

The what, why and when of childhood vaccination in South Africa – 2019

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Introduction

The Expanded Programme on Immunisation (EPI) was initiated in 1974 by the 27th World Health Assembly to ensure that all children in all countries benefit from lifesaving vaccines.¹ Initial vaccination against six diseases – diphtheria, tetanus, pertussis, polio, measles and tuberculosis have grown from protecting around 5% of the world's children in 1974 against these diseases to more than 80% in 2014.² Today, immunisation remains the most cost-effective public health intervention available.³

Goals for vaccination

The main aim of the EPI in South Africa is to prevent death and reduce suffering from infectious childhood diseases that can be prevented by immunisation of children and women. The long-term objective is to control and eventually eliminate some of the vaccine-preventable diseases included in the EPI.³

In May 2012, the World Health Assembly endorsed the Global Vaccine Action Plan to achieve the vision of the Decade of Vaccines during the period of 2011 to 2020 and beyond. The vision is to:

- Achieve universal access to immunisation with lifesaving vaccines including new vaccines
- Uphold immunisation as a Human Right and
- Establish immunisation as a core component of Primary Health Care³

Some of the EPI goals in South Africa include maintaining neonatal tetanus elimination status, achieving measles elimination target of less than one case per one million total population in 2020 and to ensure universal access to quality immunisation services, which includes new vaccines in keeping with the strategic objectives of the Decade of Vaccines. Diseases targeted for elimination and eradication include poliomyelitis, measles and neonatal tetanus.³ Continued and increased efforts are required to vaccinate children against vaccine-preventable diseases and to reach and maintain high vaccination coverage rates.⁴ Nurses and other health workers can be important advocates for the EPI.³

EPI vaccination schedule in South Africa

When including vaccines into an EPI schedule, the following are some of the factors that need to be considered⁵:

- The burden of disease in the country
- Availability and cost of a vaccine for high-burden diseases
- Safety, efficacy and suitability of available products for national programmes

The current EPI vaccination schedule provides protection against 11 infections and includes the human papillomavirus vaccine that was introduced in 2014⁶ and delivered jointly by the EPI and Integrated School Health Programme as an outreach to schools.³ EPI vaccines should be available at all public health facilities as part of the free health services for women and children.³

It is important for children to be vaccinated as early as possible, before exposure to the disease, but after maternal antibodies have waned sufficiently to prevent interference with the efficacy of the vaccines. Some vaccines are effective when administered as soon as hours after birth.³

Vaccination at birth

As per the EPI schedule, children in South Africa receive the BCG vaccine as an intradermal vaccine at birth,⁷ unless the mother is TB positive, in which case the child is treated appropriately and the BCG vaccine is then administered two weeks following discontinuation of treatment.⁸ BCG vaccine may be administered up to one year of age if it was not administered at birth, whilst OPV (usually administered at birth and six weeks of age) should not be routinely administered to children older than six months of age.³

Discussions are also underway on whether to include a dose of hepatitis B at birth in order to reduce mother to child transmission of hepatitis B.^{3,9}

Primary vaccination series

In 2009, two new vaccines (pneumococcal conjugate vaccine [PCV] and rotavirus vaccine) were introduced into the EPI.

Rotavirus vaccine (Rotarix®) is administered at 6 and 14 weeks, but not later than 24 weeks of age, whilst PCV (Prevenar®) is given at 6 weeks, 14 weeks and 9 months of age.⁷

South Africa also introduced a fully liquid hexavalent (6-in-1) vaccine (Hexaxim®) in 2015 that includes the hepatitis B component, and as a result, reduced the number of injections required at 6, 10 and 14 weeks of age.³ The hexavalent vaccine should not be administered before six weeks of age to ensure optimal efficacy of the *Haemophilus influenzae* type B (Hib) component. Limited data has shown that a dose of Hib conjugate vaccine given before six weeks of age may reduce the response to subsequent doses of Hib.¹⁰

Six and 12-month vaccinations

Although live vaccines are more effective if given after 12 months of age, measles vaccine is given before 12 months of age in South Africa. This is because the WHO recommends earlier vaccination in countries with ongoing transmission.¹¹

Measbio® is currently used to vaccinate children against measles disease as per the EPI schedule, and since the vaccine is not to be used with other childhood vaccines, it is given at 6 and 12 months of age.^{12,13}

Booster doses and additional vaccines

Since immunity wanes following some vaccines, booster doses are indicated at selected intervals to maintain protection.¹⁴ This is especially true for diphtheria, tetanus and pertussis and the EPI provides for administration of booster doses at 18 months of age using Hexaxim® (DTaP-IPV-HepB-Hib), and against diphtheria and tetanus at ages 6 and 12 years, using Diftavax®.³

Although the human papillomavirus (HPV) vaccine is not given as part of the national EPI, Cervarix® is made available through the Integrated School Health Programme to children in Grade 4 who are older than nine years of age. The first dose of the vaccine is provided through the months of February to March with a second dose administered at least six months later in September to October.³

All the vaccines used for vaccination as per the EPI schedule are also available in the private sector with the exception of Diftavax®, which is only available from government institutions.^{15,16} It is important to note that if a child missed any of the scheduled doses, he/she should still be vaccinated with all missed doses as appropriate for age.³

The latest EPI vaccination schedule is available for download from the following link⁷: https://www.westerncape.gov.za/assets/departments/health/2016_schedule.pdf

Private vaccination schedule South Africa

Although vaccination should follow the EPI schedule as closely as possible, additional vaccines and products available in the private sector, calls for a schedule that may differ slightly, based on the choice and registration of the product.^{9,17}

The following additional products are available in the private sector to vaccinate against antigens as contained in the EPI schedule¹⁷:

- Infanrix Hexa® is available for primary vaccination of children against diphtheria, tetanus, pertussis, polio, hepatitis B and Hib. To ensure optimal efficacy of the hepatitis B component, Infanrix Hexa® should not be administered before eight weeks of age, unless the child had a priming dose of hepatitis B at birth, in which case it can be administered from six weeks of age. If a birth dose of hepatitis B is introduced in the EPI, all children should be able to follow the 6, 10 and 14 week vaccination schedule, irrespective of which DTaP-IPV-HepB-Hib vaccine they are given.
- Rotateq® protects against rotavirus and is administered as a three-dose schedule given at 6, 10 and 14 weeks of age. The first dose should be administered before 12 weeks of age and Rotateq should not be administered after 32 weeks of age.
- Synflorix® vaccinates against 10 strains of *S. pneumoniae* and also offers protection against non-typeable *Haemophilus influenzae* that is known to cause otitis media in children. The vaccine is registered as a 3-dose primary series administered at 6, 10 and 14 weeks of age with a fourth dose given after 12 months of age. The product also has registration for alternative two-dose schedules.
- Tetraxim® vaccinates against diphtheria, tetanus, pertussis and polio and although it can be used from six weeks of age, it is ideally placed to be used as the booster dose at pre-school age. It contains high doses of diphtheria and is registered for use through the age of 11 years (before the 12th birthday) making it ideal to vaccinate children age 6 through 11 years who missed previous doses.
- Both Adacel Quadra® and Boostrix Tetra® contain the lower dose of diphtheria to reduce the risk of side-effects and although they are registered for use from three and four years respectively, these vaccines are ideal as the 12-year-old booster dose.
- Gardasil® vaccinates against two of the most commonly occurring oncologic strains of human papillomavirus but also protects against two additional HPV strains known to cause genital warts. Children younger than 14 years of age only need two doses, separated by a minimum of six months.

The following vaccines are not included in the National EPI vaccination schedule and may be obtained in the private sector^{9,17}:

- A conjugated meningitis vaccine (Menactra®) protecting against four strains of *N. meningitidis* can be offered from nine months of age. If the first dose is given before two years of age, a second dose should be given after an interval of at least three months.¹⁷
- Vaccination against mumps and rubella, in combination with a measles vaccine (MMR) is recommended as a two-dose schedule from 12 months of age, usually administered between 12 and 15 months of age, with a second dose at around pre-school age. The MMR vaccine

may be administered before 12 months of age but should then be repeated after 12 months of age.¹⁷

- Chickenpox vaccines are usually recommended as a two-dose schedule (Varilrix[®]), given at a minimum interval of four to six weeks, preferably after 12 months of age.¹⁸ Onvara[®] is registered as a single-dose vaccine for children younger than 13 years of age¹⁷
- Hepatitis A vaccines (Avaxim[®] and Havrix Jnr[®]) are available for administration from 12 months of age as a two-dose schedule given six months apart¹⁷

The private vaccination schedule is available for download from the following link¹⁷: <http://www.amayeza-info.co.za/wp-content/uploads/2018/08/2018-schedule-updated.pdf>

The impact of vaccination

The WHO estimates that the EPI prevents 2,5 million deaths annually and protects millions of children from illness and disability worldwide.² In South Africa, introduction of the rotavirus vaccine into the EPI at 6 and 14 weeks of age, reduced hospitalisations from diarrhoea due to rotavirus by 60% in children younger than five years of age, including children who had not been vaccinated against rotavirus.⁶

Similarly, introduction of PCV vaccine to children younger than one year of age, has resulted in a 40% decline in invasive pneumococcal disease across all age groups. Although the decline was highest in children under the age of two years, a 34% decline was also observed in patients 45 years and older.⁶ Even more remarkable, the incidence of antibiotic resistant pneumococcal infections in South Africa for the period 2005 to 2012 has been dramatically reduced by 82% for penicillin-resistant pneumococcal infections, 85% for ceftriaxone-resistant pneumococcal infections and 84% for multidrug-resistant pneumococcal disease.¹⁹

Conclusion

Vaccination remains the most cost-effective public health intervention. However, despite excellent achievements since 1974, an estimated 22 million children world-wide still do not receive the basic EPI vaccines. It is therefore imperative to continue to strive to provide every child with quality immunisation services and to ensure that no child is denied the right to protection against vaccine-preventable diseases.³

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