

## Vaccination saves lives – dare we allow the anti-vaccine lobbyists to prevent it?



Vaccines are one of the safest and most effective tools available in efforts to control and prevent many infectious diseases.<sup>[1]</sup> When the Expanded Programme on Immunization (EPI) was established by the World Health Assembly (WHA) in 1974, only about 5% of the world's children were immunised against polio, diphtheria, tuberculosis, measles, pertussis and tetanus. In 2014, 40 years later, 83% were immunised, and the World Health Organization (WHO) estimates that this programme saves the lives of two to three million children every year.<sup>[2]</sup> There are a number of other success stories ... the complete eradication of smallpox, the near-elimination of polio, and the many countries that have reported elimination of measles (although there have been recent outbreaks in some of these).

South Africa (SA) introduced the EPI in 1974 and since then has included a number of additional vaccines. Hepatitis B vaccine was introduced in 1995 and *Haemophilus influenzae* type b in 1999, and SA was the first country in Africa to introduce vaccines against pneumococcal infections and diarrhoeal disease caused by rotavirus (in 2008). These vaccines have already had a significant impact on the burden of rotavirus infections and infections caused by *Streptococcus pneumoniae*. Another success story is that the last case of polio in SA occurred in 1989! The most recent addition was a vaccine against human papillomavirus (HPV) in 2014, which is offered to all grade 4 schoolgirls in public schools.<sup>[3]</sup> Moreover, all these vaccines are provided free of charge to all children.

It is, however, *vaccination* and not *vaccines* that saves lives, and high vaccine coverage is required to have a positive impact on the burden of disease. 2011 - 2020 has been declared 'The Decade of Vaccines' by the WHA, and their vision is to achieve universal access to immunisation with life-saving vaccines.

The WHO has recently voiced its concerns regarding vaccine hesitancy, defined as people delaying or refusing vaccines for their children or themselves. Globally one in five children still do not get routine immunisations, and an estimated 1.5 million children die every year from vaccine-preventable diseases. The issue is complex and is influenced by factors such as misinformation, concerns regarding vaccine safety, myths, mistrust, complacency and convenience.<sup>[4]</sup> Much of this is fuelled by the anti-vaccine lobbyists, and evidence suggests that in North America, Europe and other parts of the world, public confidence in vaccines is decreasing, from both safety and efficacy perspectives, and anti-vaccine movements are becoming stronger.<sup>[5]</sup> Even though SAGE (the Strategic Advisory Group of Experts in Immunization) has stated that scientific reports indicate that there is no evidence of adverse events following immunisation, the public needs more convincing. There appears to be a discrepancy between scientific evidence and perception of risk.<sup>[6]</sup>

The anti-vaccine contingent largely has the privilege of living in places where many deadly communicable diseases are rare, and as a result has a good chance of never contracting the diseases. This is a luxury not afforded to those living in many areas of the world.<sup>[2]</sup> However, poor vaccination coverage leads to loss of herd immunity, which may then result in an outbreak, irrespective of where one lives. The Disneyland measles outbreak earlier this year attests to this.<sup>[7]</sup> Among the 110 California patients, 49 (45%) were unvaccinated; 12 were infants too young to be vaccinated, and 28 were intentionally unvaccinated because of personal beliefs.

Vaccination is often the victim of its own success – for example, high coverage of oral polio vaccination has resulted in the number of polio cases dropping from >350 000 in 1989 to <400 cases worldwide in 2014. Now the rare adverse event of vaccine-associated paralytic polio is seen as a considerable risk, and a number of vaccine-derived polio cases are seen.

Internet-based anti-vaccination lobbying has been acknowledged for many years, but most has originated from the USA. The websites are usually hosted by sophisticated organisations that appear to be official and authoritative. Many of the top internet search results for vaccine safety question or dispute the scientific consensus about safety and efficacy of vaccines.<sup>[1]</sup> The study by Burnett *et al.*<sup>[8]</sup> investigated anti-vaccination lobbying on SA webpages over three years (2011 - 2013), looking at the characteristics of these. Website articles and blogs/forums constituted the two leading platforms, with the largest portion of authors being lay people – mostly parents. These would appeal emotionally to readers of these blogs as they are able to identify with the authors. The majority of the claims were that vaccines were not safe, and most of them originated from the USA.

One has to wonder what the motivation for these anti-vaccine lobbyists is. From the study, it appears to be overwhelmingly profit driven. The proportion of commercial web pages increased each year during the study, making up 55% of the final analysis, and 67.6% of these were sponsored by organisations with financial interests in discrediting vaccines. The irony is that many of the anti-vaccine lobbyists claim that vaccination is profit driven, while their sponsors work in an industry that was worth USD 61 - 68 million (in 2009) and the global vaccine market was only worth USD 24 million.

Scepticism and rejection of vaccines is not new, but issues in the 21st century play an important role. These include the accelerated introduction of additional vaccines into routine programmes.

The Global Advisory Committee on Vaccine Safety monitors the safety of vaccines closely and is concerned that allegations of harm accruing from vaccines that are based on weak evidence will lead to real harm when, as a result, safe effective vaccines cease to be used. This is vividly illustrated by the story of HPV vaccination in Japan: HPV vaccination was offered free of charge to young girls and was added to the immunisation programme; the rate of completion (of three doses of the vaccine) was 74%, but following unconfirmed reports of adverse reactions to the vaccine, the Ministry of Health suspended proactive recommendations for the vaccine. This led to a drop in HPV vaccination to 0.6% in spite of an investigation that concluded that there was no causal association between the vaccine and events.

We do not know the actual vaccine coverage rates in SA, owing to some confusion regarding the denominator. Rates are not optimal, however, for a number of reasons that include vaccine shortages and lack of accessible clinics. It would be a travesty if this was exacerbated by the effect of the anti-vaccine lobbyists. Fortunately, because vaccination is voluntary in SA, the ethical and religious concerns that are touted in the USA are less of an issue.

The number of people in SA who have access to the internet has increased substantially, so potentially many more people have access to the anti-vaccine websites. The question now is what impact this SA based anti-vaccination lobbying might have on the uptake of vaccines in the country, and what can be done to overcome the problem. It is also important to acknowledge that anti-vaccination lobbying can

also occur through all social media channels, as well as sources seen as trusted, but that may be misinformed.

Effective communication is key to dispelling fears, addressing concerns and promoting acceptance of vaccination.<sup>[4]</sup> One way of countering people's anti-vaccine attitudes is to make them appreciate the consequences of failing to vaccinate their children.

**Conflict of interest.** The author does talk for Aspen GSK, Sanofi Pasteur and MSD, but there is no conflict of interest with regard to this invited editorial.

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*S Afr Med J* 2015;105(11):881-882. DOI:10.7196/SAMJ.2015.v105i11.10175