The contribution of local demographic conditions and future vaccination policies to measles elimination

Filippo Trentini1, Piero Poletti2, Stefano Merler2, and Alessia Melegaro

[[1]](#footnote-1)**Abstract** The persistent circulation of measles in both low-income and high-income countries requires a better characterisation of present epidemiological trends and existing immunity gaps across different sociodemographic settings. This study aims to investigate how measles immunity has changed over time across different socioeconomic settings, as a result of demographic changes and past immunisation policies.

According to our results the reduction in fertility that has occurred during the past decades in high-income countries has contributed to almost half of the reduction in measles incidence. In low-income countries, where fertility is high, the population is younger and routine vaccination has been suboptimum. Susceptible individuals are concentrated in early childhood, with about 60% of susceptible individuals in Ethiopia younger than 10 years. In these countries, Supplementary Immunization Activities (SIAs) were responsible for more than 25% of immunised individuals (up to 45% in Ethiopia), mitigating the consequences of suboptimum routine vaccination coverage.

Future vaccination strategies in high-fertility countries should focus on increasing childhood immunisation rates, either by raising first-dose coverage or by making erratic SIAs more frequent and regular. Immunisation campaigns targeting adolescents and adults are required in low-fertility countries, where the susceptibility in these age groups will otherwise sustain measles circulation.

**Key words:** Measles, compartmental models, epidemiology, vaccination, outbreak

1. Filippo Trentini Dondena Centre for Research on Social Dynamics, Università Commerciale L. Bocconi, Milan, Italy; email: trentini.filippo@unibocconi.it

Piero Poletti, Bruno Kessler Foundation, Trento, Italy;

Stefano Merler, Bruno Kessler Foundation, Trento, Italy;

Alessia Melegaro Department of Policy Analysis and Public Management, Università Commerciale L. Bocconi, Milan, Italy; email: alessia.melegaro@unibocconi.it

 [↑](#footnote-ref-1)