VOLUME 5, NO. 2

COMMUNICABLE DISEASES SURVEILLANCE BULLETIN

MAY 2007

FOREWORD

Vaccine preventable diseases remain a common cause of childhood mortality globally. Increasing immunisation coverage is one of the most important interventions in achieving the United Nations Millenium Development Goal of reducing under-5 mortality by two-thirds between 1990 and 2015.[1]

The May edition of the Bulletin focuses on vaccines and immunisation in order to coincide with the National Measles and Polio mass immunisation campaign from the 5th to the 13th of May 2007 with a second round of Polio vaccination only, conducted from the 9th to the 17th of June 2007. New vaccines are highlighted with articles on the recently licensed rotavirus and 7-valent conjugate pneumococcal vaccine and an update on HIV vaccine development. We also include a discussion on the possible impact of the introduction of rubella vaccination in South Africa.

As health care workers we should strive to improve vaccination coverage in South African children by supporting the national immunisation campaign and routine immunisation services. In addition we must continue our efforts to advocate for a reduction in cost and increased availability of new vaccines with the potential to reduce childhood mortality.

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Cheryl Cohen, Editor

INVITED ARTICLE: POLIO AND MEASLES MASS IMMUNISATION CAMPAIGNS - THE RATIONALE

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South Africa will conduct a national Measles and a Polio mass immunisation campaign from the 5th to the 13th of May 2007. A second round of polio only, will be conducted from the 9th to the 17th of June 2007.

During mass immunisation campaigns also referred to as National Immunisation Days (NIDs) doses of polio and or measles vaccines are given to all children in a defined age group over a short period of time regardless of their immunisation status. The primary aim of immunisation campaigns is to interrupt viral transmission by giving the vaccine to all targeted children over a short period of time.[1, 2]

Background: Polio

In 1988 the World Health Assembly (WHA) took the resolution to eradicate polio globally by the year 2000.[3] Although this goal has not been achieved, significant progress has been made towards achieving global poliomyelitis eradication. The number of wild poliovirus cases has been reduced by 99% since 1988, from over 350 000 cases per year in 1988 to 1 997 cases in the year 2006.[4]

In 2006 only 4 countries; Nigeria, India, Pakistan and Afghanistan remained endemic for wild poliovirus. These

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four countries account for 92% of all new cases of poliomyelitis.[5] Even within these countries, wild poliovirus transmission is geographically restricted to a few states.[5] The spread of wild poliovirus to countries that have been previously polio free remains a significant challenge.

A number of countries in Africa and other continents experienced importations over the last 3 to 4 years. Wild poliovirus spread from Nigeria to affect other countries in West Africa and other parts of the world. Similarly, the spread of the virus from India led to importations which affected Angola. Quite recently, on South Africa's doorstep is the polio outbreak experienced by Namibia in 2006. This outbreak resulted in 19 confirmed cases; mainly in adults (all were older than 14 years).[6]

The polio outbreak in Namibia underlies the magnitude of the risk posed by the ongoing poliovirus transmission in endemic countries. South Africa remains at significantly high risk due to a large number of travelers and immigrants from countries that are still endemic and also from those that are experiencing outbreaks from importations.

As long as there is ongoing transmission of wild poliovirus in some countries, importations cannot be prevented. However, the spread of wild poliovirus from importations can be prevented by having high population immunity. This is the underlying rationale for conducting a polio immunisation campaign in a country like South Africa which has not had a wild poliovirus case for more than 15 years.

Child receiving polio drops

Background: Measles

Measles is a highly infectious disease that is associated with significant mortality. In 2000 there was an estimated 31 million cases of measles which resulted in 777 000 deaths. Africa accounted for 450 000 of these deaths, which was 58% of the global measles mortality burden.[7] There are a number of resolutions and goals which show political commitment to measles control.[2,7,8] These include:

- The 1989 World Health Assembly (WHA) and the 1990 World Summit for Children resolution to reduce the measles incidence by 90% and measles deaths by 95% compared to the pre-vaccine era by 1995
- The 2002 United Nations General Assembly Special Session for Children (UNGASS), which took the resolution to reduce measles deaths by 50% by 2005 compared to 1999 level
- Measles mortality Reduction and Regional Elimination Plan 2001- 2005

Due to the highly contagious nature of the measles virus and that the vaccine is not 100% effective (85% efficacy of the measles vaccine at 9 months), a single dose vaccination strategy is not sufficient for good control even where there is sustained high coverage.[8] Thus a second opportunity for measles immunisation, preferably given through supplementary immunization activities like campaigns, is essential.

Experience from the American region has shown that efforts to control measles with high routine coverage and supplementary activities can be effective. Furthermore the current trends in the global reduction of measles cases is showing significant reduction of measles cases, which is attributed to supplementary activities and maintaining high routine coverage. (based on WHO data)

Progress on Measles Control in South Africa

South Africa has made significant progress in the control of measles since the mass immunisation campaigns were first conducted in 1996. The number of measles cases decreased from an average of 15 000 cases a year prior to 1996, to 37 confirmed measles cases in 2000, 8 in 2001 and 30 in 2002. (National DOH – Surveillance Data) However, a significant setback has been experienced since 2003. Measles outbreaks occurred from 2003-5, involving Gauteng, Mpumalanga, KwaZulu-Natal and Western Cape provinces. The most recent outbreak in 2006 was in North-west Province. This resulted in a number of confirmed measles cases ranging of 244 in 2003 and a peak of 830 confirmed cases in 2004. There were 81 confirmed cases of measles in 2006. (National DOH – Surveillance Data)

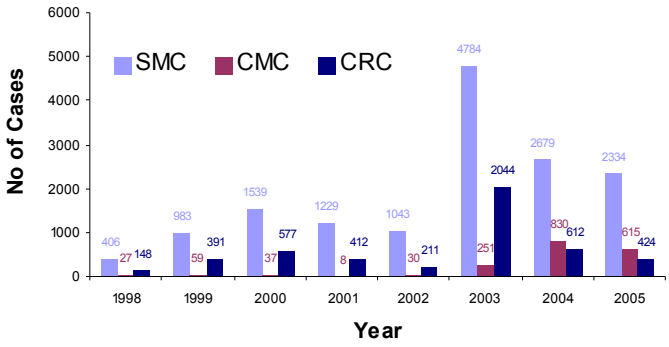

Figure 1: Case based measles surveillance South Africa, 1998 to 2005.
(SMC = suspected measles cases, CMC = confirmed measles cases, CRC = confirmed rubella cases)

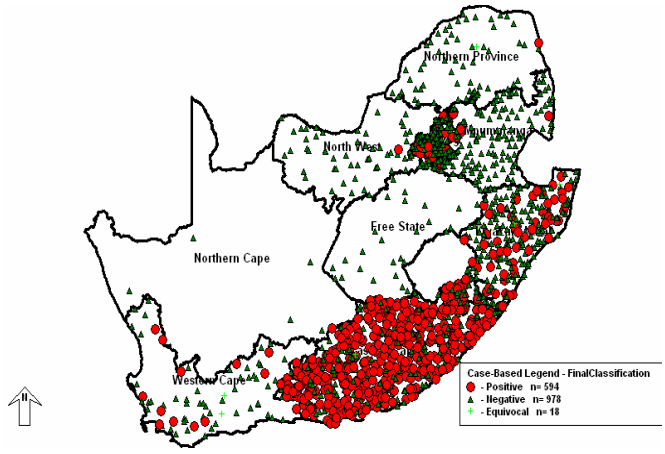

Figure 2: Suspected and confirmed measles cases by province, South Africa 2005.
(red dot = positive, green triangle = negative, green cross = equivocal or indeterminate results)

The figures and graphs are based on the case based measles surveillance conducted by the National Department of Health with the support of the National Institute of Communicable Diseases.

Routine coverage in South Africa

The national average routine measles immunisation coverage for South Africa was 85% in 2006. However, there is significant variation in coverage figures at provincial and particularly at district level. Fifteen percent (8) of districts have measles immunisation coverage below 75%. Such coverage figures, which are well below the recommended 95% target, put the country at high risk for measles outbreaks and importation of measles, which can further spread within the country.

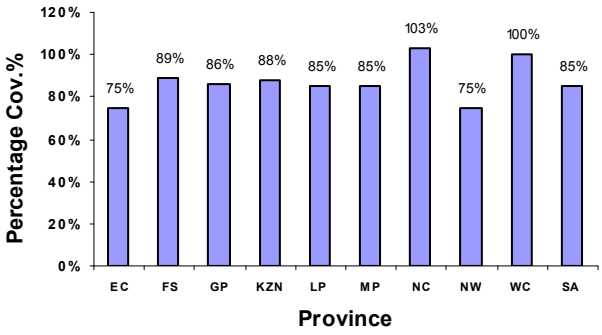

Figure 3: Measles first dose (at 9 months) coverage by province in 2006.

Eradication and Elimination Strategies

The strategies for polio eradication and measles elimination are the same. The elements are:

- High routine immunisation coverage
- Supplementary additional immunisation doses during National Immunisation Days/Campaigns
- Mop up campaigns- door to door vaccination in areas of low coverage
- Case based surveillance with laboratory support (stool specimen to investigate acute flaccid paralysis (AFP) cases and blood and urine specimen to investigate suspected measles cases.[1,2]

To achieve polio eradication and measles elimination, all the components of the strategy should be fully implemented to reach the set criteria. Routine coverage by district for measles and polio should be at 95% and 90% respectively if elimination and eradication is to be achieved.

In order for the campaigns to be effective, campaigns must attain high coverage levels of at least 90% for polio and 95% for measles. Campaigns must be able to reach the children who are normally not reached by the routine services, also referred to as zero dose children.

Conclusion

The risks of continued wild poliovirus circulation in West Africa and India, the importation of polio into polio free countries and the measles outbreaks experienced in many parts of the country make it imperative that South Africa should ensure that the routine immunisation coverage is high and the campaigns conducted reach all children in the targeted age groups. Furthermore surveillance for these conditions should be continually strengthened to ensure a high degree of sensitivity that will allow early detection and prompt response to cases, including imported cases. It is therefore important that health professionals support surveillance for Acute Flaccid Paralysis (AFP) and suspected measles cases, by ensuring that cases are notified and fully investigated with the necessary specimens collected.

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ROTAVIRUS VACCINES

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In sub-Saharan Africa, diarrhoeal diseases follow malaria and pneumonia as one of the most common causes of mortality in children under 5 year. The proportion of diarrhoeal deaths among all childhood deaths has been reduced from around 25% in the 1970's to 17% in 2003,[1] mostly due to an increase in the use of oral rehydration therapy. However, a recent report has highlighted that while the global mortality rate due to diarrhoeal disease has declined, the overall incidence of diarrhoeal disease in the under 5 age group has not. On average, 3.2 episodes of diarrhoea per child-year are still seen resulting in an estimated 4.9 deaths per 1 000 children annually, constituting approximately 20% of childhood mortality.[2] In order to attain the UN Millennium Development Goal (MDG) Target 4 of "*reducing by two thirds the under-five mortality rate (U5MR) between 1995 and 2010*", research focussed on diarrhoeal pathogens and public health care interventions are crucial.

Rotavirus is the single most important etiological agent of diarrhoea, responsible for 20-25% of all deaths due to diarrhoea and 6% of all deaths among children less than 5 years old.[3] Rotavirus infections are characterized by the acute onset of watery diarrhoea, fever and vomiting and are more likely to be associated with dehydration and hospitalization.[4] Effective medical care results in only 20-40 children dying per year due to rotavirus diarrhoea in the United States.[5] However, estimates from Africa attribute 301-411 deaths per day or a total of 110 000-150 000 deaths in children under 5 annually to rotavirus infection.[6]

In 2004 and 2005, a diarrhoeal burden of disease study conducted at the Dr George Mukhari Hospital, Ga-Rankuwa, South Africa detected rotavirus in 21% and 25% of diarrhoeal stools, respectively. At peak season (May-June), rotavirus infections accounted for up to 56-59% of all diarrhoeal cases admitted to the hospital for treatment.[7] Rotavirus diarrhoea cost estimates have been performed and will be published in due course.

Improvements in sanitation and the availability of clean water have not decreased the rate of rotavirus diarrhoea in developed countries, focusing the need to develop vaccines as the first strategy of prevention.[8] Aiming to mimic the protection against severe rotavirus diarrhoea conferred by naturally occurring infections,[9] without the related life-threatening symptoms, two candidate vaccines have been developed and are available in many countries worldwide. RotaRix®, developed by GlaxoSmithKline Biologicals (Rixensart, Belgium) is an attenuated monovalent human rotavirus comprising the most globally common serotype, G1P1a[8]. Preliminary results from randomized, double-blind and placebo-controlled studies in Belgium, Germany and Finland indicated high immunogenicity at high viral titers in susceptible infants with no adverse side affects.[10]

RotaRix® was licensed in South Africa in July 2006 and is administered orally on a two dose schedule to children less than six months of age in the private sector. No interference has been observed between RotaRix® and co-administered DPT (with acellular or whole-cell pertussis), OPV, IPV, HepB, Hib and pneumococcal vaccines. The likely duration of vaccine protection is 2 years, which is sufficient to cover the period of highest risk for severe morbidity and mortality. No evidence of increased risk of intussusception has been observed with currently available rotavirus vaccines.

RotaTeq®, developed by Merck (Blue Bell, PA) is a pentavalent bovine-human reassortant containing the VP7 proteins for serotype G1-G4 strains and the VP4 protein for the P[8] genotype, while retaining the parental strain WC3 genome backbone. While preliminary trials have established the reassortant vaccine candidates' immunogenicity, efficacy and safety, several challenges including the efficacy of the vaccine against specific human rotavirus serotypes remain to be addressed.[11] RotaTeq® was licensed by the FDA in the United States in February 2006, with 4 million doses ordered since licensure. RotaTeq® has not been licensed in South Africa and is currently unavailable.

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PREVENTION OF PNEUMOCOCCAL DISEASE IN CHILDREN: THE AGE OF THE POLYSACCHARIDE-PROTEIN CONJUGATE PNEUMOCOCCAL VACCINE

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The polysaccharide-protein conjugate pneumococcal vaccine has great potential for the prevention of mortality and morbidity in children <5 years of age. Although improving child survival is one of the Millennium Development Goals,[1] the introduction of newer vaccines into routine infant immunisation programmes has been delayed due to numerous challenges. Recognising these challenges, however, international advocacy groups have been established by the Global Alliance for Vaccines and Immunization (GAVI) to explore reasons for these delays and to impact on improving the introduction of vaccines in countries where they are needed most (*e.g.* PneumoADIP,[2] Hib Initiative[3]). Although South Africa is not a GAVI-eligible country (we will not receive monetary support to introduce new vaccines), we may still benefit from these efforts.

The World Health Organization (WHO) has come out strongly in advocating for the routine use of the new generation of polysaccharide-protein conjugate vaccines in infants to prevent pneumococcal disease. In a WHO position paper, reviewed and endorsed by WHO's Strategic Advisory Group of Experts (SAGE), they explain the advent of the conjugate vaccine in comparison to the unconjugated polysaccharide vaccine:[4] unlike the unconjugated polysaccharide vaccine, not effective in infants <2 years of age, the polysaccharide-protein conjugate vaccine results in a T-cell dependent response with immunological memory and prevents nasopharyngeal carriage. Both types of vaccines are registered in South Africa. For many years the 23-valent polysaccharide vaccines (Imovax Pneumo 23®, Aventis Pasteur; and Pneumovax 23®, Merck & Co) have been recommended for older children and adults at risk of pneumococcal disease.[5] The 7-valent conjugative vaccine (PCV-7) currently available internationally (Prevenar®, Wyeth Pharmaceuticals) was registered in South Africa in 2005. The latter vaccine is therefore available for all infants whose parents can afford the cost of the 3- or 4-dose regime (doses at 6, 10, 14 weeks, booster dose between 12 and 15 months) at approximately R600 a dose.[6]

Data from countries using the polysaccharide-protein conjugate vaccine have been very exciting. In the United States, since the introduction of PCV-7 in 2000 in their routine infant immunisation programme, they have not only seen an overall reduction in disease in the age group targeted for immunisation,[7] but they have also documented a reduction in disease in adults as a result of decreasing carriage and transmission from children.[8] There are also convincing data from Africa: in The Gambia a vaccine trial documented the reduction of all-cause mortality by 16%,[9] while in South Africa a trial in Soweto documented efficacy of 83% in HIV-uninfected infants, but also a reduction of 65% in HIV-infected children.[10] Although efficacy is less in HIV-infected children, this is the group at greatest risk of disease and therefore the vaccine has the potential to prevent a larger number of disease episodes in this group, even with the lower efficacy.[11]

Pneumonia has been highlighted as an important cause of infant mortality worldwide, and the most common cause is the pneumococcus.[12] The burden of disease due *Streptococcus pneumoniae* is high, and the most common infection is pneumonia, while less common clinical presentations include meningitis, otitis media and septic arthritis. The estimated rate of pneumococcal bacteraemia in children less than 12 months in Soweto was 349/100,000 in 1996/1997,(13) and risk increased in HIV-infected children.[13,14] In Kenya, a minimum estimate of pneumococcal bacteraemia requiring hospitalisation was 505/100,000 children under 5 years.[15] Although there are 90 serotypes of *S. pneumoniae*, approximately 20 serotypes cause most disease. Only 7 serotypes are contained in the currently licensed conjugate vaccine (4, 6B, 9V, 14, 18C, 19F, and 23F), but data support the cross-protection of one additional serotype (6A).[7,10] Ongoing national laboratory-based surveillance of invasive pneumococcal disease in South Africa estimated that approximately 70% of disease in children less than 5 years of age in 2006 was due to the latter vaccine serotypes/ groups.[16] Other vaccines with wider coverage (*e.g.* 10-valent and 13-valent vaccines) are already in development, and will increase the proportion of preventable disease.

Policy makers in South Africa are aware of the potential benefit of introducing this vaccine into our Expanded

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Programme on Immunisation (EPI), however the cost of the vaccine makes it a difficult decision while other important vaccines also need to be considered for introduction (such as Rotavirus, see article in this bulletin). Advance Market Commitments (AMCs) provide a financial commitment to subsidise the purchase of a future vaccine, if it is found to effective and safe, and if countries demand the product.[17] This has recently been established for pneumococcal vaccines, and it is hoped that this will stimulate further vaccine development. International data on the cost-effectiveness of the introduction of this vaccine into country programmes[18] may help South Africa and other countries in Africa and worldwide consider the routine use of this important vaccine in the future.

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CURRENT STATUS OF PREVENTATIVE HIV VACCINES FOR SOUTH AFRICA

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Vaccine Candidates and Trials

As the epidemic in sub-sarahan Africa continues and in South Africa in particular, the need to instigate a preventative vaccine in the public health sector is crucial. South Africa is well placed to implement successful vaccine trials because of the existence of sophisticated clinical and laboratory infrastructure and qualified personnel. More importantly, and which is the tragedy, the large level of infection rates in South Africa[1] allows for test of concept (TOC) trials to take place relatively quickly, where promising candidate immunogens can be administered to test for efficacy prior to moving into larger phase III trials. South Africa first started phase I vaccine trials in 2003[2,3] and today, we have moved into a TOC phase IIb trial to test the efficacy of a clade B gag-pol-nef Merck candidate vaccine. Although clade C is the predominant circulating viral strain in South Africa, it was considered important to move forward with a vaccine product that seems to show promise based upon a previous trial performed in the US using the same product. The product is a clade B-based Merck adenovirus serotype 5 (Ad5) HIV-1 gag/pol/nef vaccine[4] and the vaccine trial (known as Phambili) commenced enrolment in early 2007, and aims to enroll 3000 HIV uninfected participants aged between 18-35 years at five sites: Soweto, Klerksdorp, Limpopo, Durban and Cape Town. Other efficacy trials will

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commence in 2008, most notably the PAVE 100 trial, that will test the Vaccine Research Center's (VRC) multi-clade DNA and Ad5 vaccine products in a prime-boost strategy. In contrast to the Phambili trial (also known as HVTN 503), PAVE 100 will be a multi-country vaccine trial, where Phambili is a SA-only trial. As both these vaccine candidates use Ad5 as a vector, the possibility that vaccine-induced immune responses may be attenuated due to pre-existing Ad5 neutralizing antibodies could confound possible efficacy. Built into both these vaccine trials, is the measurement of Ad5 neutralizing activity in the serum of all vaccine recipients and stratification of some of the vaccine volunteers based on Ad5 neutralizing antibody titres.

Previous phase I/II vaccine trials in SA have been implemented by the International AIDS Vaccine Initiative (IAVI)[2] and the HIV Vaccine Trials Network (HVTN) and have included clade A-based products (modified vaccinia ankara, MVA, containing a scrambled gag gene along with DNA coding for an epitope string) and clade C-based product (alphavirus vector containing the gag gene[5]), respectively. In early 2008, candidate vaccines made by the South African Vaccine Initiative (SAAVI) will be implemented in both South Africa and the US, using clade C-based DNA prime and MVA boost.[6,7] This clinical trial will be funded by the HVTN, where University of Cape Town-based investigators, within SAAVI, designed the vaccine candidates and have played a leading role in the clinical trial protocol development. SAAVI investigators at the NICD are also playing a leading role in the measurement of vaccine-induced immunogenicity in vaccine volunteers receiving vaccine candidates and will monitor both humoral and cellular responses.

Laboratory Capacity For Vaccine Trials

To assess whether a vaccine candidate can provide efficacy in TOC trials and induce humoral (neutralizing and binding antibodies) and/or cellular immunity (T helper and cytotoxic killing capacity), local capacity of laboratory infra-structure is required. The infrastructure required falls into three categories: a) sample processing; b) diagnostic testing and c) immunogenicity testing. All three specialist laboratories need to be accredited by SANAS for GCLP and audited on a yearly basis.

Sample Processing

A major aspect of immunogenicity testing is the ability to preserve peripheral blood mononuclear cells (PBMC), serum, plasma and genital secretions from vaccinees for use in testing and long-term storage. As most of the current vaccine candidates in clinical trials in South Africa are designed to induce cell mediated immunity, good quality stored PBMC is critical for use in cell-based assays. A large effort has been made in preparation for the Phambili trial to enable sample processing laboratories to store PBMC within 6 hours of blood draw and are situated attached to the clinics.

Diagnostic Testing

The end-point of phase IIb and III efficacy trials is HIV infection, which is used to calculate efficacy. Specific algorithms for testing vaccine volunteers for HIV infection have been adopted by the NICD that consist of HIV ELISA's, western blots and RNA testing. Stringent measures are in place for adjudicating the algorithm by an external laboratory and so qualify whether a volunteer in a vaccine trial has become infected.

Immunogenicity Testing

It is thought that a vaccine should induce both cellular, in the form of CD8 T cell responses, and humoral, in the form of neutralizing antibodies (NAb), immune responses.[8] Assays that measure both of these immune responses have been standardized and validated and are currently being performed at the NICD, and includes the IFNg ELISPOT assay for measuring T cell responses to vaccine-matched peptide sets and the pseudovirion neutralization assay for measuring NAbs.

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SHOULD SOUTH AFRICA ROUTINELY IMMUNISE AGAINST RUBELLA?

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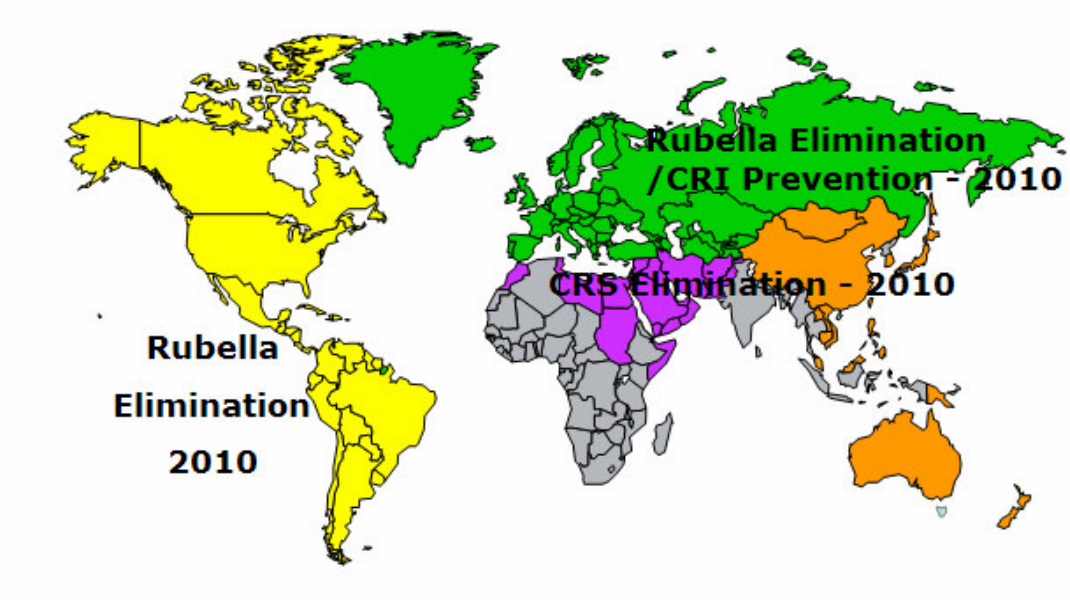
A need to review the principles and practice of control of rubella and congenital rubella syndrome (CRS) has been identified[1] and in response to the improvement of women's health, consistent with achieving the Millennium Development Goals[2], some regions have adopted rubella and CRS control or elimination targets (figure 1).[3,4]

Like measles, rubella can potentially be eradicated as it infects only humans, has no carrier state or environmental reservoir and an effective vaccine is available. The measles elimination drive presents an unprecedented opportunity to also eliminate rubella and congenital rubella syndrome (CRS) with safe and effective combination vaccines. However injudicious introduction of rubella vaccination may increase the average age at infection putting women of childbearing age at much higher risk as happened in Greece and Chile. Rubella vaccine has been available in Greece mainly as MMR vaccine in the private sector since 1975. Due to suboptimal immunisation coverage (>50%) during the 1980's, the proportion of women of childbearing age susceptible to rubella gradually increased. In 1993 Greece experienced the largest CRS epidemic since 1950, when a large rubella outbreak occurred with 69% of cases older than 15 years of age.[5] Chile introduced childhood vaccination and in 1996, conducted a follow-up campaign to immunise children aged 1-14 years with MMR vaccine. There was however no systematic immunisation of women of childbearing age and surveillance data showed a shift in the age distribution of rubella cases from young children to young adults during the rubella outbreak that occurred in 1998-1999, when over 70% of the cases were among persons aged 10–29 including cases among pregnant women.[6] Rubella immunization can also safely be introduced if high levels of immunisation are consistently achieved as demonstrated in Finland who introduces a 2 dose MMR strategy in 1982 (at 14-18m and 6y). By maintaining very high coverage (~95%) with each dose they eliminated CRS by 1986.[7] In 2000, Albania resolved to eliminate measles by 2007 by use of a four-step program: by conducting a "catch-up" vaccination campaign using a measles and rubella containing vaccine for all children aged 1-14 years, achieving and sustaining high coverage (≥95%) among children aged 1 year with the first dose, by introducing a routine second dose for children at age 5 years, and by improving surveillance. This catch-up campaign took place in November 2000. By 2002-3, zero confirmed measles, rubella or CRS cases were reported.[8]

Optimal rubella vaccination strategies aim to ensure high coverage in infants and young children and any susceptible women of child bearing age.

CRS is an important cause of deafness, blindness, and mental retardation. It is estimated that about 110 000 cases occurred in developing countries in 1996 alone.[9] Caring for CRS cases is costly, even in developing countries. Cost-benefit studies of rubella vaccination, in developing and developed countries, have demonstrated that the benefits outweigh the costs and that rubella vaccination is economically justified, particularly when combined with measles vaccine in countries with coverage >80%.[10] Even though the methodologies were not standardised these studies supported the inclusion of rubella vaccine in the immunisation programmes of both developing and developed countries and indicated economic benefits comparable to those associated with hepatitis B and Haemophilus influenzae type b vaccine.



Source: Susan E. Reef, MD, Measles Partnership Meeting, Feb. 15, 2006

Figure 1. WHO regions by rubella/CRS control target

Neither rubella nor CRS is notifiable in South Africa. The introduction of suspected measles case based surveillance in 1997, with laboratory confirmation on cases presenting with rash and fever, brought rubella outbreaks to the attention of healthcare workers and the public alike. Up to 50% of suspected measles cases were confirmed as rubella (figure 2). This is the only systematic collection of data on rubella cases.

Serological data on susceptibility to rubella can be used to estimate the burden of rubella and CRS, and is essential for monitoring the effect of vaccination programmes once rubella vaccine has been introduced.[11] An unpublished South African national rubella seroprevalence study indicated that there were immunity gaps in women of child baring age (figure 3) and, using this data to model CRS prevalence, that the burden of CRS in South Africa may be as high as 0.1-1.66 per 1000 live births in certain areas in 2005.

There is no doubt that introduction of rubella immunisation in South Africa will prevent CRS and be cost effective especially if combined with measles vaccination. The unresolved questions remain: what schedule to follow and whether vaccination coverage in targeted groups can be maintained over an extended time period.

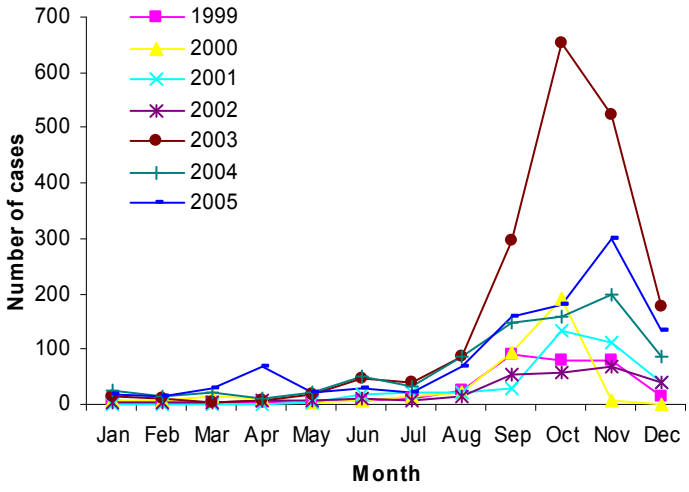


Figure 2: Rubella IgM positive cases per month, suspected measles case based surveillance, South Africa, 1999-2005

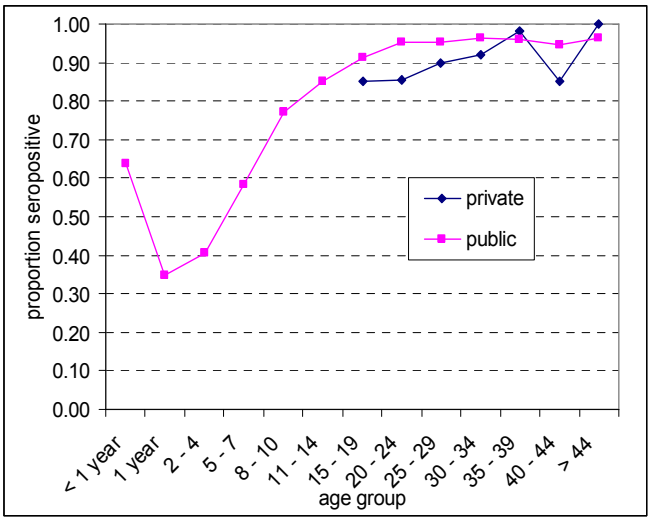


Figure 3: Rubella IgG sero prevalence per age group, public and private sector, South Africa, 2005-2006

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ERRATUM

Enteric Diseases Surveillance, South Africa, 2006 (March 2007;5:1:16-19). In Table 4: Results of antimicrobial susceptibility testing for non-typhoidal *Salmonella* isolates (n=1751) received by EDRU, 2006 (page 16). The second row from the bottom should have read Imipenem Susceptible 100%, Intermediately Resistant 0.0%, Resistant 0.0%. The text was incorrect in the electronic version of the bulletin distributed by e-mail but has been corrected in the print version and on the NICD web page.

Provisional listing: number of laboratory-confirmed cases in South Africa of diseases under surveillance reported to the NICD, corresponding periods 1 January - 31 March 2006/2007

	Disease/ Organism	Case Definition	Subgroup	Cumulative to 31 March year	EC	FS	GA	KZ	LP	MP	NC	NW	WC	South Africa
VIRAL DISEASES	Acute Flaccid Paralysis	Cases < 15 years of age from whom specimens have been received as part of the Polio Eradication Programme		2006	12	3	9	13	11	8	3	2	3	64
				2007	7	7	21	16	8	9	5	9	7	89
	Measles	Measles IgM positive cases from suspected measles cases, all ages		2006	1	0	5	0	0	1	1	2	0	10
				2007	2	0	2	0	0	1	1	2	0	8
	Rubella	Rubella IgM positive cases from suspected measles cases , all ages		2006	34	2	32	10	1	14	8	3	13	117
				2007	33	0	15	10	15	8	7	13	15	116
	VHF	Laboratory-confirmed cases of CCHF (unless otherwise stated), all ages		2006	0	2	1	0	0	0	1	0	0	4
				2007	0	0	1	0	0	0	4	0	0	1
	Rabies	Laboratory-confirmed human cases, all ages		2006	0	0	0	1	8	0	0	0	0	9
				2007	2	0	0	3	1	0	0	0	0	6
BACTERIAL AND FUNGAL DISEASES	*Haemophilus influenzae*	Invasive disease, all ages	All serotypes	2006	8	6	29	19	0	0	1	0	14	77
				2007	1	3	37	9	1	1	0	1	11	64
		Invasive disease, < 5 years	Serotype b	2006	1	1	8	4	0	0	0	0	3	17
				2007	0	1	5	1	0	0	0	1	7	15
			Serotypes a,c,d,e,f	2006	1	1	1	0	0	0	0	0	2	5
				2007	0	0	0	1	0	0	0	0	0	1
			Non-typeable (unencapsulated)	2006	1	1	3	0	0	0	0	0	0	5
				2007	0	0	8	1	0	0	0	0	0	9
			No isolate available for serotyping	2006	2	1	7	6	0	0	1	0	1	18
				2007	0	1	9	2	1	0	0	0	1	14
	Neisseria meningitidis	Invasive disease, all ages		2006	12	3	37	5	0	1	1	0	14	73
				2007	0	2	20	4	0	2	0	3	11	42
	Streptococcus pneumoniae	Invasive disease, all ages	Total cases	2006	80	43	382	96	13	42	3	18	100	777
				2007	20	64	337	62	14	38	5	22	105	667
			Penicillin non-susceptible isolates	2006	17	12	117	30	3	13	3	5	26	226
				2007	8	21	124	23	4	14	1	9	35	239
			No isolate available for susceptibility testing	2006	31	1	59	13	2	9	0	4	3	122
				2007	3	8	65	12	2	5	0	2	9	106
		Invasive disease, < 5 years		2006	27	12	122	38	5	12	1	7	35	259
				2007	6	16	100	24	6	8	3	7	42	212
	Salmonella spp. (not typhi)	Invasive disease, all ages		2006	11	10	188	37	1	11	0	6	29	293
				2007	3	18	106	25	1	6	1	4	16	180
		Confirmed cases, isolate from a non-sterile site, all ages		2006	33	12	35	70	6	12	9	18	55	250
				2007	40	5	78	24	13	30	5	4	18	217
	Salmonella typhi	Confirmed cases, isolate from any specimen, all ages		2006	9	0	5	9	5	2	0	0	7	37
				2007	3	0	6	1	1	4	0	1	4	20
	Shigella dysenteriae 1	Confirmed cases, isolate from any specimen		2006	0	0	0	1	0	0	0	0	1	2
				2007	0	0	0	0	0	0	0	0	0	0
	Shigella spp. (Non Sd1)	Confirmed cases, isolate from any specimen, all ages	All serotypes	2006	46	17	62	81	4	14	11	4	140	379
				2007	23	21	89	36	6	11	8	2	64	260
	Vibrio cholerae O1	Confirmed cases, isolate from any specimen, all ages	All serotypes	2006	0	0	0	0	0	0	0	0	0	0
				2007	0	0	0	0	0	0	0	0	0	0
	Cryptococcus (*Cryptococcus spp.*)	Invasive disease, all ages	Total cases (incl. *C neoformans*)	2006	90	59	421	322	44	126	18	53	97	1230
				2007	77	79	409	171	40	105	15	90	57	1043
			C. gattii	2006	1	2	4	1	5	6	1	2	2	24
				2007	0	0	8	1	5	7	0	4	0	25

Abbreviations: VHF - Viral Haemorrhagic Fever; CCHF - Crimean-Congo Haemorrhagic Fever

Provinces of South Africa - EC: Eastern Cape, FS: Free State, GA: Gauteng, KZ: KwaZulu-Natal, LP: Limpopo, MP: Mpumalanga, NC: Northern Cape, NW: North West, WC: Western Cape

0 = no cases reported