioritized. This includes ensuring timely administration of routine MMR doses and considering the provision of MMR vaccine to infants aged 6-11 months in recognized outbreak settings based on risk assessment and national guidelines [6,7].

Targeted Catch-Up Vaccination Campaigns: The U.S. and EU/EEA data indicate immunity gaps. Public health authorities should implement targeted catch-up vaccination campaigns for all age groups, focusing on unvaccinated or partially vaccinated individuals in communities with low coverage or active transmission, utilizing schools, community centers, and healthcare providers [7,9].

Strengthened Vaccine Demand and Misinformation Management: Declining coverage rates and outbreaks are often linked to vaccine hesitancy, fuelled by misinformation. Robust public health communication campaigns are needed to reinforce vaccine confidence, address concerns, and rapidly counter measles misinformation using evidence-based messaging and community engagement [10,11].

Improved Subnational Data Monitoring and Sharing: The Texas situation highlights the importance of granular, sub-national data. Regular monitoring and transparent sharing of vaccination coverage, exemption rates, and case data at local levels are essential for early detection of immunity gaps and timely, targeted interventions in both the U.S. and EU/EEA [9,12].

The five proposed safeguards require executive public health action, not new legislation. Early infant dosing protects the most vulnerable, walk-in clinics and non-medical exemption freezes address coverage gaps, and open data with misinformation monitoring tackles information deficits. These measures are time-sensitive. Summer travel will increase transmission opportunities.

All 2025 case counts are provisional and subject to revision.

5. Conclusion

Acting in June–June 2025, before peak mobility, is crucial to prevent the U.S. trajectory from replaying more widely in Europe. Inaction risks losing Europe's 2017 elimination status and prolonging the U.S. outbreak, underscoring that measles elimination requires sustained vigilance and rapid response.

Compliance with ethical standards

Disclosure of conflict of interest

The authors confirm they have no financial or other competing interests that could have influenced the work reported in this paper.

Statement of ethical approval

All data analyzed were aggregated, anonymized surveillance outputs already in the public domain or from publicly accessible reports; no individual-level patient information was accessed or utilized beyond health authorities' publicly reported information. Analysis of such publicly available secondary data does not typically require formal human-subjects ethical review.

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