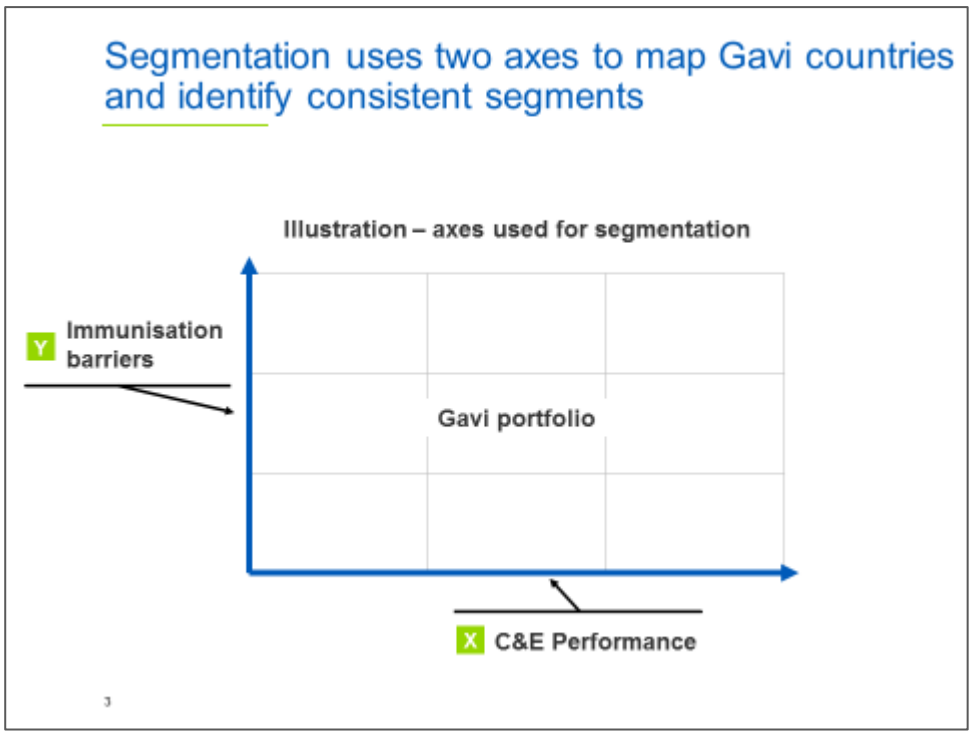
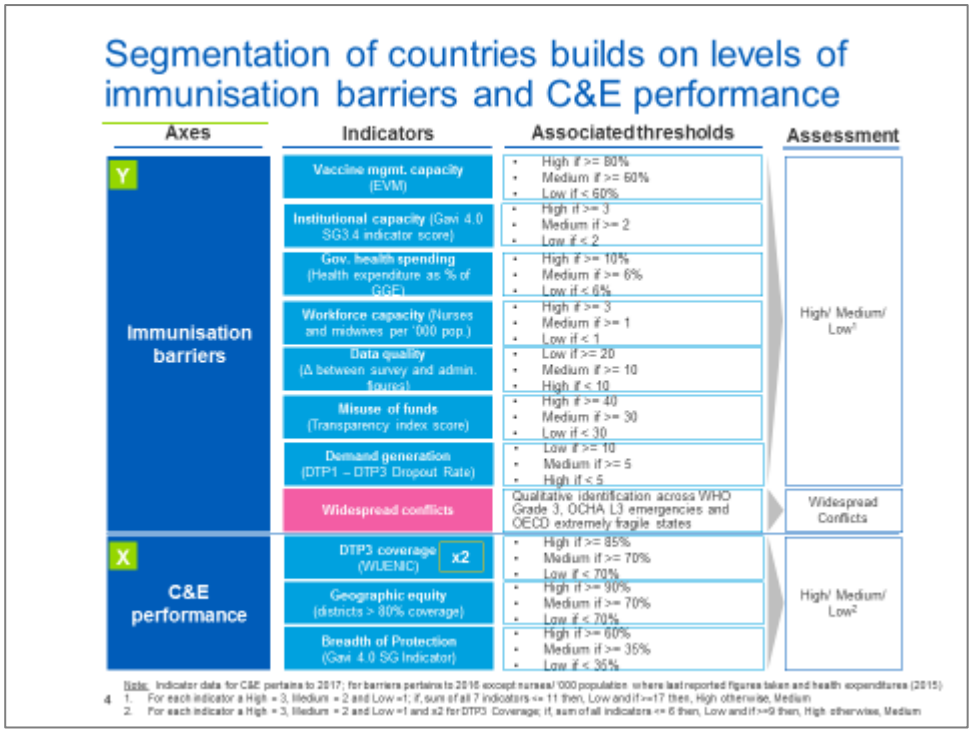
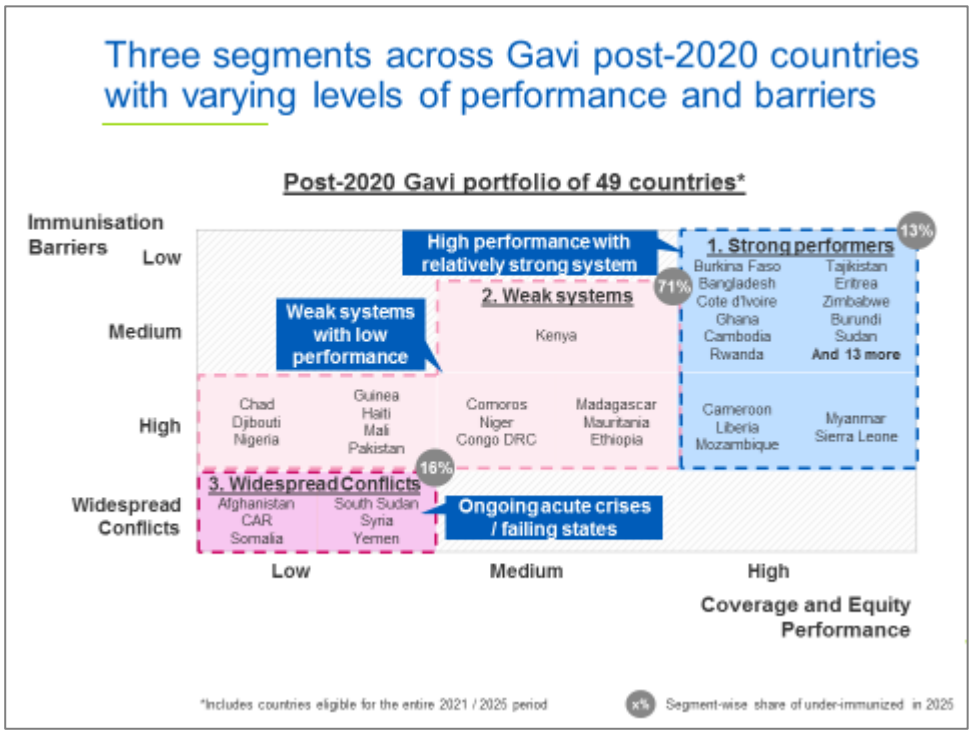
Annex B: **Supplementary contextual analyses**

This document provides a number of more detailed, contextual analyses as additional background to the two key questions that will inform Gavi post-2020 Strategy:

1. **How will the Alliance ensure continued progress on equitable coverage in the countries that are yet to transition?**
2. **How can the global community engage non-Gavi countries to address growing inequities and maximise the impact of their domestic investments in immunisation?**
3. **How will the Alliance ensure continued progress on equitable coverage in the countries that are yet to transition?**

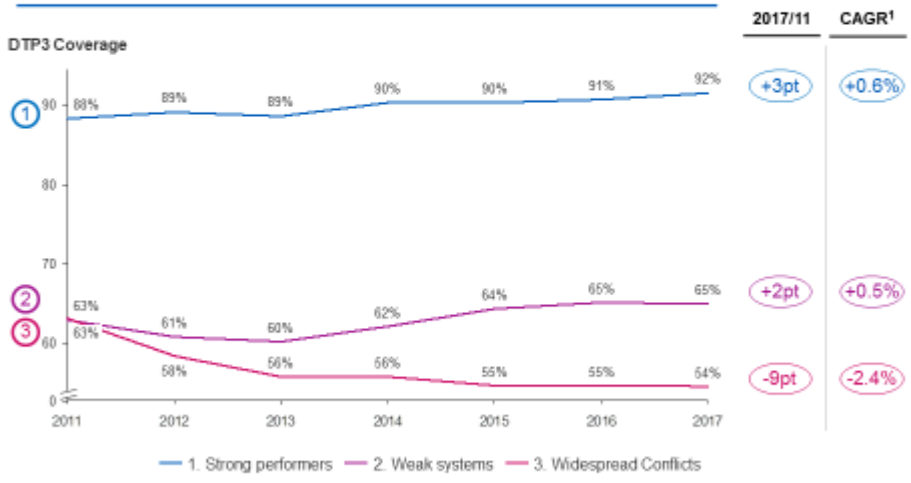



Segmentation of countries builds on levels of immunisation barriers and C&E performance
Axes
Indicators
Associated thresholds
Assessment
Y
Immunisation barriers
Vaccine mgmt. capacity (EVM)
High if >= 80%
Medium if >= 60%
Low if < 60%
Institutional capacity (Gavi 4.0 SG3.4 indicator score)
High if >= 3
Medium if >= 2
Low if < 2
Gov. health spending (Health expenditure as % of GGE)
High if >= 10%
Medium if >= 6%
Low if < 6%
Workforce capacity (Nurses and midwives per '000 pop.)
High if >= 3
Medium if >= 1
Low if < 1
Data quality (Δ between survey and admin. figures)
Low if >= 20
Medium if >= 10
High if < 10
Misuse of funds (Transparency index score)
High if >= 40
Medium if >= 30
Low if < 30
Demand generation (DTP1 – DTP3 Dropout Rate)
Low if >= 10
Medium if >= 5
High if < 5
High/ Medium/ Low1
Widespread conflicts
Qualitative identification across WHO Grade 3, OCHA L3 emergencies and OECD extremely fragile states
Widespread Conflicts
X
C&E performance
DTP3 coverage (WUENIC)
x2
High if >= 85%
Medium if >= 70%
Low if < 70%
Geographic equity (districts > 80% coverage)
High if >= 90%
Medium if >= 70%
Low if < 70%
Breadth of Protection (Gavi 4.0 SG Indicator)
High if >= 60%
Medium if >= 35%
Low if < 35%
High/ Medium/ Low2
Note: Indicator data for C&E pertains to 2017; for barriers pertains to 2016 except nurses/ '000 population where last reported figures taken and health expenditures (2015)
1. For each indicator a High = 3, Medium = 2 and Low =1; if, sum of all 7 indicators <= 11 then, Low and if >=17 then, High otherwise, Medium
2. For each indicator a High = 3, Medium = 2 and Low =1 and x2 for DTP3 Coverage; if, sum of all indicators <= 6 then, Low and if >=9 then, High otherwise, Medium


Three segments across Gavi post-2020 countries with varying levels of performance and barriers
Post-2020 Gavi portfolio of 49 countries*
Immunisation Barriers
Low
Medium
High
Widespread Conflicts
High performance with relatively strong system
1. Strong performers
13%
Burkina Faso
Bangladesh
Cote d'Ivoire
Ghana
Cambodia
Rwanda
Tajikistan
Eritrea
Zimbabwe
Burundi
Sudan
And 13 more
71%
2. Weak systems
Kenya
Weak systems with low performance
Chad
Djibouti
Nigeria
Guinea
Haiti
Mali
Pakistan
Comoros
Niger
Congo DRC
Madagascar
Mauritania
Ethiopia
Cameroon
Liberia
Mozambique
Myanmar
Sierra Leone
16%
3. Widespread Conflicts
Afghanistan
CAR
Somalia
South Sudan
Syria
Yemen
Ongoing acute crises / failing states
Low
Medium
High
Coverage and Equity Performance
*Includes countries eligible for the entire 2021 / 2025 period
x% Segment-wise share of under-immunized in 2025

Initial analysis shows progress in coverage in segment 1 while challenges in segments 2 & 3

Segment-wise coverage trend 2011 / 2017 - *DTP3 coverage*



6 1. Compounded Annual Growth Rate
Source: WUENIC Immunization Coverage

Targeted approaches for specific segments to be explored

Key dimensions in Gavi's model and option space *Illustrative*

Objectives	Capacity building / sustainability	Prioritise coverage gains
	Accelerate introductions	Ensure sustainability of existing vaccines
Operating model	Delivery through governments in country	Delivery through implementing partners
	'Light touch' fiduciary risk management	Dedicated resources to manage risks
	Retain co-financing model	Explore co-financing flexibilities (e.g. transition vaccines)
	Restrict campaigns	Opportunistic campaign approach

7

More deliberate focus on subnational approaches in large 'weak system' countries

2. Weak Systems
Weak systems with low C&E performance


Pakistan


Nigeria


Congo DRC


Ethiopia

Examples of subnational approaches

- **Target setting** – systematic disaggregation of data and objectives by subnational levels
- **Channelling of funds** – directly to regional governments
- **Vaccine introductions** – Consider introduction of vaccines in parts of countries only
- **Subnational campaigns** – Ensure campaigns targeted to specific subnational regions
- **Subnational emergencies** – Unlock specific flexibilities and operating model
- **Direct engagement and advocacy** – at subnational levels with subnational government bodies

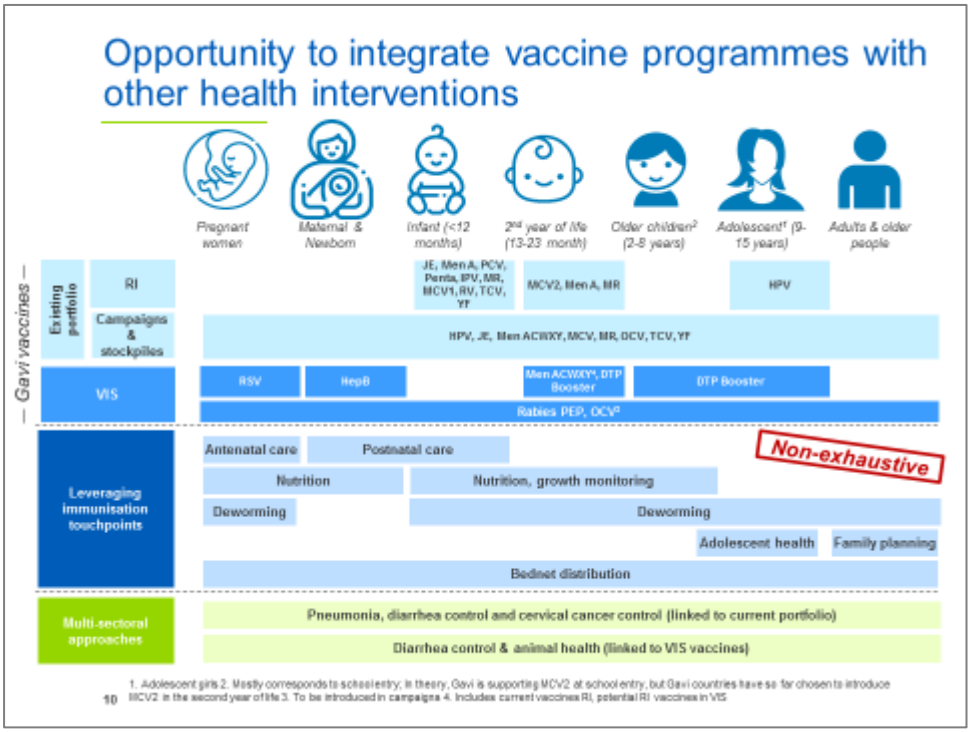
8

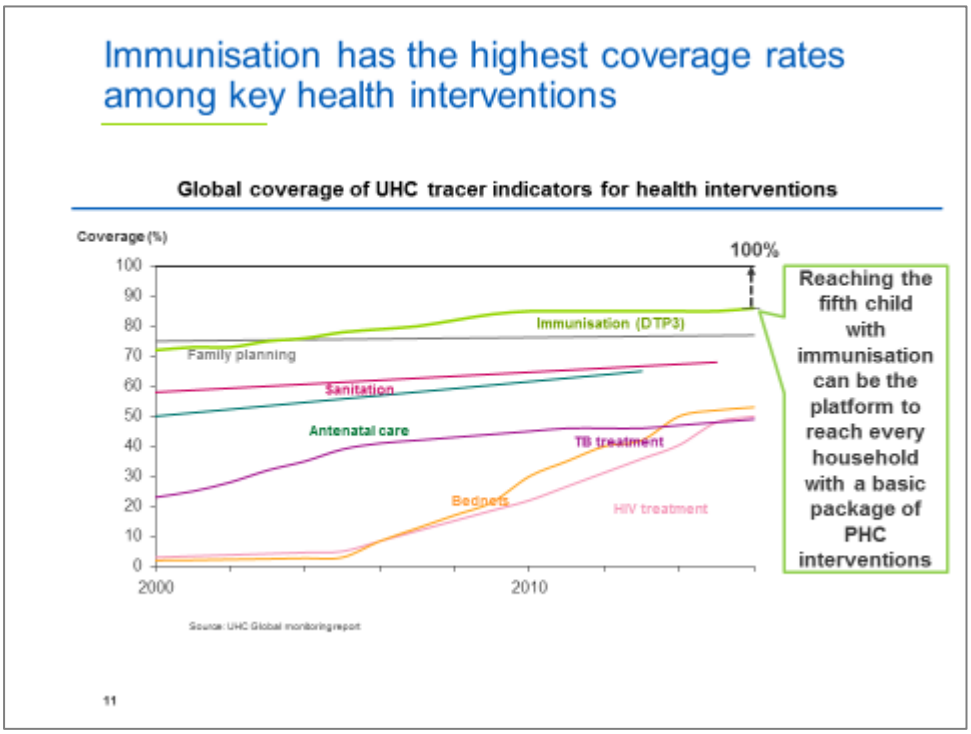
Immunisation underpins PHC and provides a platform for UHC

- Immunisation has the **highest coverage rates** among key health interventions and **has to reach every household**
- Immunisation provides **touchpoints for a basic package of PHC interventions**
- As a preventive intervention, immunisation is one of the **best buys** in health, and therefore **essential in making PHC and UHC affordable**

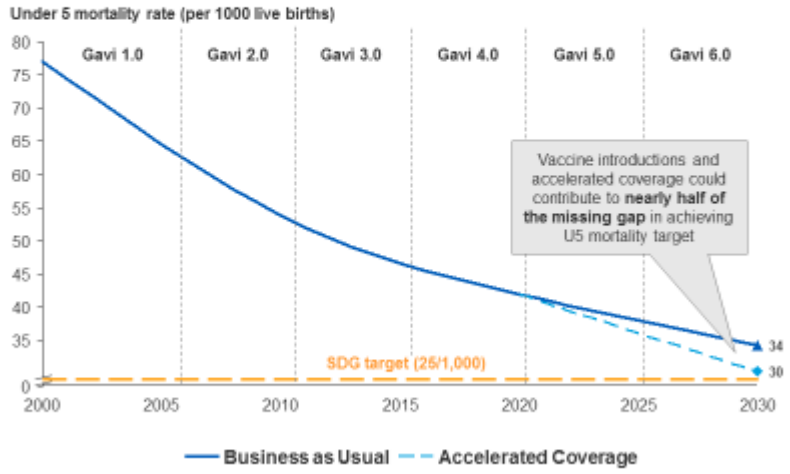
- Immunisation helps remove **physical** and **financial barriers** to achieve Universal Health Coverage (UHC)

9


Opportunity to integrate vaccine programmes with other health interventions
Pregnant women
Maternal & Newborn
Infant (<12 months)
2nd year of life (13-23 month)
Older children2 (2-8 years)
Adolescent1 (9-15 years)
Adults & older people
Gavi vaccines
Existing portfolio
RI
Campaigns & stockpiles
JE, Men A, PCV, Penta, IPV, MR, MCV1, RV, TCV, YF
MCV2, Men A, MR
HPV
HPV, JE, Men ACWXY, MCV, MR, OCV, TCV, YF
VIS
RSV
HepB
Men ACWXY, DTP Booster
DTP Booster
Rabies PEP, OCV
Leveraging immunisation touchpoints
Antenatal care
Postnatal care
Non-exhaustive
Nutrition
Nutrition, growth monitoring
Deworming
Deworming
Adolescent health
Family planning
Bednet distribution
Multi-sectoral approaches
Pneumonia, diarrhea control and cervical cancer control (linked to current portfolio)
Diarrhea control & animal health (linked to VIS vaccines)
1. Adolescent girls 2. Mostly corresponds to school entry; in theory, Gavi is supporting MCV2 at school entry, but Gavi countries have so far chosen to introduce MCV2 in the second year of life 3. To be introduced in campaigns 4. Includes current vaccines RI, potential RI vaccines in VIS
10

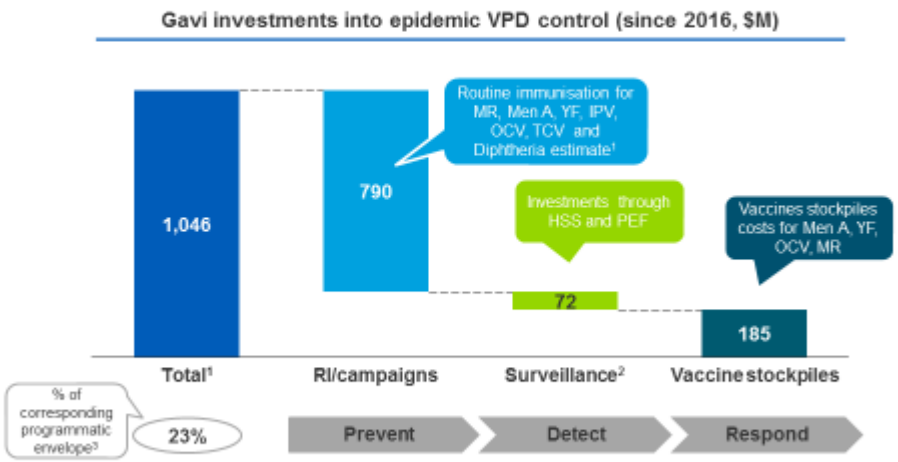

Immunisation has the highest coverage rates among key health interventions
Global coverage of UHC tracer indicators for health interventions
Coverage (%)
100%
Immunisation (DTP3)
Family planning
Sanitation
Antenatal care
TB treatment
Bednets
HIV treatment
2000
2010
Reaching the fifth child with immunisation can be the platform to reach every household with a basic package of PHC interventions
Source: UHC Global monitoring report
11

Accelerated vaccine coverage could bring the world closer to achieving the U5 mortality SDG target



12 Note: Business as Usual: Normal conduct of business; Accelerated Coverage: Doubling down to improve vaccine coverage through targeted approaches to achieve nearly zero VPD deaths

Gavi is a key contributor to outbreak detection, prevention and response



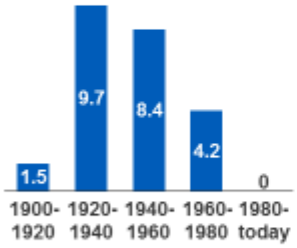
1. Includes vaccines procurement (RI and campaigns), ops and VIGS for 2016-2019 period, PEF TCA and SFA for 2016-2018 period and HSS funds for 2016-2017. All amounts are approvals. 2. Surveillance is also indirectly contributing to prevent (by guiding vaccines introduction) and respond (by triggering outbreak response) 3. Programmatic envelope based on expenditure estimate for 2016-2019

13

Gavi engagement in GHS is critical as the risk of disease outbreaks continues to increase

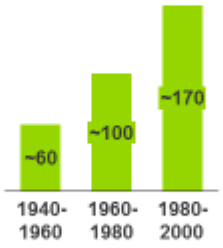
Successes in tackling some outbreaks

Smallpox cases (millions)



However, new pathogens increasingly emerging…

New pathogen events



… going hand in hand with new risks for outbreaks

"New 21st century risks"

- Altered disease patterns, e.g., due to **climate change**
- Unprecedented **population density** incl. **urbanisation**
- **Globalisation** and **migration**

"Existing 20th century risks"

- Weak **primary healthcare**
- Low **detection** and **response** capacity
- **Others**

Source: WHO, Global trends in emerging infectious diseases – Nature (Reverb approximated from published figure)

14

In addition to mortality, outbreaks have a huge economic impact…

Select examples

Influenza (1918-1919) – Global:
- No cost estimate for 1918; at this scale today, would cost **4.8% of global GDP**

Influenza (1958) – Global:
- Estimated cost of **3.1% of global GDP**

Influenza (1968) – Global:
- Estimated cost of **0.7% of global GDP**

SARS (2003) – China and Hong Kong:
- Estimated cost of **0.001% of global GDP**

Ebola (2015) – Liberia, Sierra Leone and Guinea:
- Lost **0.003% of global GDP**

Zika (2015-2017) – Latin American & Caribbean region
- Lost **0.01% – 0.02% of global GDP**

>$6T
Estimated cost of 21st century global pandemics

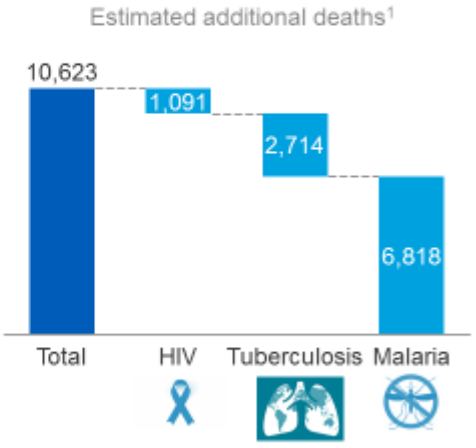
Source: Press research, Estimating the the global economic cost of SARS" Jong-Wha Lee and Warwick J. McKibbin.

15

… and are disruptive to health systems

Case study: *Ebola outbreak, West Africa (2013-16)*

- ***>11k deaths due to Ebola itself***
- ***881 cases & 513 deaths of health workers during the outbreak***
- ***~11k additional deaths due to 50% reduction in access to healthcare services in Guinea, Liberia, and Sierra Leone***

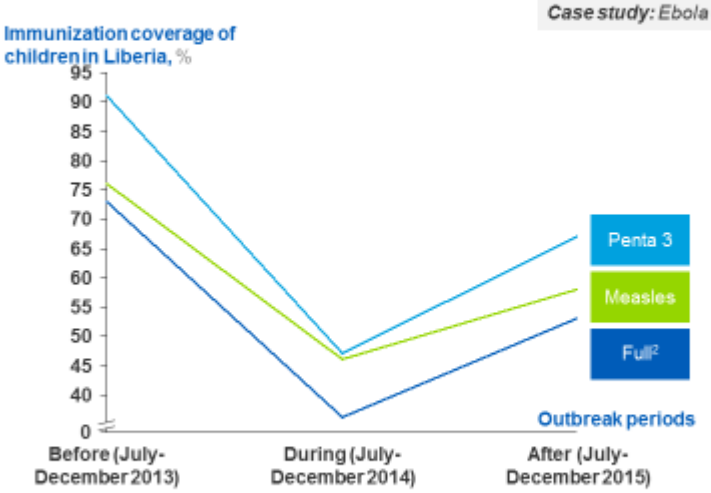


1. Result of exacerbated malaria, HIV/AIDS, and tuberculosis mortality rates; Source: Effects of the West Africa Ebola Virus Disease on Health-Care Utilization – A Systematic Review, Kim J Brolin Ribacke

16

Immunisation is particularly affected, leading to risks for additional vaccine-preventable deaths

Case study: *Ebola outbreak in West Africa*



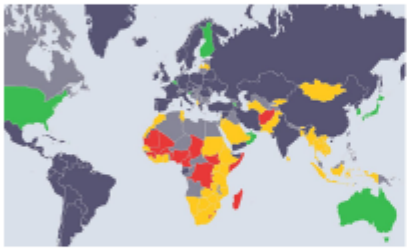
Reduction of measles immunisation coverage rate could have led to ***12,000 additional deaths in case of a measles outbreak in West Africa*** *(assuming a coverage drop of 75% for 18 months)*

1 From routine immunisation data extracted from DHIS-2, covering 552 primary health care facilities
2 Full immunisation defined as per WHO recommendation for children <1 year of age: Bacille Calmette-Guérin (BCG), polio, pentavalent, measles, yellow fever and pneumococcal

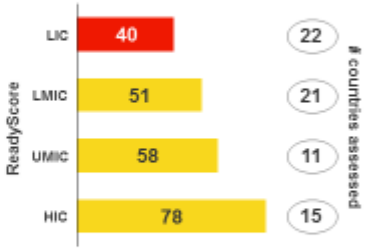
17 Source: Did the Ebola outbreak disrupt immunisation services? A case study from, Public Health Actions, C. S. Wesseh, et. al.

Gavi Countries not well prepared to respond to potential outbreaks

JEE assessment - overview



Country breakdown



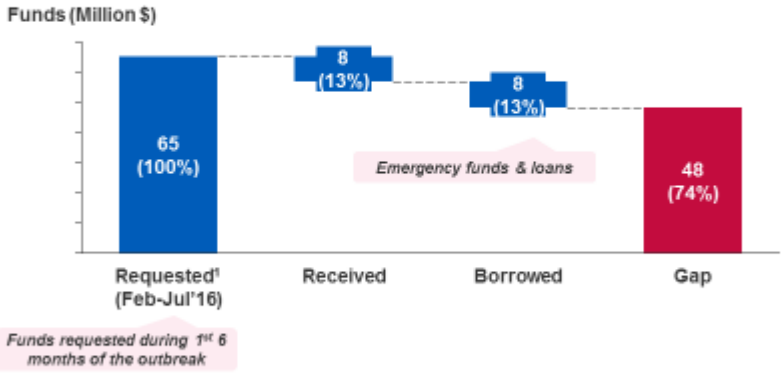
ReadyScore[1]: Better prepared (> 80) | Work to do (>40-80) | Not ready (<=40) | Unknown | In progress

Source: PreventEpidemics.org Oct 2018 1. Across prevent, detect, respond and protect from other public health threats

18

Funding gaps for responding to outbreaks remain after Ebola 2014

***Case study:** Zika outbreak 2016*



Funds requested during 1st 6 months of the outbreak

1. Requested by WHO, PAHO (Pan American Health Organizations), WPRO (Western Pacific Regional Office), UNDP (U Program),UNFPA (UN Populations Fund), UNICEF, UN Women, World Vision Source: WHO Zika Virus Outbreak Global report | May 2016

19

Overview of core pillars for outbreaks prevention/response

	JEE score	Prevent	Detect	Respond
1 Global legislation, coordination and advocacy	2.8[1]	• ***Definition of international standards / regulations*** *(IHR)* • *Coordination / management of* ***global improvement on GHS agenda***		
		• ***Global / Regional advocacy*** • ***Risk communication***	• ***Global reporting*** *of public health emergencies and outbreaks*	• *International* ***coordination*** *of response & communication* • ***Deployment of international teams*** *in response to outbreak*
2 National coordination & communication	2.8	• ***Public health risk mapping & response plan*** • ***National risk communication:*** *on status, preventive measures, engagement with affected/ at risk communities, partner coordination* • ***Activation of emergency operations****, Emergency Operations Centres, operating procedures and plans, points of entry management*		
3 Vaccines / Immunisation	4.0	• ***Routine immunisation*** • ***Immunisation of specific groups*** *(e.g. health workers)*		• *Epidemic-prone diseases* ***vaccines development*** *incentives* • *Funding and deployment of* ***stockpile vaccines*** • *Maintaining* ***RI during outbreaks***
4 Diagnostic and surveillance	3.2	• *Development of* ***predictive technology*** *and* ***diagnostic innovation***	• *Coordination of* ***support for global and regional surveillance network*** • ***National lab and surveillance capacity*** *development*	• *Deployment of* ***diagnostic mechanisms*** *for rapid and correct* ***detection during outbreaks***

20

1 IHR legislation, coordination & communication score taken as a proxy for global legislation

Broad landscape of international players coming together to tackle outbreaks

Non exhaustive

Governance/ management
Funding

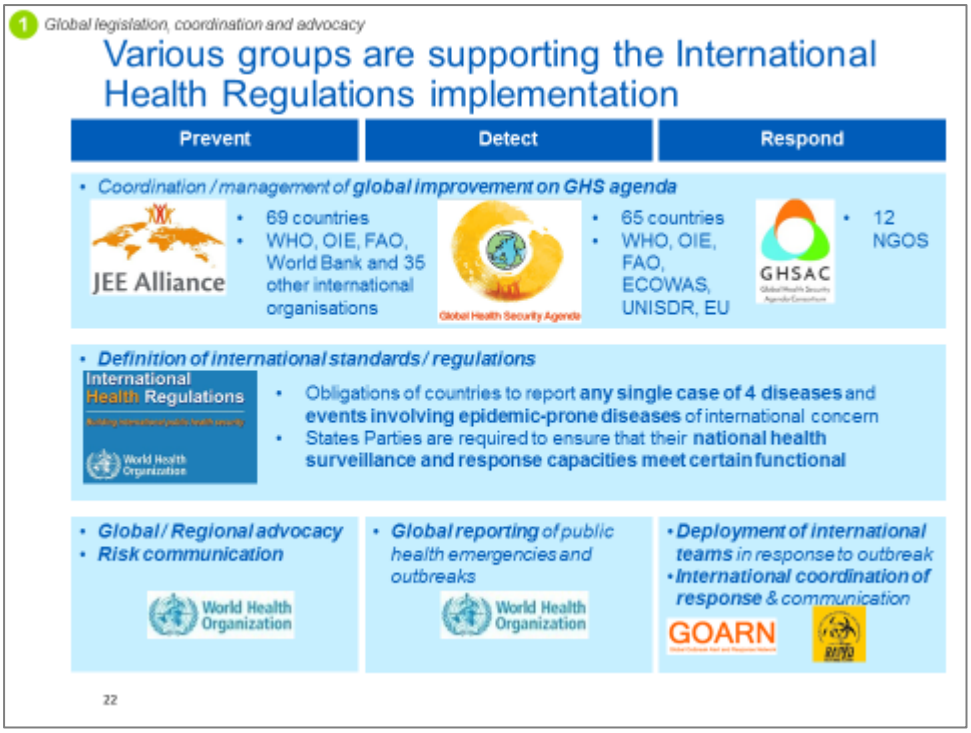
1 Global legislation, coordination and advocacy

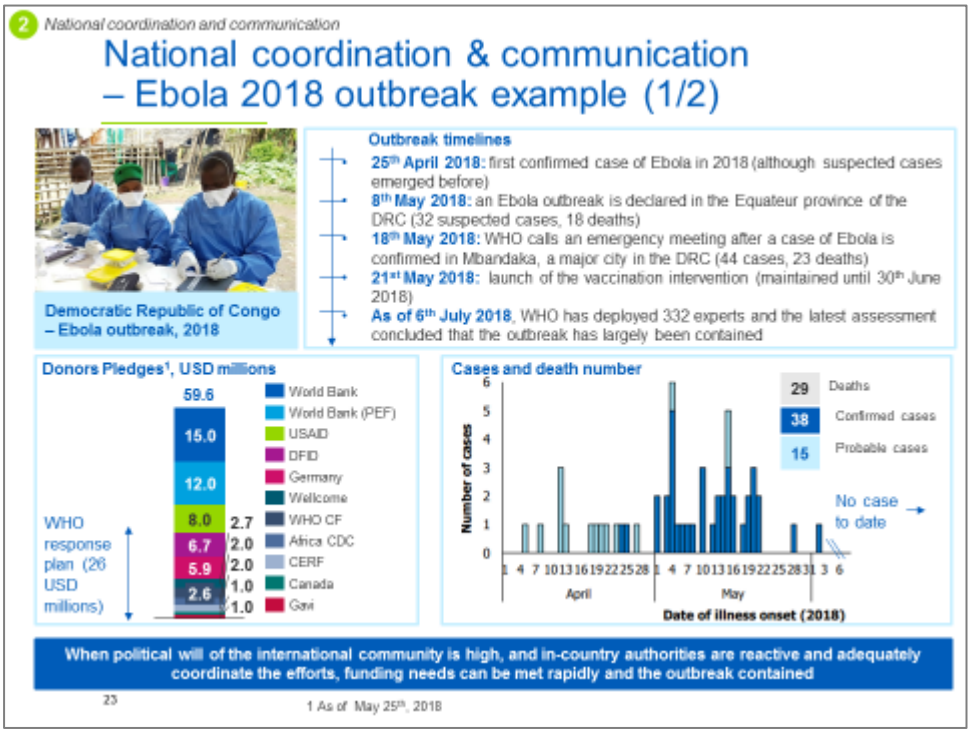
2 National coordination & communication

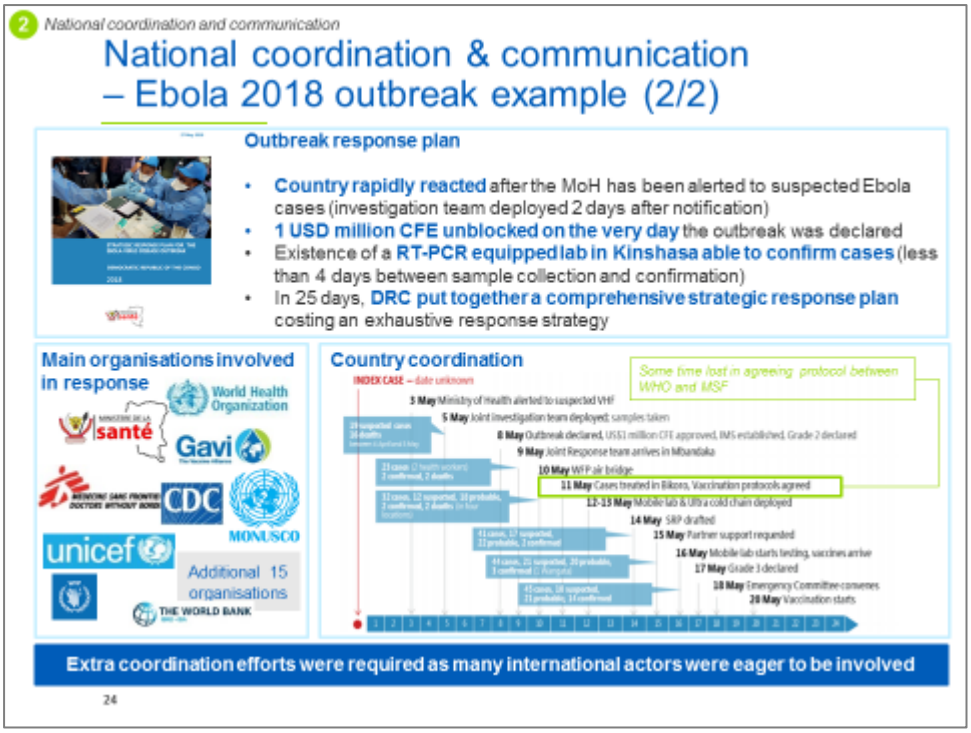
3 Vaccines / Immunisation

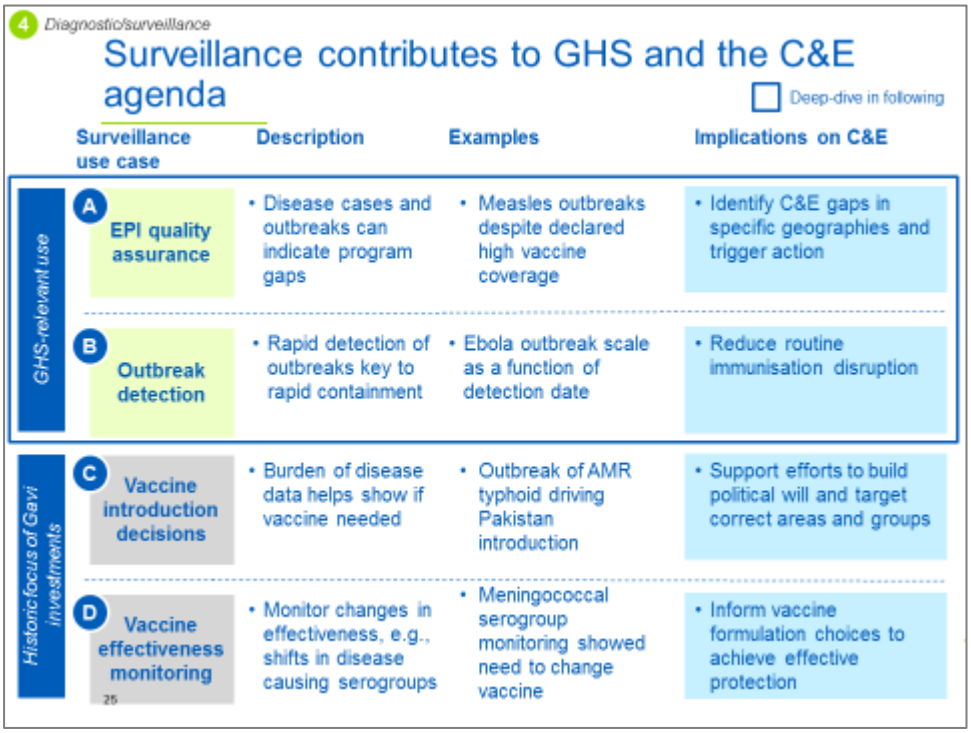
4 Diagnostic and surveillance

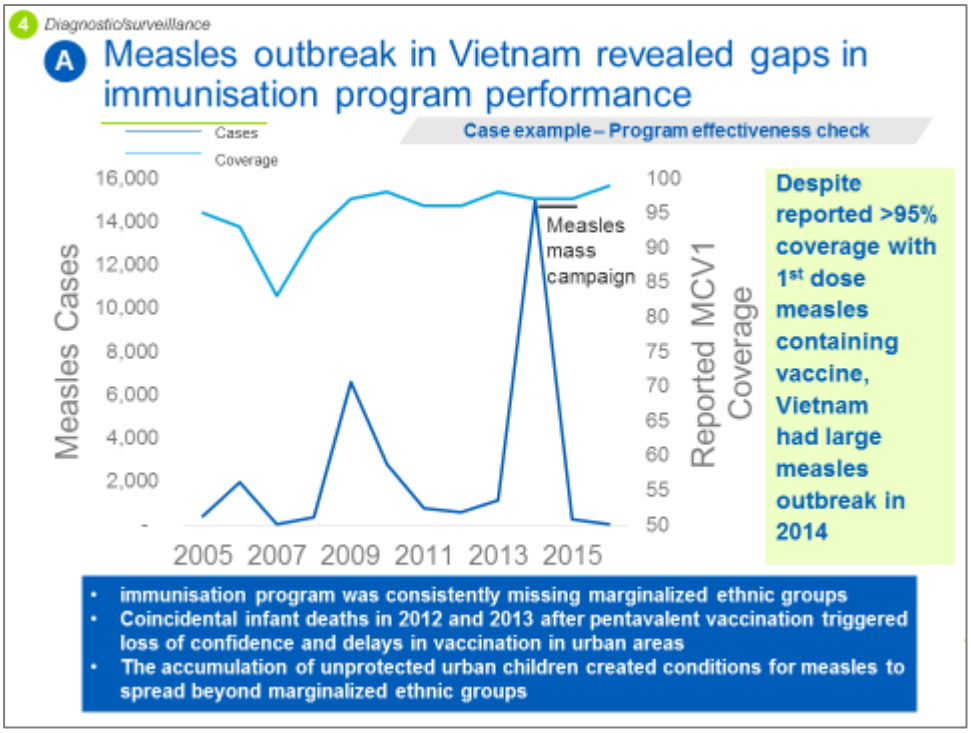
21

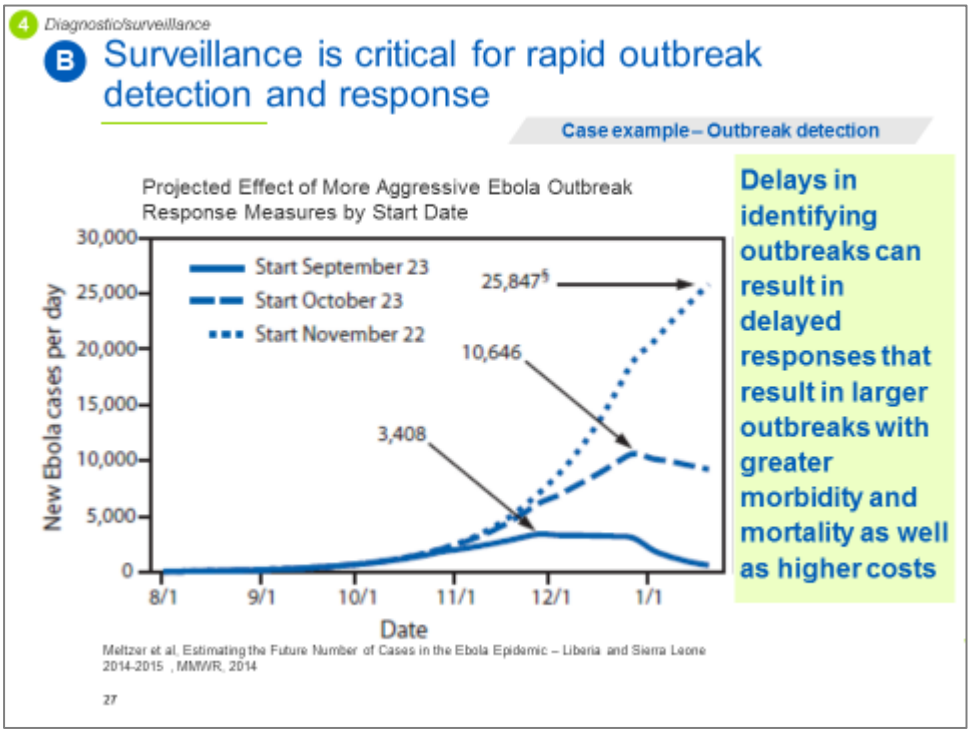

1 Global legislation, coordination and advocacy
Various groups are supporting the International Health Regulations implementation
Prevent
Detect
Respond
Coordination / management of global improvement on GHS agenda
JEE Alliance
69 countries
WHO, OIE, FAO, World Bank and 35 other international organisations
Global Health Security Agenda
65 countries
WHO, OIE, FAO, ECOWAS, UNISDR, EU
GHSAC
12 NGOS
Definition of international standards / regulations
International Health Regulations
World Health Organization
Obligations of countries to report any single case of 4 diseases and events involving epidemic-prone diseases of international concern
States Parties are required to ensure that their national health surveillance and response capacities meet certain functional
Global / Regional advocacy
Risk communication
World Health Organization
Global reporting of public health emergencies and outbreaks
World Health Organization
Deployment of international teams in response to outbreak
International coordination of response & communication
GOARN
22

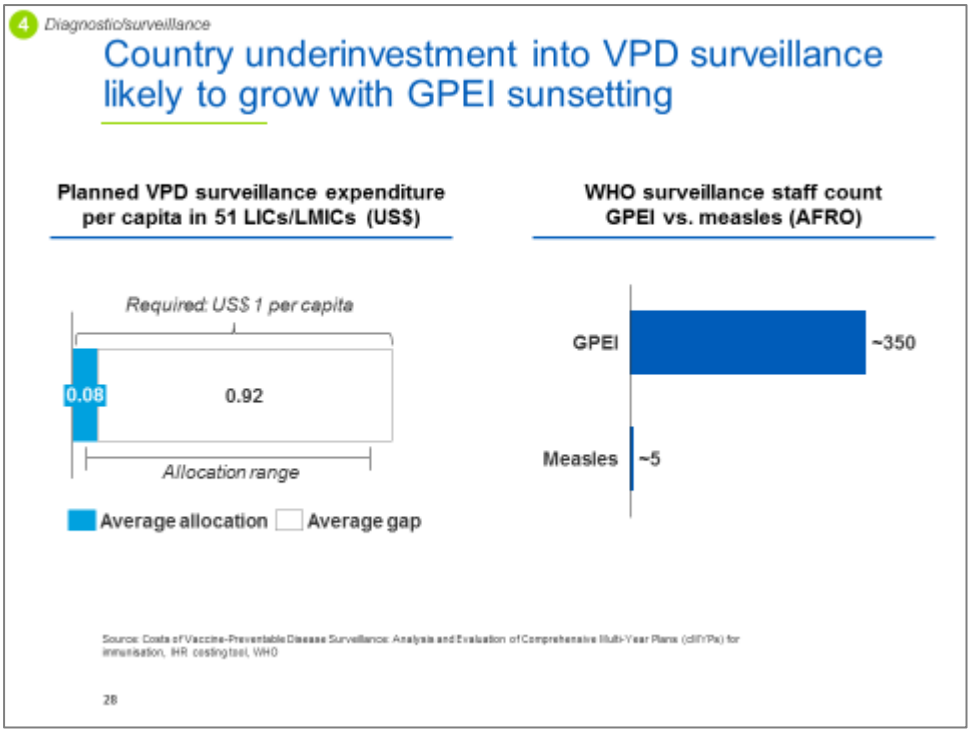

2 National coordination and communication
National coordination & communication – Ebola 2018 outbreak example (1/2)
Democratic Republic of Congo – Ebola outbreak, 2018
Outbreak timelines
25th April 2018: first confirmed case of Ebola in 2018 (although suspected cases emerged before)
8th May 2018: an Ebola outbreak is declared in the Equateur province of the DRC (32 suspected cases, 18 deaths)
18th May 2018: WHO calls an emergency meeting after a case of Ebola is confirmed in Mbandaka, a major city in the DRC (44 cases, 23 deaths)
21st May 2018: launch of the vaccination intervention (maintained until 30th June 2018)
As of 6th July 2018, WHO has deployed 332 experts and the latest assessment concluded that the outbreak has largely been contained
Donors Pledges1, USD millions
59.6
15.0
12.0
8.0
6.7
5.9
2.6
2.7
2.0
2.0
1.0
1.0
World Bank
World Bank (PEF)
USAID
DFID
Germany
Wellcome
WHO CF
Africa CDC
CERF
Canada
Gavi
WHO response plan (26 USD millions)
Cases and death number
Number of cases
29 Deaths
38 Confirmed cases
15 Probable cases
No case to date
April
May
Date of illness onset (2018)
When political will of the international community is high, and in-country authorities are reactive and adequately coordinate the efforts, funding needs can be met rapidly and the outbreak contained
23
1 As of May 25th, 2018


2 National coordination and communication
National coordination & communication – Ebola 2018 outbreak example (2/2)
Outbreak response plan
Country rapidly reacted after the MoH has been alerted to suspected Ebola cases (investigation team deployed 2 days after notification)
1 USD million CFE unblocked on the very day the outbreak was declared
Existence of a RT-PCR equipped lab in Kinshasa able to confirm cases (less than 4 days between sample collection and confirmation)
In 25 days, DRC put together a comprehensive strategic response plan costing an exhaustive response strategy
Main organisations involved in response
World Health Organization
santé
Gavi
CDC
MONUSCO
unicef
Additional 15 organisations
THE WORLD BANK
Country coordination
Some time lost in agreeing protocol between WHO and MSF
INDEX CASE – date unknown
5 May Joint investigation team deployed; samples taken
8 May Outbreak declared, US$1 million CFE approved, IMS established, Grade 2 declared
9 May Joint Response team arrives in Mbandaka
10 May WFP air bridge
11 May Cases treated in Bikoro, Vaccination protocols agreed
12-15 May Mobile lab & Ultra cold chain deployed
14 May SRP drafted
15 May Partner support requested
16 May Mobile lab starts testing, vaccines arrive
17 May Grade 3 declared
18 May Emergency Committee convenes
20 May Vaccination starts
Extra coordination efforts were required as many international actors were eager to be involved
24

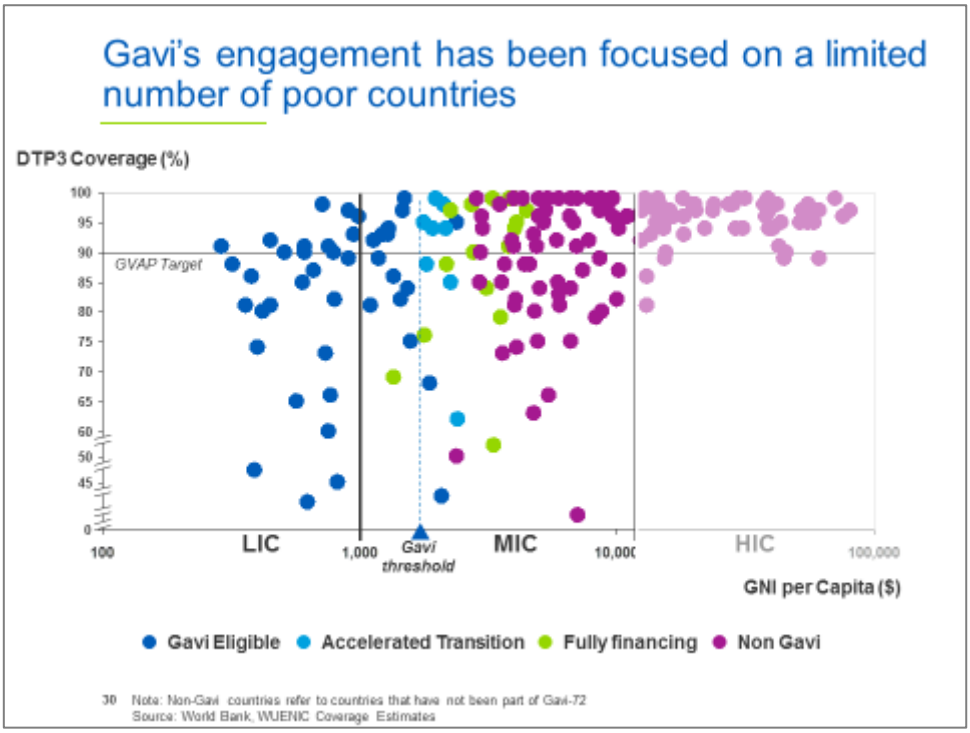

4 Diagnostic/surveillance
Surveillance contributes to GHS and the C&E agenda
Deep-dive in following
Surveillance use case
Description
Examples
Implications on C&E
GHS-relevant use
A EPI quality assurance
Disease cases and outbreaks can indicate program gaps
Measles outbreaks despite declared high vaccine coverage
Identify C&E gaps in specific geographies and trigger action
B Outbreak detection
Rapid detection of outbreaks key to rapid containment
Ebola outbreak scale as a function of detection date
Reduce routine immunisation disruption
Historic focus of Gavi investments
C Vaccine introduction decisions
Burden of disease data helps show if vaccine needed
Outbreak of AMR typhoid driving Pakistan introduction
Support efforts to build political will and target correct areas and groups
D Vaccine effectiveness monitoring
Monitor changes in effectiveness, e.g., shifts in disease causing serogroups
Meningococcal serogroup monitoring showed need to change vaccine
Inform vaccine formulation choices to achieve effective protection
25


4 Diagnostic/surveillance
A Measles outbreak in Vietnam revealed gaps in immunisation program performance
Case example – Program effectiveness check
Cases
Coverage
Measles Cases
Reported MCV1 Coverage
Measles mass campaign
2005 2007 2009 2011 2013 2015
Despite reported >95% coverage with 1st dose measles containing vaccine, Vietnam had large measles outbreak in 2014
immunisation program was consistently missing marginalized ethnic groups
Coincidental infant deaths in 2012 and 2013 after pentavalent vaccination triggered loss of confidence and delays in vaccination in urban areas
The accumulation of unprotected urban children created conditions for measles to spread beyond marginalized ethnic groups

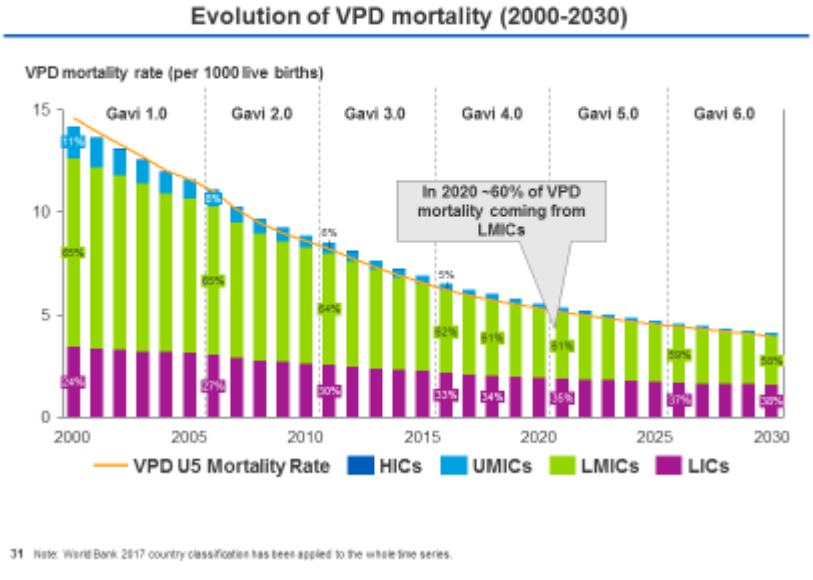

4 Diagnostic/surveillance
B Surveillance is critical for rapid outbreak detection and response
Case example – Outbreak detection
Projected Effect of More Aggressive Ebola Outbreak Response Measures by Start Date
Start September 23
Start October 23
Start November 22
25,847[5]
10,646
3,408
New Ebola cases per day
Date
Meltzer et al. Estimating the Future Number of Cases in the Ebola Epidemic – Liberia and Sierra Leone 2014-2015 , MMWR, 2014
27
Delays in identifying outbreaks can result in delayed responses that result in larger outbreaks with greater morbidity and mortality as well as higher costs



1. **How can the global community engage non-Gavi countries to address growing inequities and maximise the impact of their domestic investments in immunisation?**

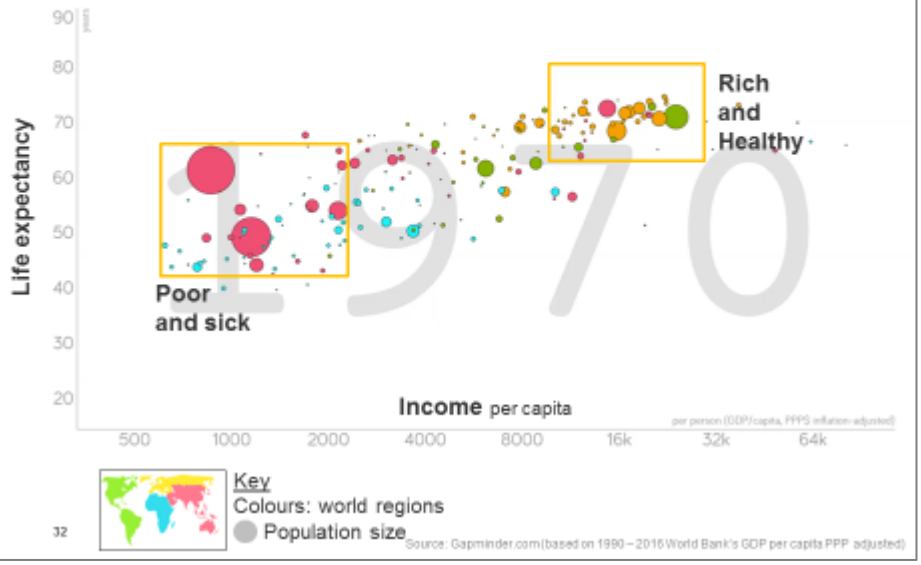


Nearly 60% of children dying of VPDs in 2020 will be in LMICs

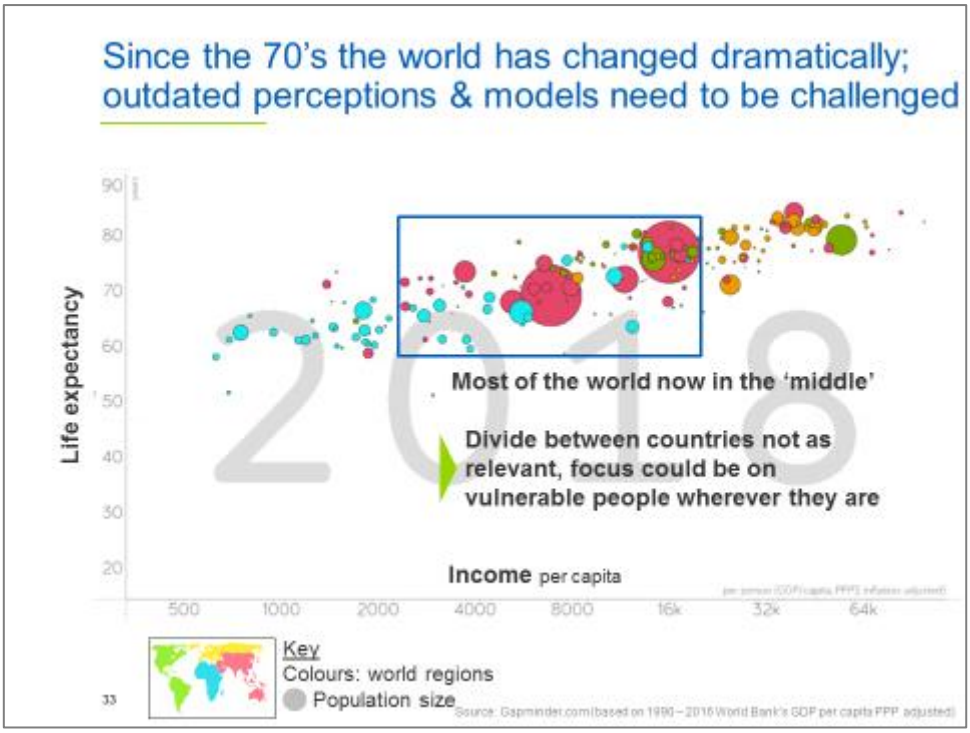


31 Note: World Bank 2017 country classification has been applied to the whole time series.

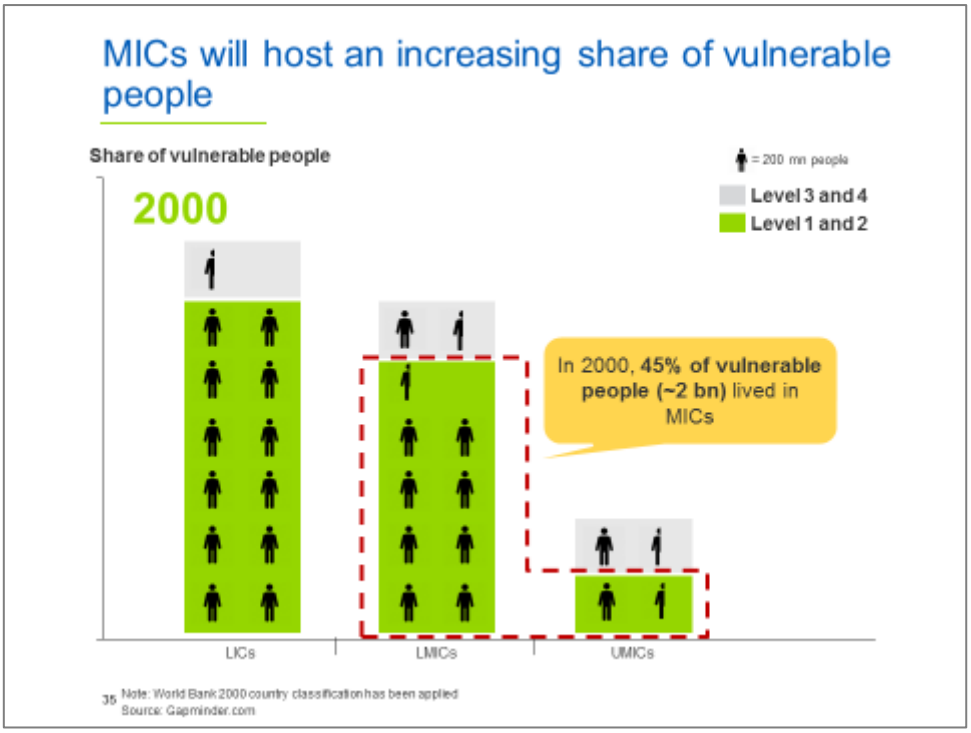
Since the 70's the world has changed dramatically; outdated perceptions & models need to be challenged

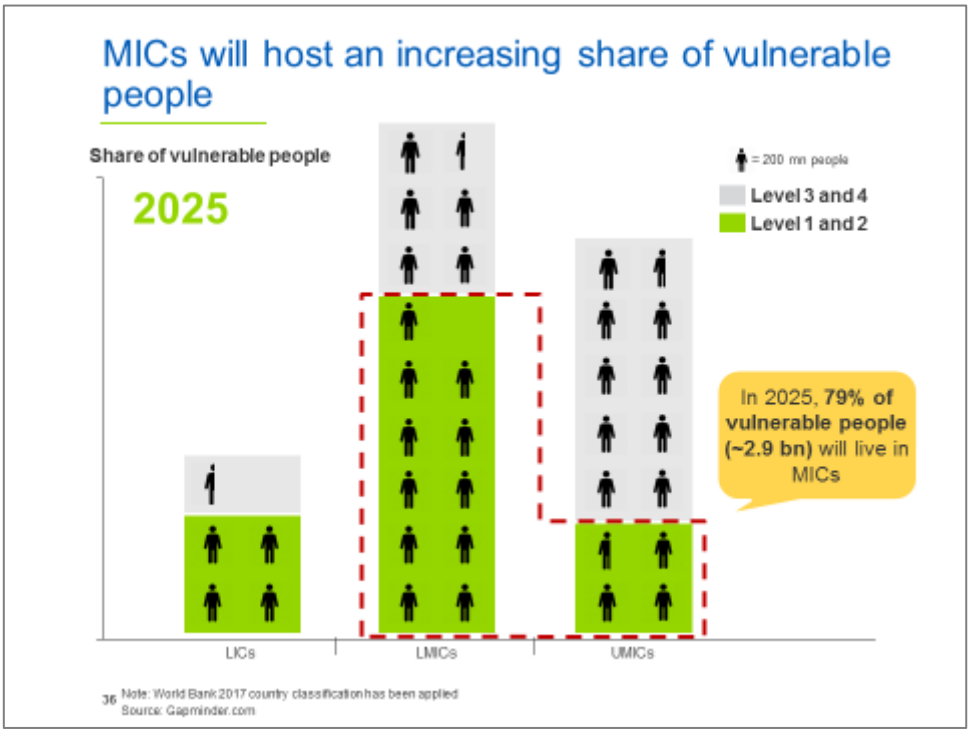


32

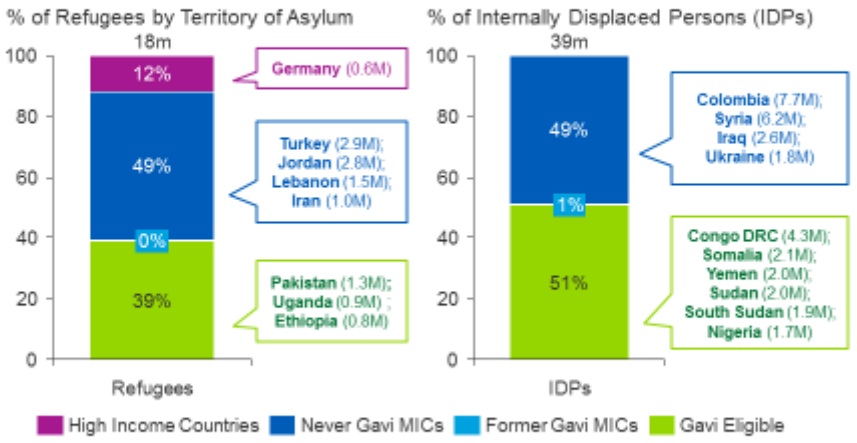

Since the 70's the world has changed dramatically; outdated perceptions & models need to be challenged
Life expectancy
90
80
70
60
50
40
30
20
2018
Most of the world now in the 'middle'
Divide between countries not as relevant, focus could be on vulnerable people wherever they are
Income per capita
500
1000
2000
4000
8000
16k
32k
64k
Key
Colours: world regions
Population size
33
Source: Gapminder.com based on 1990 – 2016 World Bank's GDP per capita PPP adjusted


People across the globe can be categorized into four income levels
Vulnerable People
Walking barefoot
Limited access to clean water
No access to life saving medicines
Hunger and starvation
$ 40/ month, Burundi
Buy slippers, cycle, plastic buckets
1 or 2 children attend primary school
Helpless against infections/ diseases
Able to afford utensils
$ 254/ month, Bolivia
Able to pay medical bills
Access to fridge, stored food
$ 738/ month, China
Car-owners, travel by plane
Cold and hot water indoors
Access to medicine/ private hospitals
Eat out, go to movies
$ 2,194/ month, France
34 Source: Gapminder.com – Dollar Street. Factfulness by Hans Rosling


MICs will host an increasing share of vulnerable people
Share of vulnerable people
2000
= 200 mn people
Level 3 and 4
Level 1 and 2
In 2000, 45% of vulnerable people (~2 bn) lived in MICs
LICs
LMICs
UMICs
35 Note: World Bank 2000 country classification has been applied
Source: Gapminder.com

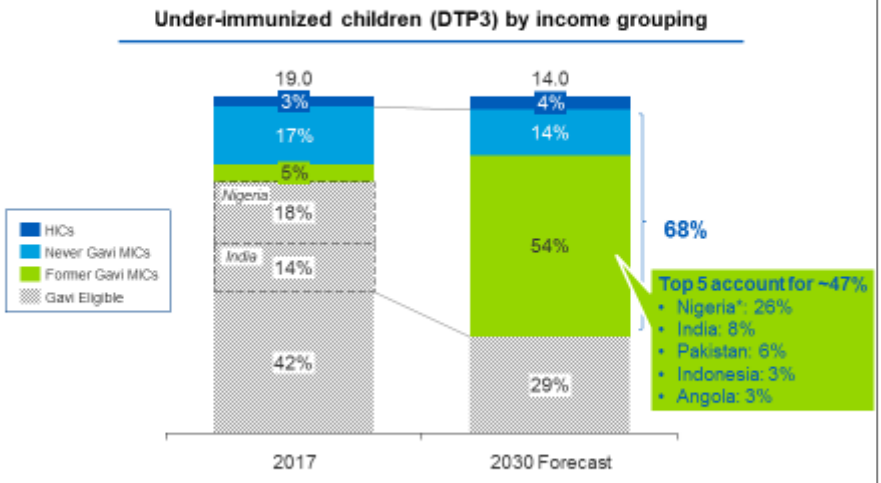

MICs will host an increasing share of vulnerable people
Share of vulnerable people
2025
= 200 mn people
Level 3 and 4
Level 1 and 2
In 2025, 79% of vulnerable people (~2.9 bn) will live in MICs
LICs
LMICs
UMICs
36 Note: World Bank 2017 country classification has been applied
Source: Gapminder.com

MICs host almost half of the world's refugees and IDPs



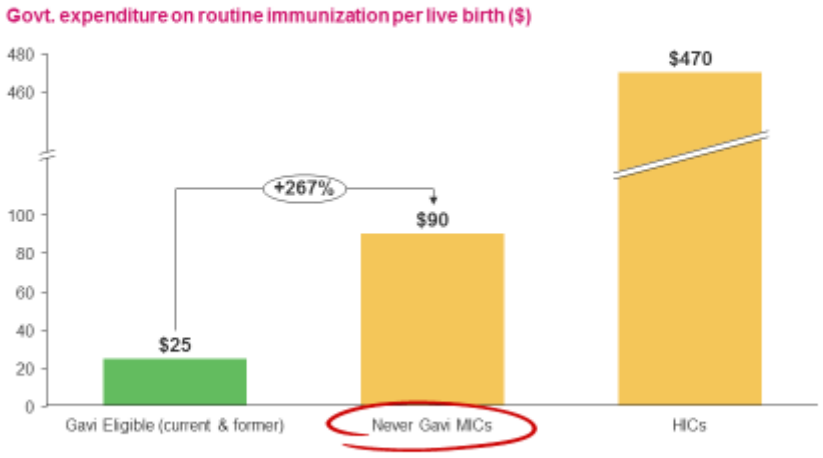
Note: An internally displaced person is someone who is forced to flee his or her home but who remains within his or her country's borders. Gavi-Eligible refers to Gavi 72 and Never-Gavi refers to countries not part of Gavi 72
37 Source: World Bank Databank 2016 for Refugees; UNHCR Global Trends 2017 for IDPs

Under-immunized in former and never Gavi MICs anticipated to grow to almost 70% by 2030



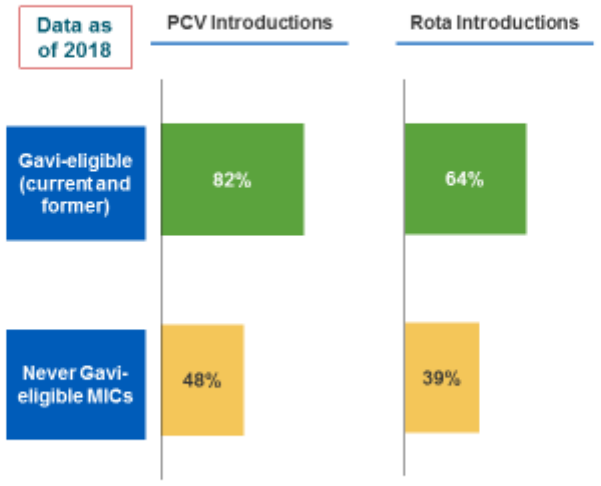
Note: Gavi Eligible includes countries eligible in 2017 and 2030 respectively; Former Gavi countries represent the remaining of Gavi-72 that transitioned; Gavi MICs exclude China, Bosnia, Albania, Ukraine & Turkmenistan that received Gavi support at some point, but did not undergo formal transition process; Nigeria 2030 forecast does not include expected improvement through Board-approved new transition plan; Syria assumed to become Gavi eligible in 2019
38 Source: WUENIC 2017 release - DTP3 Coverage

…despite significantly higher domestic expenditures on immunisation



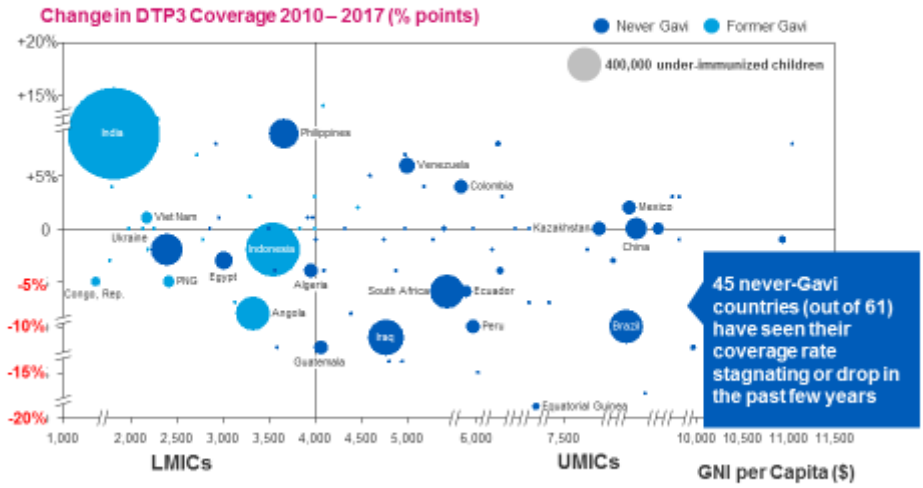
40 Note: Gavi-Eligible refers to Gavi 72 and Never-Gavi refers to countries not part of Gavi 72
Source: JRF Routine Immunization Expenditures 2016

Never-Gavi MICs lagging behind on PCV and Rota introductions…



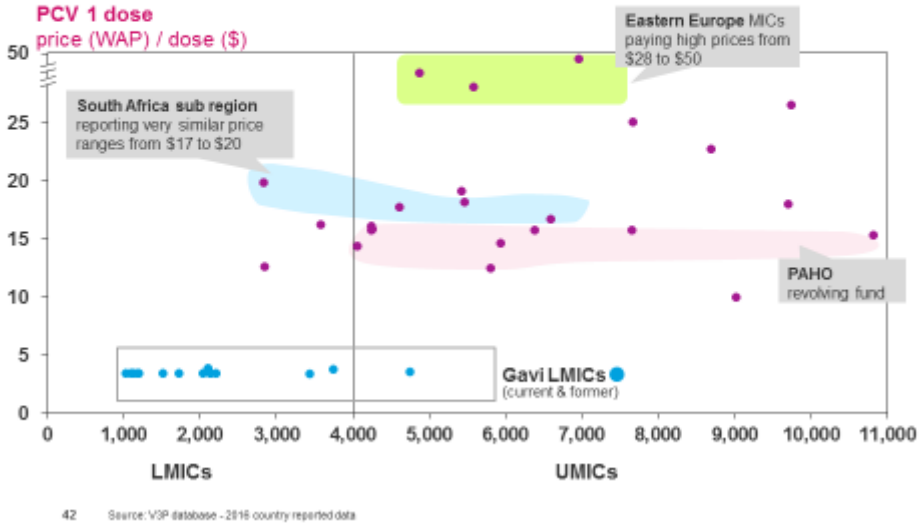
Note: Gavi-Eligible refers to Gavi 72 and Never-Gavi refers to countries not part of Gavi 72
39 Source: Vaccine Launch Database for Gavi-eligible countries; JHU IVAC View-Hub for PCV, Rota and PATH Global Overview for HPV for non-Gavi countries; Includes Phased/ Subnational and Regional introductions; Gavi Eligible excludes Syria

Evolution of coverage rates shows worrying trends especially in never Gavi-eligible MICs



41 Note: Never Gavi refers to countries not part of Gavi 72; Former Gavi refers to Gavi 72 countries that will transition out by 2025
Source: WUENIC 2017 release - DTP3 Coverage

Relatively high and variable vaccines prices appear to be a driver of MICs underperformance



42 Source: VIP database - 2016 country reported data