

Lessons from the 2009 measles epidemic in South Africa

Eighteen years after an opinion piece entitled 'Lessons from the 1992 measles epidemic in South Africa' was published in the *SAMJ*¹ we now need to revisit the same message. This follows on the recent 2009/2011 outbreak, which has involved over 18 000 recognised cases and, presumably, several hundred deaths and many more children who will suffer permanent disabilities. This comes close to the 22 000 cases of the 1992 outbreak. The message remains the same. Why is this infectious disease, which is so easily prevented by a highly effective, safe and relatively inexpensive vaccine, still such a major cause of morbidity and mortality? Simply put, there are two related reasons. Firstly, measles ranks as one of the most contagious of all organisms, with a basic reproductive rate (a measure of its transmissibility) exceeding that of any other human pathogen.² Secondly, because of this, control of measles demands exceptionally high vaccination coverage, of the order of 95%, if transmission is to be interrupted and outbreaks prevented.^{3,4} The difficulty in maintaining such a high coverage in all districts of a country is a global problem, and 2010/2011 has seen outbreaks in many parts of the developed world, with 10 - 20-fold increases over previous years in measles cases in Europe and even a 10-fold increase in imported cases in the USA.^{5,6}

Initially South Africa had a reasonably good record with measles. It was one of the first countries in Africa to introduce measles vaccine (in 1975) and to adopt a two-dose schedule (at 9 and 18 months, in 1995).⁷ By 2003 it looked as if South Africa was well on the way to measles elimination. Between 1998 and 2003 an average of only 33 laboratory-confirmed measles cases per year were reported, with no deaths.⁸ Unfortunately, however, in 2003 the first of the post-1992 epidemics broke out, albeit relatively smaller than 1992, with 1 676 cases reported by the National Institute for Communicable Diseases.⁹ Four years later the 2009/2011 epidemic rivals that of 1992, with 18 434 laboratory-confirmed cases as at 19 May 2011.¹⁰

With the end of the current epidemic the great majority of the population has now been immunised, either by the vaccine or by wild-type virus. There is therefore now a breathing space that affords public health planners an opportunity to examine this last epidemic in detail in order to plan on preventing future epidemics. These will certainly occur within a few years as a fresh cohort of susceptibles enters the population, unless the deficiencies preceding 2009 are not urgently addressed. To plan ahead rationally, we need to recognise that South Africa currently cannot claim to be in a measles elimination phase. More realistically we are rather in an outbreak prevention phase, and short-term planning must be focused on measures urgently needed to prevent future epidemics. However, the temptation to respond by rushing into making changes to the current programme needs to be resisted unless there is compelling evidence to do so. The planning needs to follow a rational and systematic sequence. May I suggest the acronym 'MAMI', to denote measurement, analysis, motivation and implementation?

Measurement – and in-depth investigation and study of the 2009 epidemic – must be undertaken in the first instance.

Analysis. Examination of these data would then define the shortcomings and indicate the research questions that need to be addressed. These could include acquiring reliable vaccine coverage

data, possibly augmented by serosurveillance studies, and vaccine responses in South African children at different ages and HIV status. Additional tools such as modelling could also assist in forward planning, for example to assess the value of supplementary immunisation programmes.

Motivation. The next step would be to convince decision makers of the cost-effectiveness of acting proactively rather than reactively. In addition to health planners, many layers of society from health care professionals to parents and caregivers need to be energised to avoid a repetition of 2009, particularly now in an inter-epidemic period when there is a danger that lack of disease visibility will be likely to engender complacency.

Implementation. What emerges from a thorough analysis and in-depth study of measles in South Africa must now be rationally implemented. Planning must include the possibility that we will not be successful in circumventing future outbreaks, and an outbreak preparedness protocol, not unlike that set up for pandemic influenza, needs to be constructed for measles. Most importantly, sensitive clinical surveillance for early diagnosis of an impending outbreak is crucial.

It is of interest that as far back as 2002 a meeting of the World Health Organization International Task Force for Disease Eradication deemed measles to be technically feasible for eradication and stated that ultimately it should be a desirable goal.¹¹ South Africa, which was a pioneer on the continent in measles vaccination, should similarly be in a position to be the forerunner in Africa for measles elimination.

The opinions expressed are the personal opinions of the author and do not necessarily reflect the views of the Institution or any other body to which the author belongs.

Barry D Schoub

National Institute for Communicable Diseases/National Health Laboratory Service
University of the Witwatersrand
Johannesburg

Corresponding author: B D Schoub (barrys@nicd.ac.za)

References

- Schoub BD. Lessons from the 1992 measles epidemic in South Africa. *S Afr Med J* 1993;83:82-83.
- Moss WJ, Griffin DE. Global measles elimination. *Nature Rev Microbiol* 2006;4:900-908.
- Kelly H, Riddell M, Heywood A, Lambert S. WHO criteria for measles elimination: a critique with reference to criteria for polio elimination. *Euro Surveill* 2009;14(50):pii=19445. <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19445> (accessed 27 June 2011).
- Van Boven M, Kretzschmer M, Wallinga J, O'Neill PD, Wichmann O, Hahne S. Estimation of measles vaccine efficacy and critical vaccination coverage in a highly vaccinated population. *J R Soc Interface* 2010;7:1537-1544.
- WHO Global Alert and Response (GAR). Measles outbreaks in Europe. http://www.who.int/csr/don/2011_04_21/en/ (accessed 27 June 2011).
- Centers for Disease Control and Prevention. Measles – United States, January - May 20, 2011. *MMWR Morb Mortal Wkly Rep* 2011; 60: 666-668.
- McMurray ML, Gebremedhin G, van den Heever J, et al. Measles outbreak in South Africa, 2003-2005. *S Afr Med J* 2009;99:314-319.
- Integrated Measles Outbreak Task Team: National Department of Health. Strategies to contain measles outbreaks in South Africa. October 2003. In: Communicable Diseases Surveillance Bulletin, November 2004. <http://www.nicd.ac.za/assets/files/CommDisBullNov04.pdf> (accessed 27 June 2011).
- McAnerney JM, Harris BA. Measles outbreak, August 2003-2005. Poster presented at the Federation of Infectious Diseases Societies Congress, September 2007, Sun City.
- National Health Laboratory Service; National Institute for Communicable Diseases. Measles outbreak 2009. Updated 19 May 2011. http://www.nicd.ac.za/?page=measles_outbreak&id=92 (accessed 27 June 2011).
- World Health Organization. Meeting of the International Task Force for Disease Eradication, June 2009. *Wkly Epidemiol Rec* 2009;44:459-466.