

# RI strategic initiative

Working Retreat Pre-reads/handouts

February 6<sup>th</sup> 2012

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## RI Retreat agenda

PRELIMINARY

Time	Session	Pre-reads
8:15-8:45 am	<b>Breakfast available</b>	
8:45-9:30 am	<b>Welcome, overview of the day and context</b>	<b>Vio Mitchell</b>
9:30-9:45 am	<b>Introduction to 'small s' strategy refresh process</b>	<b>John Grove</b>
9:45-10:30 am	<b>How RI team defines the scope of their program</b> <ul style="list-style-type: none"> <li>Current, proposed definition</li> <li>How future trends may reshape definition of RI</li> <li><b>Discussion:</b> Which trends are most critical to consider in strategy?</li> </ul>	<b>Vio Mitchell and Matt Hanson</b>
10:30-11:00 am	<b>Break</b>	
11:00-12:00 pm	<b>How RI fits into foundation's vision for success</b> <ul style="list-style-type: none"> <li>Goals that platform enables, and why</li> <li><b>Discussion:</b> How does RI enable program goals of participants? What enhancements to RI could have a transformative impact?</li> </ul>	<b>Matt Hanson and Molly Abbruzzese</b>
12:00-12:45 pm	<b>Lunch</b>	
12:45-2:30pm	<b>RI current and future problem identification</b> <ul style="list-style-type: none"> <li>Identify critical gaps that challenge foundation ability to meet goals</li> <li><b>Discussion:</b> Which gaps should be top priority for the global community to address? Why?</li> </ul>	<b>Core team (by topic) and Strategy</b>
2:30-3:00 pm	<b>Break</b>	
3:00-4:30 pm	<b>Where the foundation could and should engage</b> <ul style="list-style-type: none"> <li>What RI team has heard from survey</li> <li>Initial set of proposed goals for the 5, 10, 25 year mark</li> <li><b>Discussion:</b> Where people think the foundation should engage</li> <li><b>Brainstorm:</b> Criteria for foundation engagement</li> </ul>	<b>Vio Mitchell and Skye Gilbert</b>
4:30-5:00 pm	<b>Recap of the day and next steps</b>	<b>Vio Mitchell</b>

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RI team charter

## Project Charter (I)

Global Development Routine Immunization Steering Group Charter			
<b>Team Name</b>	Routine Immunization Steering Group: Global Development Program		
<b>Work Group Goal</b>	<p>The goals of the RI Steering Group are as follows:</p> <ul style="list-style-type: none"> <li>– Develop routine immunization strategy;</li> <li>– Identify resources that can be employed toward RI goals (potential partners, catalytic funding, voice);</li> <li>– Identify strategic opportunities for future RI investments;</li> <li>– Monitor initial implementation of RI strategic initiatives.</li> </ul>		
<b>GD Goal this effort relates to</b>	<p>Strong routine immunization systems are the core of our Vaccine Delivery goals (as listed on the Scorecard):</p> <ul style="list-style-type: none"> <li>– Eradicate Polio</li> <li>– Prevent re-emergence of polio from either wild or vaccine-derived viruses</li> <li>– Reduce measles morbidity and mortality (from 2000-2008, 2/3 of reduction in measles mortality due to RI)</li> <li>– Save 6.4M lives in 69 high burden countries over 2010-2019 with currently available (DTP, Measles, Hib, pneumo, rota) and new vaccines (malaria)</li> <li>– Reach 90% of the children in the poorest countries with sustained coverage of vaccines nationally and no district &lt;80%.</li> <li>– Achieve the DoV effort.</li> </ul>		
<b>Work Group Executive Sponsor</b>	Steve Landry	<b>Work Group Lead:</b> <b>Acting DD, RI</b>	Violaine Mitchell
<b>Time Frame</b>	Eleven Months: February 1, 2012 – December 31, 2012		
<b>Updated on</b>	April 30, 2012; and August 31, 2012		

## Project Charter (II)

Opportunity Statement	
<b>Justification Summary</b>	<ul style="list-style-type: none"> <li>▪ Strengthening routine immunization will have a direct impact on reducing morbidity and mortality related to vaccine preventable diseases</li> <li>▪ Strengthening routine immunization is vital to sustaining, and potentially achieving the foundation's number one goal of polio eradication, and is thus both an urgent and high priority (particularly in polio endemic countries and those with re-established transmission)</li> <li>▪ Strong routine immunization systems are also a necessary element to achieving maximum success through new vaccine introduction</li> <li>▪ Strong routine immunization systems will help us ensure against future measles outbreaks, such as those experienced in 2010-2011, and will pave the way for elimination</li> <li>▪ It is essential that we support the significant financial investment the foundation is making toward polio eradication and new vaccine introduction, which in 2011 totaled approximately \$336M for polio eradication activities and another \$250M for GAVI.</li> <li>▪ Immunization is also a platform upon which other maternal and child health interventions may be delivered, thus contributing to our MNCH goals</li> <li>▪ Leadership has stated that supporting strong routine systems is critical (mentioned in both internal meetings, as well as external communications, such as speech to WHA 2011)</li> <li>▪ The foundation has strong relationships with key partners who are showing a timely interest in this effort: GAVI Secretariat; UNICEF, WHO, Bilateral Donors, and other GAVI Alliance members</li> </ul>
<b>Assumptions and Risks</b>	<p><b>Assumptions:</b></p> <ul style="list-style-type: none"> <li>▪ A strategic, coordinated approach to routine immunization can be catalytic in re-engaging our partners</li> <li>▪ By drawing on comparative advantages, we (foundation &amp; partners) can achieve more than the sum of our individual activities</li> <li>▪ A strategic, coordinated approach to routine immunization will lead us to success in both polio eradication and new vaccine introduction</li> <li>▪ Country-level partners (particularly those in key geographies) will be interested in engaging with the foundation to plan for stronger RI systems</li> </ul> <p><b>Risks:</b></p> <ul style="list-style-type: none"> <li>▪ As we engage with partners – both at the global and country-level – we may be raising expectations for funding that exceed what we have to offer in the RI space</li> <li>▪ Although financing for initial efforts is not expected to be significant as compared to GPEI, or GAVI funding (exempting GAVI cash-based RI support), funding needs may be seen as competing with existing requirements</li> <li>▪ Diversion of staff time and focus from existing priorities – particularly GAVI</li> <li>▪ We may not be engaging quickly enough, or substantially enough (funding, or programmatically) to make an impact</li> <li>▪ We need to balance the short-term urgency of our RI work with the necessary long-term structure, or any gains will be unsustainable</li> </ul>

## Project Charter (III)

Steering Group Objectives and Success Criteria	
Objectives	<ul style="list-style-type: none"><li>▪ Articulate RI goals<ul style="list-style-type: none"><li>– Within global context</li><li>– Specific to the foundation</li><li>– Specific to key geographies</li></ul></li><li>▪ Maximize RI resources<ul style="list-style-type: none"><li>– Identify key partner strengths</li><li>– Strategize as to potential external partnerships</li><li>– Coordinate with other internal efforts</li></ul></li><li>▪ Outline Strategic Initiative in RI<ul style="list-style-type: none"><li>– Identify key investments</li></ul></li></ul>
Success Measures	<ul style="list-style-type: none"><li>▪ Ultimately, to achieve the new DoV goals</li><li>▪ Shorter-term increase in RI coverage in key geographies</li><li>▪ Specific success measures TBD on a per initiative basis</li></ul>

## Project Charter (IV)

Core Steering Group Members and interface with foundation divisions, SPTs, and country offices	
Core Steering Group members and their SPT/ Division	<ul style="list-style-type: none"> <li>▪ RI Team               <ul style="list-style-type: none"> <li>– Violaine Mitchell</li> <li>– Matt Hanson</li> <li>– Raja Rao</li> <li>– Molly Abbruzzese</li> </ul> </li> <li>▪ INDIA TEAM               <ul style="list-style-type: none"> <li>– Devendra Khandait</li> </ul> </li> <li>▪ Others TBD</li> </ul>
In-country presence	<ul style="list-style-type: none"> <li>▪ None</li> </ul>
Collaboration with other foundation teams (GD & FSP)	<ul style="list-style-type: none"> <li>▪ Steering Group Members are expected to coordinate across the foundation Global Health teams, and with the Global Development group as appropriate.</li> </ul>
External Relationships Managed	
Partner	<ul style="list-style-type: none"> <li>▪ FMOH in key countries</li> <li>▪ Bilateral Donors, such as: USAID, UK/DFID, and Norway</li> <li>▪ Other Partners: GAVI Secretariat, UNICEF, WHO, World Bank</li> </ul>
Role of team members / staff managing specific activities with FMOH	<ul style="list-style-type: none"> <li>▪ Violaine Mitchell, Acting DD for RI, will serve as the key contact person for FMOHs in key geographies</li> <li>▪ Steering Group Members will advise the Acting DD of new opportunities and topics under discussion with partners</li> <li>▪ Acting DD and RI Program Officer(s) will be available to join/support these discussions with internal staff and external partners, as requested or appropriate</li> </ul>

## Project Charter (V)

Proposed Timeline and Deliverables: 1 year*	
High-Level Milestones for Year One of Routine Immunization Steering Group	Date Complete
Review and adoption of RI Steering Group Charter	2/01/2012
Development of Year One Work Plan	2/01/2012
Meetings with External Advisors	06/2012, 09/2012
Development of Metrics for Project	See Scorecard
Initiation of 3 RI Emblematic Grants	Q1, Q2 2012

## Project Charter (VI)

### Proposed Resources: Roles and Responsibilities\*

#### Steering Group Sponsor – Chris Elias, President, Global Development

- Commits resources to the project
- Serves as an escalation path to highest levels of management / executive level

#### RI Steering Group Lead – Violaine Mitchell, Acting DD, Routine Immunization

- Coordinates stakeholders within Global Health
- Technical representation at immunization-related coordination meetings
- Manages relevant portfolio of grants and contracts
- Provides technical input into Vaccine Delivery grants (both polio and new vaccines) with RI component
- Liaises with other GH staff, with complementary grants (MNH, GHPA)
- Manages inter-grantee coordination at country level through the Steering Group
- Coordinates with other GH Divisions if/when overlapping of projects occur in key geographies
- Monitors dashboard, score card, and leads process improvements
- Synthesizes and shares learning among grantees, and across foundation
- Coordinates with Africa presence staff once established

#### Steering Group

- Represents Division and /or SPTs on Strategic Initiative
- Serves as communications liaison between RI Steering Group and Divisions/SPTs
- Brings relevant information from SPTs into Steering Group
- Provides technical input
- Monitors dashboard/works on process improvements
- Contributes to and facilitates shared learning across GH and with grantees

#### Program Officer supporting RI Steering Group

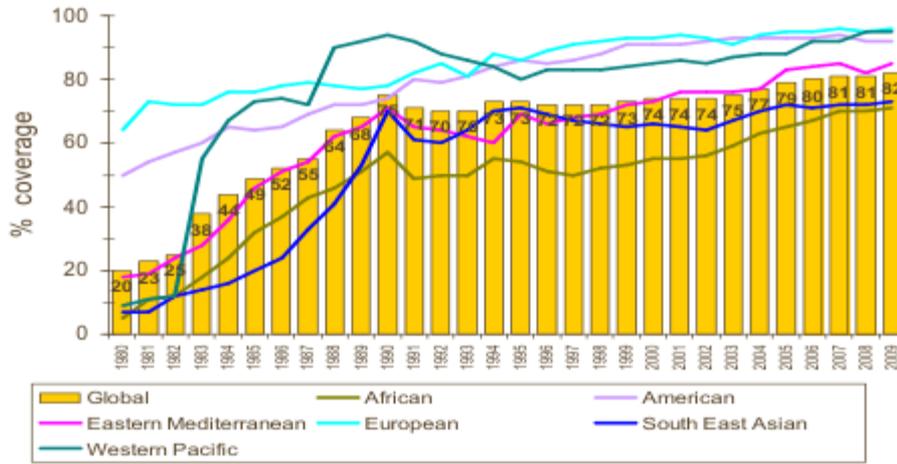
- Prepares work plan and time line for program deliverables
- Coordinates internal work group
- Manages communications, technical exchange, grantee coordination, reporting systems
- Provides grant-making support, report analyses
- Coordinates learning activities

#### 'Africa Presence'

- Remains current on political pulse of key geographies
- Brokers high level meetings with relevant Ministers, donors and stakeholders, as needed

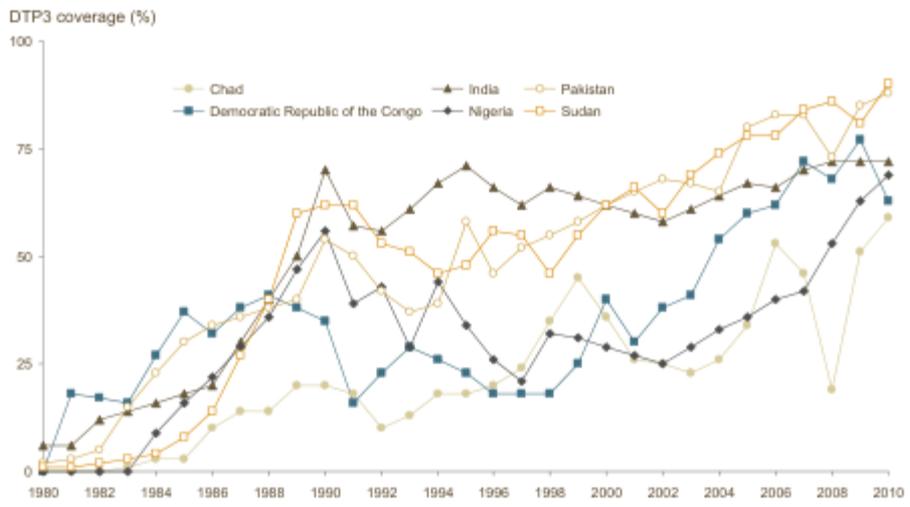


Global Immunization 1980-2009 - DTP3 coverage

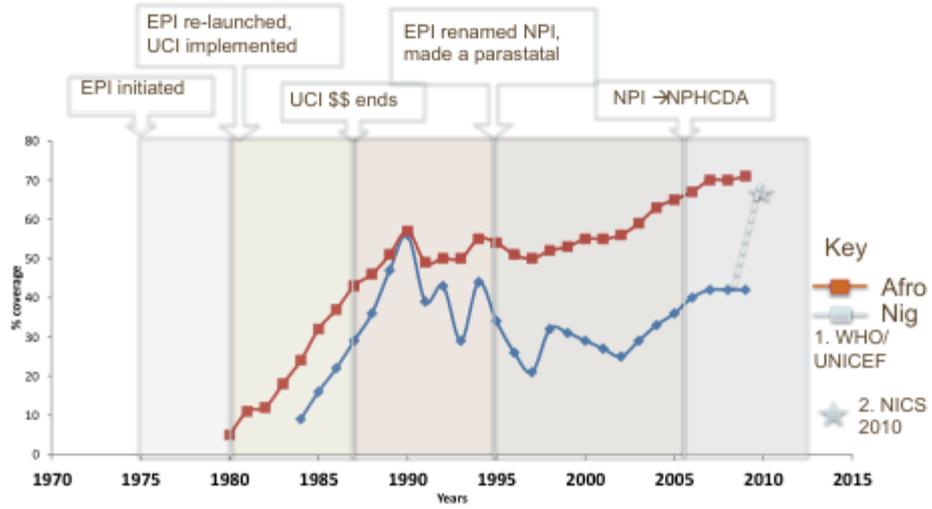


Source: WHO/UNICEF coverage estimates 1980-2009, July 2010

### DTP3 coverage levels in key geographies



## Trends in DTP3 Coverage in Nigeria, 1980 - 2010



Source: 1. WHO/UNICEF: assessed on 10/03/2010 from [http://apps.who.int/immunization\\_monitoring/en/globalsummary/timeseries/tswucoverage/dtp3.htm](http://apps.who.int/immunization_monitoring/en/globalsummary/timeseries/tswucoverage/dtp3.htm)  
 2. National Immunization Cluster Survey (NICS), 2010. FMOH and NPHCDA

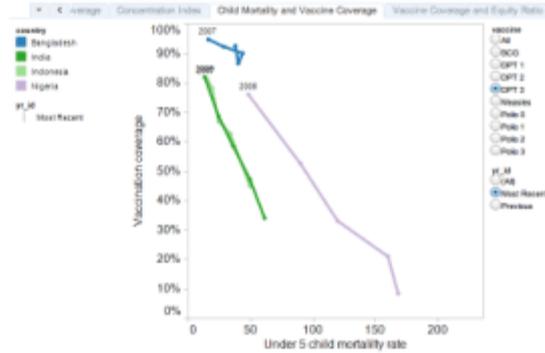
**Coverage and risk comparison of DTP3 shows that hardest to reach are those most in need of intervention**

**Compared coverage rates and risk by wealth quintile**

- Using child mortality rates (1-59 months) as a proxy for risk of vaccine preventable disease
- Each line represents a single country, with individual points for each wealth quintile

**For most vaccines and most countries, lower wealth quintiles have higher mortality risks and lower coverage rates – however the pattern differs between countries**

- Assuming infections targeted by new vaccines are distributed similarly to child mortality, existing programs may miss substantial fraction of high risk children



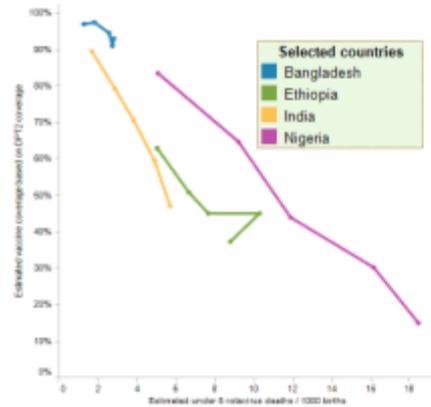
**Each line represents one country, individual points represent each wealth quintile**

Note: Vaccine coverage based on post-2003 DHS survey; Rotavirus mortality risk based on distribution of post-neonatal infant mortality and low weight for age proxies for rotavirus mortality risk.  
 Source: Rhtingana, "Really Reaching the Poor: Disparities and Distributional Impacts of Vaccines and Other Child Health and Development Interventions" SHARPS 2011

Four graphs of coverage by quintile for all countries, recent year. BCG, DPT2, Polio 2, Measles. Like tableau lower left, but only most recent year

## Case-study of impact of equitable distribution with Rotavirus

Rotavirus mortality and coverage curves



Each line represents a country; individual points represent each wealth quintile

Coverage decreases and deaths from rotavirus increase with lower wealth quintile

Note: Vaccine coverage based on post-2003 DHS survey; Rotavirus mortality risk based on distribution of post-neonatal infant mortality and low weight for age proxies for rotavirus mortality risk.  
Source: Rhtingana, "Reaching the Poor: Disparities and Distributional Impacts of Vaccines and Other Child Health and Development Interventions" SHARP 2011

Estimated distributional effects of rotavirus vx – mortality reduction and cost effectiveness

Country Wealth Quintile	Rotavirus deaths averted	CER (\$/DALY)	Rotavirus deaths averted / 1000 births	Equity Scenario - Deaths averted / 1000 births	Health cost of disparity (rotavirus deaths not averted)
<b>DH Congo</b>	<b>9,976</b>	<b>\$ 28.20</b>	<b>3.22</b>	<b>4.44</b>	<b>3,734</b>
Poorest	1,577	\$ 25.09	2.55	4.98	1,357
2nd	1,816	\$ 25.79	2.94	4.85	1,965
Middle	2,128	\$ 25.17	3.44	4.57	852
4th	2,351	\$ 27.03	3.80	4.62	460
Richest	1,715	\$ 45.11	2.77	2.77	0
<b>Ethiopia</b>	<b>5,655</b>	<b>\$ 43.38</b>	<b>1.66</b>	<b>2.17</b>	<b>1,736</b>
Poorest	1,001	\$ 37.89	1.47	2.49	622
2nd	1,414	\$ 32.37	2.06	2.91	510
Middle	1,657	\$ 43.40	1.55	2.17	378
4th	1,029	\$ 50.15	1.51	1.88	225
Richest	972	\$ 65.96	1.43	1.43	0
<b>India</b>	<b>34,616</b>	<b>\$ 62.98</b>	<b>1.20</b>	<b>1.55</b>	<b>11,625</b>
Poorest	7,064	\$ 55.22	1.22	2.33	5,748
2nd	7,649	\$ 64.48	1.32	1.99	3,483
Middle	7,136	\$ 62.24	1.25	1.56	1,711
4th	6,023	\$ 109.51	1.04	1.17	684
Richest	3,962	\$ 186.07	0.68	0.68	0
<b>Nigeria</b>	<b>15,306</b>	<b>\$ 28.30</b>	<b>2.59</b>	<b>4.56</b>	<b>13,272</b>
Poorest	1,459	\$ 58.60	1.24	6.93	6,062
2nd	2,589	\$ 21.24	2.19	6.07	4,124
Middle	2,758	\$ 28.92	2.34	4.46	2,256
4th	3,196	\$ 37.20	2.68	3.46	830
Richest	2,242	\$ 67.62	1.90	1.90	0

Large within country differences in benefit and CEA

- Significant health cost of disparity in many countries

Equitable access would increase overall impact by 35%

- Impact among poorest by 66-86%

**Countries with DTP3 coverage below 70%**



40 countries in 1990



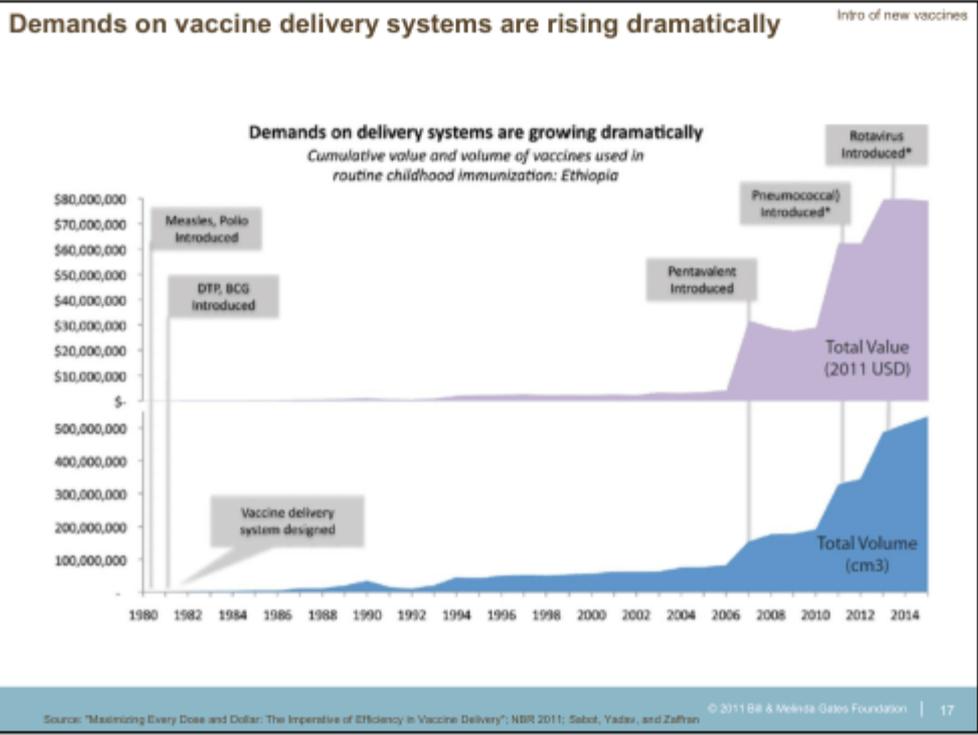
37 countries in 2000



20 countries in 2009

Source: WHO/UNICEF coverage estimates 1990-2009, July 2010, 193 WHO Member States.  
Date of slide: 23 July 2010

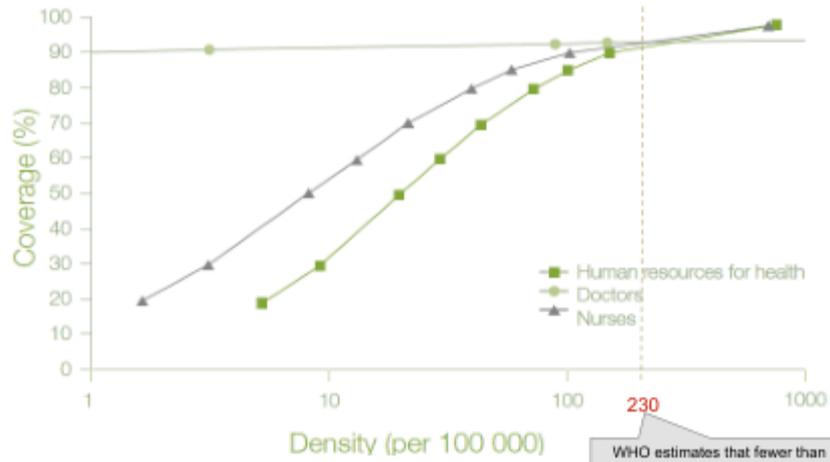
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# Health worker shortfall is affecting immunization coverage

HR shortfall

*Immunization coverage improves with increased density of vaccinators*

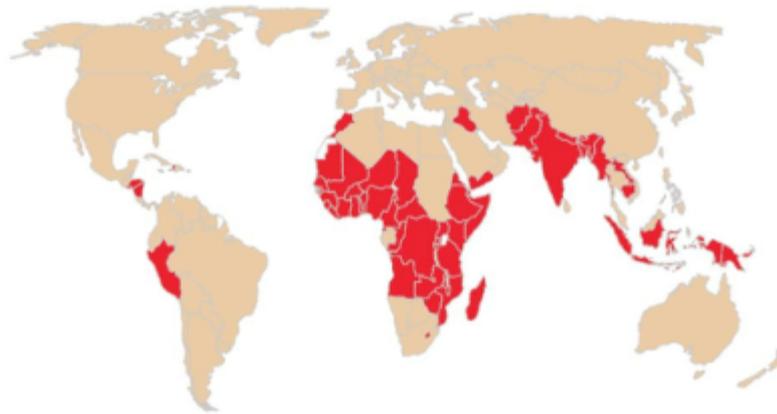


WHO estimates that fewer than 230 health care professionals (physicians, nurses, and midwives) per 100,000 constitutes a critical shortage

1. WHO definition of health care professional as constitutes a "critical shortage" may differ from the definition used by WHO on this graph. Source: State of the world's vaccines and immunization, 3rd ed. Geneva, World Health Organization, 2008; State of the World's Mothers, 2011 BR & Melinda Gates Foundation. Save the Children 2010. | 18

## 57 countries are facing a critical shortage of health workers

HR shortfall



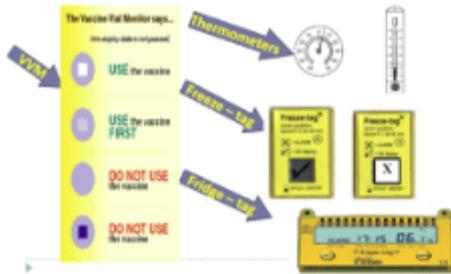
- Countries with critical shortage of health workers
- Countries without critical shortage of health workers

**Reaching target levels of health worker availability would require 2.4 million additional health workers in critical countries**

Note: While there is no gold standard for assessing the sufficiency of the health workforce, the WHO estimates that countries with fewer than 23 health care professionals (physicians, nurses and midwives) per 10,000 population will be unlikely to achieve adequate coverage rates for the key primary health care interventions prioritized by the Millennium Development Goals 2011-16 & Health 2030 Foundation. Source: "Women front-line of healthcare" State of the World's Mothers, IMAO 2016 World Health Statistics | 19

### Many technological innovations could improve RI supply-chain, but need to be effectively implemented/deployed

Temperature monitoring innovations: e.g. VVM, freeze-tags, 30-day temperature recorders



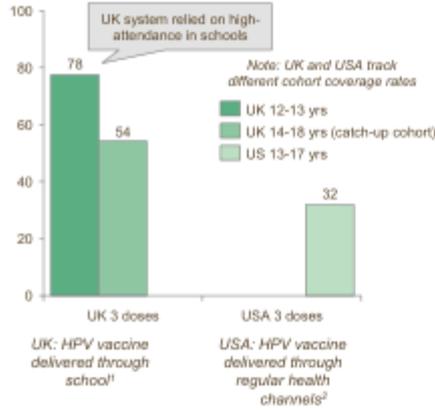
### IT systems innovations

- HERMES: supply-chain modeling tool
- EVM+: next generation EVM tool
- RFID tags: inventory monitoring tool
- Others...

## New touchpoints for vaccination (e.g. schools) have been deployed effectively in developed world

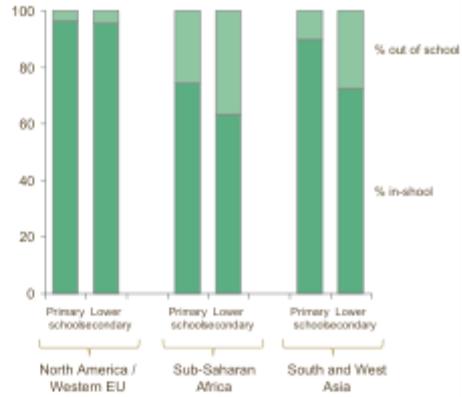
### Comparison of school-based versus health-facility touchpoints in developed world

Coverage rates for 3 doses HPV



### In developing world, greater proportion of out-of-school children can be a barrier to school-based immunizations

% of school attendance

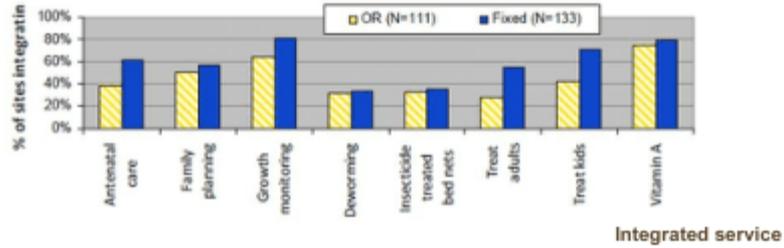


1. 12-13 year old cohort, catch-up cohorts (14-18 year olds) are shown with the dark green column (54% for all 3 doses). 2. Females 13-17 years old. Source: 2010 NIS Immunisation Statistics - UK, 2010 NIS - Teen Vaccination Coverage Table Data, UNESCO Institute for Statistics database, 2009-10 & Melinda Gates Foundation | 21

## Other services often integrated with routine immunization

Bundling services

**Health Facilities Integrating Services with Routine Immunization**  
(in 2007 RED evaluated countries)



- The RI infrastructure provides a platform for the delivery of additional services during fixed and outreach vaccination sessions
- In both fixed and outreach sessions, the services combined with immunization varied, even within the same country (see figure above)
- Health facilities report that services are more frequently combined at fixed sites than during outreach sessions

**In addition to straining delivery system with new vaccines, health workers are also providing multitude of additional services with each interaction**

1. Health facilities in seven of the 2007 RED evaluated countries reported delivering one or more of the services in chart during immunization outreach—or provided on the same day as immunization at fixed sites  
Source: RED Evaluations 2007

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Our initial thinking on barriers to successful immunization

## State of routine immunization today

### We have achieved significant impact

- In 2010, **109 million** infants worldwide receive DTP3 vaccinations each year
- **130 countries** met the 2010 target of  $\geq 90\%$  national coverage of DTP3
- More than **2.5 million deaths are averted** per year of children <5 years of age

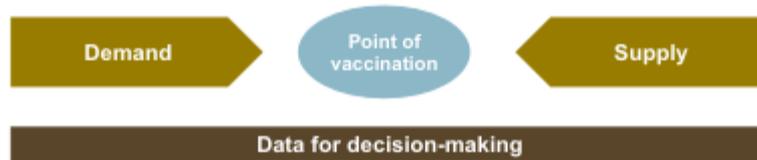
### However, an unfinished agenda remains

- In 2010, **19.3 million** (~20%) children did not receive some or all of the routinely recommended childhood vaccines
- DTP3 coverage was **below 70% in 18 countries** in 2010, only 59 countries (31%) achieved  $\geq 80\%$  coverage of DTP3 in every district
- **~2 million additional child-deaths could be avoided** if we can reach GIVS target of immunizing 90% of children < 5 years of age

### We cannot afford to be complacent in addressing these key gaps

- **RI coverage fell, or remained stagnant in 22** low-income countries between 2005 and 2009
- **Hardest to reach children** are those most in need of intervention and represent the most potential lives saved

## Initial framework for thinking about components of routine immunization



### For routine immunization to occur, three processes must be successful:

- **Demand:** Individual must be present at the point of interaction where they can receive a vaccination
- **Supply:** The vaccine needs to arrive at a designated point of interaction where it can be administered to an individual
- At the **point of vaccination**, a health worker must actively identify an individual's vaccination needs and follow the right steps to administer and record the vaccination

### In addition, one enabler of routine immunization must be in place:

- **Data for decision-making** must be collected, analyzed, and used. The data includes disease surveillance, coverage rates, and other metrics around the RI process

## Demand barriers (I)

Demand

	Barrier	Rationale, evidence, assumptions
Policy	Educational status, especially of women (mothers, caregivers)	<ul style="list-style-type: none"> <li>Women with low educational status may have less access to information, as well as lesser degree of socio-economic independence, (ultimately relates to decision-making power)</li> <li>Evidence: Often correlated with child health indicators, cited as risk factor for lack of vaccination</li> </ul>
	Political barriers	<ul style="list-style-type: none"> <li>Children who live in conflict-affected areas, or who have recently migrated from those areas are less likely to be vaccinated. Reasons may range from lack of personal financial resources, lack of service delivery systems, and lack of trust in "authority."</li> <li>Evidence: TBD</li> </ul>
Tech-nology	Lack of caregiver education about vaccination	<ul style="list-style-type: none"> <li>Rationale: Some caregivers may not realize (or may not have been told) when to come back for subsequent doses, and why it is important to do so</li> <li>Evidence: Cutts &amp; Biellik (e.g. results of Pakistan study using home-based education; study using re-design of vx card to highlight return dates and education on importance of full series)</li> </ul>
Opera-tions	Lack of information / Anti-vaccine movements <ul style="list-style-type: none"> <li>Caregivers may choose not to have child vaccinated</li> </ul>	<ul style="list-style-type: none"> <li>Rationale: May stem from mis-information; or from a lack of information regarding AEFIs</li> <li>Some indications that anti-vaccination movements are growing with coverage rates increase as people see less evidence of VPDs</li> <li>Evidence: TBD</li> </ul>
	Cultural / religious beliefs	<ul style="list-style-type: none"> <li>Cultural or religious resistance to receiving vaccinations</li> <li>Evidence: TBD</li> </ul>

## Demand barriers (II)

Demand

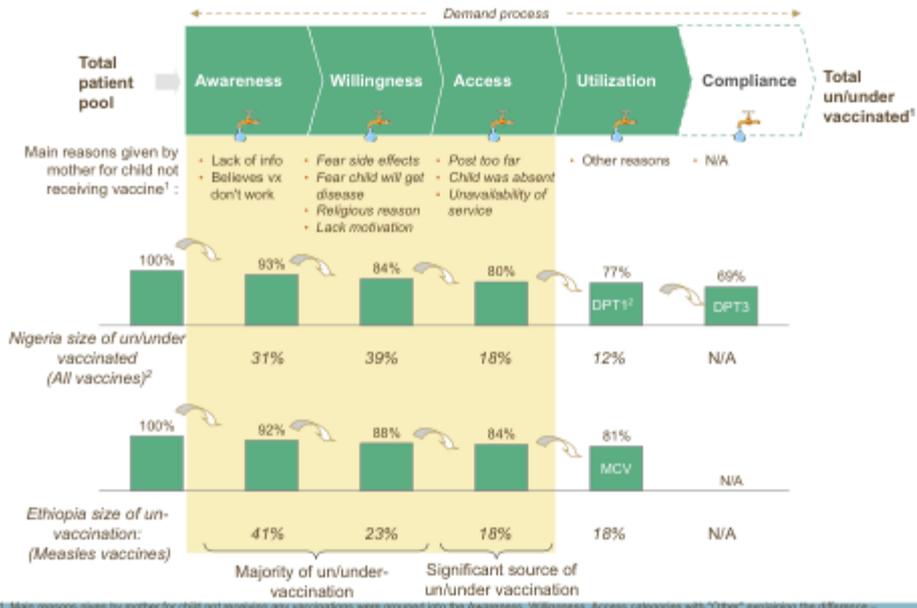
Operations  
(cont.)

Barrier	Rationale, evidence, assumptions
Geography	<ul style="list-style-type: none"> <li>Distance to point of vaccination is a barrier (often related to time and finance, but also in its own right)</li> <li>Some geographic areas, are "off the grid" (e.g. urban slums), and not accounted for in a designated service delivery area</li> <li>Evidence: Cutts/Biellik paper; Walt Orensteinn and Stanley Plotikin</li> </ul>
Lack of financial resources	<ul style="list-style-type: none"> <li>Delivery system does not account for the cost and opportunity cost of travelling to a vaccination, of waiting, and of any "unofficial" charges</li> <li>Evidence: TBD</li> </ul>
Lack of motivation	<ul style="list-style-type: none"> <li>If no other services are offered at the same site/same time, it may not be perceived as worth the cost &amp; time</li> <li>Evidence: TBD</li> </ul>
Lack of Maternal-Child Health Service Utilization	<ul style="list-style-type: none"> <li>Children born at home / without a skilled birth attendant are less likely to be vaccinated</li> <li>This priori lack of service utilization, presumably for similar operational reasons, spills over into lack of service utilization for immunization</li> <li>Evidence: TBD</li> </ul>
Poor service delivery	<ul style="list-style-type: none"> <li>Missed opportunities, whereby stockouts, concerns of wastage (thus no opening of a new multi-dose vial), or other cancellation of vaccination discourage completion of a series</li> <li>Evidence: TBD</li> </ul>
Bad experience	<ul style="list-style-type: none"> <li>Dropouts can also be caused by someone having a bad priori experience at a health center – rude treatment by a healthcare worker, unexpected fees, local vaccine reactions, etc.</li> <li>Evidence: TBD</li> </ul>

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# Surveys in Nigeria and Ethiopia shows that majority of unvaccination driven by lack of awareness or willingness

Demand

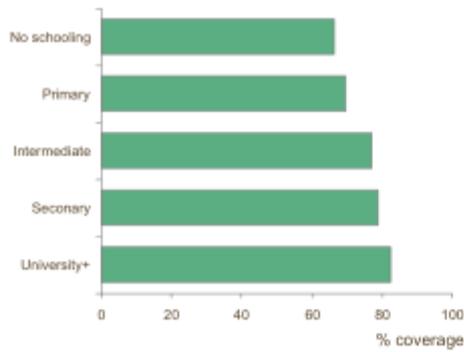


1. Main reasons given by mother for child not receiving any vaccinations were grouped into the Awareness, Willingness, Access categories with "Other" explaining the difference - includes reasons like "mother too busy" or "family problems". 2. Applying leakage percentages to DPT1 and DPT3 doses (assumes DPT would be one of first vaccines given). Note: Final DPT1 and DPT3 and MCV numbers come from WHO/UNICEF estimates. Assumes that rationale percentages can still be applied. Source: Nigeria Demographic and Health Survey 2009; Kilale and Tobin. "Factors influencing child immunization coverage in Ethiopia, 2010". WHO/UNICEF estimates 2010.

## Mother's education appears to be a positive factor for immunization

Demand

### Coverage in Khartoum, Sudan correlated to mother's education



### Key findings on education from other studies

- Generally, the studies reviewed supported the conventional wisdom that education, particularly mothers' education, is a positive factor for immunization
- However, the relationship is not always clean and consistent
  - e.g. in one Kenya study fathers' education correlated well with vaccination in urban areas and mothers' education in rural areas
  - In Nigeria, educated people were less likely to immunize their children than illiterates

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Source: Brexoul, "Factors influencing immunisation coverage in Khartoum State, Sudan", "Epidemiology of an unimmunized child" CDC 2009

#### Country examples

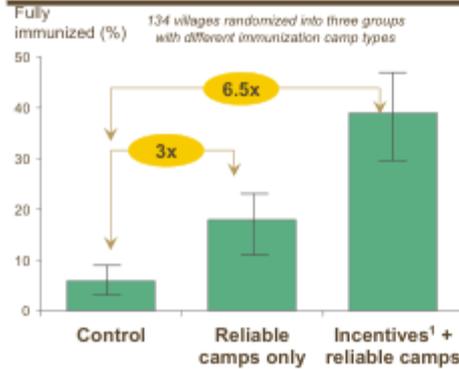
- Liberia: Over 1/3 of mothers said they were not informed about the return date
- 2008 EPI review in Benin found that one of the principal reasons for non-vaccination was mothers' being unaware of the need to return or when or where to return
- In Mozambique, 3/4 of health workers said they always write the return dates on the child's card, but only 1/4 of the cards actually had the return date written
- However, in Uganda, 80% of parents claimed that health staff advised them to return for more vaccinations
- In one area of Bangladesh, with a 30% dropout rate, 63% of mothers claimed they were not informed about the time and place of EPI sessions

## Case study: addressing demand in rural India has more impact than addressing supply-issues only

Demand

**Note: This is a controversial issue!**

### Immunization rates by type of immunization camp in rural India



	Control	Reliable camps only	Incentives <sup>1</sup> + reliable camps
% coverage	6%	18%	39%
Avg cost / child		\$55.83	\$27.94

*Note: CCTs impact still TBD*

### Key findings

**Improving reliability of services improves immunization rates by ~3x, but adding small incentives improves uptake of by ~6.5x**

- Primary impact of incentive is to increase full compliance

**Offering incentives proves to be more cost effective than purely improving supply**

- Average cost / child is actually lower when offering incentives – since daily fixed cost (mainly health worker salary) is spread over more children

**Study indicates that size of incentive does not matter beyond the fact that a positive incentive is offered**

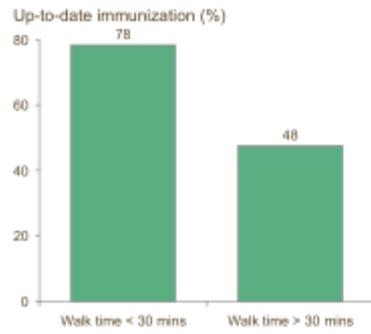
**However, coverage still remains very low despite interventions**

1. Incentive consisted of \$1 worth of low kashis per immunization and a set of metal plates upon completion of full set of immunizations. Source: BMJ 2010;340:e2220 doi:10.1136/bmj.e2220 © 2011 Bill & Melinda Gates Foundation | 31

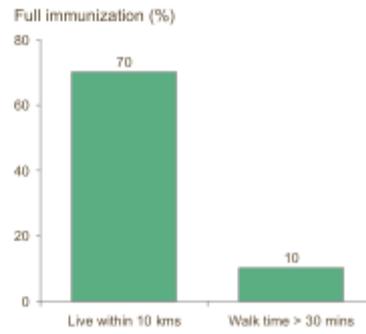
## Epidemiology of unimmunized child – access

Demand

### Impact of distance in Khartoum State, Sudan



### Impact of distance in Senegal



Source: Brexler, "Factors influencing immunisation coverage in Khartoum State, Sudan"; "Epidemiology of an unimmunized child" CDC 2009

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**Nigeria: Closer look at disparities by wealth quintile**

Demand

**Methods**

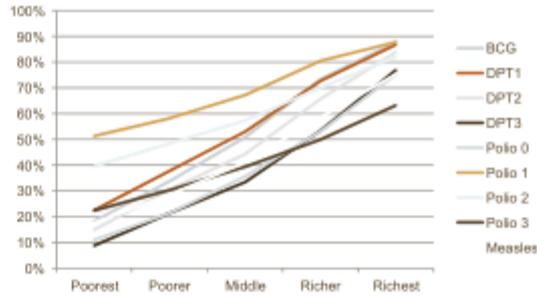
- 2003 and 2008 data
- Analyzed by region, wealth, vulnerability (nutritional status) and time
- BCG, DPT1, DPT2, DPT3, Polio 0, Polio 1, Polio 2, Polio 3, Measles

Table show coverage rates of different vaccines by wealth quintile

**Key findings**

- Children in poorer households are less likely to be vaccinated
- Disparities in coverage for all vaccines

**Vaccination coverage rates by wealth quintile: Nigeria DHS 2008, children 12-23 months**



Source: Rwigyema, "Really Reaching the Poor: Disparities and Distributional Impacts of Vaccines and Other Child Health and Development Interventions" SHARE 2011 | 33

1 figure (most recent year) with multiple vaccines coverage rates by quintile (national)

Barriers	Utilization difficulties: country examples
<b>Lack of motivation</b>	<ul style="list-style-type: none"><li>▪ In Dhaka, 21% of mothers in one study stated that immunizations were not necessary for their children</li></ul>
<b>Previous use of health services</b>	<ul style="list-style-type: none"><li>▪ Studies in West Africa, India, and Ecuador found that families with a history of using health services for other reasons had a much higher chance of having their children vaccinated</li></ul>
<b>Poor service delivery</b>	<ul style="list-style-type: none"><li>▪ In Liberia, 30% of mothers commented on the inconvenience of long waiting times</li></ul>
<b>Bad experience</b>	<ul style="list-style-type: none"><li>▪ In Uganda, only a minority (13%) complained about being treated rudely or badly</li><li>▪ After some mothers lose their immunization/health cards, they are scared to go back to the health centers for fear of being yelled at by the health staff, made to pay for a new card, and/or asked to return home for the forgotten card</li></ul>

Note: Based on the "best" studies  
Source: "Epidemiology of an unimmunized child" CDC 2009

## Epidemiology of unimmunized child: summary of major determinants

Demand

Major Risk Factors (secondary factors)	Corresponding/reinforcing factors
Place of residence (rural, distant from a health facility) (family factor)	Insufficient facilities; unreliable services/outreach, restricted/inconvenient service hours (service factors)
Poverty (family factor)	Health worker attitudes and behavior; charges (official and unofficial) (service factors)
Mothers' education (family factor) [Although mothers' education was commonly associated with children's immunization status, some studies found little or even a reverse correlation]	Insufficient/ineffective IEC, engagement with community leaders and groups (service factors)
Major Causal Factors (primary factors)	Corresponding Reinforcing factors
Bad experiences at health facility/outreach, leading to fears, negative expectations, and lack of trust (family factor)	Health worker attitudes and behavior, side effects, stock outs (service factors)
Competing priorities (too busy) (family factor)	Restricted/inconvenient hours, difficult access, unreliable services (service factors)
Missed opportunities to immunize (service factor)	Parents' attitudes and fears (e.g. to have sick child immunized), although in most cases parents accept health staff's recommendation
Fears/rumors (family factor)	Insufficient/ineffective IEC, engagement with community leaders and groups (service factors)
Lack of appreciation of basic benefit of vaccination (family factor)	Insufficient/ineffective IEC, engagement with community leaders and groups (service factors)
Lack of understanding of need for multiple doses, when and where to return, that immunization protects against certain specific diseases (family factor)	Poor health worker communication; insufficient/ineffective IEC, engagement with community leaders and groups (service factors)

Note: Based on the "best" studies  
Source: "Epidemiology of an unimmunized child" CDC 2009

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## Summary of papers reviewed shows a significant impact can be achieved by addressing demand generation barriers

Demand

Country [Ref] Year(s)	Brief description	Outcomes
Loevisohn 1987 [19]	Mass vaccination campaigns; stationary clinics and mobile clinics with or without food supplementation as an incentive.	Regular mobile: 63.3% Mass vaccination campaigns: 77.1% Stationary with food incentive: 94.1% Mobile with food incentive: 99.2%
Cutts 1990 [20]	Outreach teams; communications system to inform villages about arrival mobile teams. Training of representatives from grass roots organisations; development of community-based volunteers from grass roots organizations; Door-to-door canvassing.	Measles vaccination 1985-1987 Beira (1% increase) Inhambane (13% increase) Tete (22% increase) Quelimane (31% increase) Notes: Difficult to track study in conflict zone
Zimicki 1994 [16]	The mass-media element of the campaign was March-Sept 1990 focused on four tv, four radio, and printed ads w/ reminders of vaccination day and dangers of measles	53.6% (1989) to 64.5% (1990)
Brugha 1996 [22]	Program of home visits during which parents were advised to take the children to the next <5 clinic of their choice, and were given a referral note for the clinic.	Intervention group: increase from 59.5% to 86% Control group: increase from 60.7% to 66.7%
Amin 1997 [18]	NGO provision of small collateral-free area focused credit. Outcomes listed for last-born vaccination data.	Total area: 62.4 % Credit program 67.8% non-member 58.8% Comparison area 49.4 %
Hutchinson 2006 [17]	"Smiling Sun" communication program included a variety of important health-related messages (e.g. MCH, FP, vaccination). The delivery media included signboards, television drama series, television advertisements, radio spots, press ads in newspapers and local publicity.	Mothers who recalled seeing Smiling Sun promotional material were more likely than those who did not to complete DPT vaccination (64% vs 48%). Note: local publicity less cost-effective vs national media
Andersson 2009 [6]	Three structured discussions with one in every ten thousand respondents. 1) Discussion showed findings about vaccine uptake from baseline survey 2) Focused on the costs and benefits of vaccination 3) Focused on local action plans including options for sharing transport and childhood costs.	Measles: 20% increase after knowledge-transfer DPT: 28.5% increase after knowledge-transfer

Source: Shea, Anderson, Henry, BMC International Health and Human Rights. 2009 Increasing demand for childhood vaccination in developing countries: a systematic review. © 2011 Bill & Melinda Gates Foundation | 36

## Point of Vaccination barriers (I)

Point of  
vaccination

	Barrier	Rationale, evidence, assumptions
Policy	Health worker shortage	<ul style="list-style-type: none"> <li>▪ Critical shortages and a high turnover of service delivery and supply chain health workers in the poorest countries; compounded by poor motivation and underperformance—leave poorest areas most underserved</li> <li>▪ Evidence: <i>State of world's mothers</i></li> </ul>
	Competing health worker priorities	<ul style="list-style-type: none"> <li>▪ Opportunity cost associated with screening for immunization, administering a vaccination, and recording the information can be outweighed by need for another competing health service</li> <li>▪ Evidence: <i>Studies showing decrease of vaccinations during curative care visits</i></li> </ul>
	Policies can result in missed opportunities to vaccinate (e.g. wastage, open-vial)	<ul style="list-style-type: none"> <li>▪ Include policies against wastage, lack of VVMs, facilitating open-vial policies, and lack of clarity on contra-indications</li> <li>▪ Evidence: <i>Observation and status of VVMs on new vaccines</i></li> </ul>
Tech-nology	Recording name-based data on vaccinations is time consuming, prone to errors, and often insufficient to allow tracking of children in the community	<ul style="list-style-type: none"> <li>▪ Difficult to ID patient quickly at health facility if home-based vaccination card is unavailable</li> <li>▪ Evidence: <i>DQA and DQS assessments; RED evals</i></li> </ul>

## Point of Vaccination barriers (II)

Point of  
vaccination

### Opera- tions

#### Barrier

Missed opportunities due to stock-outs or inadequate training leading to concerns about wastage or false contra-indications

Clinic operations discourage parents from attending

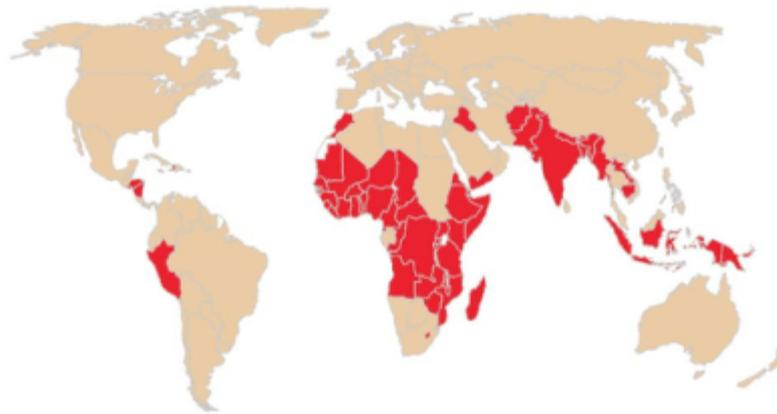
#### Rationale, evidence, assumptions

- Evidence: RED evals; presentations by WHO regional EPI advisors to SAGE meetings; literature on missed opportunities

- Inadequate explanation to parents of hte need to return or when to return
- Negative family experience at a previous health center or outreach attendance
- Evidence: same as above

## 57 countries are facing a critical shortage of health workers

Point of vaccination



- Countries with critical shortage of health workers
- Countries without critical shortage of health workers

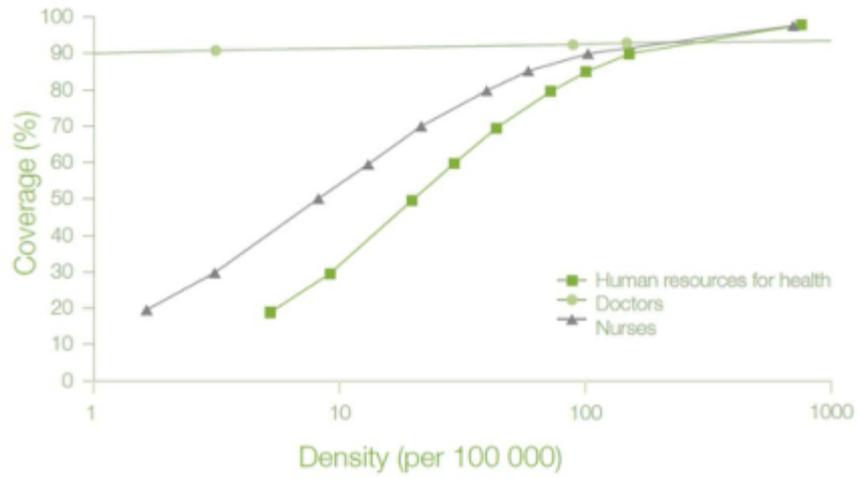
Reaching target levels of health worker availability would require 2.4 million additional health workers in critical countries

Note: Critical shortage is defined as countries with fewer than 23 health care professionals (physicians, nurses, and midwives) per 10,000 population. BR & Helms-Green Foundation | 39  
Source: "Women Frontlines of Healthcare" State of the World's Mothers, WHO 2009

# Health worker shortfall is affecting immunization coverage

Point of vaccination

*Immunization coverage improves with increased density of vaccinators*

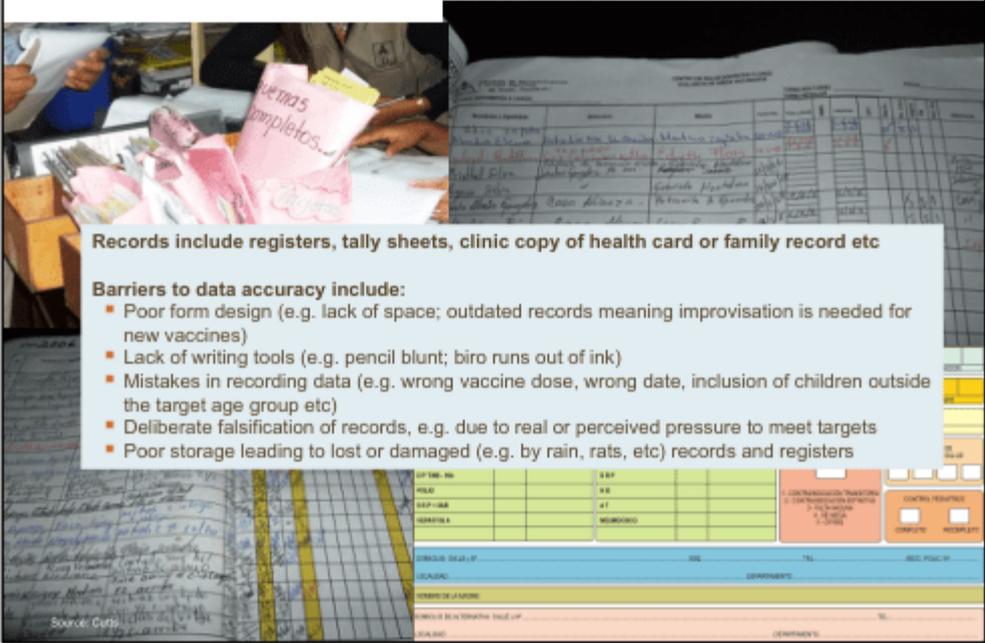


Source: State of the world's vaccines and immunization, 3rd ed. Geneva, World Health Organization, 2009

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**Data accuracy is difficult to achieve on health facility-based primary records**

Point of vaccination



Records include registers, tally sheets, clinic copy of health card or family record etc

**Barriers to data accuracy include:**

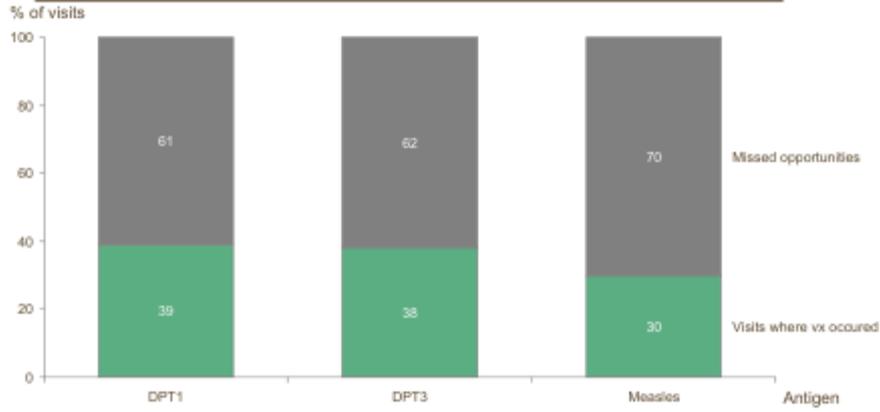
- Poor form design (e.g. lack of space; outdated records meaning improvisation is needed for new vaccines)
- Lack of writing tools (e.g. pencil blunt; biro runs out of ink)
- Mistakes in recording data (e.g. wrong vaccine dose, wrong date, inclusion of children outside the target age group etc)
- Deliberate falsification of records, e.g. due to real or perceived pressure to meet targets
- Poor storage leading to lost or damaged (e.g. by rain, rats, etc) records and registers

Source: Gertis

**~60-70% of all opportunities for valid vaccination were missed in CAR study**

Point of vaccination

**Frequency of missed opportunities for vaccination, by antigen, among the study sample of 12-23-month-olds, Central African Republic, 1990**



- A missed opportunity for vaccination was defined as a vaccination visit or other health centre visit by a child who did not receive a vaccination for which he or she was eligible
- Immunization policy in the Central African Republic encourages the immunization of all age-eligible children, unless they are sick enough to warrant hospitalization (study assumes no hospitalizations)

Note: Study sample is 12-23 month olds, Central Africa Republic 1990, N = 642

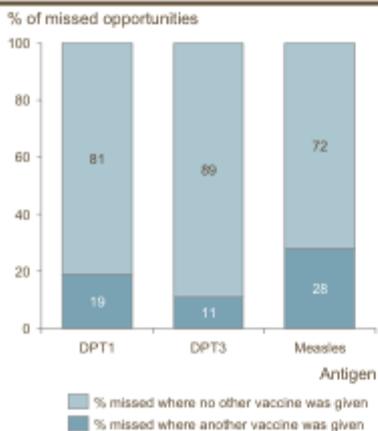
Source: Khan, et al "Avoiding missed opportunities for immunization in the Central African Republic", WHO Bulletin 1995, 73 (1), 47-55

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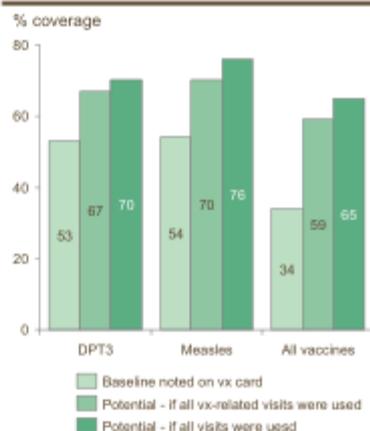
**Study suggests that by using all opportunities to vaccinate, full coverage rates could be raised to 65%**

Point of vaccination

**Some opportunities were missed even when another vaccine was given**



**Potential increase in coverage by avoiding missed opportunities during other vaccination-visits or all visit**

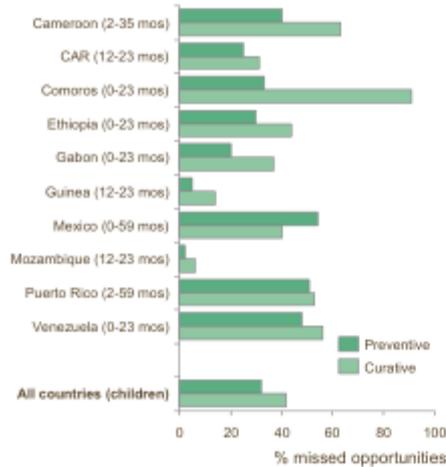


Note: Study sample is 12-23 month olds, Central African Republic 1990  
Source: Khan, et al "Avoiding missed opportunities for immunization in the Central African Republic", WHO Bulletin 1995, 73 (1), 47-55

**Other studies showed % of missed opportunities varied widely by country but generally higher in curative than preventive visits**

Point of vaccination

**Prevalence of missed opportunities in preventive and curative visits in ten countries**



**Key findings from missed opportunity studies**

**Screening for immunizations at curative visits important**

- Studies showed that "Never immunized" children were identified at curative services but were less likely to be seen at preventive services

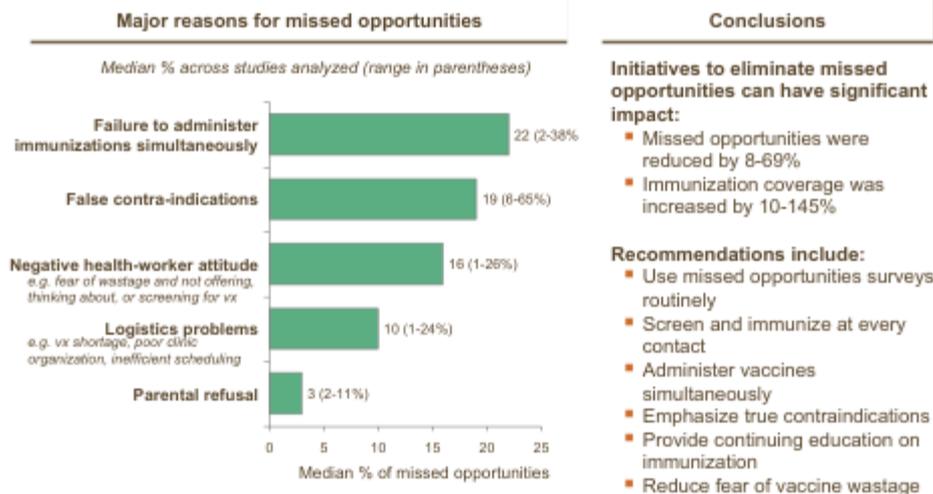
**Alternatively, health facilities should increase the number of days that immunizations are offered**

- Studies in Gabon showed a 2- to 3-fold increase in missed opportunities on days when immunizations were not scheduled
- In Burundi, missed opportunities were lowest in facilities that immunized at every health contact (15%), compared with facilities that immunized every day but not at every contact (21%), or facilities that immunized fewer than 4 days/ wk (30%)

Source: Hutches, "Studies of missed opportunities for immunization in developing and industrialized countries," WHO Bulletin, 1993

## Five major reasons for missed opportunities highlighted by studies

Point of vaccination



Source: Huthuis, "Studies of missed opportunities for immunization in developing and industrialized countries," WHO Bulletin, 1993

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## Supply barriers (I)

Supply

	Barrier	Rationale, evidence, assumptions
Policy	Health worker shortage	<ul style="list-style-type: none"> <li>▪ Critical shortages and a high turnover of service delivery and supply chain health workers in the poorest countries; compounded by poor supervision and support often resulting in absenteeism and underperformance —leaves poorest areas most underserved</li> <li>▪ Evidence: State of world's mothers</li> </ul>
	Inadequate training	<ul style="list-style-type: none"> <li>▪ Little up-to-date pre-service training for immunization services, in-service training is time-consuming to develop, thus is frequently out-of-date. Few e-Learning or text messaging systems available</li> <li>▪ EPI managers' meetings are useful for exchanging information at the policy level but rarely provide updates to staff at the lower levels</li> <li>▪ Unclear protocols and inadequate training of staff for appropriate data collection and utilization</li> <li>▪ Evidence: TBD</li> </ul>
	Poor demand forecasting at all levels	<ul style="list-style-type: none"> <li>▪ Vaccine demand forecasting is often based on old census data and last year's procurement</li> <li>▪ It is rarely matched to end-user consumption</li> <li>▪ Evidence: TBD</li> </ul>
	Strategies not context specific	<ul style="list-style-type: none"> <li>▪ Countries and districts face challenges in adapting program strategies to specific contexts/needs</li> <li>▪ Evidence: TBD</li> </ul>

## Supply barriers (II)

Supply

	Barrier	Rationale, evidence, assumptions
Policy (cont.)	Built in buffer stocks are too large	<ul style="list-style-type: none"> <li>Current inefficiencies are overcome by maintaining high stock levels and tolerating high wastage rates</li> <li>Evidence: TBD</li> </ul>
	Parallel systems	<ul style="list-style-type: none"> <li>Many vertical medicine supply chains (vx cold chains), ART, RH, operating in parallel</li> <li>There are also significant management disincentives to integrate</li> <li>Evidence: TBD</li> </ul>
	Lack of optimally designed systems	<ul style="list-style-type: none"> <li>There are only rare projects or country policies to demonstrate efficient and effective vaccine supply chains optimized for high performance and low cost; rather, current systems follow administrative structures</li> <li>Evidence: TBD</li> </ul>
	National and international policies are being very slow to adapt to the heat-stability of new vaccines	<ul style="list-style-type: none"> <li>HBV, TT, conjugate bacterial, and pentavalent vaccines (minus pertussis) can be heat-stable, but policies constrain vaccination to sites with functioning cold chain, increasing costs of cold-chain</li> <li>Assumption: Ability to distribute, store and deliver vaccines under more flexible storage conditions</li> <li>Evidence: Multiple references on heat-stability and freeze-sensitivity; Project Optimize work?</li> </ul>

## Supply barriers (III)

Supply

Policy  
(cont.)

Barrier	Rationale, evidence, assumptions
Lack of reliable funding	<ul style="list-style-type: none"> <li>▪ Inadequate, unpredictable, and delayed release of designated funds from governments and donors to central and district levels affects ability of program to plan and implement RI services</li> <li>▪ Evidence: Nigeria national stock out of ped vx in 2011 due to late disbursement of funds; Lydon – report on Laos financial sustainability plan</li> </ul>
Donor dependency	<ul style="list-style-type: none"> <li>▪ Many countries depend upon outside donors to fund the lion's share of NIP</li> <li>▪ Evidence: country share of funding</li> </ul>
Poor financial management, particularly at lower levels	<ul style="list-style-type: none"> <li>▪ With little or no budget oversight and accountability there is little understanding of the cost drivers of the program and potential efficiencies</li> <li>▪ Evidence: TBD</li> </ul>
Lack of discretionary funds at operational level to solve problems locally	<ul style="list-style-type: none"> <li>▪ E.g. Lack authority or petty cash to subcontract to a local source of transport</li> <li>▪ Evidence: RED evals, personal experience</li> </ul>
Routine immunization lacks priority at global level	<ul style="list-style-type: none"> <li>▪ Evidence: No RI position funded at UNICEF HQ through regular resources; &lt;2% of AFRO's immunization budget goes to RI; much of WHO's immunization program funded through GAVI Business Plan)</li> </ul>

	Barrier	Rationale, evidence, assumptions
Policy (cont.)	Lack of information used to guide country decision making (i.e. around new product introductions)	<ul style="list-style-type: none"> <li>▪ Limited country access to up-to-date information on product presentation and future pricing trajectories</li> <li>▪ GAVI-eligible countries have little choice over vaccine presentation</li> <li>▪ No detailed mapping of is available of areas with low coverage, or with high drop-out rates, to guide and direct intensified activities</li> <li>▪ Evidence: TBD</li> </ul>
	Inadequate guidance provided for some new vaccines	<ul style="list-style-type: none"> <li>▪ Many national immunization programs lack policies, guidance and strategies to deliver vaccines that do not readily fit into current routine EPI schedule or touchpoints</li> <li>▪ Evidence: HepB birth dose should be given within 24 hours of birth, Men A is targeted to 1-29 year olds in campaign settings, HPV is targeted to school age populations</li> </ul>
	Inadequate vaccine safety guidelines	<ul style="list-style-type: none"> <li>▪ Guidance on AEFI training and capacity needs in countries is weak and yet with the advent of newer vaccines (some introduced for the first time in developing countries, given at different age groups, and through SIAs,) AEFI surveillance and response is critical – especially with increasing pressure from anti-vaccine movement</li> <li>▪ Evidence: TBD</li> </ul>
	Inadequate waste disposal guidance	<ul style="list-style-type: none"> <li>▪ No clear policy recommendations on injection material waste disposal</li> <li>▪ Evidence: TBD</li> </ul>

## Supply barriers (V)

Supply

	Barrier	Rationale, evidence, assumptions
Technology	Conflicting and inadequate information systems	<ul style="list-style-type: none"> <li>▪ Different systems for logistics and supply chain, stock management, immunization records, performance monitoring and surveillance</li> <li>▪ Lack of birth registry to track unvaccinated children</li> <li>▪ Evidence: RED evals; SAGE reports; ARISE, Cutts/Bielik report</li> </ul>
	Lack of reliable communication between layers of health system	<ul style="list-style-type: none"> <li>▪ Fixed posts were built decades earlier and population has moved subsequently or posts were organized for political reasons rather than need</li> <li>▪ Evidence: personal experience,</li> </ul>
	Lack of information systems	<ul style="list-style-type: none"> <li>▪ Current information systems to monitor and track vaccine and injection supply stocks from arrival to point of use or disposal are not being used or are not being used to track and monitor vaccine supplies and utilization from national to peripheral levels</li> <li>▪ Evidence: Optimize</li> </ul>
	Suboptimal product profile	<ul style="list-style-type: none"> <li>▪ Packaging, presentation, thermostability, and dosage regimen could be improved for the developing world supply chain</li> <li>▪ Evidence: Project Optimize</li> </ul>
Operations	Infrastructure in place does not match current need	<ul style="list-style-type: none"> <li>▪ Mismatch between in the number of vaccination points and/or they are distributed in a manner that does not match up with population needs and the requirements of the health service</li> <li>▪ Evidence: personal experience, data on WHO health systems site</li> </ul>
	Outreach sessions frequently cancelled or delayed	<ul style="list-style-type: none"> <li>▪ Owing to a lack of funding or procedures in place to re-fund out-of-pocket expenses of health staff immunization outreach is often delayed or cancelled</li> <li>▪ Evidence: TBD</li> </ul>

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## Supply barriers (VI)

Supply

	Barrier	Rationale, evidence, assumptions
Operations (cont.)	Inadequate cold-chain capacity	<ul style="list-style-type: none"> <li>At sub national levels in particular</li> <li>Evidence: WHO/UNICEF data; Project Optimize</li> </ul>
	Inadequate temperature monitoring and reporting	<ul style="list-style-type: none"> <li>There is an absence of data compiled centrally on vaccine heat exposure and no routine data is available at all on freeze excursions at any level of the system VVMs indicate heat exposure locally</li> <li>Evidence: Optimize</li> </ul>
	Inadequate maintenance	<ul style="list-style-type: none"> <li>Cold chain equipment maintenance tends to be poor (everything from not wiping down solar panels to having an effective maintenance organization with skilled staff, transport and spare parts)</li> <li>Evidence: TBD</li> </ul>
	Suboptimal power supply	<ul style="list-style-type: none"> <li>Poor and inconsistent power supply at subnational levels</li> <li>Evidence: LARI 2011</li> </ul>
	Serious transportation issues at peripheral points	<ul style="list-style-type: none"> <li>The last 10K are the most difficult</li> <li>Evidence: TBD</li> </ul>
	Supply Chain evaluation variability	<ul style="list-style-type: none"> <li>Significant variability in the use of supply chain and cold chain assessment tools leading to variable measured costs across countries and data gaps</li> <li>Evidence: TBD</li> </ul>

# WHO Immunization schedule

Supply

Antigen	Age of 1 <sup>st</sup> Dose	Doses in Primary Series	1 <sup>st</sup> to 2 <sup>nd</sup>	Interval between Doses 2 <sup>nd</sup> to 3 <sup>rd</sup>	3 <sup>rd</sup> to 4 <sup>th</sup>	Booster Dose
<b>Recommendations for all children</b>						
BCG	As soon as possible after birth	1				
Hepatitis B	Option 1	as soon as possible after birth ( <24h)	3	4 wks (min) w/ DTP1	4 wks (min) w/ DTP2	
	Option 2	as soon as possible after birth ( <24h)	4	4 wks (min) w/ DTP1	4 wks (min) w/ DTP2	4 wks (min) w/ DTP3
Polio	OPV	6 weeks (See notes for dose)	3	4 wks (min) w/ DTP2	4 wks (min) w/ DTP3	
	IPV/OPV	6 weeks (OPV 1) <sup>1</sup>	1,2 (IPV)	4-6 weeks	4-6 weeks	4-6 weeks
	Sequential IPV	6 weeks	3	4-6 weeks	4-6 weeks	4-6 weeks
DTP	6 weeks (min)	3	4 wks (min) - 6 wks	4 wks (min) - 8 wks		5-6 years of age
Haemophilus influenzae type B	6 weeks (min) w/ DTP1 (2-3 months (max))	3	4 wks (min) w/ DTP2	4 wks (min) w/ DTP3		
Pneumococcal (Conjugate)	6 weeks (min) w/ DTP1	3	4 wks (min) w/ DTP2	4 wks (min) w/ DTP3		
Rotavirus	Rotarix	6 weeks (min) w/ DTP1 (2 weeks (max))	2	4 wks (min) w/ DTP2 no later than 32 wks		
	Rotarix	6 weeks (min) w/ DTP1 (2 weeks (max))	3	4 weeks (min) - 10 weeks w/ DTP2 no later than 32 wks		
Measles	9-15 months (6 months (min))	2	4 weeks (min)			
MMV	Females Quadrivalent 9-13 years Bivalent 10-13 years	3	Quadrivalent - 2 mos (min 4 wks) Bivalent - 1 mo (max 2.5)	Quadrivalent - 4 mos (min 12 wks) Bivalent - 5 mos		
<b>Recommendations for children residing in certain regions</b>						
Japanese Encephalitis (non-sterilized)	1 year	2	4 weeks (min)			after 1 year and every 3 years up to 10-15 years
Yellow Fever	9-12 months w/ measles	1				after 1 year
<b>Recommendations for children in some high-risk populations</b>						
Typhoid (Vi Ps)	2 years (min)	1				every 3 years
Typhoid (Ty21a)	Greater 6 years (min) / 3 to 6	1 or 2	1 day	1 day	1 day	every 3-7 years
Cholera (Dukoral (WC-BS))	2 years (min)	1 (2-5 yrs) / 2 (6-11 yrs)	≥ 7 days (min) - 6 weeks (max)	≥ 7 days (min) - 6 weeks (max)		every 6 months every 2 years
Cholera (Shanchol and mOROCVAK)	1 year (min)	2	14 days			after 2 years
Meningococcal	2 years (min) (non-conjugate)	1				
Hepatitis A	1 year (min)	2	6-18 months			
Tuberc	as required	3	7 days			10-21 days
<b>Recommendations for children receiving vaccination from demonstration programmes with certain characteristics</b>						
Measles	12-18 months with measles	2	1 month (min) to school entry			
Tuberc	8-13 months with measles	1				
Influenza (Inactivated)	6 months (min)	2 (1-5 yrs) / 1 (6-11 yrs)	1 month			

Source: WHO Immunization schedule 2011

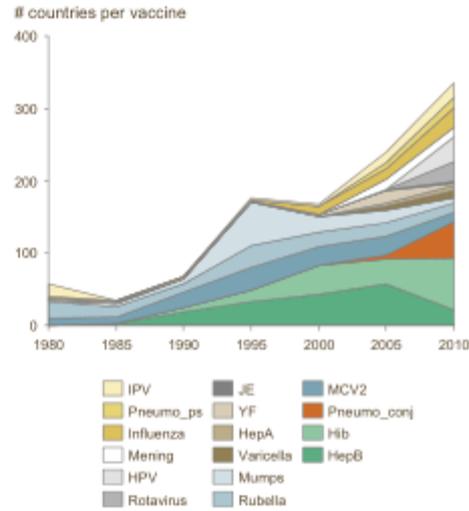
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## Country schedules

Supply

Antigen	# of countries with vaccine introduced <sup>1</sup> (of 193 WHO states)
<b>Recommendations for all children</b>	
BCG	N/A
Hepatitis B	177 (92%)
Polio	60 (30%) <sup>2</sup>
<b>DTP</b>	
Haemophilus influenzae type b	173 (90%)
Pneumococcal (Conjugate)	88 (46%) <sup>3</sup>
Rotavirus	38 (20%)
Measles	138 (72)%
HPV	45 (23%)
<b>Recommendations for all children residing in certain regions</b>	
Japanese Encephalitis	4 (2%)
Yellow Fever	33 (17%)
<b>Recommendations for children in some high-risk populations</b>	
Typhoid	N/A
Cholera	N/A
Meningococcal	32 (17%)
Hepatitis A	12 (6%)
Rabies	N/A
<b>Recommendations for children receiving vx from immunization program with certain characteristics</b>	
Mumps	120 (62%)
Rubella	131 (68%)
Influenza (inactivated)	106 (55%)
Varicella	15 (8%)

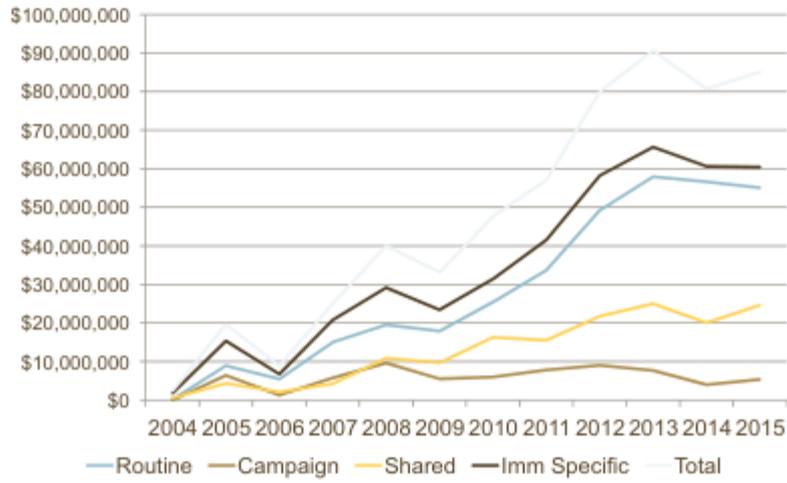
# of country vaccine introductions  
(for WHO tracked vaccines<sup>4</sup>)



<sup>1</sup> Introduced for whole country with date for year of introduction. <sup>2</sup> For IPV vaccine. <sup>3</sup> Does not include pneumococcal polysaccharide vaccine which is introduced by 26 countries (13%). <sup>4</sup> Year of vaccine introduction tracked for only the 16 vaccines in legend up to 2010—excludes countries with vaccine on schedule but no data provided for year of introduction and rounds down where year of introduction is given as "prior to". Source: WHO Data and statistics—Year of Vaccine Introduction, 2011. 53

**Average Annual Immunization Program Cost per Year  
(2009 \$USD)**

Supply

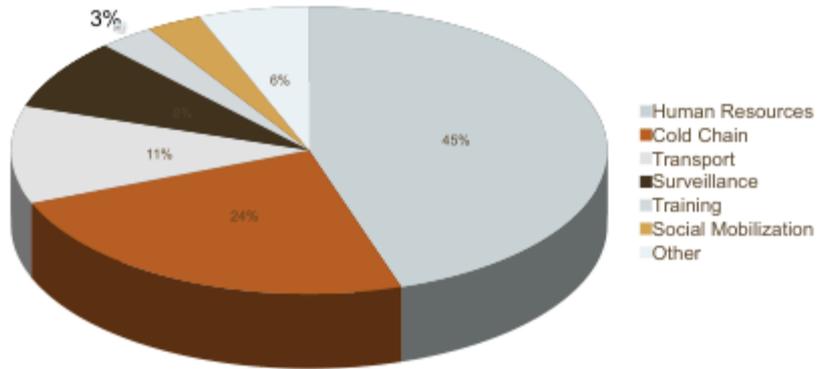


Source: Logan Bientzel presentation Sept 2011

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Human resources costs a large part of non-vaccine costs

Supply

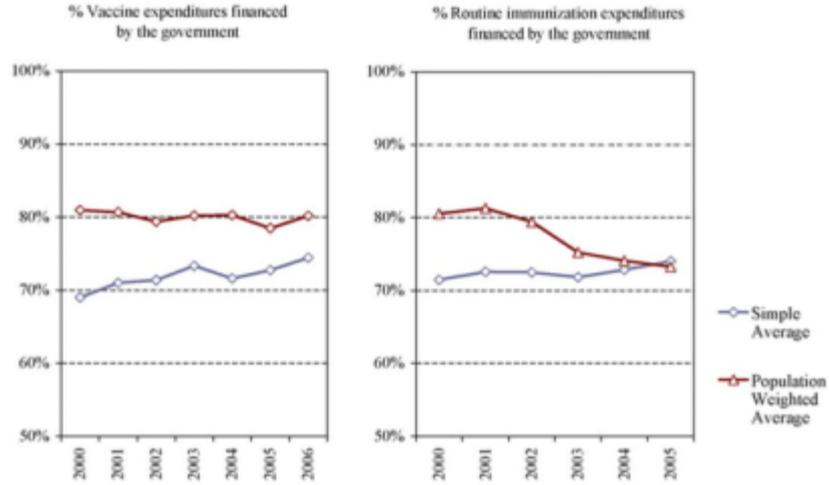


Source: Lydon P, et al. 2009

Proportion of government funding increasing slowly

Supply

Trend in government funding for vaccines and routine immunization in 185 WHO Member States—2000–2006

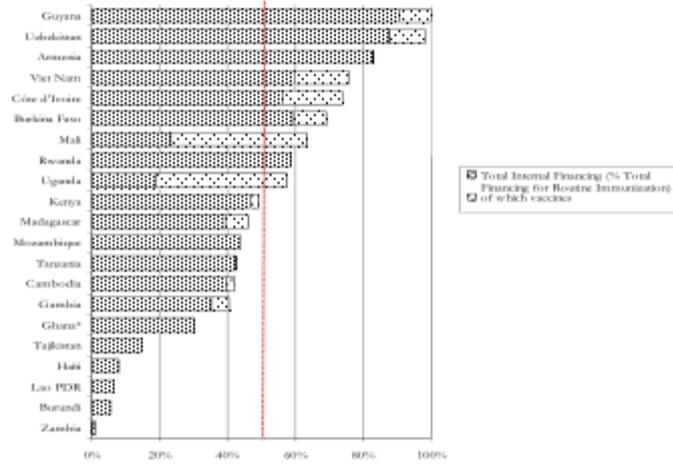


Source: P. Lydon et al. / Vaccine 26 (2008) 6727–6734

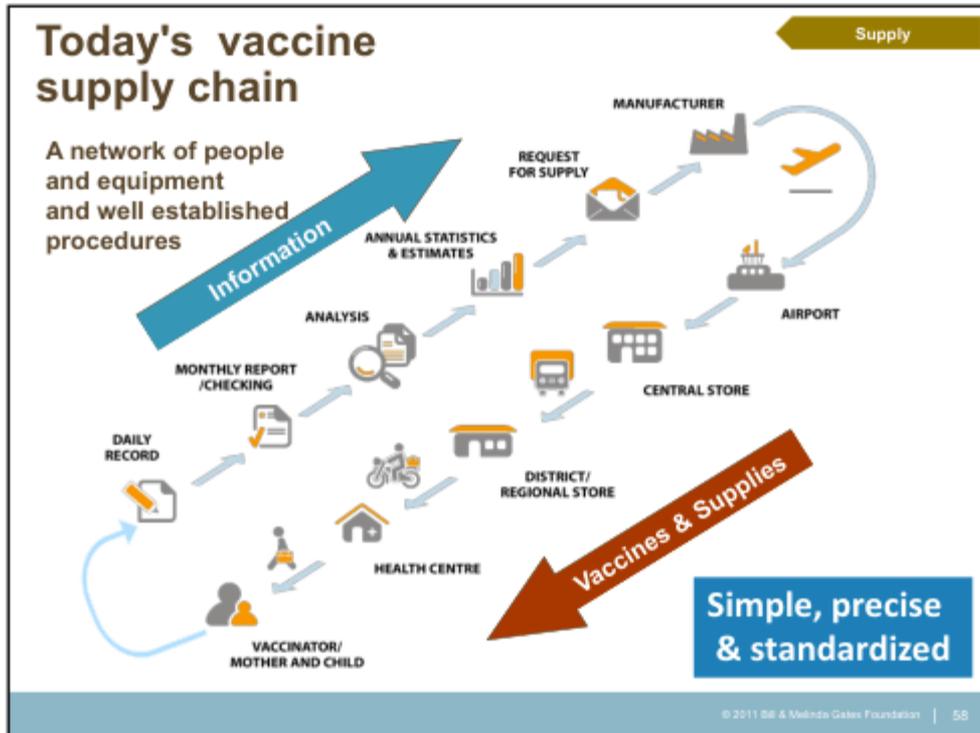
Half of countries financing less than 50% of total needs

Supply

Government financing is 42% of total financing

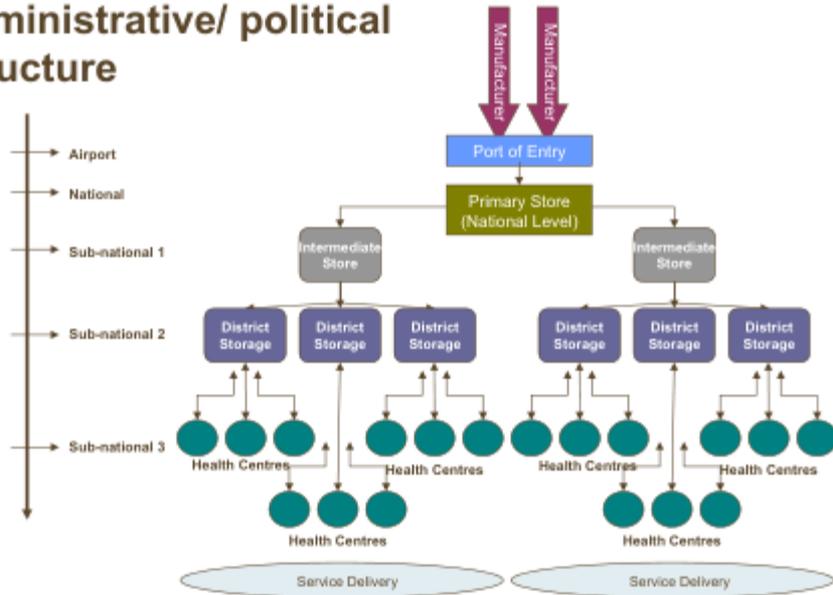


Source: Logan Bientzel presentation Sept 2011



# Supply system architecture follows administrative/ political structure

Supply



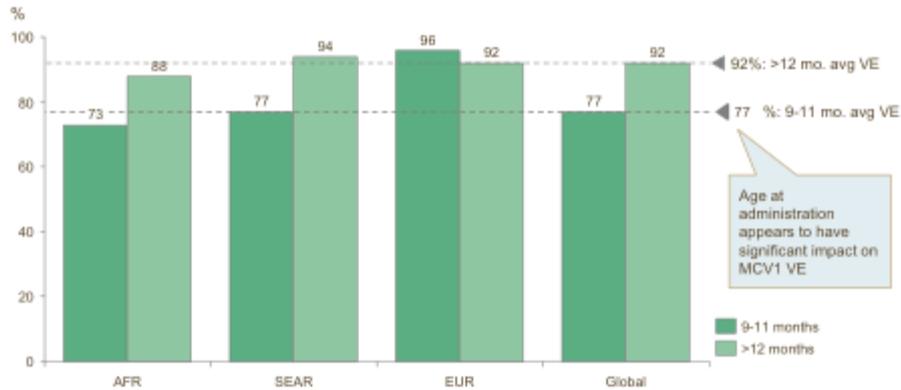
## Vaccine storage recommendations

	Primary vaccine store Up to 6 Months	Intermediate vaccine store		Health centre Up to one month	Health post Up to one month
		Region- up to 3 months	District- up to one month		
OPV	-15°C to -25°C		<b>+2°C to +8°C</b>		
BCG	<b>2°C to +8°C</b> (-15°C to -25°C also possible)				
Measles, MR, MMR					
YF					
Hib freeze-dried					
Meningococcal A&C					
HepB	<b>+2°C to +8°C</b> <b>Never Freeze !</b>				
IPV					
DT, DTP, DTP Hep B					
Hib liquid					
Td					
TT					

**Data suggests that vaccine effectiveness is impaired by age as well as logistics issues**

Supply

*MCV1 Vaccine Effectiveness by age of administration and select WHO region*



Age at administration appears to have significant impact on MCV1 VE

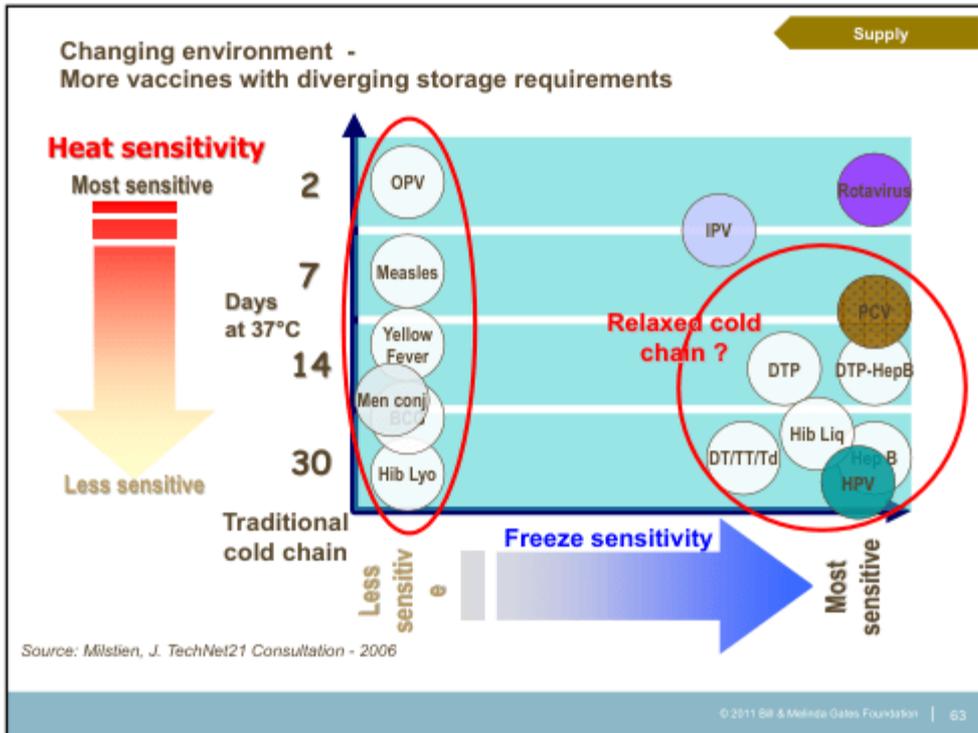
Generally lower VE estimates in AFR and SEAR have been attributed by studies to programmatic differences including: cold chain issues, inadequate vaccine handling, poor vaccine storage, and inadequate vaccine administration

Note: Medians generally increased when results were verified through confirmation of vaccination history and laboratory testing. Source: Uzcainin and Zimmerman, "Field Effectiveness of Live Attenuated Measles-Containing Vaccines: A Review of Published Literature," CDC JID 2011. © 2011 Bill & Melinda Gates Foundation | 61

## Legacy from the early EPI days:

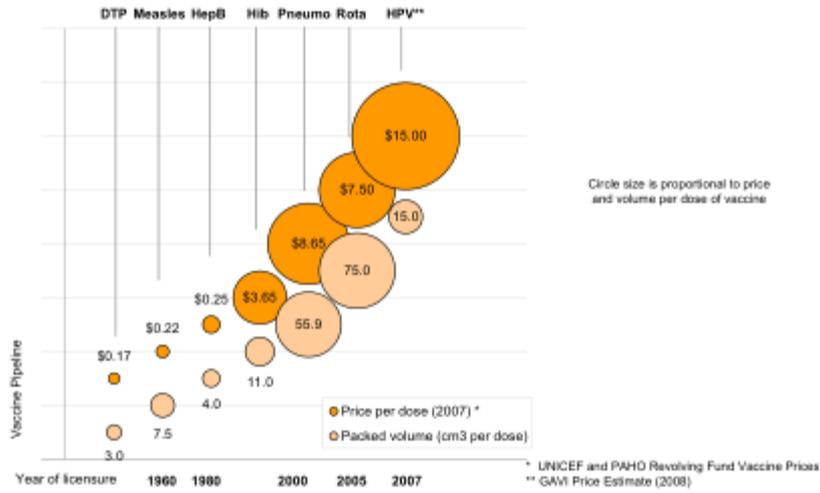
Focus on enforcing standard practices in a robust infrastructure

- **SOPs for all aspects of the programmes**
  - Simple rules and procedures/guidelines
  - Easy to convey through cascade training
  - Easy to remember and monitor
- **Training large numbers of staff**
  - Training materials, large numbers of training courses, cascade training
  - Focus on mid level managers and health workers
  - All partners engaged in supporting/conducting training sessions
- **Health Care workers trained to follow SOPs not to make decisions**
  - Keep vaccines cold ! (freezing occurring with TT and DTP but because freezing points were low, freezing was not a real concern until Hep B was introduced)
  - Vaccine management rules:
    - Discard vaccines vials open at the end of the session
    - Discard vaccine vials taken for outreach and returned unused
    - Open a 10 dose vial even if only one child comes to the session to avoid missed opportunities
  - High rates of vaccine wastage was encouraged (acceptable for penny vaccines but is no longer)
  - VVM can help change paradigm – this is still not exploited in an optimal manner to move towards a more flexible and efficient supply chain

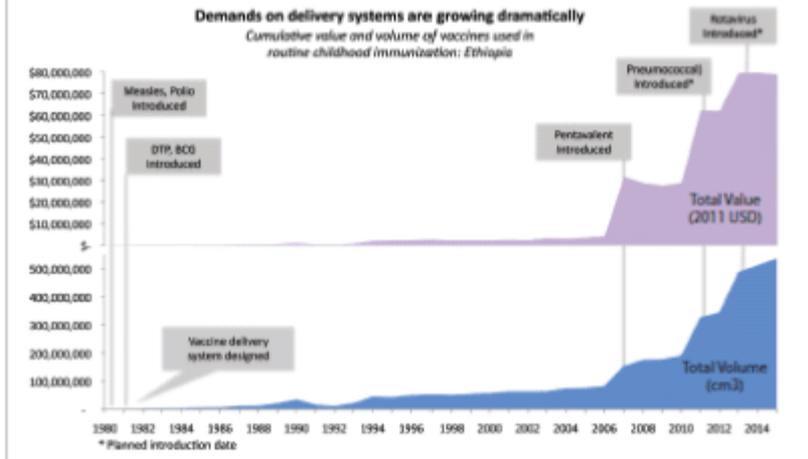


**Prices and packed volume pre dose have been increasing over time**

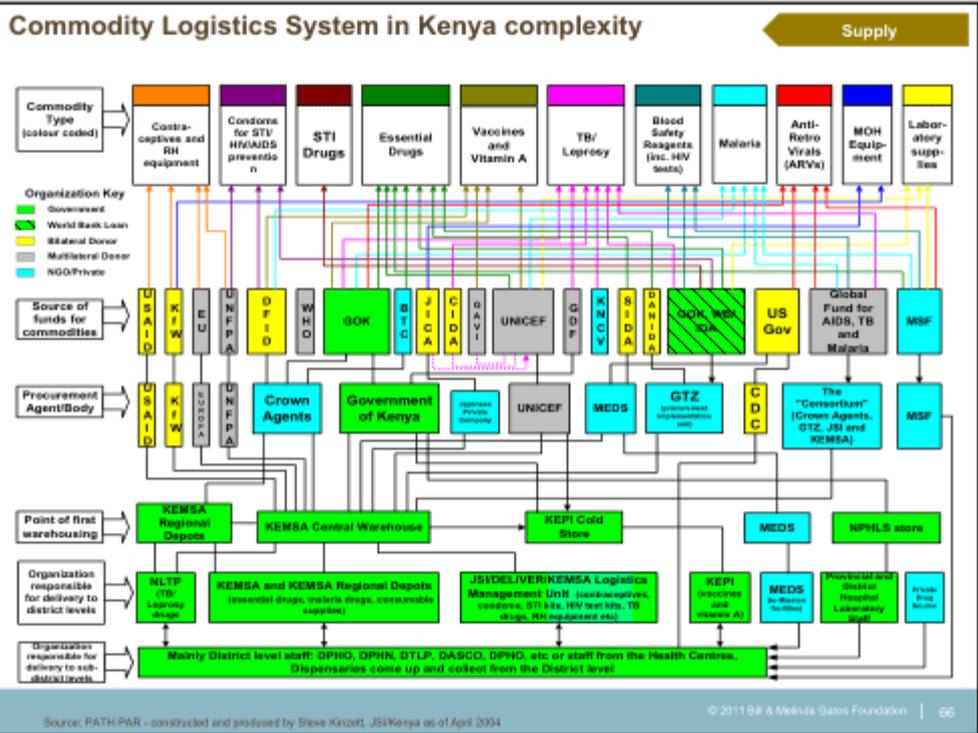
Supply



**Figure 1: Demands on vaccine delivery systems are rising dramatically.**<sup>2,3,4,5</sup>



- New and increased-volume packaging require more storage space and training / supervision on handling, use, disposal
- Higher cost of vaccines increases financial risk and exacerbates effect of high wastage



**Best practices: SCMS regional distribution centers run by PEPFAR**

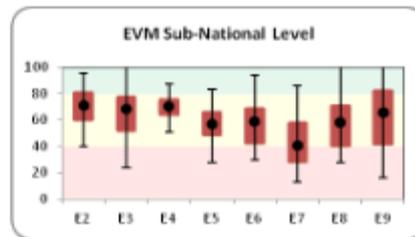
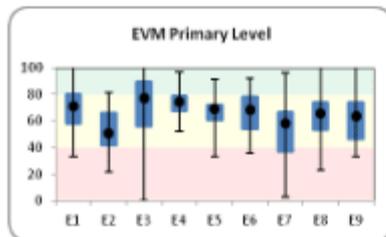
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*SCMS regional distribution centres and coverage*

**Management of warehousing and distribution - could be outsourced to parastatals and autonomous supply agencies**

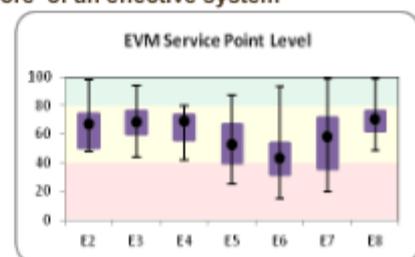
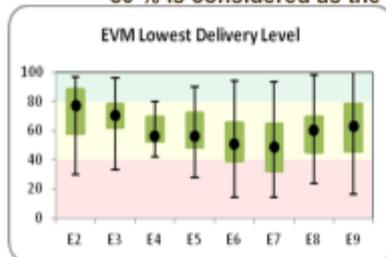
## Enduring weaknesses- EVM assessments in 24 countries

Supply



1- Arrival ; 2- Temperatures; 3- Capacity; 4-Infrastructure; 5- Maintenance; 6- Stock Mgt  
7- Distribution; 8- Vaccine mgt; 9-Information Sys

**80 % is considered as the score of an effective system**

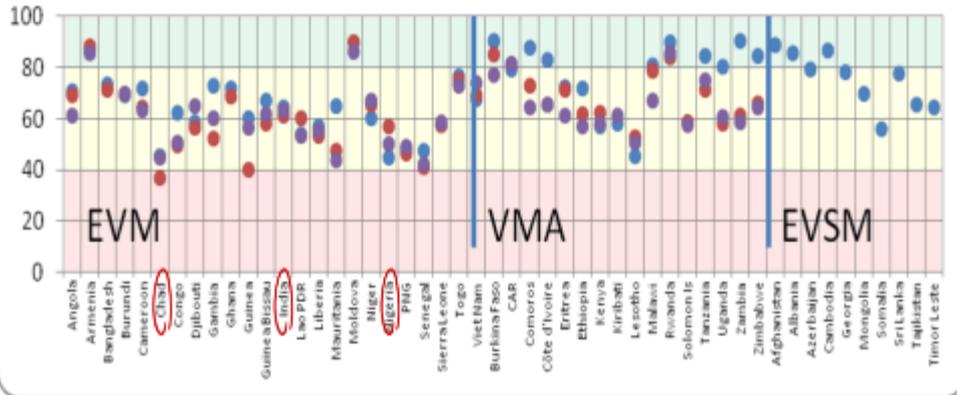


Source : GAVI analysis, 2011

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### Aggregate performance by country

● primary ● intermediate ● service point



Key geographies in EVSM metrics circled in red

**Optimize (WHO, PATH partnership with funding from BMGF)**

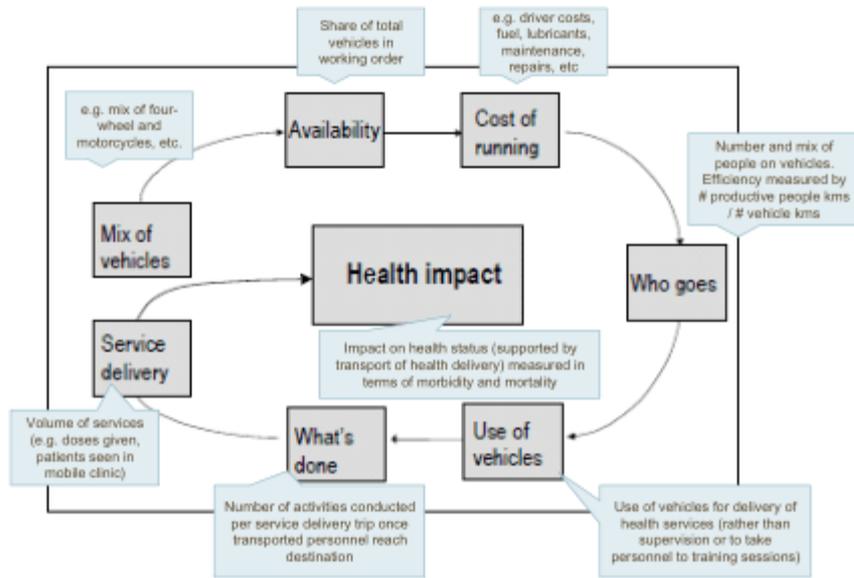
- Since 2007 has aimed to use technological and scientific advances to guide the development of new products and ensure maximum efficiency and safety in the field
- e.g. passively cooled produce-delivery carts, battery-free solar refrigerators

**Vaccine Presentation and Packaging Advisory Group (VPPAG)**

- Provides forum for representatives of UN agencies, experts involved in public sector delivery of vaccines, and industry representatives to discuss vaccine presentation and packaging issue
- Originally run by GAVI in 2007 to deal with new pneumo vaccine, now run by WHO and expanded in scope to address HPV and other pipeline vaccines

# Aspects of transportation affecting effectiveness and efficiency

Supply

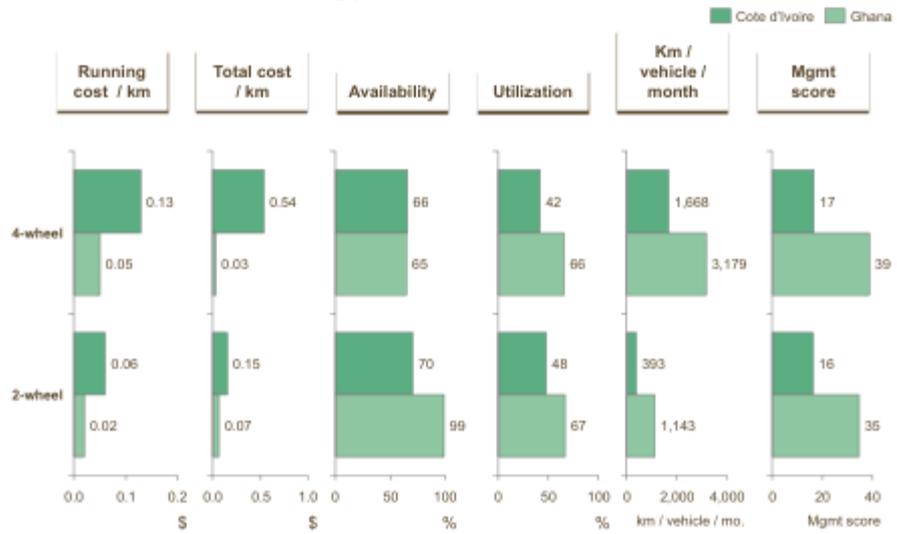


Source: Transport in primary healthcare report – Transaid 2009

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**Comparison of transportation efficiency measures across two countries and two vehicle types**

Supply



**Ghanaian resources are around 50% more effective than the Côte d'Ivoire transport resources in most efficiency measures**

Source: Transport in primary healthcare report – Transaid 2008

## Planning vaccination services and managing resources needs improvement

Supply

- Emphasizing low vaccine wastage (e.g. only vaccinating one day a week; not opening a multi-dose vial for few children) may mean more missed opportunities
- Poor stock control and lack of transport for vaccine distribution mean stock-outs are common
- Mothers turned away because of stock-outs, attendance on days not designated for vaccination, outreach team not arriving on time, health workers' concern about vaccine wastage or false contra-indications, may be discouraged from returning
- Children who are vaccinated are not always protected, as inadvertent freezing of freeze-sensitive vaccines is now more common than damage by excessive heat; transport of vaccine to outreach needs to maintain appropriate temperatures for heat-sensitive and freezing-sensitive vaccines
- Lack of planned preventive maintenance greatly reduces the working life of transport and cold chain equipment
- Projects have demonstrated increased utilization rates of transport by improving transport policies (e.g. using most cost-effective means of transport) and maintenance
- Effective Vaccine Store management (EVSM) evaluations since 2000 constantly identify the need for more, higher-grade and better-trained logisticians to plan and implement efficient vaccine supply chain management, especially now that expensive new vaccines are being introduced.
- Refresher training must be updated and repeated due to frequent staff turnover.
- Governments need to create posts for logistics and transport managers
- The best mix of strategies (e.g. daily vaccination at fixed sites; reducing missed opportunities; using most cost-effective transport and human resources) needs to be evaluated in different settings

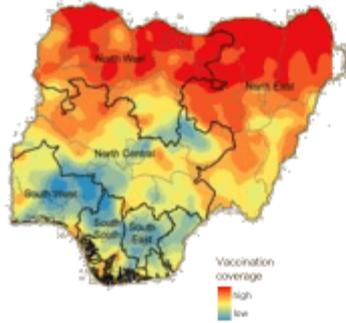
Source: Cutis & Bialek Dec. 2010 report to BMGF "The opportunity and obligation to strengthen national immunization programs"

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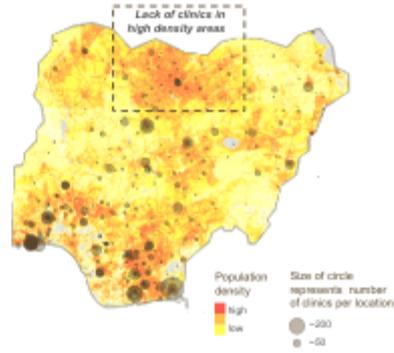
## Distribution of clinics versus population density and DPT3 vaccination coverage highlights problem areas in Nigeria

Supply

DPT3 Vaccination coverage



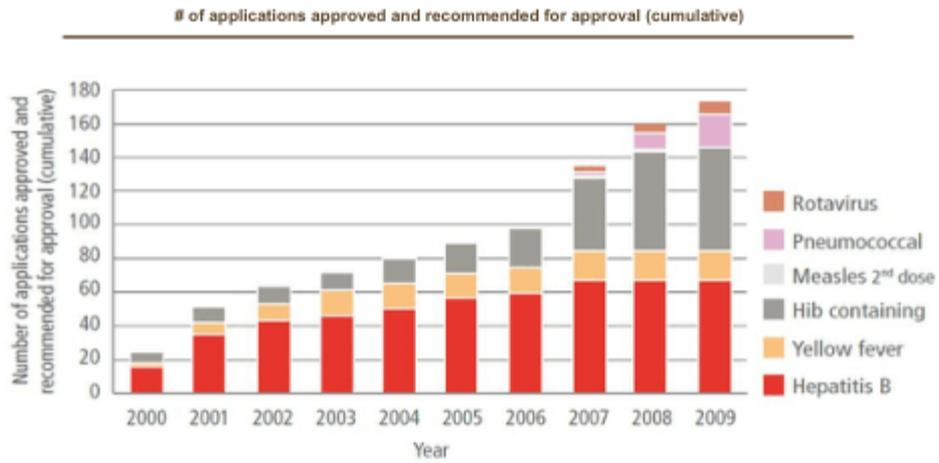
Population & clinic density



Note: >99% NHS Network clinics - over 5,500, represented (includes pharmacies). NHS clinics in Nigeria consist of both Primary Health Care Providers (which serve as the first contact within the health care system) as well as Secondary Health Care Providers (which offer their services for fees).  
 Source: BCG Geospatial; Healthcare International (NHS Network) - <https://www.healthcareinternational.org/> accessed Jan 28, 2012

## GAVI-countries rely on GAVI for new vaccine support

Supply



Source: WHO Department of Immunization, Vaccines and Biologicals, 2010 – fig 6; GAVI Alliance Secretariat Fig 7

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## Data for decision-making barriers (I)

Data for decision-making

	Barrier	Rationale, evidence, assumptions
Policy	Inadequate IMCI (integrated management of childhood illnesses) policies	<ul style="list-style-type: none"> <li>IMCI policies don't emphasize (a) need to bring health/vaccination card to outpatient care, (b) need to use all opportunities to refer a child for vx, including attendance for curative care</li> <li>Evidence: review of IMCI training</li> </ul>
	No national policy of using a general home-based "health card" for all health interactions	<ul style="list-style-type: none"> <li>Need card that captures all health services (e.g. growth monitoring, vaccinations and sick visits).</li> <li>Would help reduce missed opportunities and monitor vaccination status of children with VPDs</li> <li>Evidence: personal experience</li> </ul>
	Difficulty knowing vx status for children who are ill	<ul style="list-style-type: none"> <li>Vaccination status of children who are ill is often unknown (b/c vx card often not brought) or not recorded (b/c poor training of health workers)</li> <li>VPD surveillance therefore often lacks info on vx status of cases which could be used to assess vx effectiveness</li> <li>Evidence: personal experience</li> </ul>
Technology	Difficulty in diagnosing aetiological agent of disease syndromes	<ul style="list-style-type: none"> <li>Difficulty in diagnosing aetiological agent of disease syndromes like diarrhoea, sepsis and pneumonia makes surveillance complex to organize; only feasible in sentinel sites</li> <li>Evidence: personal experience</li> </ul>
	Cause of death data are very difficult to obtain in low income countries	<ul style="list-style-type: none"> <li>Possibly need technology to improve autopsies (potentially post-mortem detection of infectious agents)</li> <li>Need improved completeness and quality of death registration</li> <li>Evidence: Personal experience</li> </ul>

## Data for decision-making barriers (II)

Data for decision-making

	Barrier	Rationale, evidence, assumptions
Technology (cont.)	Improved methods are needed to record information on # of vaccine-dose combinations each child has received	<ul style="list-style-type: none"> <li>For surveys, information is usually obtained via home-based records</li> <li>For administrative data, the numerator may be taken from tally sheets, but what is recorded on those tally sheets depends on what was on the health card when the child was vaccinated</li> <li>Evidence: TBD</li> </ul>
	Lack of inexpensive field-friendly antibody assays	<ul style="list-style-type: none"> <li>Needed for use in finger-prick blood spots or oral fluid reduce the potential to use sero-surveillance and model resulting data to estimate impact</li> <li>Evidence: TBD</li> </ul>
	Lack of communications technology	<ul style="list-style-type: none"> <li>Needed to track (and reduce the occurrence of): "stockouts" of vaccine, transport, fuel, or health workers</li> <li>Evidence: northern Nigeria pilot project? RED evaluation</li> </ul>
	Lack of data to allow high-level managers and policy-makers to plan and manage vaccination points efficiently	<ul style="list-style-type: none"> <li>Data on population movements, urbanization etc not easily available and not matched with data on physical infrastructure (roads, electricity etc), communications and other planning requirements.</li> <li>Evidence: Personal experience</li> </ul>
Operations	Inadequate disease surveillance	<ul style="list-style-type: none"> <li>Constrained by due to inefficient use of tools, lack of skilled and motivated human resources; lack of laboratory resources; lack of access to curative care for sick children</li> <li>Evidence: F Cutts landscape analysis on surveillance for BMGF 2007</li> </ul>
	Inadequate skills and resources to conduct useful outbreak investigations	<ul style="list-style-type: none"> <li>Inability to determine causes of outbreak (failure to vaccinate vs vaccine failure) or root causes / risk factors</li> <li>Evidence: TBD</li> </ul>

## Data for decision-making barriers (III)

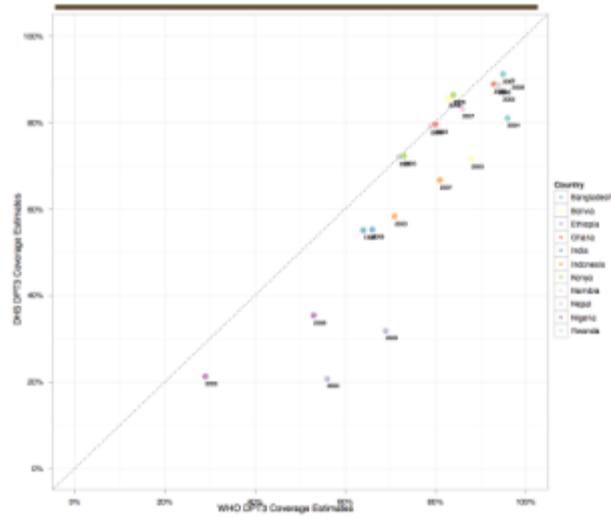
Data for decision-making

	Barrier	Rationale, evidence, assumptions
Operations (cont.)	Inadequate monitoring of numbers, distribution and maintenance of inputs	<ul style="list-style-type: none"> <li>For health services metrics (e.g. infra-structure, health workers, transport)</li> <li>For vaccination program metrics (e.g. cold chain, vaccines, supplies)</li> <li>Monitoring systems need to be integrated and adequately supervised</li> <li>Evidence: HMN reports, Cutts &amp; Biellik report, Project Optimize, et al</li> </ul>
	Inadequate AEFI surveillance	<ul style="list-style-type: none"> <li>Limited by same constraints as above as well as - lack of dissemination of clear definitions for AEFIs</li> <li>Evidence: TBD</li> </ul>
Overall	False perception that coverage equals population protection	<ul style="list-style-type: none"> <li>Need also to know vaccine effectiveness or surrogates of VE (e.g. vaccines stored and transported under temperatures that do not inactivate them or reduce their potency)</li> <li>Evidence: TBD</li> </ul>
	Inadequate skills, motivation and co-ordination to review and use data	<ul style="list-style-type: none"> <li>Inadequate combined reviews of data on target population, inputs, outputs and impact; inadequate use of information for action</li> <li>Evidence: TBD</li> </ul>

## Comparison of WHO and DHS for DPT3

Data for decision-making

WHO and DHS coverage estimates for DPT3 in 11 countries



### Key observations

- DHS coverage tends to be lower
- DHS not influenced by administrative data

## Advantages and Disadvantages of methods to measure vaccination coverage

Data for decision-making

Method	Advantages	Disadvantages
Register-based (electronic)	<ul style="list-style-type: none"> <li>Can give complete and accurate information on cumulative vaccination status of individuals and populations</li> <li>Can be used to set appointments, issue reminders and recalls</li> <li>Use of electronic systems could reduce time spent on paper registers that are widespread in low income countries and often not used</li> </ul>	<ul style="list-style-type: none"> <li>Need good computer access</li> <li>Need complete birth registry for true denominator</li> <li>Need unique ID number throughout life</li> <li>If held locally, difficult to track vaccination of migrants</li> <li>If held nationally, feedback/use at local level may be slow</li> <li>Requires adequate funding and human resources</li> <li>Need secure procedures to maintain confidentiality</li> </ul>
Routine reports of vaccinations delivered	<ul style="list-style-type: none"> <li>Simple in conception</li> <li>Continuous information allows monitoring of cumulative coverage through the year and by district/health facility</li> <li>Can be used at local level to track coverage and dropout rates</li> </ul>	<ul style="list-style-type: none"> <li>Population denominators often inaccurate</li> <li>Private sector often does not report</li> <li>Exaggeration of doses administered common (e.g. double-counting of same child if home-based record mislaid; inclusion of children outside target age group, or purposeful exaggeration)</li> <li>Transcription errors at each health system level when paper-based systems used</li> </ul>
Surveys	<ul style="list-style-type: none"> <li>If well-conducted, can provide accurate information</li> <li>Other indicators (e.g. missed opportunities, caretaker knowledge) can be assessed</li> <li>Involvement of health workers can be training opportunity</li> <li>Large-scale surveys for multiple programs can reduce costs</li> <li>Lot quality sample surveys can be used to identify health facilities and low coverage population subunits</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy of data depends on adequate survey design, training, supervision and quality control</li> <li>Sampling frame often based on outdated census information</li> <li>High-risk subgroups (e.g. migrants, street children) may be missed</li> <li>Home-based records may be missing or incomplete and accuracy of verbal history of vaccination varies</li> <li>Participation rate affects reliability of results</li> <li>Often long delays until results are known.</li> <li>Small sample sizes give imprecise results; large sample sizes are expensive and more time-consuming</li> </ul>

Source: Cutis & Bialek Dec. 2010 report to BMGF "The opportunity and obligation to strengthen national immunization programs"

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## Draft conclusions on state of coverage

Data for decision-making

### Biggest challenges are:

- Rapidly changing population demographics, e.g. urbanization, changing birth rates, infant survival rates, changing security settings
- Political context of denominator measurement
- Constraints on high-quality survey implementation especially in politically unstable countries, conflict-affected areas, and urban slums
- Increasing complexity of vaccination schedule increases chances of errors in recording & compiling numerator data

### Ways to improve coverage estimates:

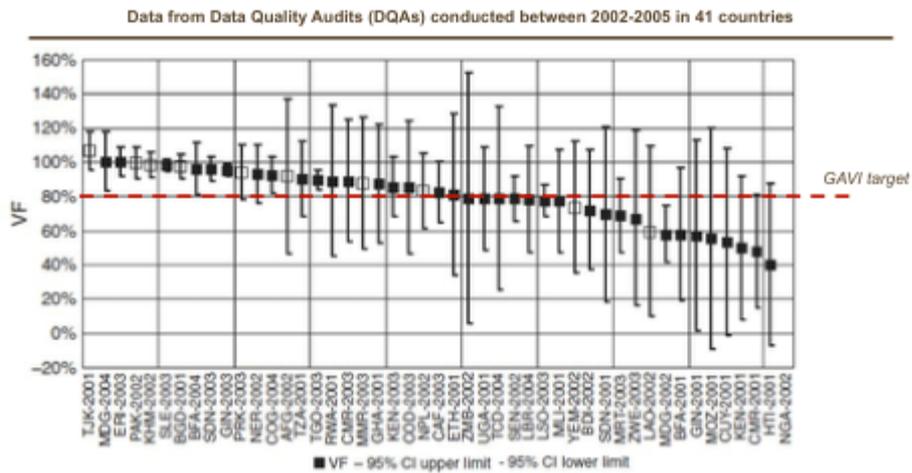
- New or improved survey methods can be developed, but will only address parts of the problem (i.e. can reduce selection bias (though security constraints may persist), can reduce but not eliminate observer bias, and can improve data management).
- Fuller analysis of existing data can also improve coverage estimates (e.g. combining data from routine reports and surveys into models (Lessler)
- Registries may be long-term solution but are difficult to implement even in high-income countries
- Whether measured by survey or other means, accurate completion of primary records of vaccination is essential -- this requires strong management and supervision

### To decide where to invest, need to determine priorities for use of coverage data:

- As a tool to estimate population protection, coverage is limited by assumptions about vaccine effectiveness and thus is not sufficient
- Triangulate data on vaccinations with data from effective vaccine management assessments, surveillance, outbreak investigations, and special studies (e.g. case control studies) to obtain fuller picture of program impact
- As a tool to identify under-served populations for local (e.g. district) use, coverage is very helpful and existing methods are adequate if implemented well
- Investment in improving recording and transmission of data on vaccinations, and strengthening managerial use and feedback of data, will improve all methods of measurement

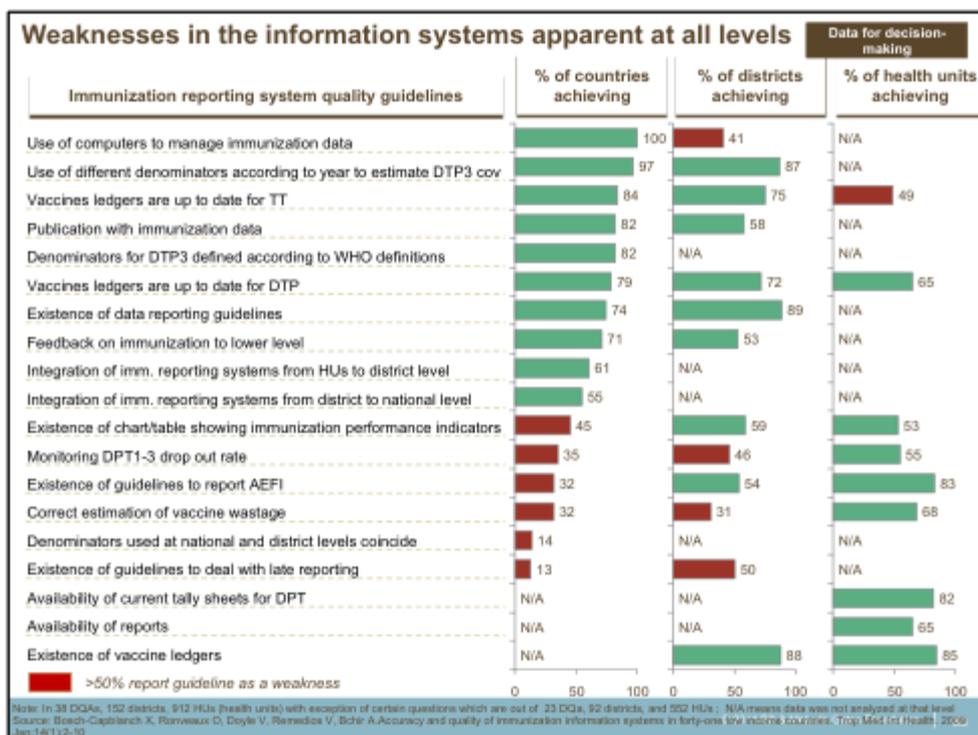
## Data quality audits show 48% of countries have a poor verification factor

Data for decision-making



46% of countries obtained a VF (verification factor) below 80% (needed for continued GAVI support)

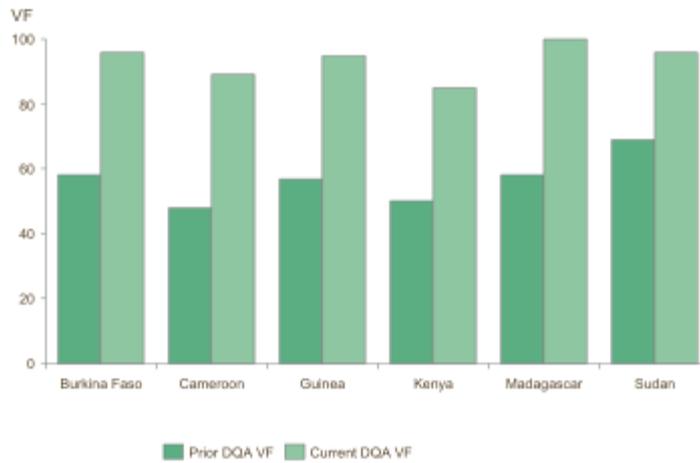
Source: Bosh-Casblanch X, Ronveaux D, Doyle V, Renardis V, Bzhr A. Accuracy and quality of immunization information systems in forty-one low income countries. Trop Med Int Health. 2009 Jan;14(1):2-10. © 2011 Bill & Melinda Gates Foundation | 82



## However, countries have demonstrated ability to improve Verification Factors

Data for decision-making

Compared performance of countries that undertook two DQAs across 2-3 years



Note: Confidence intervals overlap for all countries except Madagascar  
Source: Beatty-Capitaniach X, Borroneaux D, Doyle V, Remedios V, Schar A. Accuracy and quality of immunization information systems in forty-one low income countries. *Top Med Int Health*. 2009; Jan; 14(1):2-10. | 84

## Indicators to monitor immunization program performance

Data for decision-making

Program component	Indicators
Program outputs	% Fully vaccinated children (if routine reports are used, DTP3 taken as proxy) % districts with >80% DTP3 coverage in infants <sup>1</sup> % districts with >90% measles vaccine coverage in infants <sup>1</sup>
Service delivery <sup>2</sup>	% of planned outreach sessions that were conducted on schedule % of planned fixed site sessions that were conducted on schedule
Access to services	% of children up-to-date (BCG and DTP1/OPV1) by age 2 months
Tracking activities	"Dropout" - difference in percentage receiving DTP1/OPV1 and either DTP3/OPV3 or measles vaccine
Use of all opportunities	Percentage of children receiving all vaccines for which they are eligible at each visit
Safety	Proportion of districts that have been supplied with adequate (equal or more) number of AD syringes for all routine immunizations during the year <sup>3</sup>
Logistics and cold chain	Proportion of districts that had no interruption in vaccine supply <sup>1</sup> Percentage of facilities storing vaccine at recommended temperatures Vaccine effectiveness in expected range for each vaccine evaluated
Transport <sup>3</sup>	Kilometers/vehicle or motorbike/month (high km = high utilization) Percent use for service delivery and service delivery support (higher = more effective) Policy of planned preventive maintenance (PPM) & % PPM activities conducted Full cost per km (low cost = more efficient use of vehicles/motorbikes)
Surveillance/monitoring	% expected district disease surveillance reports received at national level <sup>1</sup> % expected district coverage reports received at national level <sup>1</sup>
Management and supervision	Country has 5-year immunization plan % districts having microplans that include immunization activities <sup>3</sup> % districts that did ≥1 supervisory visit to all Health facilities in last year <sup>3</sup>
Provider knowledge <sup>3</sup>	Proportion of providers who know and follow recommended guidelines, including those on simultaneous administration, contraindications, and safe injection procedures

1. on the WHO-UNICEF Joint Reporting Form on Immunization (JRFI) 2. proposed in GPEI strategic plan that pilot officers will assist in monitoring these indicators 3. no indicators routinely recorded by DFI to date  
Source: Cutts & Ballek Dec 2010 report to BMGF "The opportunity and obligation to strengthen national immunization programs" © 2011 Bill & Melinda Gates Foundation | 85

Survey and interview responses



## Survey respondents generally set four different categories of goals

### 1 Improving coverage levels

- Hard to reach populations
- At least 80% in key priority geographies like India, Nigeria
- **Maximizing coverage (2)**
- **90% in all districts (2)**
- Children under one, women of child bearing age, (and possibly adolescents)
- Per GAVI goals
- Universal
- Countries with high infant mortality rates due to VPDs
- High-burden, low-performing countries
- 'Stalled' or low coverage countries
- Achieve equity in coverage
- Focus on both existing and new vaccines

Everyone wants to improve coverage, but has different ideas on where to focus

### 2 Improving the RI system and data

- Catalyze improvements the performance of RI systems
- **Building sustainable processes to allow for future expansion (4)**
- Innovative approaches that result in:
  - **Greater efficiency and quality (2)**
  - Sustained local and international support for EPI programs
  - Improved delivery approaches where needed
- Updating/modernizing system
- Improve cold chain and logistics
- Improved program management
- Improved estimates of vaccination coverage
- Demonstrate RI platforms are cost-effective

### 3 Achieving health impact

- Achieve highly cost effective health impact
- Facilitate the control, elimination and potential eradication of VPDs

### 4 Enabling foundation goals

- Identify initiatives at 'risk' without an RI strategy and support/ mitigate risks
- Convert / support Measles elimination and linkages between SIAs and RI
- Support polio eradication

Note: Includes surveys completed through 1/31; will share full version on Monday

## Internal and external interviews reveal key themes in where people think the foundation should engage

### External (n = 3)<sup>1</sup>

#### Strong alignment on foundation's role in advocacy

- "Use [your] voice to **motivate the donor community** to invest in systems."
- "Support governments building capacity (and sustaining it) in the health system."
- "Help LMIC/MICs get enough information to negotiate effectively with manufacturers."
- "Policymakers listen to [the co-chairs] differently... [Their] **perspective is valuable and powerful.**" (2 people)

#### One interviewee also highlighted foundation's intellectual leadership

- "[BMGF] is very good at **challenging our assumptions about the field**- particularly on logistics management."

### Internal (n = 4)

#### Strong alignment on foundation's role in advocacy and supply chain/logistics

- "Use the co-chair voice to **make RI a priority** for countries."
- "Bring partners together to work on this issue, but to do so we'd need to have some skin in the game."
- "Focus on the **supply chain.**" (2 people)

#### Direction less clear in data improvement and human resources

- "Improve **immunization data.**" (2 people)
- "We can **push others to improve metrics.**"
- "Success of system is based on human management- we need to consider whether we have a role, and if so, how to be **catalytic in human management.**" (2 people)

<sup>1</sup> Given the small number of interviews, we cannot share the names of individuals interviewed but perspectives from GAVI, WHO and CDC are included here.  
Note: There was some inconsistency for brevity.





## Summary description of PARs directly relating to RI

Preliminary!

Grantee	Short description	Size of grant (\$M)	Directly related to RI	PO	Timing	What on framework it addresses	Global / country / local
CARE	RI portion of Integrated Family Health initiative - Bihar	\$12.0	Direct	Usha	2010 - 2015	System-wide	Local
JSI	ARISE Learning grant to better understand the performance of routine immunization systems in Africa	4.4	Direct	Dan/ Margaret	2009-2012	Planning & Management	Global
JSIUUMD	Embed support within the national immunization program of Ethiopia	3.7	Direct	Mary/Matt	2011-2013	Planning & Management	Country
WHO	Re-evaluate and optimize WHO immunization schedules	1.5	Direct	Matt	2011-2012	Political commitment & policy setting	Global
WHO	Develop a comprehensive plan for enhancing vaccine safety monitoring, investigation and response	1.1	Direct	Matt	2009-2011	Political commitment & policy setting	N/A

Total funding of grants directly relating to RI: ~\$22.7M

\*Sample grants –may not be comprehensive

## Summary description of PARs indirectly relating to RI (I)

Preliminary!

Grantee	Short description	Size of grant (\$M)	Directly related to RI	PO	Timing	What on framework it addresses	Global / country / local
GAVI	Vaccine Fund	3500.0	Indirect	Steve	2000-present	Financing & Procurement	Global
WHO, UNICEF, Rotary	Global Polio Eradication Initiative grants to WHO (\$573M), UNICEF (\$250M), and Rotary (\$406M)	1228.0	Indirect	Tim	2008-present	System-wide	Global
PATH	Immunization and Health Products Logistics and the Cold Chain of the Future	34.7	Indirect	Steve	2007-2011	Supply chain & Logistics	Country
WHO	Accelerating, through the WHO prequalification process, access to vaccines for the developing world	27.0	Indirect	Vincent	2007-2011	Political commitment & policy setting	Global
SURVAC	Grant on disease surveillance	25.0	Indirect	Linda V.	2008-2014	Disease surveillance	N/A
PATH	Catalyze work with collaborators, identify and possibly obtain access to additional stabilization technologies, and advance the development of priority thermostable vaccines through the clinical trial phase	14.0	Indirect	Steve	2003-present	Supply chain & Logistics	Global
Measles Initiative	Reduce measles mortality and sustain those reductions in sub-Saharan Africa	14.0	Indirect	Tim	2009-2013	System-wide	Global
AMP	Supporting the establishment of national processes to enhance evidence-informed decision making in immunization/health	9.9	Indirect	Vio	2008-2014	Political commitment & policy setting	Country
PATH	Evaluation of Disposable-Cartridge Jet Injectors, Regulatory, Economic and Programmatic Feasibility	9.9	Indirect	Steve	2007-present	Quality service & data management	Local
Sabin	Advocacy of GAVI country governments for Sustainable Immunization Financing	9.3	Indirect	Vio	2007-2012	Financing & Procurement	Country

## Summary description of PARs indirectly relating to RI (II)

Preliminary!

Grantee	Short description	Size of grant (\$M)	Directly related to RI	PO	Timing	What on framework it addresses	Global / country / local
WHO	(SAGE+) Strengthening WHO's normative and policy-setting functions for immunization 2006-10	6.8	Indirect	Steve	2006-present	Political commitment & policy setting	Global
Lions Club	Conduct \$10 million fundraising campaign for MI and distribute funds to MI SIA activities	5.4	Indirect	Michael	2011-2012	Financing & Procurement	Global
AMP	Establish a training program for government logisticians, to build management and technical assistance capacities for developing country vaccine logistics / supply chain mgmt	4.3	Indirect	Tasleem	2011-2013	Supply chain & Logistics	Country
WHO – Tech Net	Operationalize policy decisions into country level guidelines; transmit accurate information to those working on cold chain, logistics and vaccine management	1.5	Indirect	Steve	2011-2014	Planning & management	Country
Imperial College of London	Develop tools to monitor emergence and impact of rumors undermining trust in vaccines	1.0	Indirect	Michael	2009-2011	Willingness	Global
Task Force for Global Health	Promote a strong leadership role for Heads of State in Africa in sustaining the tremendous progress with measles	0.50	Indirect	Michael	2009-2012	Prioritization & policy setting	Country
SEEDR	Improve cold boxes for final stages of cold chain	0.45	Indirect	Apoorva	2010-present	Supply chain & logistics	Local

**Total funding of grants indirectly relating to RI: ~\$3,892M**

\*Sample grants –may not be comprehensive