Global Immunization Overview

Thomas Cherian
Expanded Programme on Immunization
WHO, Geneva
About a quarter of under-5 deaths globally
(Estimated annual childhood deaths, 2004)

76%
24%

- Measles (16%)
- Hib (15%)
- Pertussis (10%)
- Tetanus (6%)
- Other (<1%)
- Pneumococcus (30%)
- Rotavirus (21%)
- Meningococcus A (<1%)

10.4 million deaths under 5 years of age
2.45 million or 24% deaths under 5 from vaccine preventable diseases
- 1.16 million deaths under 5 years of age from diseases targeted by conventional EPI vaccines
- 1.29 million from diseases where licensed vaccine is available
Immunizations are more than just about preventing death

- Health is more than absence of disease or death
- Keeping people healthy has benefits beyond the immediate health benefits and contributes to economic growth

*I would be hard-hearted enough to let the sick die if you could tell me how to prevent others from falling sick*

- Mohandas Gandhi
Returns on investments in immunization

The rate of return to investment in the GAVI immunization program is *conservatively* estimated at **12%** in 2005, rising to **18%** in 2020.

Source: Bloom & Channing 2004

These figures are comparable to average rates of return to investments in schooling (based on a survey of 98 country studies during 1960-97):

- primary: **19%**
- secondary: **13%**
- higher: **11%**

Uneven Coverage Patterns Across Interventions

- Only vaccinations reaching 80% coverage
- Interventions able to be scheduled routinely have higher coverage than those needing functional health systems and 24-hour availability

Median national coverage levels for 18 Countdown interventions and approaches, 68 priority countries, most recent estimate.

Source: WHO CAH department
Current status of immunization programmes
Global Immunization 1980-2009, DTP3 coverage

global coverage at 82% in 2009

Countries with most unvaccinated infants DTP3, 2007-2009 (in millions) and DTP3 coverage in 2009

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<thead>
<tr>
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<tbody>
<tr>
<td>India</td>
<td></td>
<td></td>
<td>66%</td>
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<tr>
<td>Nigeria</td>
<td></td>
<td>42%</td>
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<tr>
<td>China</td>
<td>97%</td>
<td></td>
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</tr>
<tr>
<td>Indonesia</td>
<td>82%</td>
<td></td>
<td></td>
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<tr>
<td>Pakistan</td>
<td>85%</td>
<td></td>
<td></td>
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<tr>
<td>Ethiopia</td>
<td>79%</td>
<td></td>
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<tr>
<td>Democratic Republic of the Congo</td>
<td>77%</td>
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<tr>
<td>Uganda</td>
<td>64%</td>
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<tr>
<td>Chad</td>
<td>23%</td>
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<tr>
<td>Kenya</td>
<td>75%</td>
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Challenges

- Uninformed population

- Programme management
  - Human resources: number, training & motivation
  - Immunization delivery (hard to reach populations)

- Issues with data quality
  - Capturing and reporting data on VPDs through administrative systems (numerator and denominator problems)
  - Wide variation between administrative and survey data
  - Low use of data for planning and corrective action

- Vaccine supply
  - Supply chain management (forecasting, procurement and distribution)
  - Storage and transportation in the cold chain
Review of published literature: Reasons for being un-/under-vaccinated

Under-vaccinated

- Immunization Systems: 44%
- Family Characteristics: 28%
- Parental Attitudes and Knowledge: 21%
- Communication and Information: 7%

Unvaccinated

- Immunization Systems: 55%
- Family Characteristics: 27%
- Parental Attitudes and Knowledge: 12%
- Communication and Information: 6%

% based on 887 reasons abstracted from 209 relevant articles
% based on 33 reasons abstracted from 12 articles on unvaccinated children
Addressing the challenges

COMMUNITY DEMAND FOR IMMUNIZATION AND PHC
Community participation, public information, social mobilization

Trust, accountability, partnership

HEALTH SYSTEM EFFECTIVE DELIVERY OF IMMUNIZATION SERVICES
Political/administrative commitment
Trained motivated health workforce
Supply chain & logistics
Monitoring and feedback

ENHANCED PROGRAMME PERFORMANCE

HEALTHY POPULATION
Reduction in Estimated Measles Deaths by WHO Region 2000 to 2008

<table>
<thead>
<tr>
<th>Region</th>
<th>% Reduction</th>
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<tr>
<td>AMR</td>
<td>100%</td>
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<tr>
<td>EUR</td>
<td>100%</td>
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<tr>
<td>EMR</td>
<td>93%</td>
</tr>
<tr>
<td>AFR</td>
<td>92%</td>
</tr>
<tr>
<td>SEAR</td>
<td>46%</td>
</tr>
<tr>
<td>WPR</td>
<td>92%</td>
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<tr>
<td>GLOBAL</td>
<td>78%</td>
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90% 2010 reduction goal

Source: WHO/IVB, November 2009
Report A63/18: Global Eradication of Measles

- 19 Member States made interventions
- Eradication is a worthy public health goal that can be achieved
- A major obstacle in many countries is inadequate routine immunization systems which must be strengthened as an essential building block for achieving and maintaining regional measles elimination.

2015 targets as a milestone towards eradication

- GIVS coverage goals
- 95% mortality reduction vs 2000
- Incidence <5 per million
Expanding Measles Outbreaks in Africa, 2009-2010

As of 16 June 2010:
- Outbreaks in 30 African countries
- Over 79,000 cases and 1,127 deaths reported
- Major resurgence in southern Africa after >10 years of very low incidence following accelerated control efforts

Reasons:
- Weak routine delivery
- Gaps in campaign coverage
- SIAs delayed due to inflated coverage estimates
- Limited target age range due to shortage of funds
- Cross border spread (migrants/nomads) and religious objectors
Recognition of potential and strong demand from

- 165 countries have introduced Hib vaccine, but:
  - Large countries yet to introduce, e.g. India, China, Indonesia and Nigeria
  - Vaccine prices have not dropped to the expected levels

- 42 countries have introduced PCV, including 2 GAVI eligible; 15 other GAVI countries ready to introduce
  - Supply and resource constraints
  - Long term financial sustainability
  - Serotype replacement: is this really a problem?

- 23 countries have introduced rotavirus vaccines; 4 GAVI eligible approved
  - Uncertainties about value given lower efficacy in developing countries
  - Age restrictions for use leading to lower coverage
Challenges of new vaccine introduction

- Uncertainty or scepticism about disease burden
- Weak immunization systems
  - Knowledge and practice of immunization staff
  - Cold chain, logistics, waste management
- Financial sustainability in resource constrained environment
- Surveillance systems
  - Country ownership and investments in surveillance
  - Adverse events surveillance & appropriate response
- Concerns about vaccine safety
- Fears, perceptions and misinformation about new vaccines
Integrated Approaches to Disease Control

- Global Action Plan for Prevention and Control of Pneumonia launched in November 2009
- WHA resolution on Pneumonia Prevention and Treatment passed in May 2010
- Comprehensive WHO/UNICEF Diarrhoea Control Strategy launched in Nov 2009
- Comprehensive Cervical Cancer Control Strategy updated including immunization, reproductive health, cancer screening and control programmes, and adolescent health services
Recent Policy Updates from WHO
Efficacy against severe rotavirus gastroenteritis in the first year of life, by mortality quartile

<table>
<thead>
<tr>
<th>WHO mortality strata</th>
<th>Under-5 child mortality</th>
<th>Efficacy Estimates</th>
<th>Countries where studies performed</th>
</tr>
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<tbody>
<tr>
<td>HIGH</td>
<td>Highest (top 25%)</td>
<td>50-64%</td>
<td>Ghana, Kenya, Malawi, Mali</td>
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<tr>
<td>INTER-MEDIATE</td>
<td>High mid (next 25%)</td>
<td>46-72%</td>
<td>Bangladesh, South Africa</td>
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<tr>
<td>LOW</td>
<td>Low mid (next 25%)</td>
<td>72 - 85%</td>
<td>Vietnam Multiple countries in Americas</td>
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<tr>
<td></td>
<td>Least (lowest 25%)</td>
<td>85 – 100%</td>
<td>Multiple countries in Americas, Europe, WPRO</td>
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Pertussis – updated position paper
(Scheduled publication in Oct 2010)

- aP and wP are equally efficacious in preventing severe pertussis

- Choice of vaccines
  - Both are safe;
  - aP is less reactogenic but more expensive;
  - In countries where reactogenicity leads to lower coverage; aP may be used; where price is the constraint, wP use should continue

- Schedule
  - 3 dose primary series in infancy (no change)
  - Booster dose in children 1-6 years; preferably 2nd year
  - Insufficient data to recommend immunization of adolescent/adult, pregnant women, health workers or for "cocooning"
  - Only aP for children > 6 years
Polio vaccination in the pre-eradication era: updated position paper June 2010
(http://www.who.int/wer/2010/wer8523.pdf)

- Choice of vaccine based on:
  - Endemicity (continuing transmission)
  - Risk of importation and spread

- High potential for WPV transmission is determined mainly by level of routine immunization coverage, sanitation and overall socio-economic status

- OPV + birth dose for countries endemic or very high risk for importation

- OPV ± birth dose for countries moderate or high risk for importation

- Sequential IPV-OPV schedule (1 or 2 doses IPV followed by ≥ 2 doses OPV) only with very high routine coverage (~95% with moderate or high risk and ~90% with low risk)

- IPV alone only in the lowest risk countries
Polio vaccination in the pre-eradication era: updated position paper June 2010
(http://www.who.int/wer/2010/wer8523.pdf)
New opportunities in immunization
New opportunities for vaccines and immunization

- Mandate from the WHO governing bodies
  - WHA report on GIVS 2005 with report back in 2011
  - WHA resolution on measles control
  - WHA resolution on pneumonia prevention and treatment

- Visible impact of vaccination on mortality and morbidity
  - Pneumococcal and rotavirus vaccines in high and middle-income countries
  - Data from developing countries through ongoing impact monitoring

- Strengthening of national policy & decision making processes

- Decade of vaccines
  - Partnership to communicate the value of vaccination and increase investments in disease prevention through vaccination
Decade of Vaccines

DAVOS 29 January 2010
Bill and Melinda Gates Pledge $10 Billion in Call for Decade of Vaccines to support research, production and delivery of life-saving vaccines to children in developing countries

World Health Assembly May 2010
"....Vaccines are one of the best life-saving buys on offer, preventing an estimated 2 to 3 million deaths each year. WHO and UNICEF, in close collaboration with the Gates Foundation, countries, and partners, are initiating a process to define the ambitions and scope of this Decade of Vaccines."....
THANK YOU