Measles Eradication: Issues, Strategies and Challenges


Abstract

Measles is considered to be an important cause of morbidity and mortality in children, in developing nations. After poliomyelitis, measles is the next candidate disease for eradication. The feasibility of measles eradication has been studied and approved by an expert panel, convened by WHO. Pan American Health Organisation evolved the strategy for measles eradication which includes initial “catch up campaign” followed by “keep up” and “follow up” campaigns. Region of the Americas has achieved elimination of measles by adopting this strategy. To reduce measles mortality in South East Asia region, The Strategic Advisory Group of Experts (SAGE) has drafted recommendations, stating all children should receive two doses of measles vaccine. In spite of biological and technical feasibility, measles eradication faces ample challenges. Competing priorities like ongoing polio eradication, introduction of new vaccines under Universal Immunisation Program and other ongoing health initiatives, pose major challenges. Limited resources and injectable vaccine requiring trained workforce to administer, are other considerations. Wars, political and social unrest, as well as population displacement and migration, create hindrance in achieving and maintaining, good vaccine coverage, which is essential for eradication. Hence, measles eradication seems to be very challenging. Each and every part of the world should comply with the efforts for eradication; only then, global transmission of the disease can be terminated.

Background

Measles is a highly communicable, acute, viral infectious disease. References date back to early 10th century, when it was described by the Persian physician Rhazes as “more dreaded than smallpox”. Before a vaccine was available, infection with measles virus was nearly universal during childhood. Measles is still a common and often, a fatal disease, in developing countries.

Epidemiological features

Measles is a human disease. There is no known animal reservoir and an asymptomatic carrier state has not been documented. Transmission is primarily person to person via large respiratory droplets. It is highly communicable, with greater than 90% secondary attack rates among susceptible persons.† Worldwide, the disease infects nearly 30 million children each year, and deaths usually occur from complications related to pneumonia, diarrhoea and malnutrition.‡ WHO estimates that approximately two- thirds of the global burden of measles deaths, nearly 1,36,000 (range: 98,000 to 1,80,000), occurred in the South East Asian Region in 2007, with most of them occurring in India. India accounted for 47% of estimated global measles mortality in 2010.§ According to WHO estimates, measles is responsible for about 3% of under- five mortality in India. The median case fatality ratio (CFR) of measles in India is 1.63% [range: 0-30%].

Important issues regarding eradication

Research has demonstrated the need to have homogeneous population immunity of ≥93% to achieve measles elimination.¶ Eradication of measles requires achieving immunization coverage of at least 96% of children less than one year of age and that accumulation in the immunity gap be prevented. Three biological criteria are deemed important for disease eradication and all

*Resident, Department of Community Medicine, Lady Hardinge Medical College, New Delhi
**Associate Professor, Department of Community Medicine, Lady Hardinge Medical College, New Delhi
***Director Professor, Department of Community Medicine, Lady Hardinge Medical College, New Delhi

Correspondence to: Dr. Pritam Roy, Department of Community Medicine, Lady Hardinge Medical College, New Delhi. E-mail: drpritamroy@gmail.com

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these criteria are fulfilled in case of measles: (a) humans are the sole pathogen reservoir; (b) accurate diagnostic tests exist; and (c) an effective, practical intervention is available at reasonable cost. The feasibility of measles eradication has been discussed for more than 30 years, beginning in the late 1960s, when the long-term protective immunity induced by measles vaccines, was becoming evident. The programmatic and operational feasibility of measles eradication has been demonstrated by the Region of the Americas, where regional elimination of measles was achieved and interruption of transmission has been sustained since 2002.\

In 2008, the World Health Assembly requested a study on the feasibility of measles eradication and in 2010, an expert advisory panel convened by the World Health Organization to assess the same concluded that (a) measles can and should be eradicated, (b) eradication by 2020 is feasible if measurable progress is made towards existing 2015 measles mortality reduction targets, (c) measles eradication activities should occur in the context of strengthening routine immunization services, and (d) measles eradication activities should be used to accelerate control and elimination of rubella and congenital rubella syndrome (CRS).

**Strategies for measles eradication**

The strategy for measles elimination was pioneered by the Pan American Health Organization (PAHO) in 1991. The strategy includes: an initial “catch-up” campaign targeting all children aged 1–14 years, regardless of previous vaccination history; “keep-up” vaccination through routine health services; and periodic “follow-up” campaigns targeting children aged 1–4 years. The strategy led to the interruption of endemic measles virus transmission in the Americas in 2002. Confirmation of measles should be based on serological evidence or an epidemiological link with a laboratory-confirmed case. Determining the genome of the measles virus isolated from patients, facilitates the identification of the geographic sources of the outbreaks, and helps trace the chains of transmission.\

The WHO/UNICEF Global Immunization Vision and Strategy (GIVS) - was adopted in May 2005 at the 58th World Health Assembly. GIVS called upon the member countries to reduce the global measles deaths by 90% by 2010, as compared to 2000 estimates. Followed by this in 2007, the Regional Technical Consultative Group (TCG) endorsed the Strategic Plan for Measles Mortality Reduction in the South East Asian Region.\n
At the 2010 World Health Assembly, member states endorsed the following targets to be met by 2015 as milestones toward eventual global measles eradication: (a) raising routine coverage with first dose of Measles Containing Vaccine (MCV) to ≥ 90 % nationally, and ≥ 80% in every district or equivalent administrative unit; (b) reduction and maintaining annual measles incidence to < 5 cases per million; and (c) reduction of measles mortality by ≥ 95% in comparison with the estimated level in the year 2000.

To reduce measles mortality in South East Asia region, The Strategic Advisory Group of Experts (SAGE) had drafted recommendations, stating all children should receive two doses of measles vaccine. The criterion for starting routine second dose of measles vaccine is more than 80% coverage of the first dose for 3 consecutive years. Supplementary Immunization Activities should be stopped when there is more than 90-95% coverage of both the doses of measles vaccine nationally.\

Presently, India is in the final stages of a vast catch-up campaign aimed at vaccinating some 134 million children in the 14 states with the weakest immunisation programmes. The remaining states have introduced the second dose of vaccine; the others will follow.\n
**Challenges for measles eradication**

Despite the success in global measles control, progress towards reducing the numbers of measles cases and deaths stagnated between 2008 and 2010. This happened largely due to numerous prolonged measles outbreaks in Africa and Europe and the continued high measles disease burden in India. The number of measles cases in Europe, primarily in western European countries, grew from 7,499 in 2009 to more than 30,000 in both 2010 and 2011, contributing to a rise in the global number of reported cases. The outbreaks in Africa, during the same time period, represent a widespread resurgence of measles that affected 28 countries in sub-Saharan Africa.

There are many challenges for measles eradication. There are problems with vaccine administration. Measles vaccine is injectable and not easy to administer unlike polio vaccine. An army of trained workforce is required for vaccine administration. One plausible solution may be use
of aerosol technique which, with improved delivery system can be used by field worker also. This will be very helpful in increasing the acceptability of the vaccine as it does not require injections. Then, there are chances of adverse reactions to the live vaccine, which need to be addressed. Maintaining proper cold chain during storage and transportation of vaccine is also an important consideration.

Other important challenge is competing priorities like polio eradication, investing in streamlining of newer vaccines (against diarrhoea, pneumonia, and cervical cancer), and also in other health initiatives (e.g. against HIV/ AIDS, malaria, and tuberculosis). This competition from other health programs affects the availability of qualified staff as well as funds.

A measles eradication initiative would also face challenges from population displacement and migration. Currently, there are large displaced populations in big cities and metros. As a result of exponential increase in trans- migration, the measles program may face greater challenges than did eradication programs launched earlier. Key measles- endemic countries are at war, and the world is more heavily armed than ever. Terrorism, both real and perceived, adds to the complexity and reaching high rates of vaccine coverage in conflict- affected areas will be extremely difficult and dangerous.

Improved vaccination rates are critical for success of measles eradication, but the progress in this regard is not very satisfactory. Maintaining excellent vaccination coverage with high quality surveillance is essential. Meeting this challenge will be especially critical for dealing with importations of measles virus that will occur, as long as the virus is circulating anywhere in the world. Another challenge is to maintain high population immunity with excellent vaccination coverage and effective laboratory networking for high- quality surveillance.

Besides, the changing epidemiology of measles needs to be considered which causes an increased transmission among adolescent and adults.

In spite of all these challenges, there are factors favouring the success of measles eradication initiative including strong political and societal support, economic analyses demonstrating a high level of cost- effectiveness, and a rigorous up- front process. Compared with the previous ones, the present eradication initiative has validated the feasibility of achieving measles eradication.

**Conclusion**

Hence, it can be concluded, that measles eradication is a feasible target but it will be very challenging. Exponential increase in resources and commitment is an essential pre requisite, if we want to pursue measles eradication initiative. All the regions and countries of the world will have to work in collaboration, only then we will be able to achieve it and this will be a milestone in reducing child mortality and achieving MDG 4.

**References**


10. CDC. Eliminating Measles, Rubella, and CRS Worldwide. Available at: http://www.cdc.gov/globalhealth/measles/challenges/