Immunization and Vaccine-Preventable Diseases

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Objectives:
By end of this session, participants will:

1. Understand the basics of immunization: vaccines, players, global targets, progress to date, key indicators
2. Understand approaches and challenges to managing and providing immunization
3. Know where to find more information
Maternal Child Health Integrated Project (MCHIP)

- Since 2008, USAID’s “technical flagship” project for maternal, newborn, and child health
- Working in 50 countries. For immunization:
  - **Asia:** India, Timor Leste
  - **Africa:** DRC, Kenya, Liberia, Malawi, Rwanda, Senegal, South Sudan, Tanzania, Uganda, Zimbabwe
  - **Europe:** Ukraine, Tajikistan, Kyrgyzstan
- For immunization, technical support for planning new vaccine introductions, reaching the unreached, improved equity
- New successor project to MCHIP just starting
### Major *global* players in immunization

<table>
<thead>
<tr>
<th>Organization</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Health Organization</td>
<td>Global policy and strategy development; disease surveillance; training</td>
</tr>
<tr>
<td>GAVI Alliance (Global Alliance for Vaccines and Immunization)</td>
<td>Shapes global vaccine markets; provides new and underutilized vaccines to countries (co-payment by countries); Health System Strengthening (HSS) funding</td>
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<tr>
<td>UNICEF</td>
<td>Procures vaccines; supports communication and social mobilization; equity agenda</td>
</tr>
<tr>
<td>Bill &amp; Melinda Gates Foundation</td>
<td>Major support to GAVI; key supporter of polio eradication; support to certain countries (India, Ethiopia, Nigeria…)</td>
</tr>
<tr>
<td>CDC</td>
<td>Disease surveillance; operations research and evaluations; build capacity in epidemiology</td>
</tr>
<tr>
<td>Some NGOs, ex. MSF</td>
<td>Emergency humanitarian aid particularly for disasters, internally displaced populations, refugees</td>
</tr>
</tbody>
</table>
Vaccines used in immunization programs

“Traditional” vaccines
- BCG (tuberculosis)
- Oral polio vaccine
- DTP (Diphtheria, pertussis, tetanus)
- Measles
- Tetanus toxoid

New/underutilized vaccines
- Hepatitis B
- Hib (Haemophilus influenzae type b)
- Pneumococcal conjugate
- Rotavirus
- Rubella
- Human Papillomavirus Virus
- Yellow fever
- Meningococcal A (conjugate)
- Typhoid
- JE (Japanese encephalitis)
- Oral cholera?

Regional use
Global U5 Mortality: Role of Vaccine Preventable Diseases (2008 data)

8.8 million under five deaths

17% (1.5 million) from vaccine preventable diseases


* WHO/IVB estimates
<table>
<thead>
<tr>
<th>Age of Contact</th>
<th>Vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth</td>
<td>BCG, OPV-0, Hep B*</td>
</tr>
<tr>
<td>6 weeks</td>
<td>DTP1, Hep B*, Hib, OPV1, PCV, rota</td>
</tr>
<tr>
<td>10 weeks</td>
<td>DTP2, Hep B*, Hib, OPV2, PCV, rota</td>
</tr>
<tr>
<td>14 weeks</td>
<td>DTP3, Hep B*, Hib, OPV3, PCV (rota)</td>
</tr>
<tr>
<td>9 months</td>
<td>Measles, Hep B*, YF</td>
</tr>
</tbody>
</table>

* total of 3 doses with timing dependent upon local epidemiology
# Tetanus Toxoid Immunization Schedule (Women of Child Bearing Age)

<table>
<thead>
<tr>
<th>Dose</th>
<th>When to give</th>
<th>Expected Duration of Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT1</td>
<td>As early as possible in pregnancy, or at first contact when a girl reaches childbearing age</td>
<td>None</td>
</tr>
<tr>
<td>TT2</td>
<td>At least 4 weeks after TT1</td>
<td>One to three years</td>
</tr>
<tr>
<td>TT3</td>
<td>At least 6 months after TT2 or in next pregnancy</td>
<td>Five years</td>
</tr>
<tr>
<td>TT4</td>
<td>At least 1 year after TT3 or in next pregnancy</td>
<td>10 years</td>
</tr>
<tr>
<td>TT5</td>
<td>At least 1 year after TT4 or in next pregnancy</td>
<td>All child bearing years</td>
</tr>
</tbody>
</table>

*Source: WHO.*
People: Those who are to receive the vaccines (target groups)

- Infants
- Young children (e.g., measles 2nd dose)
- Pre-adolescents (HPV)
- Women of child-bearing age (tetanus toxoid)
- Expanded age groups during campaigns (e.g., polio, measles, meningitis A)
Decade of Vaccines (2010-2020) and Global Vaccine Action Plan (GVAP)

- **Achieve a world free of polio**
  - By 2015: Interrupt wild polio virus transmission
  - By 2020: Certification of poliomyelitis eradication

- **Meet vaccination coverage targets in every region, country and community**
  - By 2015: 80+ LICs and MICs have introduced 1+ new or underutilized vaccine to their immunization (vs 2011)
  - By 2020: 90% national coverage, 80% in every district for all vaccines in immunization programmes

- **Meet global and regional elimination targets**
  - By 2015: Neo-natal tetanus eliminated in all WHO regions, Measles eliminated in at least 4, Rubella in at least 2
  - By 2020: Measles and rubella eliminated in 5 WHO regions

- **Develop and introduce new and improved vaccines and technologies**
  - By 2020: Licensure, launch of vaccine(s) against one or more major non-VPDs
  - By 2020: Licensure, launch of 1+ new platform delivery technology
Scenario 1: Low herd immunity

Low population immunity
Chance for contagious to meet susceptible is high
Disease spreads fast. Transmission is sustained. Outbreaks are frequent.

- Source: WHO
Scenario 2: High herd immunity

Above a certain threshold of population immunity (95% for measles), chance for contagious to come into contact with susceptible is low. Disease spread is limited. Outbreaks are small. This population has herd immunity.

(Source: WHO)
Global Immunization 1980-2012, DTP3 coverage

Global coverage at 83% in 2012

Immunization, Vaccines and Biologicals (IVB), World Health Organization.
194 WHO Member States. Date of slide: 27 August 2013.
People: Who is not getting vaccinated? (by WHO Regions)

22.6 million infants not immunized (DTP3), 2012

194 WHO Member States. Date of slide: 22 July 2013.
People: Who is not getting vaccinated?  
The poor

DTP3 coverage for lowest and highest wealth quintiles,  
Source: Demographic and Health surveys (DHS) in 14 African countries, 2007-2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Lowest quintile</th>
<th>Highest quintile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>2011/12</td>
<td>59%</td>
<td>86%</td>
</tr>
<tr>
<td>Cote d'Ivoire</td>
<td>2012</td>
<td>65%</td>
<td>87%</td>
</tr>
<tr>
<td>DRC</td>
<td>2007</td>
<td>28%</td>
<td>73%</td>
</tr>
<tr>
<td>Ghana</td>
<td>2008</td>
<td>33%</td>
<td>62%</td>
</tr>
<tr>
<td>Guinea</td>
<td>2012</td>
<td>46%</td>
<td>84%</td>
</tr>
<tr>
<td>Liberia</td>
<td>2007</td>
<td>46%</td>
<td>84%</td>
</tr>
<tr>
<td>Madagascar</td>
<td>2008/09</td>
<td>46%</td>
<td>92%</td>
</tr>
<tr>
<td>Mozambique</td>
<td>2011</td>
<td>53%</td>
<td>93%</td>
</tr>
<tr>
<td>Niger</td>
<td>2012</td>
<td>52%</td>
<td>84%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>2008</td>
<td>52%</td>
<td>76%</td>
</tr>
<tr>
<td>Rwanda</td>
<td>2008</td>
<td>77%</td>
<td>96%</td>
</tr>
<tr>
<td>Senegal</td>
<td>2010/11</td>
<td>88%</td>
<td>99%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>2010</td>
<td>74%</td>
<td>96%</td>
</tr>
<tr>
<td>Uganda</td>
<td>2011</td>
<td>75%</td>
<td>96%</td>
</tr>
</tbody>
</table>
Who are the “unreached”? 

- Peri-urban populations who do not fully utilize accessible services
- Rural and urban populations with access who start but do not complete
- Remote rural populations with poor access
- Marginalized groups and sects
Epidemiology of the unimmunized child:
30-second conclusion of multiple studies

- **Left-outs (Have not received DTP1):** difficult access, inconvenient hours, negative beliefs/rumors, minority status

- **Drop-outs (Started but did not complete):** poor treatment/bad experiences, missed opportunities, fears (side effects, abuse due to lost card), poor understanding of need to return or when to return

*Not just a matter of “access”:* Are services available, acceptable, affordable, affable?

*Source:* IMMUNIZATIONbasics/JSI. "Epidemiology of the Unimmunized Child: review of grey literature." September 2009
Components of Routine Immunization System

- Policies
- Practices
- Financing
- Community Action
- Supportive Supervision
- Monitoring & Surveillance
- Advocacy & Communication
- Training
- Cold Chain, Supplies, and Logistics

Source: BASICS 1997
Service Delivery: Planning Vaccination

**National level**
- Set policies and standards for Immunization Services

**District Level**
- Manage the implementation of immunization Policies and standards

**Service Delivery Level**
- Provide Immunization Services

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Service delivery strategies
- Fixed or Static
- Outreach
- Mobile

Enhancing Vaccination Coverage
- Campaigns
- Vaccination Weeks

Planning at the health facility level
Reaching Every District (RED) approach: Five overlapping components

- Planning and management of resources
- Reaching the target populations
- Linking services with communities
- Supportive supervision
- Monitoring for action

A flexible approach for countries and districts to tailor to their situation.
Reaching the Target Population

- **Identify service delivery strategies** most appropriate to the needs of eligible populations (women and <1 children)

- **Develop the right mix of strategies** (fixed, outreach, mobile). Identify location of eligible groups, including hard to reach, reasons why underserved or why they under-utilize services, and ways in which they can be reached

- **Increase access, reduce drop-out rates and missed opportunities**
Immunization challenges: human resources

- District health teams (>4000 in Africa alone): limited capability and resources—must decide which priorities to support
- Service providers: limited education, low pay, motivation
Immunization challenges: Weak infrastructure
Immunization challenges: cold chain and logistics management
Immunization challenges: providing high quality services to encourage utilization

When I did bring my child to the vaccination session:

• Was the health worker present at the appointed time?
• Was one or more of the required vaccines or syringes absent?
• Was I yelled at for not having “retained” a vaccination card which I might never have been given in the first place or that was damaged in the rain on the long walk home or that I perhaps did lose?
• Was I reprimanded publicly for not having returned exactly four weeks after the previous dose?
• Was I ridiculed for my child’s threadbare or unclean clothing?
• Was I informed in my own language what the health worker was trying to say to me?
• Was I made to feel ignorant for asking the health worker to explain the purpose of the vaccination or why my child needed to return yet again for another dose?
• Was I told when to return for subsequent doses?
• Was I requested to make unofficial payments that I could not afford?
• Was I expected to wait in the hot sun without any explanation, without seats, without water?

Source: MCHIP, 2011
Immunization challenges: injection safety

- 12 billion injections annually in developing countries
- Over 50% unsafe → HIV, Hepatitis B, Hepatitis C
- Immunization accounts for 10% of total but led push for safe injection
- Auto-disable syringes used in immunization since 2000 or so
- Sharps waste management a challenge
Immunization coverage is not enough!

Was potent vaccine administered safely and efficiently in a timely manner before exposure to disease?

-Source: BASICS, 1996
Disease Control Initiatives

Polio Eradication, Measles Elimination, Maternal and Neonatal Tetanus Elimination all share common elements:

- Campaigns to give EXTRA, supplemental doses to an expanded age range for eligibility
- Enhanced, well-defined disease surveillance
- *A strong base of routine immunization is required*
Every child should be a VIP...

Vaccinated, Immunized & Protected!
Technical resources

- GAVI Alliance: www.gavialliance.org (see country hub)
- Country immunization data submitted to WHO and UNICEF: http://apps.who.int/immunization_monitoring/globalsummary
- Demographic and Health Surveys: http://www.dhsprogram.com/What-We-Do/survey-search.cfm?pgtype=main&SrvyTp=country
Thank you!

www.mchip.net

Follow us on:
Starting out in your career?
12 rules to work by:

- See the big picture, but sweat the details
- Keep an open mind, challenge the orthodoxies
- Learn from the field, be humble
- Help people “diagnose” and solve their own problems
- Ask the right questions, probe, take the time
- Observe, don’t take yes for an answer
- Maintain a sense of humor
- Be true to yourself, thicken your skin
- Prepare for some personal sacrifice and lead by example
- Do your homework, persevere and keep your promises
- Don’t be afraid to fail
- Don’t blame the victim