

# Onward transmission following measles secondary vaccination failure: a systematic review

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## Background

Despite the effectiveness of measles containing vaccines, infection remains possible in immunised individuals. This phenomenon is known as vaccination failure. Secondary vaccination failure is a result of waning or incomplete immunity. Measles infection after secondary vaccination failure is generally milder (i.e. less cough, coryza, conjunctivitis, or fever), associated with lower viral loads, and with lower risk of complicated disease. This form of measles is thought to occur due to insufficient but not absent immune response.

It has been hypothesized that due to reduced symptomatology and lower viral loads, secondary vaccination patients are less likely to transmit the measles virus.

## Objectives

This systematic review aimed to assess transmission risk of measles following secondary vaccination failure.

## Methodology

Pubmed, Embase, and Web of Science databases were searched from inception. Inclusion criteria included articles describing individual/s who were exposed to measles infected persons who had experienced secondary vaccination failure.

## Results

Across the included fourteen studies, >3030 individuals were exposed to the virus from secondary vaccination failure cases, of which 180 were susceptible – this resulted in secondary attack rates of 0% - 6.25%. From the studies, 109 cases of secondary vaccination failure were identified, with 10.09% (n=11) transmitting the virus, resulting in 23 further cases, and yielding an effective reproduction number ( $R_{eff}$ ) of 0.063 (95% CI 0.0, 0.5).

## Discussion/conclusion

Our findings suggest a remarkably low attack rate in secondary vaccination failure cases. In large outbreak situations, public health management of measles cases in unvaccinated individuals could be prioritised before those with secondary vaccination failure.