

Global Status of Measles and Rubella Elimination Activities

Pediatric Societies and Immunization Partners Workshop

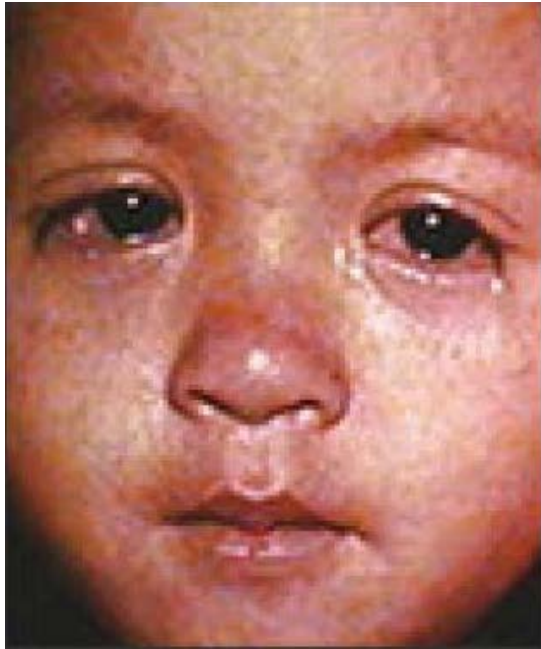
May 23, 2018

Geneva, Switzerland

Katrina Kretsinger, MD

WHO HQ, IVB/EPI

Measles and Rubella



89,000 measles deaths in 2016 (estimated)

CONGENITAL RUBELLA

Rubella infection early in pregnancy can lead to fetal death, premature delivery, congenital defects, spontaneous abortion, stillbirth, blindness, deafness, heart defects or mental retardation.

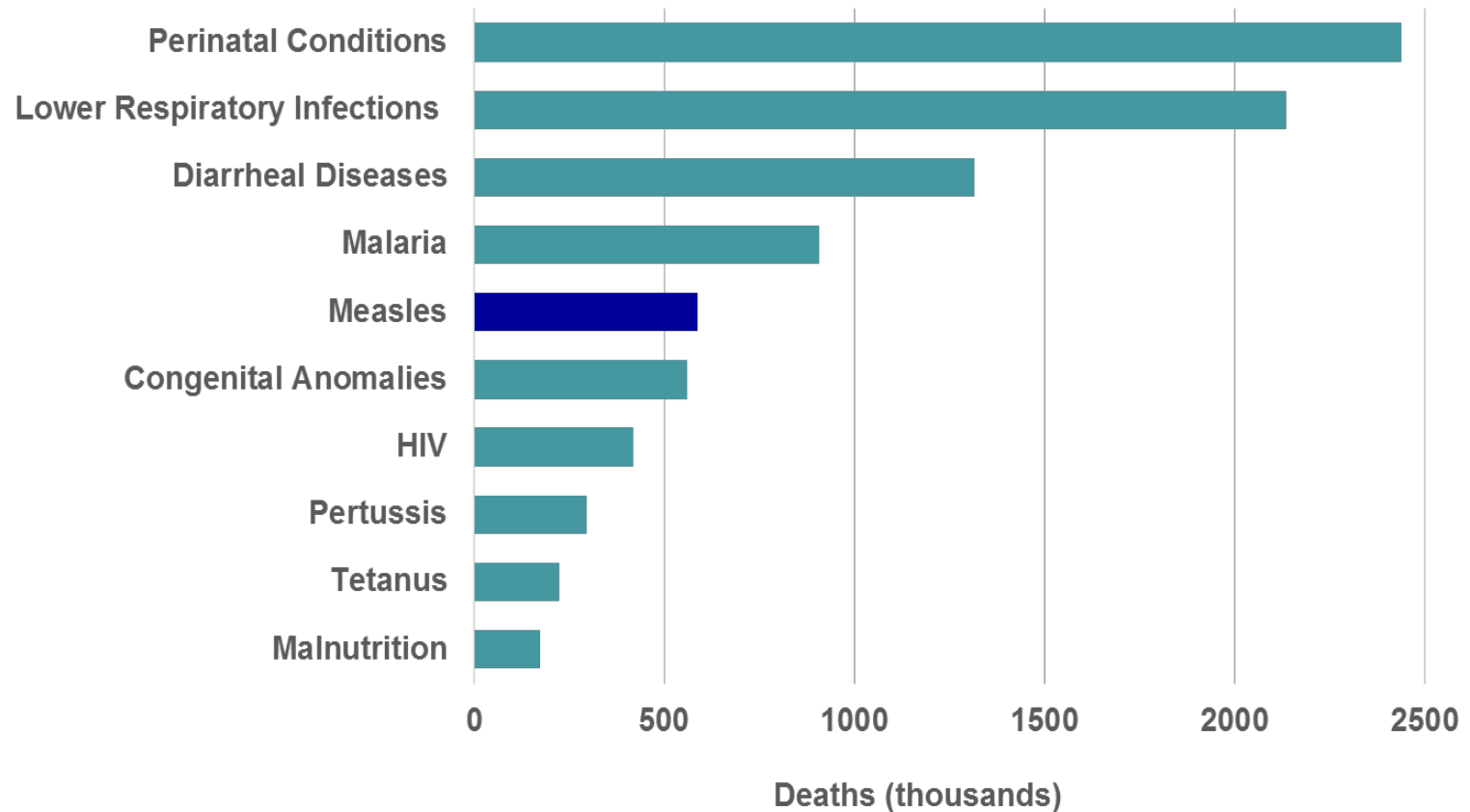
Rubella syndrome

Microcephaly PDA Cataracts

- Heart: patent/primary ductus arteriosus, other defects
- Eyes; cataracts, glaucoma, blindness
- CNS: mental retardation, deafness

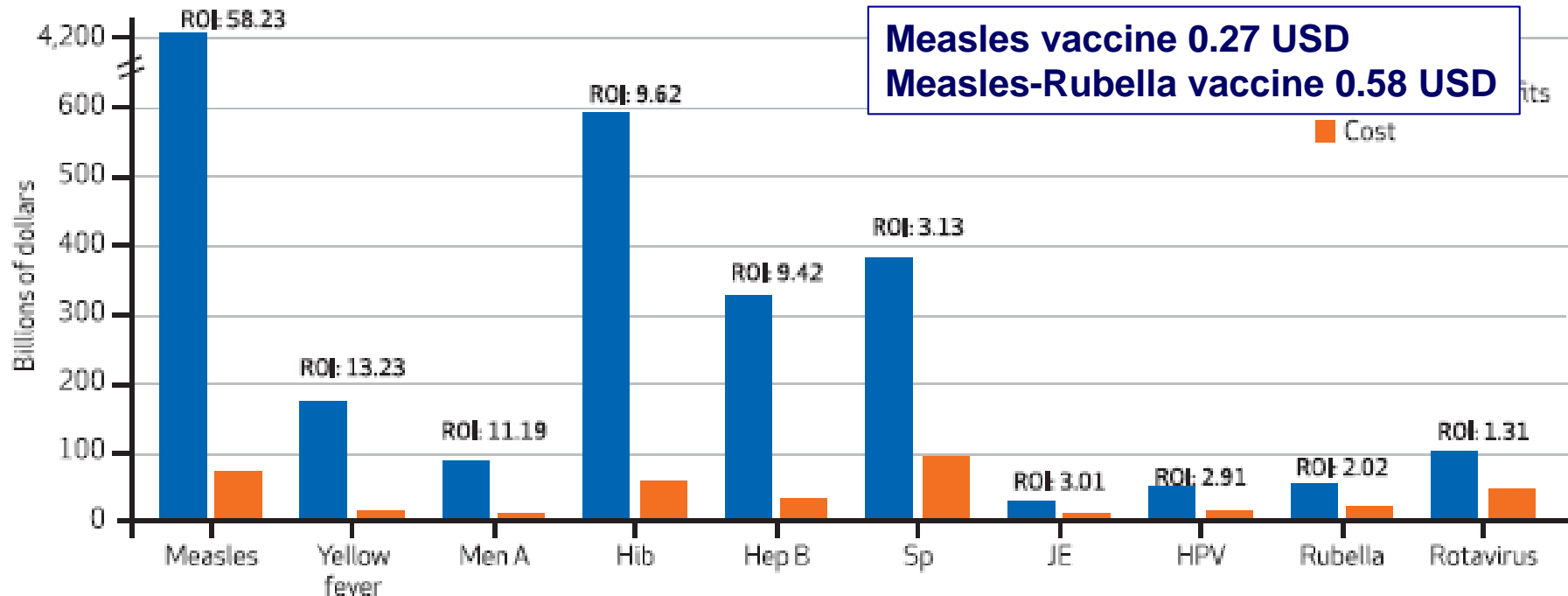
100,000 babies born with congenital rubella syndrome each year (estimated)

Fifth-leading cause of death among children <5 years of age, worldwide in 2000



Return on Investment

Estimated Costs, Economic Benefits Based On Costs Of Illnesses, And Return On Investment For Immunization, By Antigen, In 94 Low- And Middle-Income Countries, 2011-20



SOURCE Authors' analysis based on health impact estimates derived from Gavi's 2014 strategic demand forecast and dose estimates from Gavi's 2014 adjusted demand forecast (Notes 8 and 25, respectively, in text). **NOTES** Costs and economic benefits are reported in 2010 US dollars. Men A is *Neisseria meningitidis* serogroup A. Hib is *Haemophilus influenzae* type b. Hep B is hepatitis B. Sp is *Streptococcus pneumoniae*. JE is Japanese encephalitis. HPV is human papillomavirus.

Return on Investment From Childhood Immunization in Low- and Middle-Income Countries, 2011-20, *Health Affairs* 35, No. 2 (2016): 199-2

2010 Evaluation of Feasibility of Measles Eradication

1. Biological feasibility

2. Programmatic feasibility

3. Vaccine market analysis

4. Impact on health systems

5. Economic analysis

6. Risk analysis for post-measles era

7. Global context and political feasibility

SAGE

Global Consultation meeting (2010)

Recommend global measles goal

WHA set global measles goal



Measles and Rubella Targets



Global: World Health Assembly, 2010

By 2015:

- MCV1 coverage $\geq 90\%$ national and $\geq 80\%$ in every district
- Measles reported incidence < 5 cases/million
- Measles mortality reduction of 95% vs. 2000

Regional elimination (GVAP, 2012):

By 2015:

- Elimination of measles in 4 WHO Regions
- Elimination of rubella in 2 WHO Regions

By 2020:

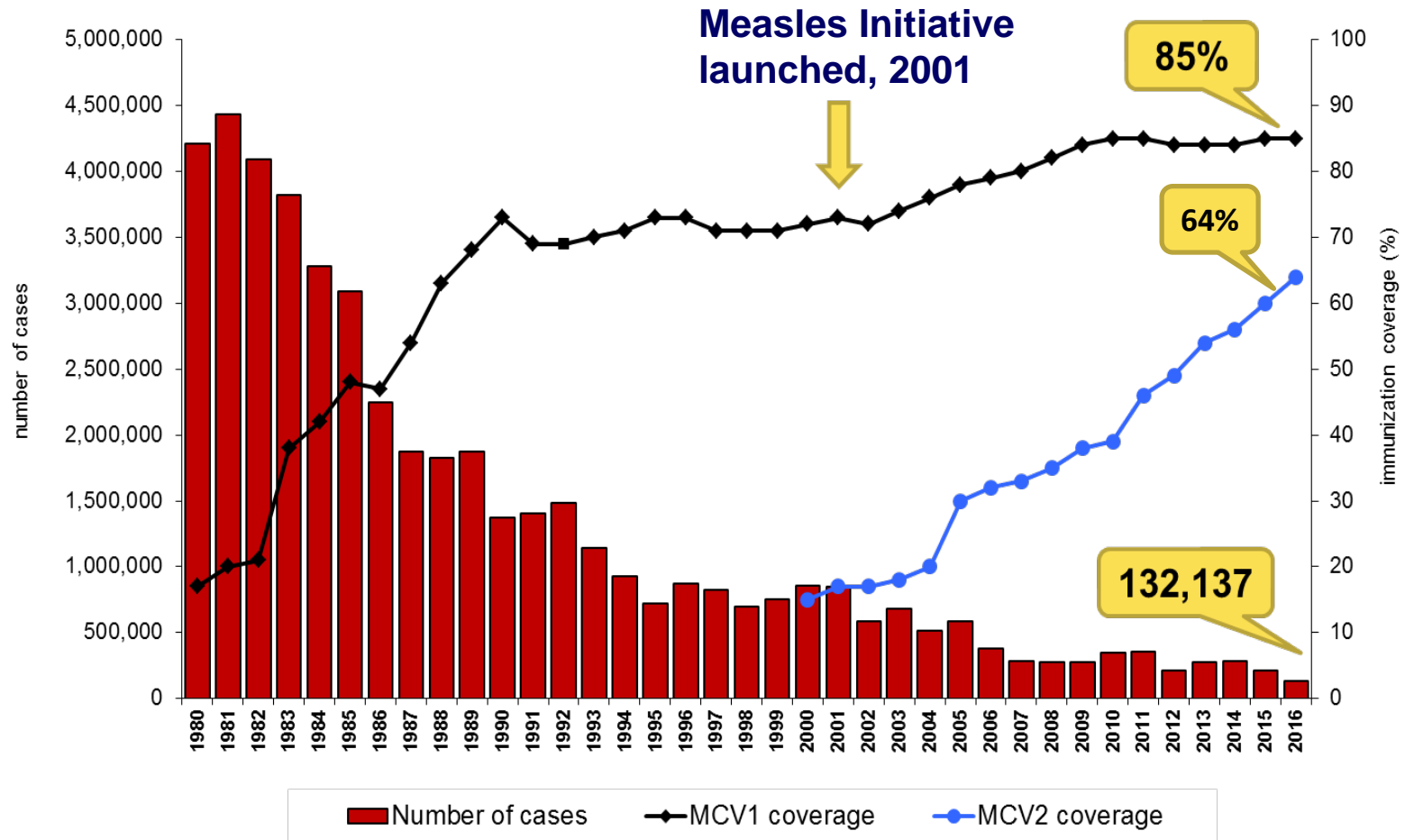
- Elimination of measles & rubella in 5 WHO Regions



Global Vaccine
Action Plan
2011–2020



Measles Global Annual Reported Cases and MCV1* and MCV2** Coverage, 1980–2016



*MCV1 coverage: first dose of measles-containing vaccine as estimated by WHO and UNICEF.

**MCV2 coverage estimates are only available from 2000 when global data collection started, however some countries introduced MCV2 earlier

Source: WHO /IVB database, 2017. 194 member states



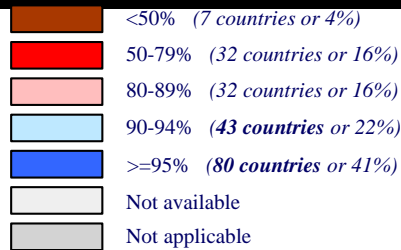
World Health Organization



Global Milestone #1:

90% MCV1 Vaccination Coverage in Every Country

- **Global MCV1= 85%**
- **123 (63%)** countries have $\geq 90\%$ coverage with 1st dose of MCV
- **44 (23%)** with MCV1 coverage $\geq 90\%$ national and $\geq 80\%$ in every district

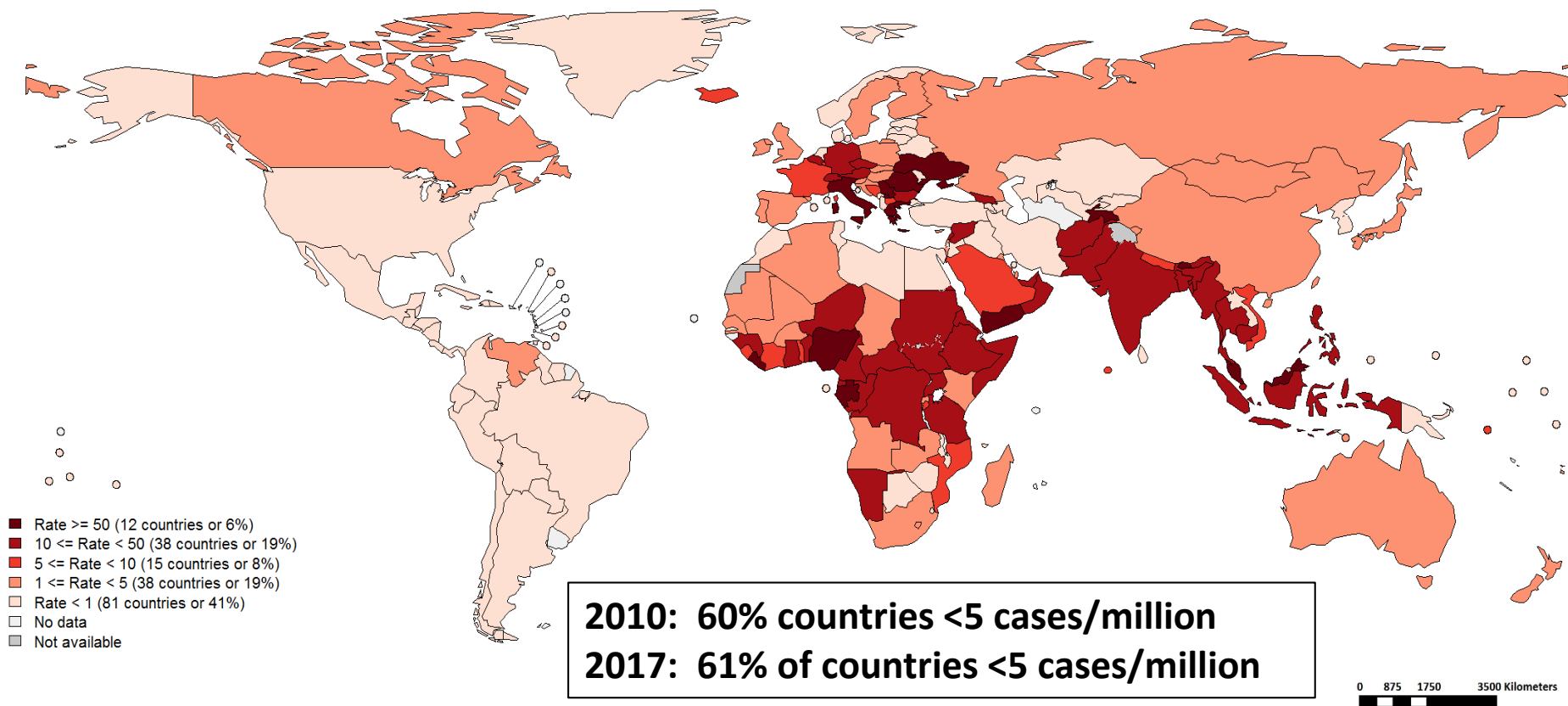


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Source: WHO/UNICEF coverage estimates 2016 revision, July 2017. Map production: Immunization Vaccines and Biologicals (IVB), World Health Organization.
194 WHO Member States. Date of slide: 19 July 2017

Immunization coverage with 1st dose of measles containing vaccines in infants, 2016

Global Milestone #2: Measles Incidence <5 cases/million



Map production: World Health Organization, WHO, 2017. All rights reserved
Data source: IVB Database

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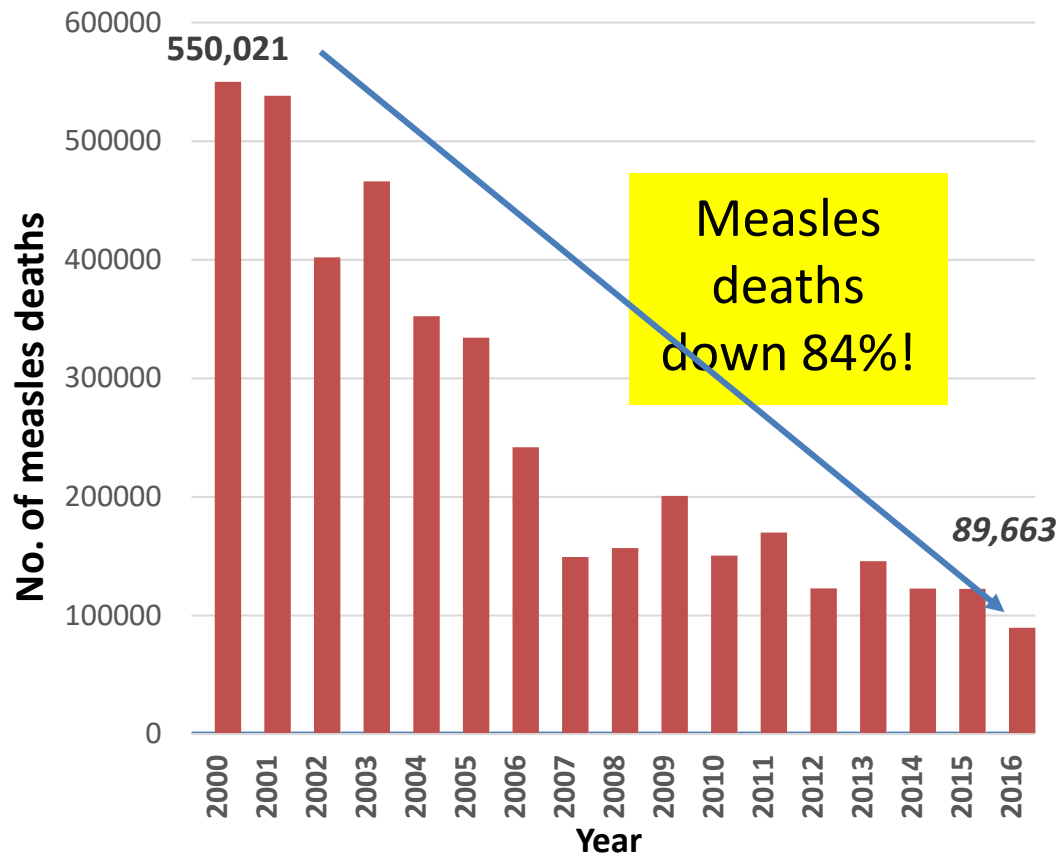
Based on data received 2018-02 and covering the period between 2017-01 and 2017-12 - Incidence: Number of cases / population* * 100,000 - * World population prospects, 2017 revision - ** Countries with the highest number of cases for the period - *** Countries with the highest incidence rates (excluding those already listed in the table above)



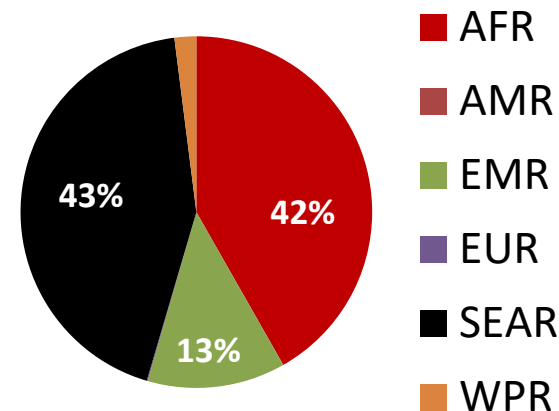
Global Milestone #3

95% Reduction in Measles Deaths

Measles Deaths, by Year 2000-2016



Estimated deaths by Region, 2016

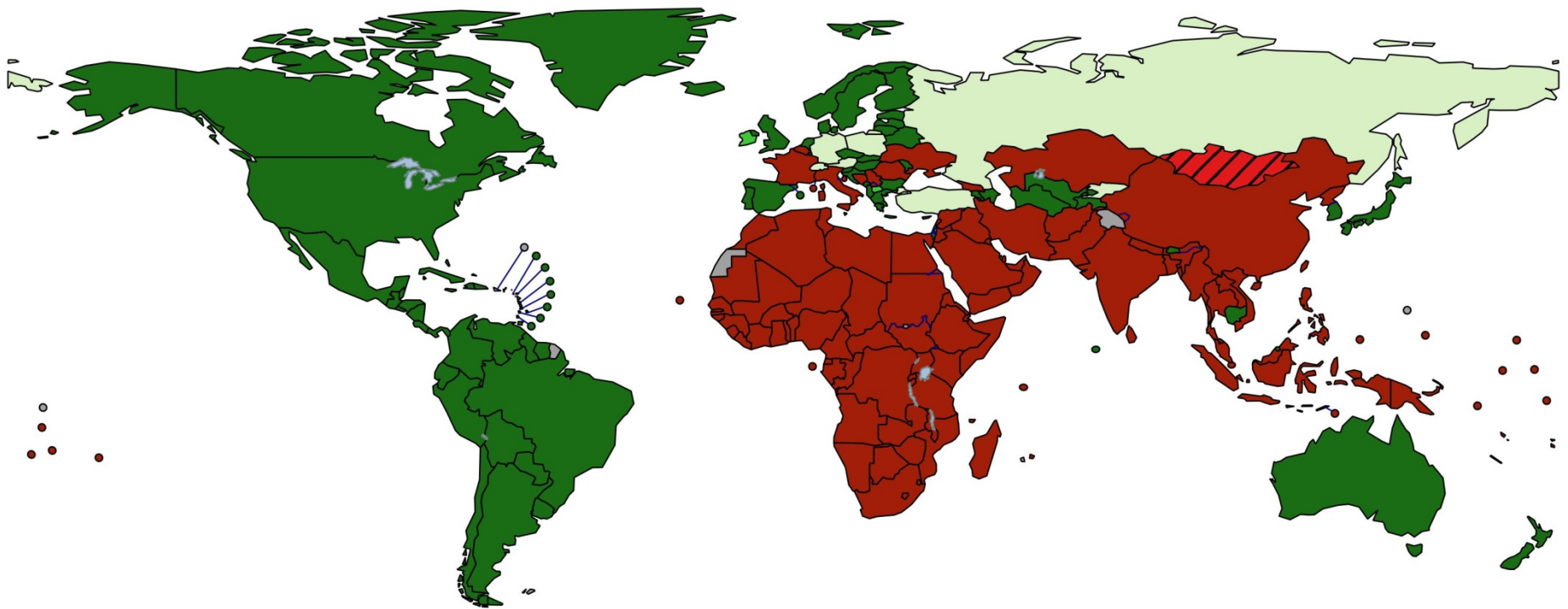


20.4 million deaths prevented from 2000-2016 by measles vaccination

Regional Scorecard on Verification of Elimination, Oct. 2017

WHO Region (No. Member States)	Regional Verification Commissions Established	Elimination Achieved	
		No. of MS (areas)	% of MS
Americas (n=35)	Yes	Measles: 35 Rubella: 35	100% 100%
Europe (n=53)	Yes	Measles: 33 Rubella: 33	62% 62%
Western Pacific (n=27)	Yes	Measles: 6 (2) Rubella: 2	22% 7%
Eastern Mediterranean (21)	Yes	-	-
South-East Asia (n=11)	Yes	Measles: 2	18%
Africa (n=47)	Yes	-	-
TOTAL (n=194)		Measles: 76 (39%)	
EUR: 7 (13%) additional countries interrupted measles transmission for >12 m but <36 m. 4 (7.5%) additional countries interrupted rubella transmission for >12 m but <36 m.		Rubella: 70 (36%)	

Measles Elimination Status



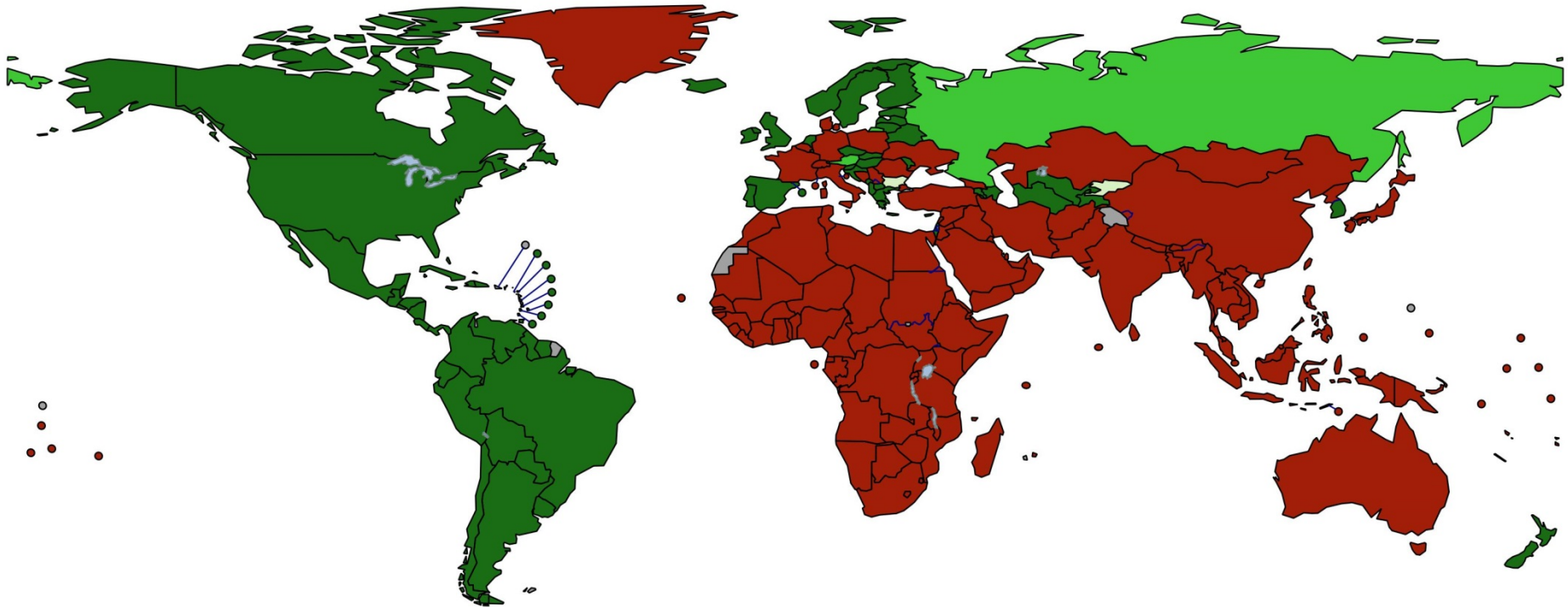
Measles elimination status

- Verified as eliminated (n=76)
- Interrupted for 24 months (n=2)
- Interrupted for 12 months (n=7)
- Re-established (n=1)
- Endemic (n=108)
- Not applicable

Data source: WHO, as of 31 March 2018
Map production Immunization Vaccines and Biologicals (IVB),
World Health Organization

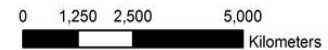
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Rubella Elimination Status



Rubella elimination status

- Verified as eliminated (n=70)
- Interrupted for 24 months (n=2)
- Interrupted for 12 months (n=2)
- Endemic (n=120)
- Not applicable



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24 countries still lack rubella vaccine

Countries with rubella vaccine in the national immunization programme



<input type="checkbox"/>	2018 Not Available, Not Introduced/No Plans <i>(24 countries or 12%)</i>
<input type="checkbox"/>	<i>Not applicable</i>

* Includes partial introduction

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Measles and Rubella Targets

Global: World Health Assembly, 2010

By 2015:

- MCV1 coverage $\geq 90\%$ national and $\geq 80\%$ in every district
- Measles reported incidence < 5 cases/million
- Measles mortality reduction of 95% vs. 2000

*63% with
MCV1 $\geq 90\%$*

*23% with
MCV1 $\geq 90\%$
and $\geq 80\%$ in
every district*

36 cases / million

84% reduction

Regional elimination (GVAP):

*20.4 million deaths prevented since
2000 by measles vaccination*

By 2015:

- Elimination of measles in 4 WHO Regions
- Elimination of rubella in 2 WHO Regions

1 region (PAHO)

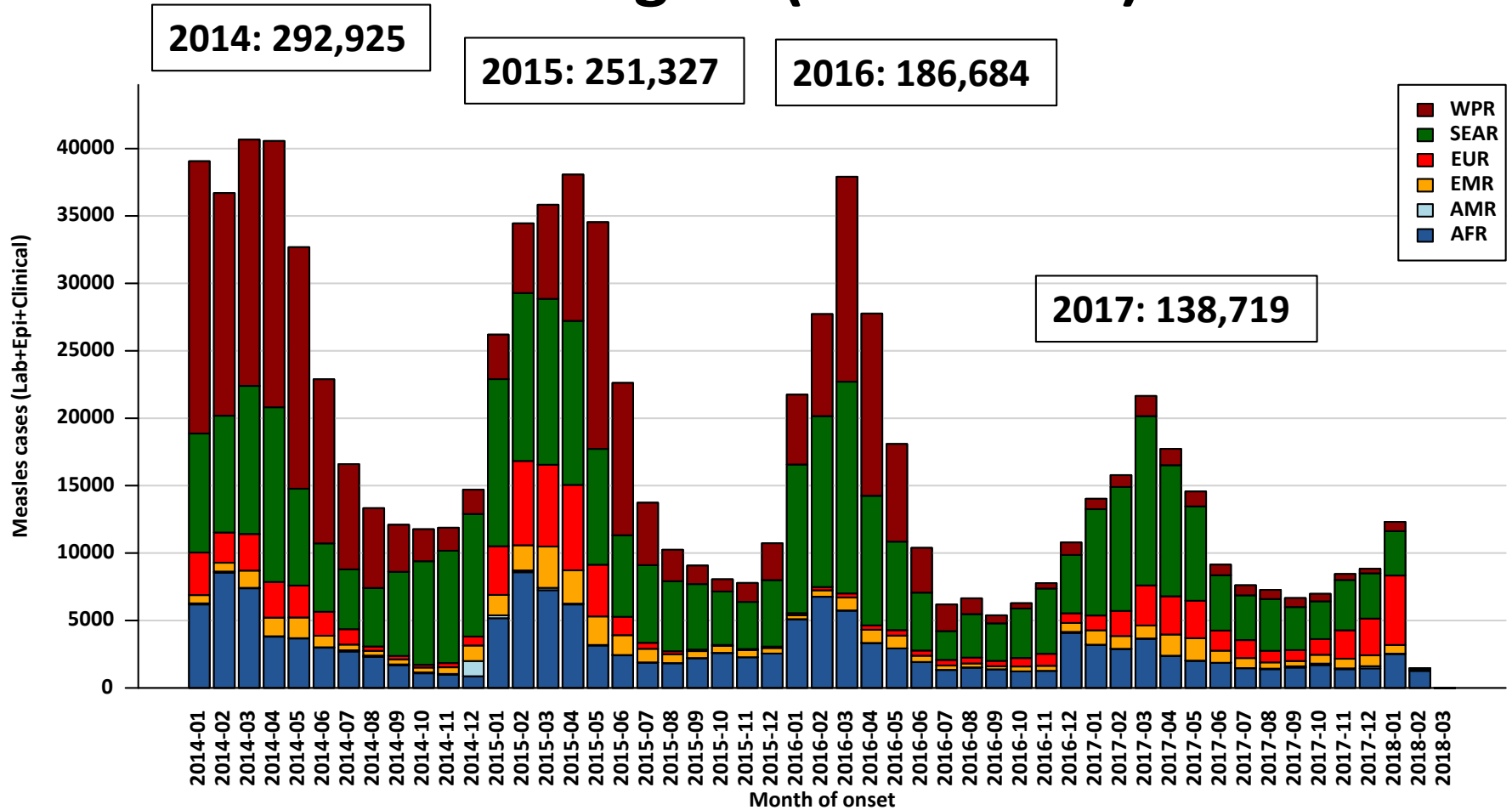
1 region (PAHO)

By 2020:

- Elimination of measles & rubella in 5 WHO Regions

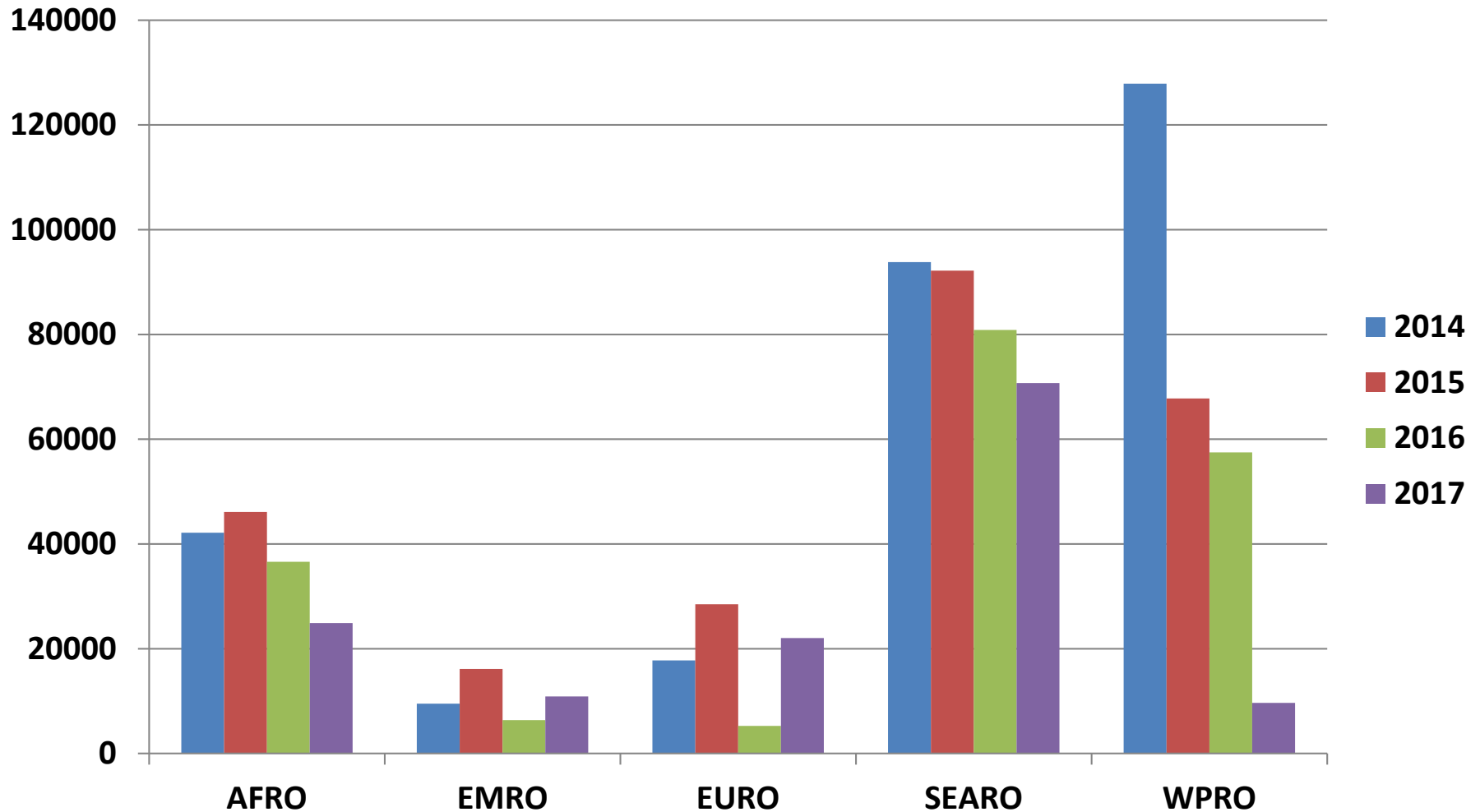
Measles elimination goals set by member states of all regions; rubella by 2 regions

Measles Case Distribution by Month and WHO Region (2014-2018)



- Based on data received 2018-03 - Data Source: IVB Database - This is surveillance data, hence for the last month, the data may be incomplete.
- Note: India started submitting monthly measles data from 2014 onwards.

Reported Measles Cases by Region 2014-2017



Key Regional Achievements

- One Region achieved and sustained measles & rubella elimination (AMR).
- 12 AFR countries near elimination* and an additional 14 on track for the 2020 goal.
- High level of control achieved in 7 EMR countries, of which, Bahrain, Oman and Palestine are ready to verify elimination.
- High coverage with 2 doses of MCVs (AMR/EUR/WPR).
- Three regions with all countries having introduced RCV (AMR/EUR/WPR).
- India and Indonesia introducing rubella vaccine in 2017-2018 (>470 million targeted through SIAs).
- In 2017, reported measles cases at all-time low in AFR/SEAR/WPR
- RVC established in all 6 Regions. With three regions verifying rubella elimination (AMR/EUR/WPR).



Key Regional Challenges (1)

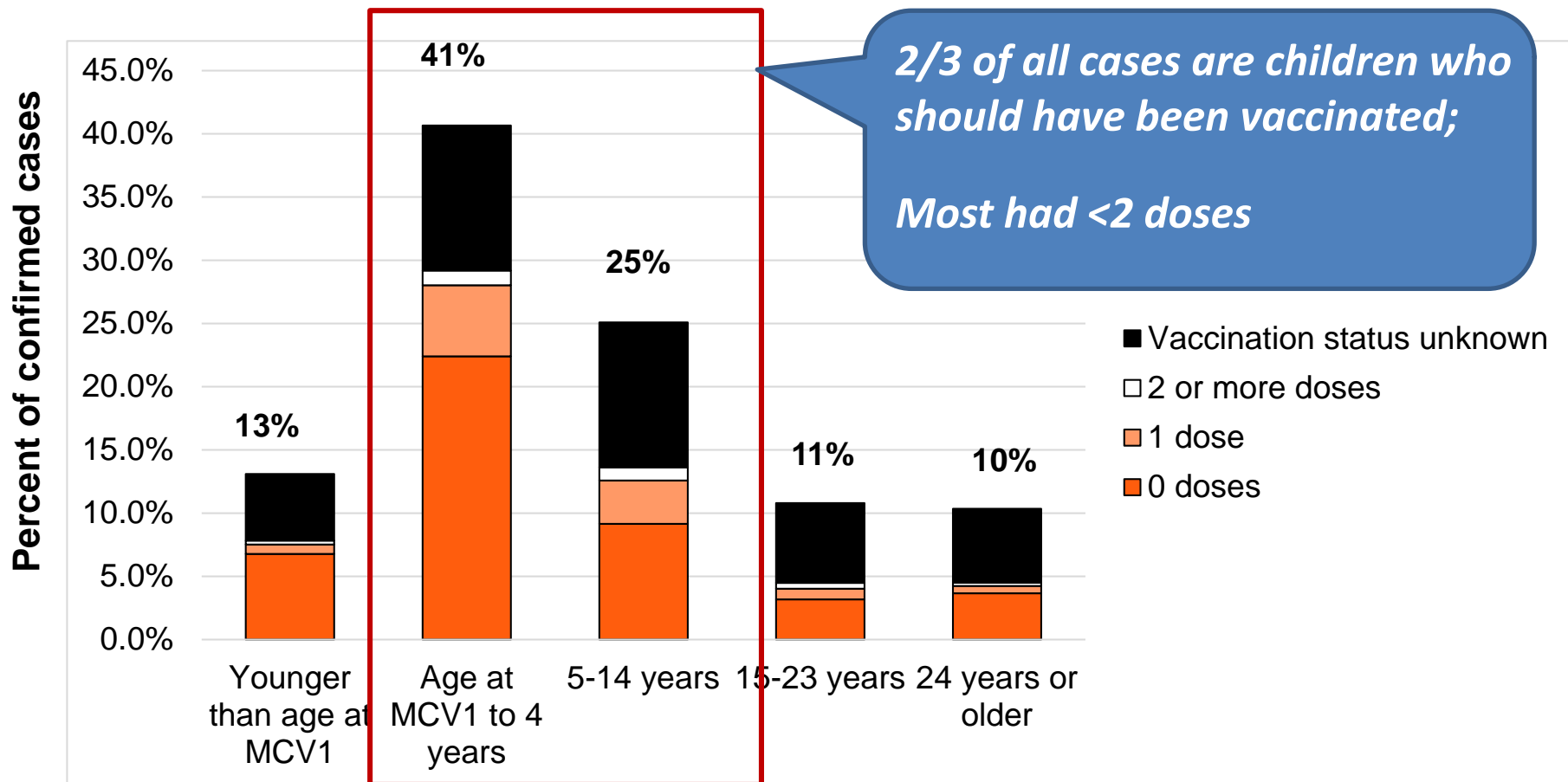
- Gaps in population immunity due to:
 - Weak and fragile health systems in many countries (AFR/EMR)
 - Civil unrest, famine, active conflict (EMR)
 - Vaccine hesitancy (EUR)
 - Declining maternal antibody levels
- Susceptible persons distributed across increasingly wide age groups, making eventual elimination more expensive & more technically difficult (EUR/WPR).
- Outbreaks affecting adolescent and adults, migrants, religious groups (EUR/WPR)
- Infants <1 year old affected by measles (EUR/WPR).

Key Regional Challenges (2)

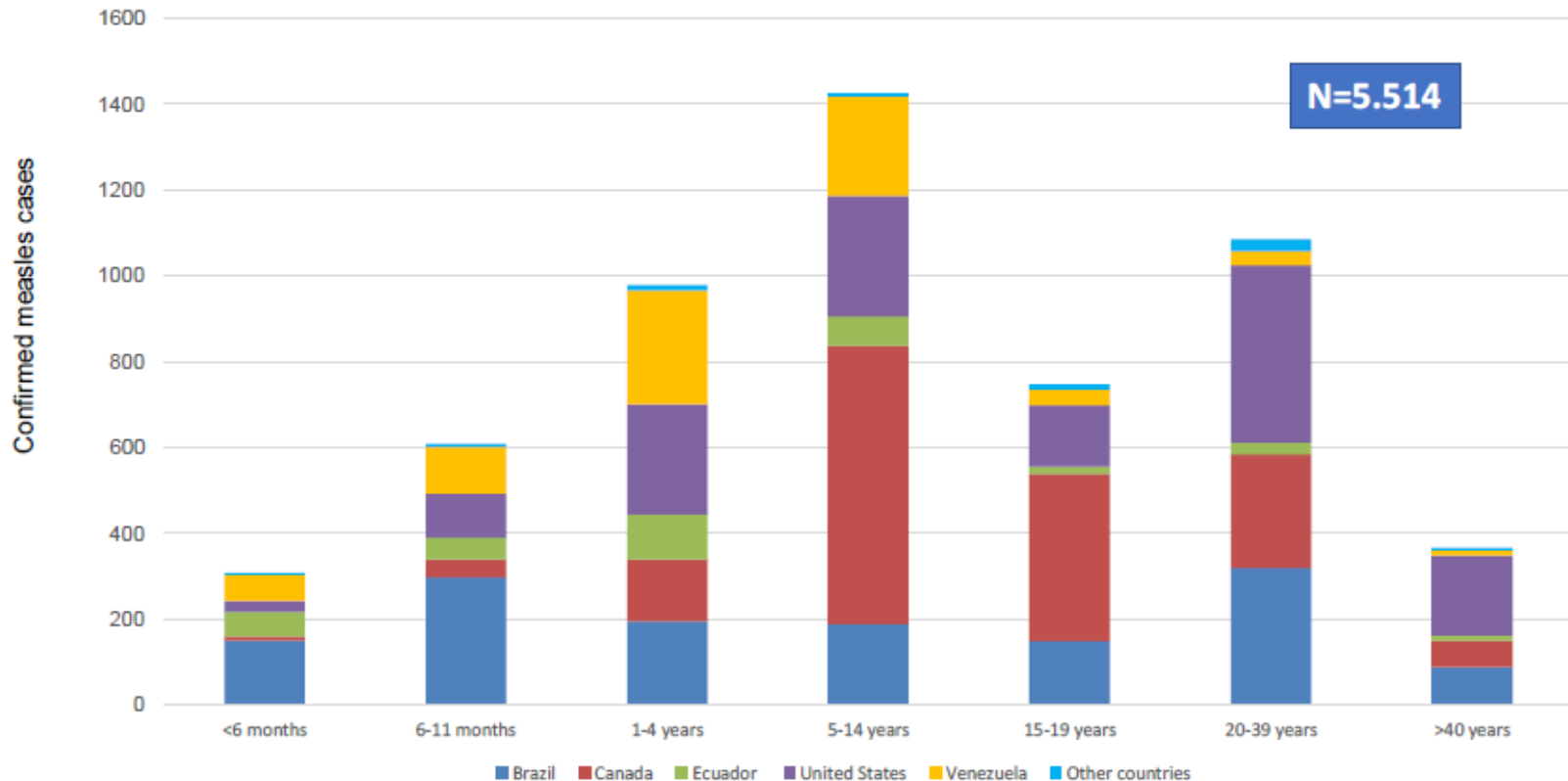
- Maintaining elimination in the face of ongoing Venezuela outbreak PAHO and resurgence in EUR
- No target for rubella /CRS elimination (AFR/EMR/SEAR)
- No target date for rubella elimination (WPR)
- Low commitment to elimination in some member states
- Inadequate resources to fully implement recommended strategies:
 - Inadequate resources for wide age-range campaigns to address population immunity gaps
 - Steadily declining resources through M&R Initiative
 - Lack of resources for surveillance (AFR/EMR/SEAR)
 - Polio transition (AFR/EMR/SEAR)

Major reason: failure to vaccinate

Age and Vaccination Status of Confirmed* Measles Cases, 2010-2014 (n=356,632)



Distribution of Measles Cases by Age and Country, PAHO, 2011-2018



Sources: Surveillance country reports sent to the Immunization Unit of PAHO/WHO.

*Data as of epidemiological week 18, 2018








Strengthening of Routine Immunization



- RI is critical for achieving MR elimination goals:
 - $\geq 95\%$ coverage with 2 doses of MCV is needed
 - Central theme for M&R Initiative Strategic Plan (2012-2020) and ongoing activities
 - 2/3 of measles cases averted through RI (J. Inf Dis. 204, 2011)
- Studies demonstrate that *properly* planned SIAs can strengthening RI (E.g.):
 - Improve micro-planning, training and supervision of HCW
 - Improvement of CC, waste management system & injection-safety standards
 - strengthened AEFI surveillance
- MCV2 in the 2YL offers an ideal opportunity by:
 - fixing an immunization/health check contact during 2YL (e.g. growth monitoring, booster doses, Vit A)
 - catch-up vaccination for all missed vaccines
- Measles vaccination school entry checks can improve coverage of other VPDs.
- Measles outbreaks as an indicators of weak RI:
 - Measles is highly infectious and seeks out susceptibles; disease is highly visible,
 - Outbreaks identifies gaps in RI programs and population groups missed by RI.

Continued reliance on SIAs: 62 Measles-related Campaigns in 46 countries in 2016

16 of 62 SIAs integrated 1 or more other interventions

**136 million children reached
32/62 (52%) attained 95% coverage
10/62 (16%) with coverage survey
7 surveys document >95% coverage**

-  Measles (30 campaigns in 17 countries)
-  Measles and Rubella (26 campaigns in 23 countries)
-  Measles, Mumps and Rubella (6 campaigns in 6 countries)
-  No SIAs in 2016
-  Not applicable

-  SIAs integrated with other interventions - OPV, Vit A, deworming (16 campaigns in 15 countries)
-  Countries having conducted a coverage survey in 2016 (9 countries with 7 countries attaining 95% coverage)

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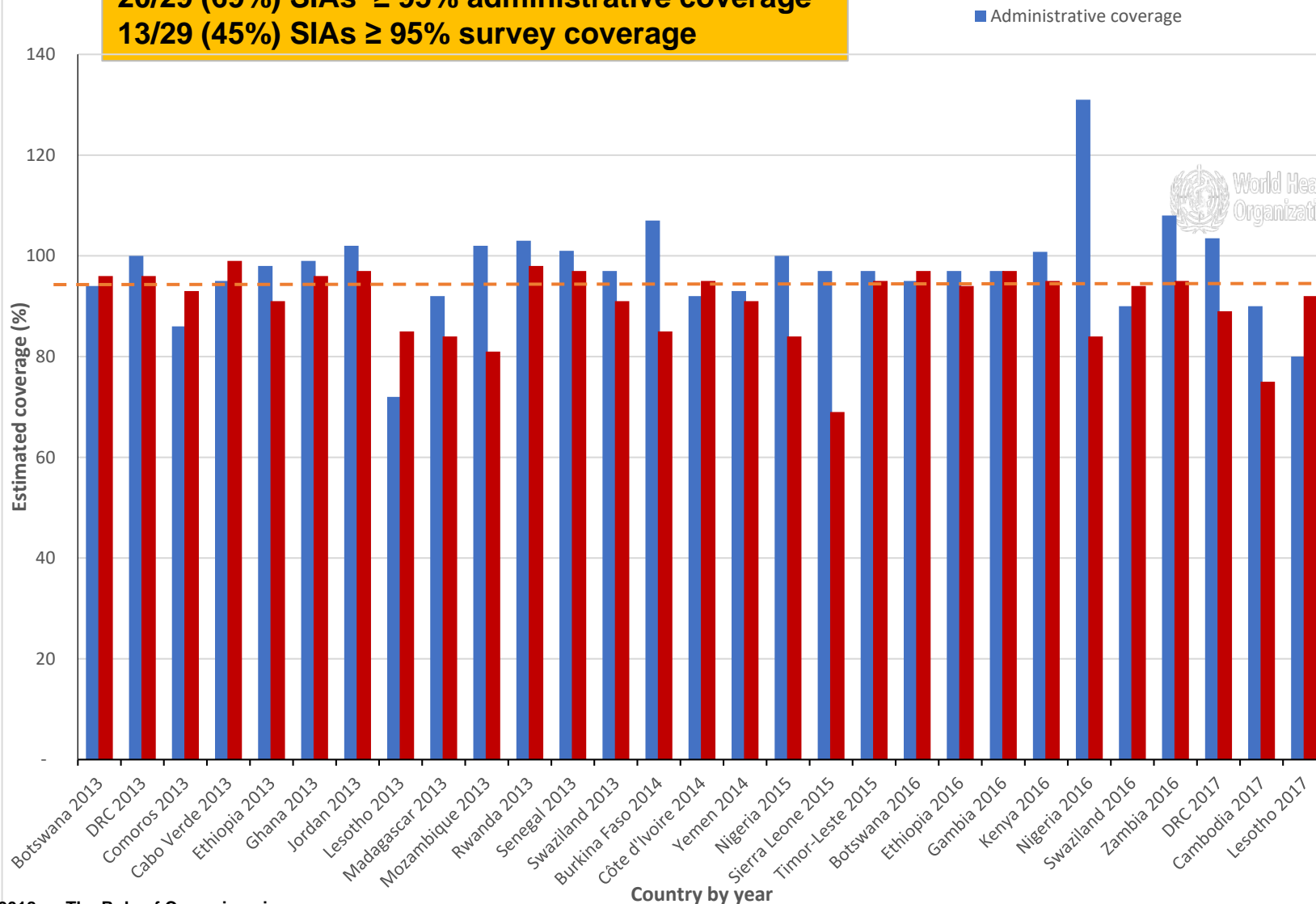
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M/MR Campaigns Missing 95% Target

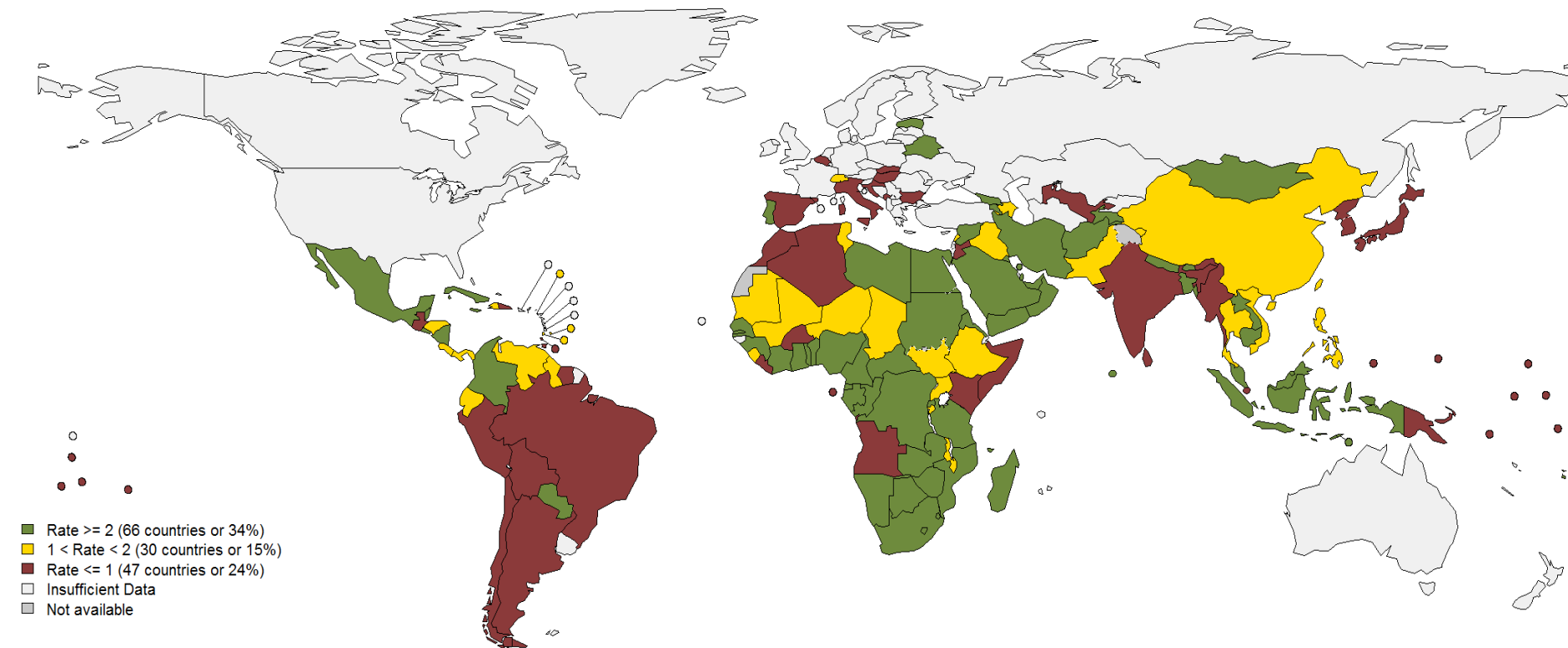


MR SIA Administrative Coverage vs Survey Coverage, 2013-2017

20/29 (69%) SIAs \geq 95% administrative coverage
13/29 (45%) SIAs \geq 95% survey coverage



Surveillance sensitivity reporting rate of measles and rubella (12 months, discarded cases* per 100,000 population)



Map production: World Health Organization, WHO, 2017. All rights reserved
Data source: IVB Database

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Based on data received 2018-02 and covering the period between 2017-01 and 2017-12 - Target: ≥ 2 discarded cases* / 100,000 population** - * Suspected cases investigated and discarded as non-measles non-rubella using laboratory testing and/or epidemiological linkage to another etiology ** World population prospects, 2017 revision

Challenge: Polio Transition

16 countries with largest polio assets



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RISKS:

Polio virus transmission if re-introduced

Resurgence of measles and rubella

88% of estimated measles deaths occur in these countries

Most of the world's rubella and CRS cases (100,000)

Polio field staff spend nearly 1/3 of their time working on RI & MR.

Critical for SIA quality and surveillance

Up to \$77 million (70%) to replace polio funded support for annual needs for VPD/MR surveillance

Over 2500 polio-funded staff are supporting VPD/MR surveillance

New tools under development

Diagnosis: Point of care testing

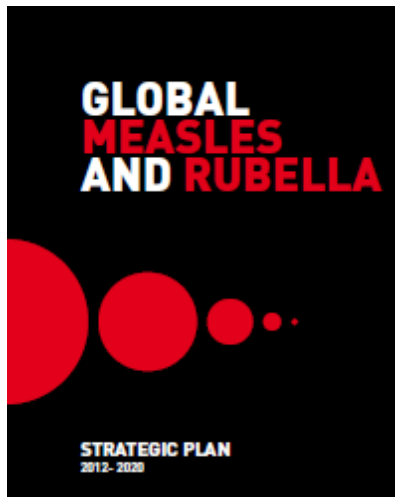


Vaccination: Microarray patches (MAP)



100 MAP

Midterm Review of the Global Measles and Rubella Strategic Plan 2012 – 2020



W. A. Orenstein, MD

SAGE

Geneva, 19 October 2016

Global eradication goal

- It is **premature to set a timeframe for measles eradication at this point**
 - Determination should be made, not later than 2020, whether a formal global goal for measles eradication should be set with timeframes for achievement
 - **73rd WHA 2020 measles roadmap to eradication**
 - In the meantime, all regions should work toward achieving the regional elimination goals.

Key MTR Recommendations

- **Increase emphasis on surveillance**
- Urgent need to **strengthen the collection and use of surveillance data**
- **Strengthening of RI systems is critical** to achieving regional elimination goals. Need to move from SIAs to **primary reliance on ongoing routine services**
- **Microarray patches (MAPs)** identified as potentially game changing advances to enhance the likelihood of reaching M/R goals.
- **Establish RVCs in all regions**
- Given the imminent reduction in polio eradication resources, which can have an adverse impact on both MR control/elimination efforts, a **focus on transition of polio resources is urgent** and needs to be a top priority

Role of Pediatric Societies?

- Advocacy for immunization
 - National authorities
 - Patients
- Use all clinical encounters to update immunization status
- Surveillance
 - Maintain high index of suspicion for measles and rubella
 - Report all suspected measles and rubella cases to national authorities, including confirmed and discarded cases
 - Promote sentinel CRS surveillance

Measles *anywhere* is measles *everywhere*!



Partnerships



Thank You