

# Variability in Recommendations for Measles, Mumps, Rubella Vaccination, and Vitamin A Administration in the Setting of Measles Outbreaks

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## Summary

A survey of Emerging Infections Network members conducted in June 2025 of 169 pediatric infectious disease physician respondents practicing in the United States demonstrated that risk assessments drove pre-travel measles, mumps, rubella vaccine recommendations. Hospitalization, oral formulation availability, oral administration, and vitamin A deficiency influenced vitamin A recommendations.

## INTRODUCTION

Measles incidence has increased globally since 2020, with prolonged outbreaks now threatening measles elimination status in the United States.<sup>1</sup> As cases rise, clinicians are more frequently encountering challenges with interpreting guidelines for measles, mumps, rubella vaccine (MMR) dose 0 and early dose 2 administration in young children<sup>2,3</sup> due to:

- A) Difficulties in assessing exposure risk related to travel
- B) Balancing exposure risk with the potential of impaired measles neutralizing antibody levels with subsequent MMR doses following dose 0 administration in infants<sup>4</sup>
- C) Limited data on vitamin A effectiveness outside of resource-limited countries
- D) Practical challenges of administering vitamin A to young children<sup>5</sup>

Our aim was to assess early MMR vaccination and vitamin A treatment recommendations by pediatric ID physicians.

## METHODS

The Infectious Diseases Society of America Emerging Infections Network (EIN) is a U.S. Centers for Disease Control and Prevention (CDC)-funded, provider-based emerging infections

sentinel network composed of members of the ID community.<sup>6</sup> An 8-question electronic survey was developed and distributed via email to EIN pediatric ID physician members in June 2025 ([Appendix A](#)). Survey results were summarized using descriptive statistics using SAS v9.4 software.

## RESULTS

Overall, 169 of 429 (39%) EIN members responded to the survey that they provide counsel for MMR vaccination. Respondent characteristics described in [Appendix B](#).

Survey responses on recommendations for administering MMR dose 0 to infants and MMR dose 2 to children earlier than 4 years old are summarized in the [Table 1](#). Variability existed in vaccine recommendations prior to international travel, prior to domestic travel, and for those living in an area experiencing an outbreak.

Most respondents recommended vaccination prior to international travel only to countries with either endemic transmission (42%, 71/168, for dose 0; 45%, 77/178, for early dose 2) or to countries reporting cases in the prior 6 months (29%, 49/168, for dose 0; 26%, 43/165, for early dose 2). Only 29%, 48/168, (dose 0) and 27%, 45/165, (dose 2) of respondents recommended administering early vaccination prior to any international travel regardless of country. For domestic travel, most respondents recommended both dose 0 (77%, 129/167) and early dose 2 (76%, 125/164) prior to domestic travel to any county currently experiencing a measles outbreak.

Survey responses on recommendations for vitamin A treatment of measles infection are summarized in [Appendix C](#). Most respondents recommended vitamin A for any child

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**Table 1.** Responses Regarding MMR Vaccine Dose 0 for Infants Prior to 12 Months and Dose 2 Prior to 4–6 years of Age.

| Survey Question                                                                                                         | Dose 0<br><12 months<br>n/N (%) | Early Dose 2<br><4–6 years<br>n/N (%) |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------|
| <b>MMR vaccination prior to international travel</b>                                                                    |                                 |                                       |
| Recommend prior to any international travel<br>(ie, travel to either endemic or measles-eliminated countries)           | 48/168 (29%)                    | 45/165 (27%)                          |
| Travel to countries with endemic transmission only<br>(ie, excluding travel to any measles-eliminated country)          | 71/168 (42%)                    | 77/165 (45%)                          |
| Travel to countries with endemic transmission or measles-eliminated countries with reported cases in the past 6 months: |                                 |                                       |
| • Any number of cases in the past 6 months                                                                              | 7/168 (4%)                      | 5/165 (3%)                            |
| • $\geq 10$ cases in the past 6 months                                                                                  | 11/168 (7%)                     | 7/165 (4%)                            |
| • $\geq 100$ cases reported in the past 6 months                                                                        | 21/168 (12%)                    | 23/165 (13%)                          |
| • $\geq 1000$ cases reported in the past 6 months                                                                       | 10/168 (6%)                     | 8/165 (5%)                            |
| <b>MMR vaccination prior to domestic travel</b>                                                                         |                                 |                                       |
| Recommend prior to travel to any county currently experiencing a measles outbreak                                       | 129/167 (77%)                   | 125/164 (76%)                         |
| • Travel to outbreak county, only if recommended by a local public health authority                                     | 42/167 (25%)                    | 43/164 (26%)                          |
| Recommend prior to travel to any county <i>adjacent</i> to counties currently experiencing a measles outbreak           | 74/167 (44%)                    | 69/164 (42%)                          |
| • Travel to an adjacent county, only if recommended by a local public health authority                                  | 45/167 (27%)                    | 46/164 (28%)                          |
| <b>MMR vaccination for those living in the United States</b>                                                            |                                 |                                       |
| Recommend prior to travel to any county currently experiencing a measles outbreak                                       | 119/163 (73%)                   | 118/162 (73%)                         |
| • Travel to outbreak county, only if recommended by a local public health authority                                     | 49/163 (30%)                    | 45/162 (28%)                          |
| Recommend prior to travel to any county <i>adjacent</i> to counties currently experiencing a measles outbreak           | 59/163 (36%)                    | 64/162 (40%)                          |
| • Travel to an adjacent county, only if recommended by a local public health authority                                  | 45/163 (28%)                    | 46/162 (28%)                          |

n = number of respondents with “yes.” N = total number of respondents.

hospitalized with measles (78%, 131/168). Responses were divided for vitamin A treatment in children with measles who do not require hospitalization: 36% (61/168) recommended treatment, 8% (14/168) recommended only if the child could swallow capsules or has suspected vitamin A deficiency, and 36% (61/168) do not routinely administer vitamin A in non-hospitalized children.

## DISCUSSION

This national survey of pediatric ID physicians showed substantial variability in recommendations for administering MMR dose 0 to infants and early MMR dose 2 to children younger than 4 years old. Fewer than 30% of respondents indicated they recommend early MMR vaccination prior to international travel regardless of destination country as per current CDC guidelines,<sup>3</sup> suggesting most instead favor an itinerary-specific assessment to determine potential exposure risk. Similarly, fewer than 30% of respondents recommended early MMR vaccination related to domestic outbreaks only if recommended by a local public health authority. Most

respondents indicated they recommend early MMR vaccination in domestic areas experiencing outbreaks. These results may indicate either a preference for local transmission data to drive vaccine recommendations, difficulty in identifying county-specific public health recommendations, or variability in assigning county-specific risk. Survey vaccine responses did not vary significantly between MMR dose 0 in infants and early MMR dose 2 recommendations, with similar distribution of responses for international travel, domestic travel, and children living within outbreak areas.

Responses were mixed regarding adherence to the World Health Organization recommendations for administering vitamin A to all children with measles, regardless of hospitalization status. Heterogeneity in responses may be due to limited data on the effectiveness of routine vitamin A treatment in children with measles outside of resource-limited countries as well as the practical challenges of administering large oral doses in young children.<sup>5</sup>

There are limitations to this survey. The survey did not include questions about other variables which may factor into

travel risk assessment, such as mode and duration of travel, planned activities, potential exposure to crowds, and vaccine status of family members including young siblings. Selection bias may be present as pediatric ID physicians only within EIN participated and those actively involved in measles outbreaks may have been more likely to respond. The survey was not designed to identify specific rationale behind when respondent recommendations differed from public health guidelines such as following hospital-based practice guidelines.

Survey responses potentially indicate that many pediatric ID physicians are incorporating a risk assessment into their pre-travel MMR vaccine recommendations, and we suspect that there are increases in shared-decision making with parents given extent of variability. Updating national guidelines to reflect a standardized domestic and international travel risk assessment could improve adherence to recommendations and reduce variability. Additionally, centralization and standardization of local public health recommendations in outbreak settings regarding early MMR vaccination may help improve adherence and reduce variability, particularly for out-of-state clinicians who are assessing risk of domestic travel. Lastly, updated data are needed to better understand the potential benefit of vitamin A administration in children with measles within the United States.

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#### Supplementary material

Supplementary material is available at *Journal of the Pediatric Infectious Diseases Society* online (<https://jpid.oxfordjournals.org>).

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#### Conflicts of interest

None.

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