Polio and measles control: opportunities and threats for health systems

USAID
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OVERVIEW

Polio and measles: an overview

Control strategies and programs

Opportunities and threats to health systems

Questions for discussion
OVERVIEW

What are polio and measles?
Poliomyelitis

Infantile paralysis (most < 5 years)

Acute, viral, infectious disease

Fecal-oral route mainly

Greek words:

‘polios’ = grey

‘myelos’ = spinal cord
POLIOMYELITIS

No symptoms: 91-96%

Paralytic Polio:

<1% asymmetrical flaccid paralysis and fever:

30% make a full recovery

30% are left with mild paralysis

30% have medium to severe paralysis

10% die
1940s & 1950s “iron lungs” used to regulate breathing and keep polio patients alive.
MEASLES

- Virus: rash, cough, runny nose, eye irritation, and fever.
- 90% infection rate: respiratory droplets, crowding, displacement & malnutrition
- 30% complication rate: pneumonia, diarrhoea, seizures, brain damage & death
Control strategies and programs
VACCINES

‘A vaccine is an antigen introduced to a non-infected host for the purpose of creating antibodies’

First Vaccine: Smallpox

Edward Jenner

Take a weaker form of a virus and inject it into a none infected child, who then developed immunity to the stronger form of the same virus.
### POLIO

**IPV (Salk):** Killed vaccine, given IM or SC, liquid, prevents paralysis but not reinfection, not useful in epidemic control, > costly, 90% immunity after 2 doses, 99% immune after 99% 3 doses

**OPV (Sabin):** Live vaccine, oral, intestinal and general immunity, prevents paralysis & reinfection, cheaper, 50% immune 1 dose, >95% immune after 3 doses @ 6,10 & 14 weeks

### MEASLES

Live vaccine, 85% immune after 1 dose @ 9mo, + rubella + mumps, lyophilized, herd immunity.

Needs 95% population immunized - 2 doses @ 9 + 18 months
Public Health Emergency of International Concern (PHEIC)

Temporary recommendations for all 'exporting countries':

Consider delivery:
- To hard to reach populations
- Cold chain in hot climates
- Routine immunization or campaigns?
- Fixed site or outreach?
- Transit points?
- Supply / demand side issues?
GLOBAL POLIO ERADICATION STRATEGY

1. Routine Immunisation:
   1985 >80% 3 doses

2. Supplemental Immunization Activities:
   1995-96 pulse polio days – 2 doses

3. Acute Flaccid Paralysis (AFP)
   Surveillance - 1997

4. Targeted Mop-Up Campaigns
   Last stage in eradication: door-to-door immunization in high risk districts, where wild polio virus circulating
POLIO ERADICATION PROGRESS

Poliomyelitis global annual reported cases and Pol3 coverage, 1980-2012

Source: WHO/IQB database, 2013
194 WHO Member States.
Data as of July 2013

Date of slide: 12 July 2013
POLIO ERADICATION PROGRESS

Poliomyelitis virus transmission interruption expected 2016, certification expected 2019

Cases 204-15 limited to Pakistan & Afghanistan:

2014 246 cases; 2015 51 cases (all type 1)

$1.5 billion annually
Effects of 9-10 rounds annually on health system to deliver anything else?
MEASLES ELIMINATION STRATEGY

1. **Vaccine**: 95% coverage, 2 doses of measles containing vaccine through routine and/ or SIA

2. **Monitor disease**: Quality, case-based surveillance & labs

3. **Outbreaks**: Preparedness, response & case management

4. **Communications**: Increase demand and confidence

5. **R+D**: cost effective tools and operations
# GLOBAL ANNUAL MEASLES DEATHS

Source: WHO November 2015 for Measles Rubella Initiative
% GLOBAL COVERAGE MEASLES VACCINE FIRST DOSE

Source: Morbidity and Mortality Weekly Report and WHO’s Weekly Epidemiological Record Nov 12 2015
15.8 MILLION MEASLES DEATHS AVERTED, 2000-2010

BUT: ONLY 1% OF MEASLES RUBELLA INITITIATIVE BUDGET 2015-2020 IS ALLOCATED FOR ROUTINE IMMUNIZATION ACTIVITIES

2000-2010: 5.0 million deaths averted (32%)
2000-2010: 10.8 million deaths averted (68%)

Source: WER, 4th December 2009. Date of Slide 03 February 2010
Methodology modelled from Wolfson et al 2007
OVERVIEW

Opportunities and threats to health systems
Routine Immunization System

- Tetanus Elimination
- Measles Elimination
- Polio Eradication
- Family Planning
- New Vaccines
- Life Cycle Vaccination
- Support other health interventions
ROUTINE IMMUNIZATION
“TOOLS OF THE TRADE”

EPI reviews
Comprehensive Multi-year Plans (cMYP)
Annual Plans of Action
Joint Reporting Forms
Monthly data
RED strategy documents
Post-introduction evaluations for new vaccines
Effective Vaccine Management Assessments
Evaluation reports from SIAs
National policies and guidelines
# DISEASE TARGETED AND ROUTINE IMMUNIZATION

<table>
<thead>
<tr>
<th>SCOPE</th>
<th>DISEASE TARGETED APPROACHES</th>
<th>ROUTINE IMMUNISATION (RI)</th>
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</thead>
<tbody>
<tr>
<td><strong>DISEASE TARGETED APPROACHES</strong></td>
<td>One disease at a time</td>
<td>All vaccine-preventable diseases</td>
</tr>
<tr>
<td><strong>FUNDING</strong></td>
<td>Well-financed, often externally</td>
<td>Poorly financed, mainly domestic</td>
</tr>
<tr>
<td><strong>TIME-FRAME</strong></td>
<td>Time-limited to achieve goal</td>
<td>Aims to achieve incremental, durable gains</td>
</tr>
<tr>
<td><strong>SERVICE DELIVERY</strong></td>
<td>Episodic short campaigns, with frequency dictated by disease epidemiology, reaching across broad age ranges, frequently bypassing the health system with its intrinsic barriers, often bi-passing the system</td>
<td>Aims to reach all infants as soon as they become eligible for each vaccine, working through the health system</td>
</tr>
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<td><strong>STRUCTURE</strong></td>
<td>Top-down “command and control,” ownership mandated at each successively lower level</td>
<td>Aims to build ownership from the bottom up, usually through decentralized health structures</td>
</tr>
<tr>
<td><strong>PLANNING</strong></td>
<td>“Micro-planning” at high levels based on formulas</td>
<td>Some local autonomy and flexibility required for customized solutions</td>
</tr>
<tr>
<td><strong>LOGISTICS</strong></td>
<td>Fast chain, some provision of refrigerators (sometimes fuel only for campaigns), with pre-positioning of ample supply</td>
<td>Slow chain requiring skills for forecasting, stock management, temperature monitoring, avoiding freezing</td>
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*Source: Robert Steinglass*
## DISEASE TARGETED AND ROUTINE IMMUNIZATION

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<td><strong>COMMUNITY</strong></td>
<td>Short-term social mobilization that is externally financed, sometimes well-funded armies of “volunteers” going door to door</td>
<td>Must create locally affordable community partnerships for long term for an ongoing service that is considered “routine”</td>
</tr>
<tr>
<td><strong>RECORDING</strong></td>
<td>Only tally sheets used, as all are eligible for supplementary doses</td>
<td>Age-and dose-specific recording needed to screen and vaccinate individuals. Doses recorded on tally sheets, registers, and home-based records</td>
</tr>
<tr>
<td><strong>DATA FLOW &amp; USE</strong></td>
<td>Data flow to higher levels of system for analysis and rapid remedial action</td>
<td>Data ideally used at periphery of system for improved staff understanding, interest and motivation, better data quality and decentralized advocacy</td>
</tr>
<tr>
<td><strong>INVESTMENT STRATEGY</strong></td>
<td>Based on current epidemiology of polio or measles</td>
<td>Health development approach aiming for affordable durable improvements, unrelated to current polio epidemiology at any given point in time and place</td>
</tr>
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<td><strong>SUSTAINABILITY</strong></td>
<td>Interest in achieving eradication / elimination (little interest shown in RI until recently)</td>
<td>Of high concern. Affordable improvements for long term are required in many systems components (e.g., pre-service education, preventive cold chain maintenance)</td>
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*Source: Robert Steinglass*
# COMPARING RI WITH SIAS

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<th>SIA</th>
<th>Objectives</th>
<th>Routine Immunization</th>
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<td>Reduce transmission of disease</td>
<td>High coverage with all antigens</td>
<td></td>
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<tr>
<td>Expanded to broader age groups</td>
<td>Mainly children &lt;1 and women of child-bearing age</td>
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<tr>
<td>Intermittent, defined by disease epidemiology and RI coverage</td>
<td>Ongoing: Daily, weekly, monthly</td>
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<tr>
<td>Fixed, outreach, extra posts, door-to-door</td>
<td>Fixed + outreach</td>
<td></td>
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<tr>
<td>Supplementary doses; in past, not recorded on child health card</td>
<td>Routine doses; recorded on child health card</td>
<td></td>
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<tr>
<td>High</td>
<td>Limited</td>
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## SIAs

- **Objective**: High coverage with all antigens
- **Target groups**: Mainly children <1 and women of child-bearing age
- **Frequency**: Ongoing: Daily, weekly, monthly
- **Service delivery strategy**: Fixed + outreach
- **Recording/reporting**: Routine doses; recorded on child health card
- **Visibility**: Limited
London School of Hygiene and Tropical Medicine studies concluded:

“…weaker health systems may not be able to benefit sufficiently from the accelerated measles elimination activities, while in more developed systems disruptions are unlikely to occur. Opportunities to strengthen routine immunization services and the health system should be actively sought…”

J Inf. Dis. 2011; 204(Suppl 1): S82-9
SIA OPPORTUNITIES FOR ROUTINE IMMUNISATION

SIA opportunities

- More training, supervision
- More human resources
- Identification of underserved communities
- Greater ability to reach the hard to reach
- More cold chain equipment and fuel
- Increased attention to injection safety and AEFI
- Increased attention to waste management
- Strengthen surveillance, including AEFI
- Other

Routine immunization priorities and needs
Reaching Every District (RED)
- Micro planning
- Use of data for action
- Reaching hard to reach
- Strengthen links with community
- Supportive supervision

New vaccine introduction
- Vaccine supply management
- HMIS revision
- Updating cold chain
- Injection safety/waste management
- Other...

Translation to Routine Immunization
POLIO LEGACY PLANNING

Positive: real time detection and response, accessing insecure & hard to reach areas, accountability, social mobilization, partnership

“…..ensure that the investments made to eradicate poliomyelitis contribute to future health goals, through a program of work to systematically document and transition the knowledge, lessons learned and assets of the Global Polio Eradication Initiative…”
A no-brainer: How to transition from polio eradication to measles eradication

By Steve Coote | 13 October 2015

Polio immunization carried out by members of Rotary International in India. How can the polio infrastructure be harnessed for measles eradication? Photo by: Jean-Marc Glicoux / Rotary International / CC BY

Why stop with eradicating polio when the eradication of measles is within our grasp? During more than 25 years of operations, the Global Polio Eradication Initiative has mobilized and trained millions of volunteers, social mobilizers, and health workers; accessed households untouched by other health initiatives; mapped and brought health interventions to chronically
OVERVIEW

Questions
1. Do infectious disease control strategies weaken or strengthen health systems capacities to deliver other interventions?

2. Is polio control legacy work really a ‘no brainer’ to transition into measles control?