Vaccine preventable Diseases

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## Kenya - Priority diseases

<table>
<thead>
<tr>
<th>Epidemic prone Disease</th>
<th>Diseases targeted for Eradication or Elimination</th>
<th>Other Major Disease of Public Health Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Anthrax</td>
<td>1. Acute flaccid Paralysis (Polio)</td>
<td>1. Acute Jaundice</td>
</tr>
<tr>
<td>2. Brucellosis</td>
<td>2. Leprosy</td>
<td>2. Cancer (Breast, cervix, oesophagus &amp; prostate)</td>
</tr>
<tr>
<td>4. Diarrhoea with Blood (Shigella)</td>
<td>4. Neonatal Tetanus</td>
<td>4. HIV/AIDS (newly diagnosed cases)</td>
</tr>
<tr>
<td>5. Dengue Fever</td>
<td></td>
<td>5. Malaria</td>
</tr>
<tr>
<td>7. Meningococcus meningitis</td>
<td></td>
<td>7. Maternal deaths</td>
</tr>
<tr>
<td>8. Plague</td>
<td></td>
<td>8. Neonatal deaths</td>
</tr>
<tr>
<td>10. SARI*</td>
<td></td>
<td>10. Pneumonia &lt;5</td>
</tr>
<tr>
<td>11. Typhoid fever</td>
<td></td>
<td>11. STI</td>
</tr>
<tr>
<td>12. VHF syndrome*</td>
<td></td>
<td>12. Trachoma</td>
</tr>
<tr>
<td>13. Yellow fever</td>
<td></td>
<td>13. TB</td>
</tr>
<tr>
<td>*Ebola, Marburg, Lassa, CC, WNF</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Influenza like illness</strong></td>
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</tbody>
</table>

**Influenza like illness**
Available vaccines
- Cholera
- Dengue
- Diphtheria, Pertussis, Tetanus
- Hepatitis A, Hepatitis B, Hepatitis E
- Haemophilus influenzae type b (Hib)
- Human papillomavirus (HPV)
- Influenza
- Japanese encephalitis
- Malaria
- Measles
- Meningococcal meningitis
- Mumps
- Pneumococcal disease
- Poliomyelitis
- Rabies
- Rotavirus
- Rubella
- Tick-borne encephalitis
- Tuberculosis
- Typhoid
- Varicella
- Yellow Fever

Pipeline vaccines
- Campylobacter jejuni
- Chagas Disease
- Chikungunya
- Dengue
- Enterotoxigenic Escherichia coli
- Enterovirus 71 (EV71)
- Group B Streptococcus (GBS)
- Herpes Simplex Virus
- HIV-1
- Human Hookworm Disease
- Leishmaniasis Disease
- Malaria
- Nontyphoidal Salmonella Disease
- Norovirus
- Paratyphoid fever
- Respiratory Syncytial Virus (RSV)
- Schistosomiasis Disease
- Shigella
- Staphylococcus aureus
- Streptococcus pneumoniae
- Streptococcus pyogenes
- Tuberculosis
- Universal Influenza Vaccine
# NATIONAL VACCINATION SCHEDULE

<table>
<thead>
<tr>
<th>AGE</th>
<th>VACCINE (S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth</td>
<td>BCG + OPV0</td>
</tr>
<tr>
<td>6 Weeks</td>
<td>DTP-HB/Hib1+ PCV10 1+ OPV1+ Rota1</td>
</tr>
<tr>
<td>10 Weeks</td>
<td>DTP-HB/Hib2+ PCV10 2+ OPV2+Rota2</td>
</tr>
<tr>
<td>14 Weeks</td>
<td>DTP-HB/Hib3+ PCV10 3+ OPV3</td>
</tr>
<tr>
<td>9 months</td>
<td>MR1 +YF</td>
</tr>
<tr>
<td>5 mons - 17 mons</td>
<td>RTS,S (malaria) 1-4</td>
</tr>
<tr>
<td>18 Months</td>
<td>MR2</td>
</tr>
</tbody>
</table>
New vaccine introduction

• HPV introduction into RI schedule in 2019
• Scale up of Yellow Fever in West Pokot & Turkana in 2018
• Meningitis (MenA) Campaign and introduction in some identified counties
• National switch from 2 dose PCV to 4 dose later in 2018
• Switch from TT to Td in 2018
• Malaria vaccine Pilot in Western Kenya
VACCINES -1/2

• A suspension of live or killed microorganisms or antigenic portion of those agents presented to a potential host to induce immunity to prevent the specific disease caused by that organism.

• With sanitation and nutrition, vaccines are one of the most important & cost effective public health interventions in the 20th C.
VACCINES -2/2

- Pathogen (human) 
  - Toxins 
    - Infection, disease & complications 
      - Immune response or death 
- Vaccine 
  - Protective immune responses without major adverse events
Vaccine preventable Disease

• A vaccine-preventable disease is an infectious disease for which an effective preventive vaccine exists.

• If a person acquires a vaccine-preventable disease and dies from it, the death is considered a vaccine-preventable death.
Key facts - 2016

- Immunization prevents illness, disability and death from VPDs

- Global vaccination coverage of DTP containing vaccine was 86%

- Estimated **19.5 million** infants world wide are still missing out on basic vaccines

- Estimated **mortality from measles** was 90,000
IMMUNISATION

Science of controlling and preventing infectious diseases

- **Two FORMS of immunisation**
  - **Passive immunisation**
    - *Natural passive immunisation* = transplacental or colostral transfer of antibodies from the mother to the baby
    - *Artificial passive immunisation* = intramuscular inoculation of immunoglobulin [IG]
  - **Active immunisation**
    - *Natural* - following resolution of natural infection
    - *Artificial* - direct inoculation of a *vaccine*, the process is called *vaccination*

- **Important to note that:**
  - Immunisation is NOT synonymous to vaccination
  - *Vaccination* is another form of immunisation
  - Vaccination ONLY involves the use of a vaccine
2011-2020 Decade of Vaccines 1/2

• Global, Regional and National Vaccinations Action Plans

• Global Level – Global Vaccine Action Plan

  • Achieve a world free of poliomyelitis

  • Meet global and regional elimination targets

  • Meet vaccination coverage targets in every region, country, and community Regional

• Develop and introduce new and improved vaccines and technologies

• Exceed the Millennium Development Goal 4 target for reducing child mortality
2011-2020 Decade of Vaccines 2/2

- **Regional (AFRO) Level – Regional Vaccine Action Plan**
  - To improve immunization coverage beyond the current levels
  - To complete interruption of polio transmission and ensure virus containment
  - To attain the elimination of Measles and make progress in the elimination of Rubella and congenital Rubella Syndrome
  - To attain and maintain elimination/control of other VPD

- **National**
  - Comprehensive Multi-Year Plan (cMYP)
Regional Targets

• **Objective 1**: Improve immunization coverage beyond current levels

  • DTP Coverage to reach 90% region-wide by 2020
  • All countries to Introduce PCV by 2020
  • At least 37 Countries to introduce Rotavirus vaccine by 2020
  • At least 35 Countries to introduce HPV by 2020
  • At least 25 Countries to introduce birth dose HepB by 2020
  • All countries to regularly report AEFI
Regional Targets - 2

- **Objective 2**: Complete interruption of poliovirus transmission and ensure virus containment

  - All countries to interrupt transmission of wild poliovirus by 2014
  - All OPV-using countries to introduce at least one dose of IPV by 2015
  - All polioviruses to be laboratory contained and the Region certified polio free by end of 2018
Regional Targets - 3

• **Objective 3:** Attain elimination of measles and make progress in the elimination of rubella and CRS
  - All countries to achieve an incidence of confirmed measles of < 1 /1m pop by 2020
  - MCV1 Coverage to be at least 95% at national and district with SIAs coverage of 95 in all districts
  - At least 25 Countries to introduce Rubella containing vaccine by 2020
Regional Targets - 4

- **Objective 4**: Attain and maintain elimination/control of other VPDs
  - All countries to attain and validate elimination of MNT by 2020
  - All high risk countries to attain Yellow fever immunization coverage of 90% or higher by 2020
  - All countries within the meningitis belt to introduce MenA vaccine through campaign and 15 of them to have the vaccine in the routine schedule by 2020
  - Sero-prevalence of HbsAg among children <5 to be less than 2% by 2020
Summary of Key Points

WHO Position Paper on BCG Vaccine, February 2018
Background

- **Tuberculosis (TB)** is caused by the bacterium Mycobacterium tuberculosis, which spreads via airborne droplets when individuals infected with active TB cough. HIV infection, malnutrition, tobacco use, and diabetes are predisposing factors for TB.

- **Multi-drug resistant TB (MDR-TB)** is caused when bacteria do not respond to the 2 most powerful first line anti-TB drugs.

- Globally, 1.7 billion people are estimated to be infected with *M. tuberculosis* and in 2016, 1.7 million people died from TB, including 400,000 among people infected with HIV. In children, TB most commonly occurs in those aged <5 years.
Background

- **Leprosy** is caused by *Mycobacterium leprae* and mainly affects the skin and peripheral nerves. More than 200,000 cases of Leprosy were reported in 2016, including 12,819 new cases with visible deformities.

- **Buruli ulcer** is caused by *Mycobacterium ulcerans* and in 2016, 1,864 new cases of Buruli ulcer were reported from 11 countries.
Vaccines

- Bacillus Calmette-Guérin (BCG) vaccines continue to be the only vaccines in use for prevention of TB.
  - BCG is a live attenuated bacterial vaccine derived from *M. bovis*.
  - Several BCG vaccines, based on different strains, are available worldwide.
  - BCG has demonstrated significant effectiveness, however protection has not been consistent across all forms in all age groups.

- BCG has also shown effectiveness in preventing leprosy (RR from 20-80%), Buruli ulcer (RR of 50% in Africa region) and other non-tuberculosis mycobacterial (NTM) infections.

- Several new vaccine candidates are in development to protect against TB and Leprosy.
WHO Position

- BCG vaccination is recommended in countries or settings with a high incidence of TB and/or high leprosy burden as well as where Buruli ulcer occurs.

- A single dose should be given to all healthy neonates at birth. If the vaccine cannot be administered at birth, it should be given at the earliest opportunity thereafter.

- Countries with low incidence of TB or leprosy may choose to selectively vaccinate high-risk neonates.

- Countries with declining rates of TB are encouraged to evaluate the epidemiology of TB and leprosy and consider a switch to selective risk group vaccination.
WHO Position

Special Populations

- BCG is recommended for unvaccinated, TST-negative or IGRA-negative school children for those coming from or moving to high incidence/burden settings, as well as older groups at risk through occupational exposure.

- As a precaution, BCG vaccination is not recommended during pregnancy.

- BCG vaccination is contraindicated for immunocompromised persons and for patients undergoing immunosuppressive treatment.
WHO Position

- Children who are HIV-infected should not receive BCG vaccination.

- HIV-infected individuals, including children, who are receiving anti-retroviral therapy (ART), are clinically well and immunologically stable should be vaccinated.

- Neonates born to women of unknown HIV status should be vaccinated.
WHO Position

- Neonates with unknown HIV status born to HIV-infected women should be vaccinated if they have no clinical evidence suggestive of HIV infection, regardless of whether the mother is receiving ART.

- Neonates with HIV infection should delay BCG vaccination until ART has been started and are immunologically stable.

- Neonates born to mothers with pulmonary TB should receive BCG vaccination if they are asymptomatic, have no immunological evidence of TB and are HIV-negative.
Malaria vaccine
<table>
<thead>
<tr>
<th></th>
<th>Cases</th>
<th>Deaths</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>216 million</td>
<td>445,000</td>
<td>2.7 billion</td>
</tr>
</tbody>
</table>

- malaria cases worldwide in 2016
- malaria deaths worldwide in 2016
- Resources available for malaria in 2016 (in US$)
RTS,S/AS01 (RTS,S) – Malaria Vaccine -1

- World’s first malaria vaccine that has been shown to provide partial protection against malaria in young children.

- The Phase 3 trial of RTS,S/AS01 (RTS,S) was conducted over 5 years (2009–2014), enrolled 15,600 children in 7 sub-Saharan African countries: Burkina Faso, Gabon, Ghana, Kenya, Malawi, Mozambique and the United Republic of Tanzania.
RTS,S/AS01 (RTS,S) – Malaria Vaccine -2

• Beginning in 2018, it will be the first malaria vaccine provided to young children through routine immunization programmes. Three sub-Saharan African countries (Kenya, Ghana & Malawi) will introduce the vaccine in selected areas as part of a large-scale pilot implementation programme.
Target age group & efficacy?

- **Children aged 5–17 months: Phase 3 trials**
  - Among children aged 5–17 months who received three doses of RTS,S administered at 1-month intervals, followed by a fourth dose 18 months later, the vaccine;
  - reduced malaria by 39%, equivalent to preventing nearly 4 in 10 malaria cases.
  - Additionally, the 4-dose vaccine schedule reduced severe malaria by 31.5% in this age group, with reductions also seen in malaria hospitalizations, all-cause hospitalizations and the need for blood transfusions.
  - Among children aged 5–17 months who did not receive a fourth dose of the vaccine, the protective benefit against severe malaria was lost, highlighting the importance of the fourth dose of this vaccine to maximise its benefits.

- **Infants**
  - Among the younger infants, the malaria vaccine did not work sufficiently well to justify its further use in this age group.
Vaccine safety

• In the Phase 3 trial, the vaccine was generally well tolerated, with adverse reactions similar to those of other childhood vaccines.

• Among children in the older age group;
  • there was an increased risk of febrile seizures within 7 days after any of the vaccine doses.

  • A modest increase in the number of cases of meningitis and cerebral malaria in the group receiving the malaria vaccine compared to the control group.

• This observation was not seen in infants aged 6–12 weeks.
Challenges
Global & Regional

- Economic uncertainty
- Conflicts and natural disasters
- Displacements and migration
- Global lack of appreciation of the power to achieve wider health and development objectives
- Continued marked underperformance of certain countries relative to others within the same region
National level

- Other infectious disease outbreak

- Concerning signs of complacency and inadequate political commitment

- Growing levels of vaccine hesitancy

- Worrying rise in stock outs disrupting access to vaccines arising from procurement and distribution but also to vaccine production
END