Is it time to reconsider measles, mumps, and rubella immunisation strategies?

a hexavalent vaccine in pregnant women, diaplacental transfer of antibodies, and protection of neonates from disease, disability, or death.

I was part of the EU-funded (7th Framework Programme) project DEVANI (Design of a Vaccine to Immunize Neonates Against GBS Infections through a Durable Maternal Immune Response) for which Novartis Vaccines and Diagnostics was part of the project team.

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Since the late 1990s, measles has continued to be a public health problem, and so WHO launched a global plan for measles and congenital rubella elimination in 1997. Despite the relevant efforts, the goals of elimination have not yet been achieved, and the deadline to reach them has been postponed many times. Moreover, even in areas where high immunisation coverage has been registered, epidemics of measles have occurred in the past 10 years worldwide.[1-4] What can be done to eliminate this disease?

Increased immunisation coverage in children and susceptible individuals continues to be the most important way to reach the elimination objectives. However, it is now evident that vaccination uptake should be encouraged in any suitable way. For example, some countries have adopted effective mandatory vaccination, in order to increase coverage.[5]

In addition, it is also necessary to better understand potential problems of immunogenicity (primary vaccine failure) and the waning protection over time (secondary vaccine failure) of the measles-mumps-rubella (MMR) vaccine.

In *The Lancet Infectious Diseases*, Julie Schenk and colleagues[6] did an accurate meta-analysis, which is—to our knowledge—the first of its kind, on the overall data related to the immunogenicity and antibody persistence after immunisation with trivalent MMR vaccines. Their results show that antibody levels are high (>91%) soon after immunisation, but they decline over time. These data could be very useful for the future assessment of MMR immunisation strategies and their effectiveness. Thus, continuing to vaccinate is imperative, but we must keep in mind that primary and secondary vaccine failure can sometimes occur.

As reported by the authors, their results are also valuable to build more truthful mathematical models representing transmission of infectious diseases. These models will allow us to identify the most relevant susceptible groups in society and, consequently, the most suitable vaccination strategies to achieve the elimination of measles. However, it will also be crucial to recognise that the circulation of wild-type viruses decreases and natural boosters disappear when universal immunisation is implemented. The reduction of natural boosters could have a further relevant impact on the rate of waning of immunity. This issue in particular must be included in any future consideration of strategies for the prevention of measles.

The authors analysed humoral immunity only, which is a proxy in the estimation of protection, and could

therefore underestimate the real level of protection, as cellular immunity was not included. In this sense, low antibody concentrations do not necessarily correspond to a lack of protection. However, these are the best data available so far and, if correctly used, could be very useful in the assessment of future public health decisions. Meanwhile, we are waiting for new scientific evidence on the degree of protection via cellular immunity, in people without detectable antibodies.

Data retrieved in this systematic review are from healthy individuals. Thus, it is reasonable to suppose a lower response (such as lower immunogenicity and shorter duration of protection) in individuals with underlying health conditions. Therefore, attention should be paid to identify and protect these target groups.

Standardisation of serological tests for immunity is also desirable. The definition of a gold-standard cutoff level of seropositivity for protection against measles, mumps, and rubella will allow results that are comparable between laboratories and countries to be obtained, and reliable sero-epidemiological profiles of the population to be established,[7] to identify susceptible individuals to whom prevention activities should be addressed.

In the past 10 years, vaccine hesitancy has led to a decrease in the uptake of the MMR vaccine. At present, a further issue to consider is the impact of the current COVID-19 pandemic on vaccination. During this emergency, a general reduction of immunisation coverage is expected worldwide, as shown by preliminary data registered in the USA.[8] In the near future, if these negative trends are confirmed, we can foresee an increase in vaccine-preventable infectious diseases. This concern should be kept in mind when planning future catch-up campaigns to immunise individuals who missed vaccinations during the COVID-19 pandemic.

Because of the aforementioned issues, effective organisation of public health initiatives becomes much more important in each country, to protect susceptible individuals and difficult-to-reach populations. In particular, health-care workers should ensure that they correctly communicate the effectiveness of the MMR vaccine to the general population.[9]

Therefore, in the future, we must reconsider the current MMR immunisation strategies, on the basis of the relevant data on primary and secondary vaccine failure, as reported by Schenk and colleagues.

We declare no competing interests.

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Concerns and motivations about COVID-19 vaccination

More than 200 COVID-19 vaccines are in development worldwide, with governments securing deals to access advance doses. But access is only one issue. Willingness to accept a COVID-19 vaccine when it becomes available has varied considerably across countries over the course of the pandemic. In *The Lancet Infectious Diseases*, we presented data collected in Australia in April, 2020,[1] which suggested 86% of people surveyed (3741 of 4362) would be willing to vaccinate against COVID-19 if a vaccine became available. Furthermore, the COCONEL group[2] showed in March, 2020, that 74% of French citizens would vaccinate. Between April and July, 2020, willingness to vaccinate has ranged from 58% in the USA[3] to 64% in the UK[4] and 74% in New Zealand.[5] The New Zealand data showed that the most commonly reported reasons to get vaccinated were to protect

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