

## Eliminating measles — no quick fix

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In recent years, a number of countries have had notable success in eliminating measles using a variety of vaccination strategies. Three WHO regions — the Americas, the Eastern Mediterranean and Europe — now have measles elimination goals. In the Americas a strategy based on supplementing high routine coverage with an initial catch-up and periodic follow-up campaigns has achieved a dramatic reduction in measles incidence and interrupted transmission in many areas (1). Other countries have eliminated indigenous measles transmission with a routine two-dose schedule by reaching coverage of over 95% (e.g. Finland, Hungary, United States). A similar result has been achieved in Canada, Oman and the United Kingdom by following a catch-up campaign with a routine two-dose schedule. The success of these different strategies is based on a common characteristic: they all reduce the proportion of the population susceptible to measles infection to below the level at which infection can remain endemic (the herd immunity threshold) (2), and maintain it there. This causes chains of transmission to die out and prevents sustained transmission from becoming re-established if the infection is re-introduced by an imported case (3).

Catch-up campaigns that immunize a high proportion of the susceptibles in a population (by targeting the right age group and reaching previously unvaccinated children) have a rapid and dramatic impact on measles transmission. However, campaigns need to be followed by high routine coverage to prevent the reaccumulation of susceptibles to levels that will permit sustained measles transmission (4). Examples from the Americas illustrate this: inadequate infant coverage has been identified as the main cause of recent measles outbreaks in Argentina, Bolivia and the Dominican Republic despite the implementation of supplemental campaigns (1). This

should serve as a reminder to other countries aiming for measles elimination: it is easier to achieve impressive progress initially than to sustain elimination in the long term.

The WHO strategy for the elimination of measles from the European Region recognizes both theory and experience by setting explicit target levels of susceptibility for each age group (5). Starting from a knowledge of its own susceptibility profile, each country can design an appropriate vaccination programme to reduce the proportion susceptible below these target levels. In each country, the susceptibility profile can be estimated from vaccination coverage and disease incidence data, but the most direct evidence comes from seroprevalence studies of the type described by Salmaso and colleagues in this issue of the *Bulletin* (pp. 950–955). Such data provide a firm evidence base for vaccination policy decisions, by identifying susceptible cohorts. Recent developments in methods to detect antibody in oral fluid (rather than blood) facilitate the collection of suitable samples (6). Having developed appropriate vaccination strategies, the greater challenge is to implement them. This is where much more needs to be done in the European Region to reach the target of elimination by 2007.

The major burden of measles infection, however, is in developing countries, where 888 000 measles deaths are estimated to have occurred in 1998. In countries with significant measles mortality the emphasis is on trying to achieve measles control rather than elimination. In the African Region, which accounts for 40% of measles deaths, measles vaccination coverage in the first year of life is reported as 49% (7). Improving routine coverage remains the first priority for measles control. The rapid impact of vaccination campaigns covering wide age groups is seductive but short-lived unless coverage in the first year of life is improved.

The launch of the Global Alliance for Vaccines and Immunization (GAVI) has provided exciting new opportunities for funding improvements to vaccination programmes in the developing world. GAVI's drive to improve access to sustain-

able immunization services aims to ensure that 80% of developing countries have routine coverage of at least 80% in all districts by 2005. Improving routine coverage to this level is an essential first step in reducing the burden of measles, though it should be emphasized that even at 80% coverage the remaining burden of measles is high and may be comparable to that of hepatitis B and *Haemophilus influenzae* type b. That is, even at high levels of coverage the most effective (and cost-effective) option may be to continue to improve measles coverage, rather than introduce new vaccines. Funding appropriately designed supplemental measles vaccination in countries that have achieved 80% routine coverage would help to achieve GAVI's objective "to expand the use of all existing, safe and cost-effective vaccines where they address a public health problem". In the enthusiasm to introduce new vaccines into developing countries the need for improving measles control should not be forgotten. ■

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