



Updates on Vaccines against Measles & Polio

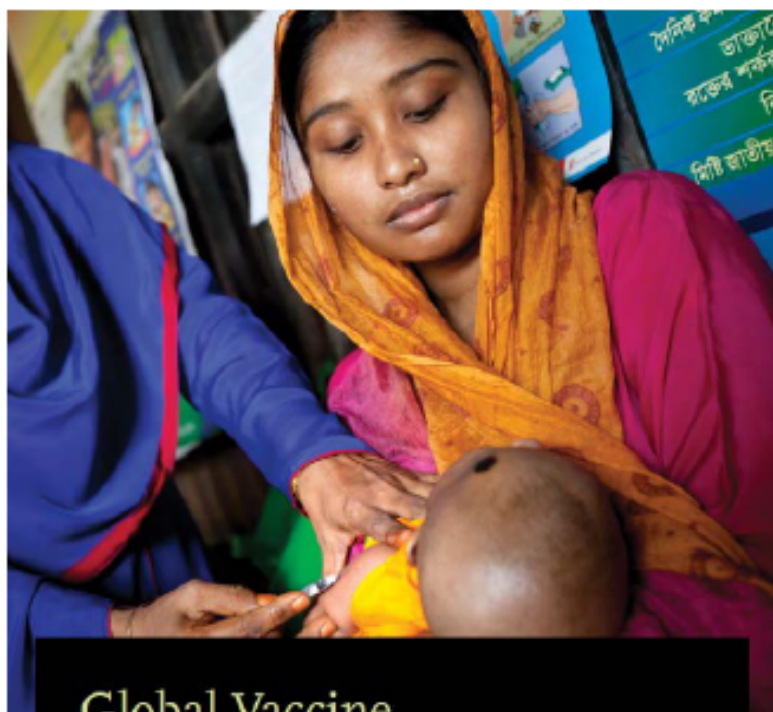
10th Annual African Vaccinology Course (AAVC)
Cape Town
13 November 2014

Johann van den Heever: NDoH EPI Manager

Outline

- Measles
- Polio
- Conclusion & way forward

GVAP approved by the World Health Assembly in 2012



Global Vaccine Action Plan

2011–2020

The vision

for the Decade of Vaccines (2011–2020) is of a world in which all individuals and communities enjoy lives free from vaccine-preventable diseases.

Dr. Seth Berkley
Chief Executive Officer
GAVI Alliance

Dr. Christopher Elias
President
Global Development Program
Bill & Melinda Gates Foundation

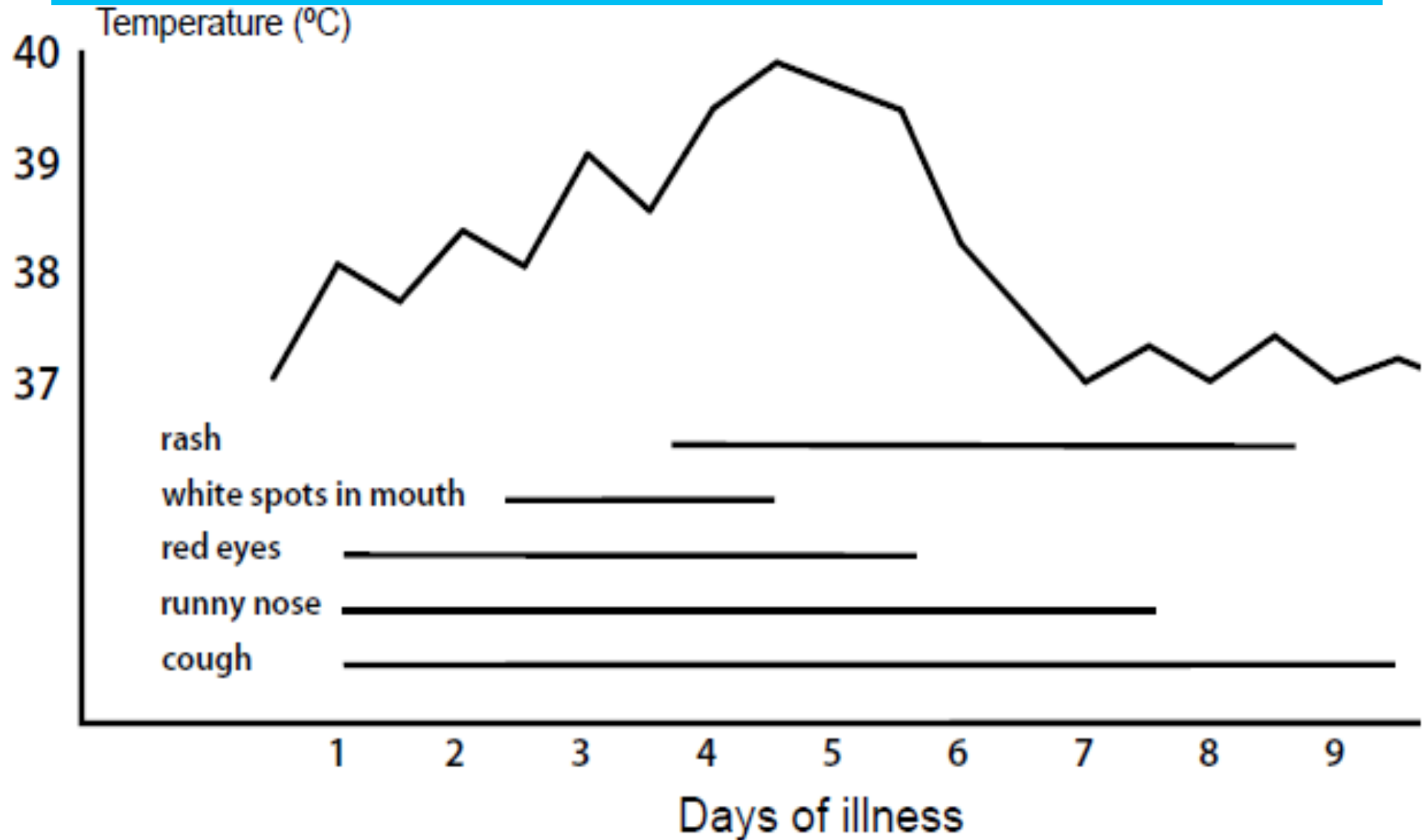
Mr. Anthony Lake
Executive Director
United Nations Children's Fund (UNICEF)

Dr. Margaret Chan
Director General
World Health Organization

Dr. Anthony Fauci
Director
US National Institute of Allergies
and Infectious Diseases

Ms. Joy Phumaphi
Executive Secretary
African Leaders Malaria Alliance

Clinical course of Measles



Case Definition: Suspected Measles

Case



- Measles is an **acute childhood infectious disease** caused by a virus
- The virus is **transmitted from person to person through coughing or sneezing**
- **Characterized by:**
 - a **generalized, reddish (erythematous), blotchy (maculopapular) rash**;
 - a **history of fever** usually above 38°C (if not measured, then "hot" to touch); and **at least one of the following:**
 - **cough, runny nose (coryza), or red eyes (conjunctivitis)**
- In addition, children with measles **frequently exhibit a dislike of bright light (photophobia)**, and often have a **sore red mouth (stomatitis)**
- **There are many other childhood infectious diseases that also present with**
 - a measles-like rash, such as rubella (German measles) and scarlet fever
- **However in these diseases cough, coryza or conjunctivitis are usually NOT present**

Rash day 3, Post Measles Staining & Post Measles Peeling



Clinical course of Measles

The incubation period of measles¹ is usually 8-12 days. The illness before the rash (prodromal illness²) is characterized by high fever, runny nose, cough, conjunctivitis and Koplik spots (tiny whitish-blue spots on the lining of the inside of the cheeks, opposite the molar teeth). These symptoms are followed by the typical red rash, starting behind the ears and on the hairline and then spreading to the rest of the body, arms and legs. The spots often run into each other in blotchy patches. The temperature subsides after 3-4 days and the rash fades after 5-6 days, leaving skin discoloration (post-measles staining). The skin often peels off and may continue to peel for weeks.

¹ The incubation period is the time between being exposed to infection from another person with measles, and developing the first signs or symptoms.

² The prodromal illness is the set of signs and symptoms which occur before the development of the skin rash. It lasts for 3-4 days.

Complications of Measles



Associated with long-term health problems, including

- blindness (measles causes about half of the cases of childhood blindness in Africa)
- chronic lung disease
- malnutrition (marasmus or kwashiorkor) and failure to thrive
- recurrent infections.
- The risk of contracting other infections or dying remains high for several months after recovery from acute measles infection,
- measles illness may be due to the measles infection itself, to another complicating infection, or to vitamin A deficiency precipitated by measles.
- This slide shows a child with measles-related blindness.

Complications of Measles

Common

Pneumonia

Diarrhoea

Croup

Malnutrition

Otitis media

Mouth ulcers

Eye complications

Uncommon

Encephalitis

Myocarditis

Pneumothorax

Pneumomediastinum

Appendicitis

Subacute sclerosing
panencephalitis (SSPE)

Background (3)

- Why do we get Measles outbreaks?
 - No/"poor" maternal anti-bodies: no natural infection/vaccine-immunity is less effective than natural infection, leading to
 - Build-up of susceptibles – when the number of susceptibles exceed half of the birth cohort – causes outbreaks when the Measles virus is circulating
 - Reproductive rate $R_0 = 17 - 18$

Background (3)

- **Threat of importations** from neighbouring countries where services have collapsed/ coverage is low (undocumented immigrants)
- **Poor surveillance**: not reporting, analysing & investigating and doing outbreak response where necessary for EACH case
- **Poor clinical Case Management**: Not isolated in time (rash appears 3 – 5 days after prodrome)

Ideal Conditions for the spread of Measles

- Hospitals/crowded waiting rooms/clinics
- Schools

RISK FACTORS FOR SEVERE COMPLICATED MEASLES

- Young age
- Malnutrition
- Overcrowding
- Immune deficiency
- Vitamin A deficiency

THE MEASLES & RUBELLA INITIATIVE: GLOBAL MEASLES AND RUBELLA

STRATEGIC PLAN

2012–2020

*“With strong partnerships, resources and political will, we can,
and must work together to achieve and maintain the
elimination of measles, rubella and CRS globally”*



Margaret Chan, DG, WHO

Anthony Lake, Executive Director, UNICEF

Timothy E. Wirth, President, UNF

Gail J. McGovern, President & CEO, ARC

Thomas R. Frieden, Director, CDC

Vision

Achieve and maintain a world
without measles, rubella and
congenital rubella syndrome



Measles and Rubella Targets

Global targets by 2015:

Measles vaccination coverage $\geq 90\%$ national and $\geq 80\%$ district

Measles reported incidence < 5 cases per million

Measles mortality reduction of 95% vs. 2000

Global Vaccine Action Plan (GVAP):

Measles and rubella elimination in 5 WHO regions by 2020

Regional targets:

Measles Elimination goals set:

2000 AMRO

2012 WPRO

2015 EURO, EMRO

2020 AFRO, SEARO

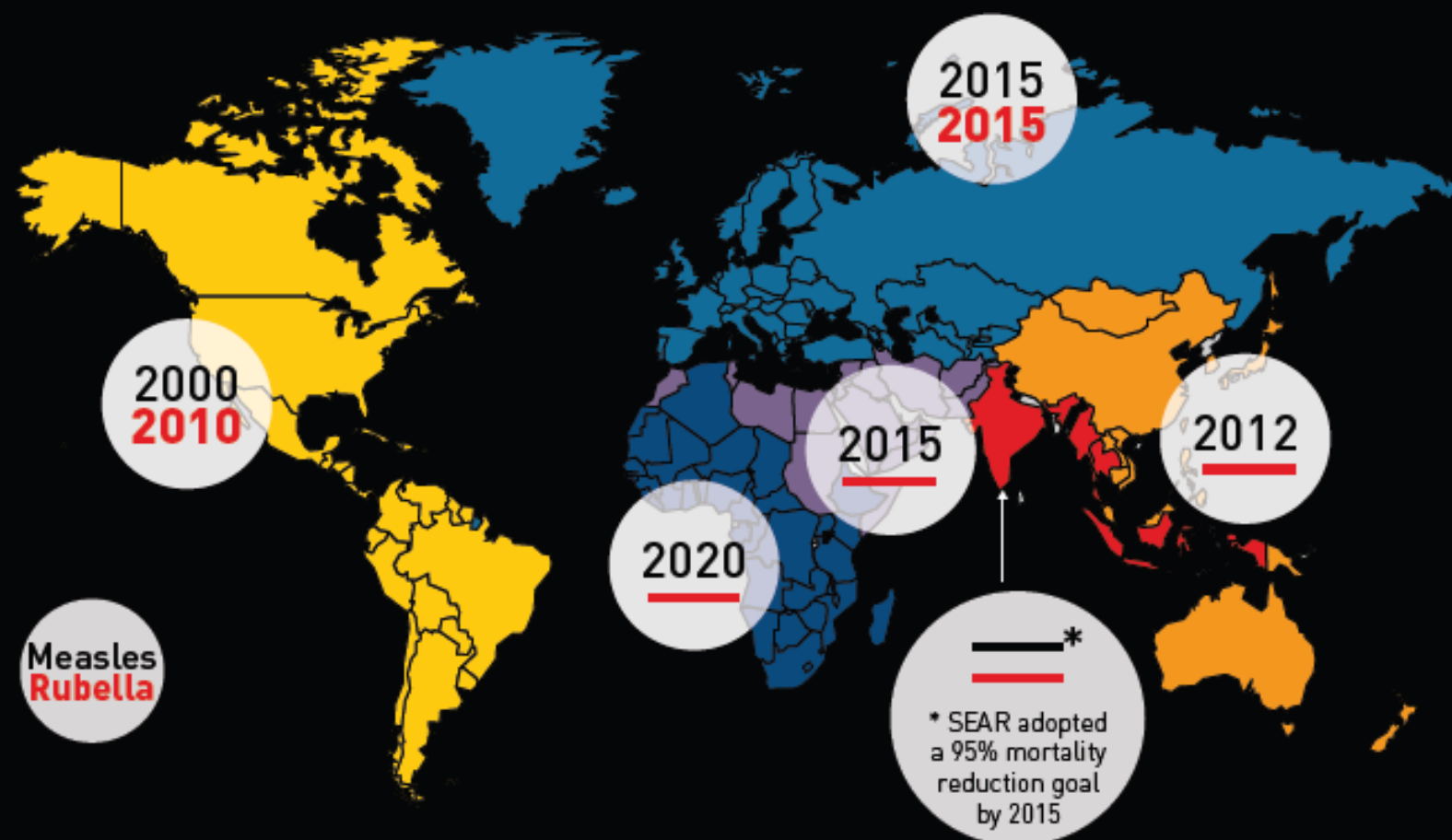
Rubella Elimination goals set:

2010 – AMRO

2015 – EURO

Figure 3:

Current WHO Regional Measles and **Rubella** Elimination/Control Goals

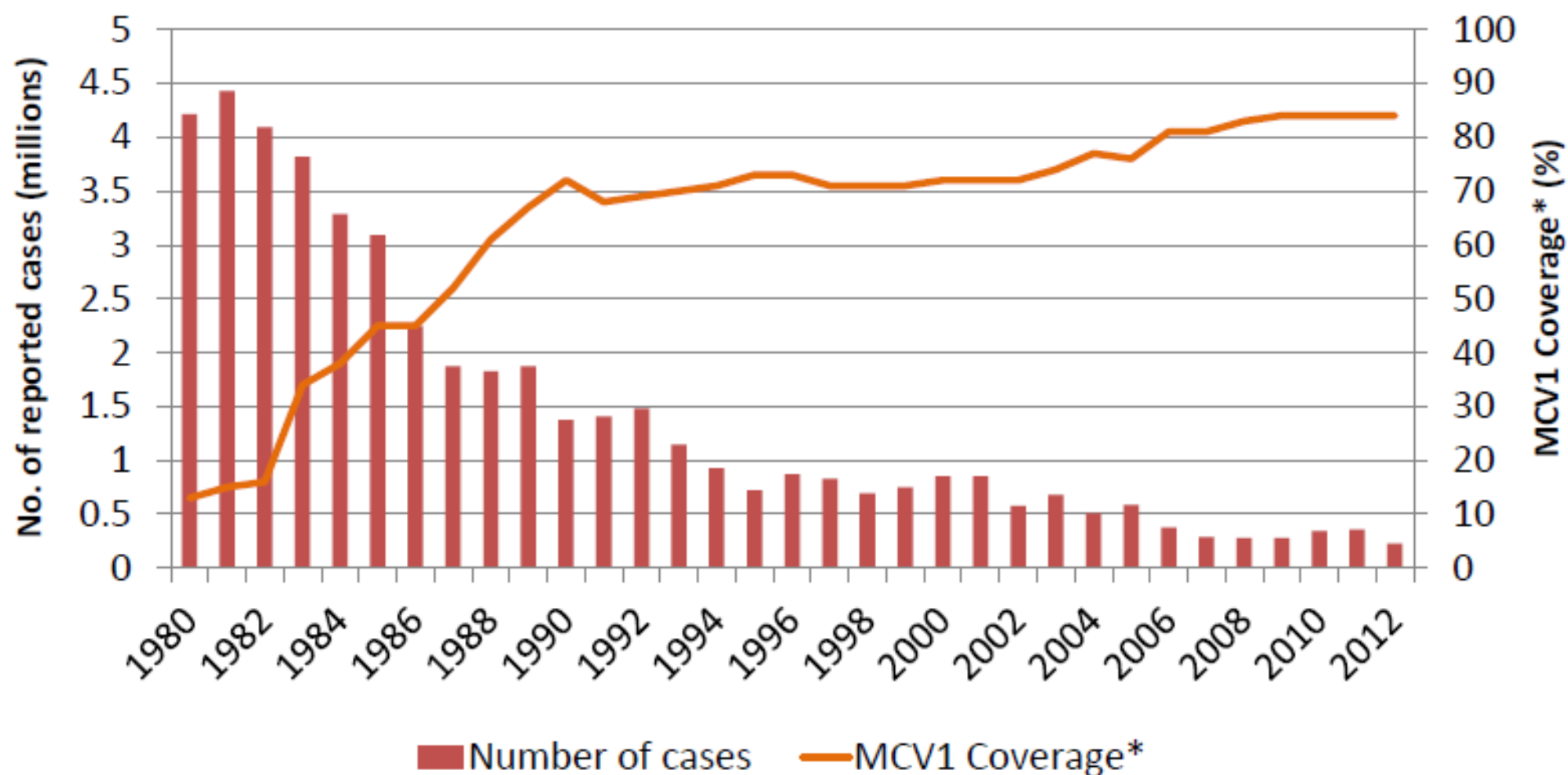


In 2009, SEAR Regional Committee endorsed a resolution to mobilize support toward measles elimination.

Note: EMRO is in the process of adopting a target for rubella elimination by 2020.

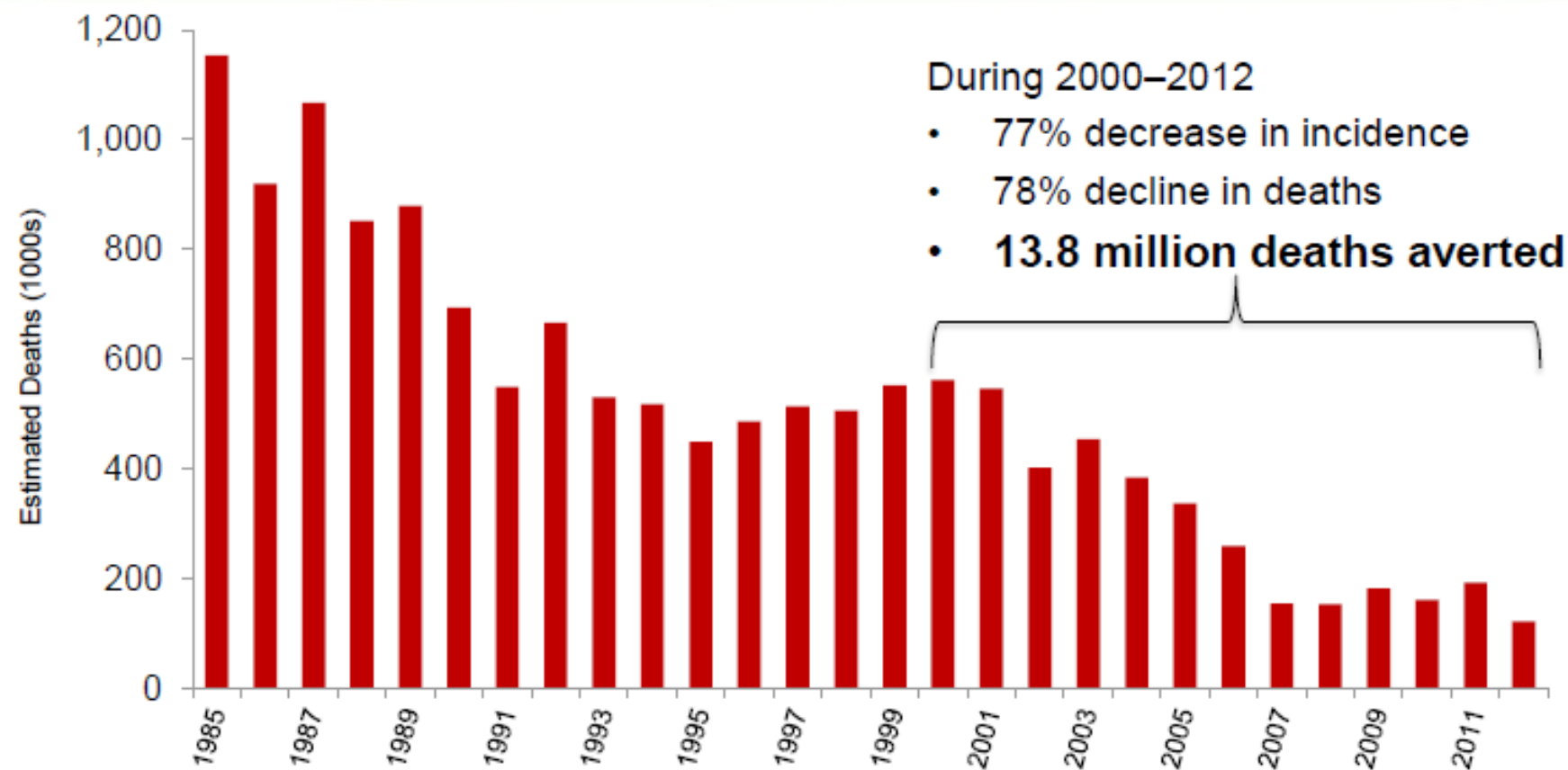
94% Reduction in reported measles cases

Measles global annual reported cases and MCV1 coverage*, 1980-2012

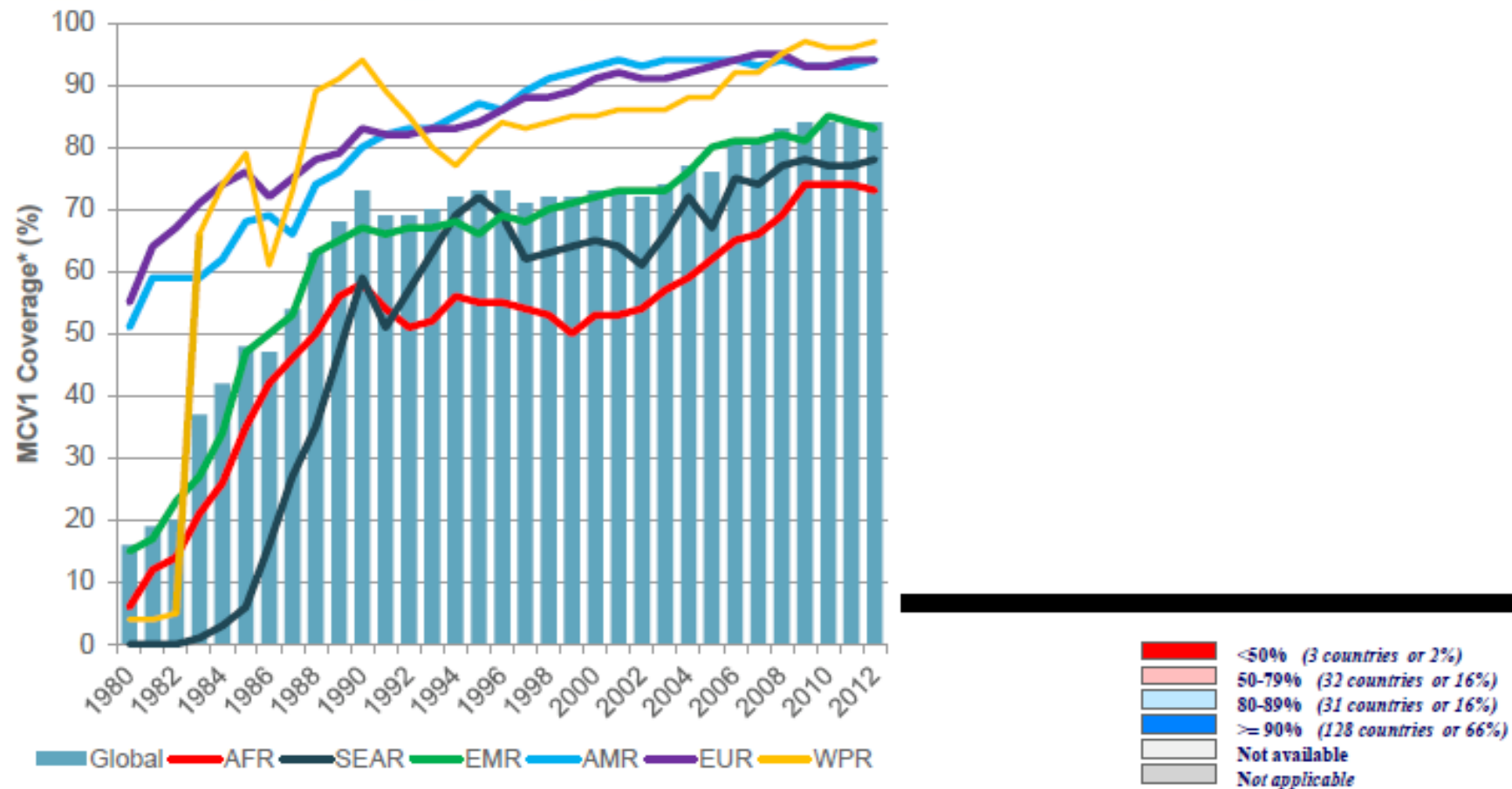


* MCV1 coverage: coverage with first dose of measles-containing vaccine as estimated by WHO and UNICEF

90% Reduction in Estimated Measles Deaths, 1985–2012



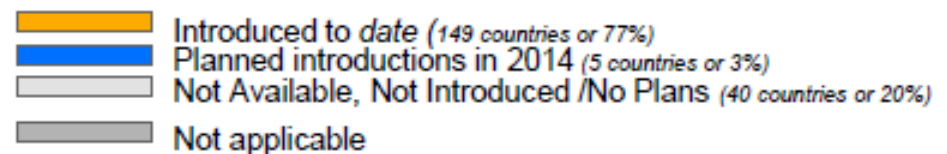
Global MCV1 Coverage at 84% in 2012



Source: WHO/UNICEF coverage estimates 2012 revision. July 2013; Immunization Vaccines and Biologicals, (IVB), World Health Organization. Date of slide: 17 July 2013

Routine Measles Second Dose

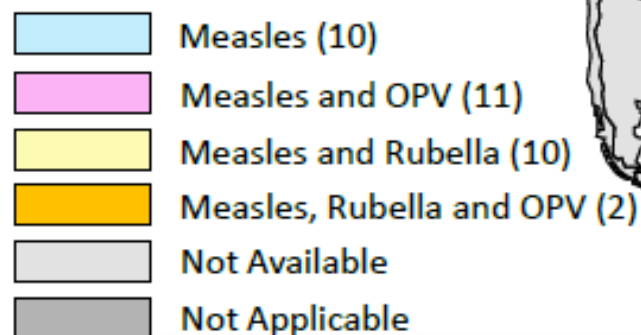
- Global MCV2 coverage 56% in 2012
- Increasing number of countries with MCV2
 - 145 in 2012
 - 149 in 2013
 - 5 more planned for 2014
- Important opportunity for establishing child health platform beyond first-year of life, vaccine catch-up



44 Measles Campaigns in 33 Countries in 2013

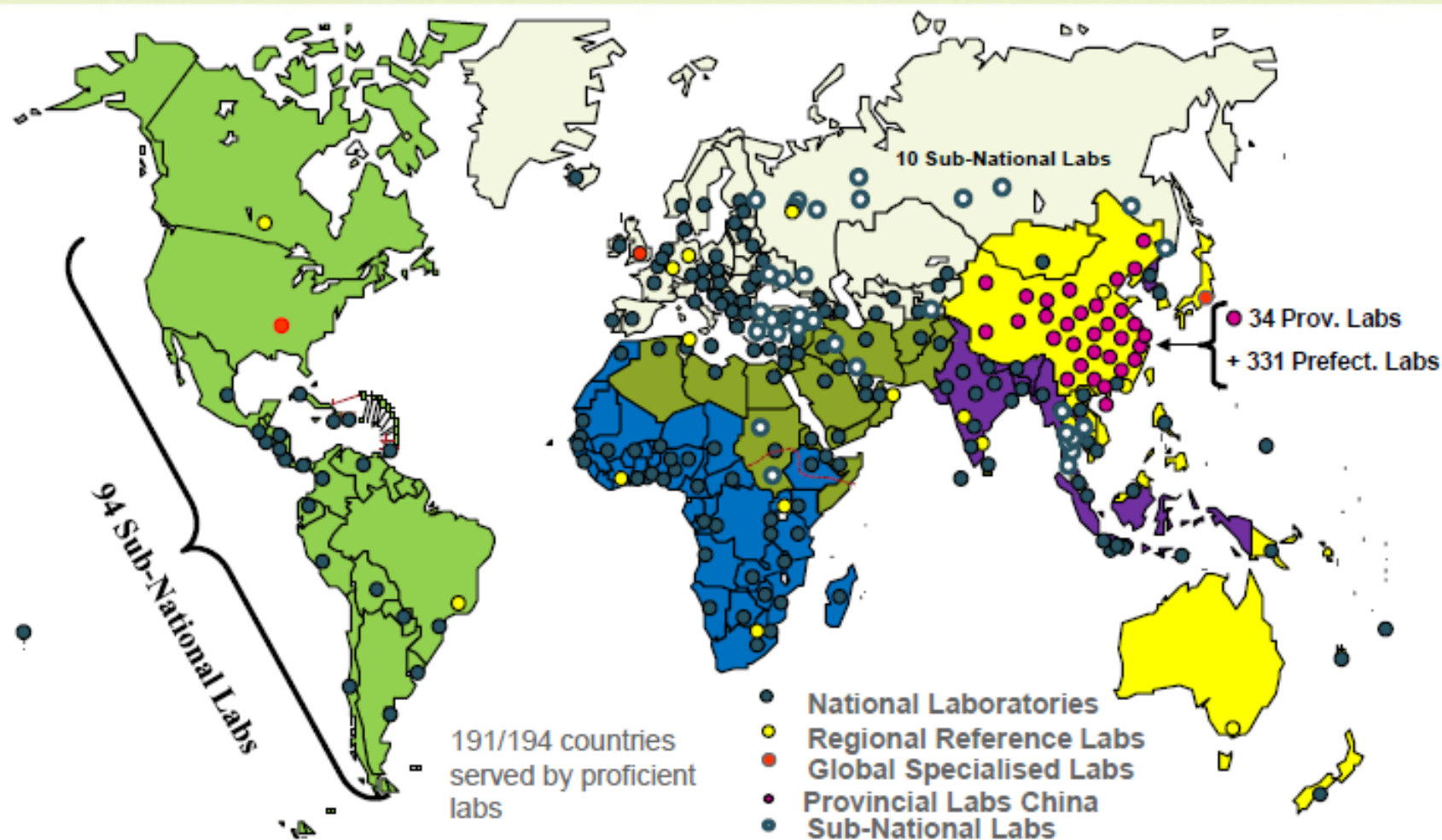
197 million children reached
24 (55%) achieved $\geq 95\%$ coverage

36 of 44 SIAs
integrated 1 or
more other
interventions

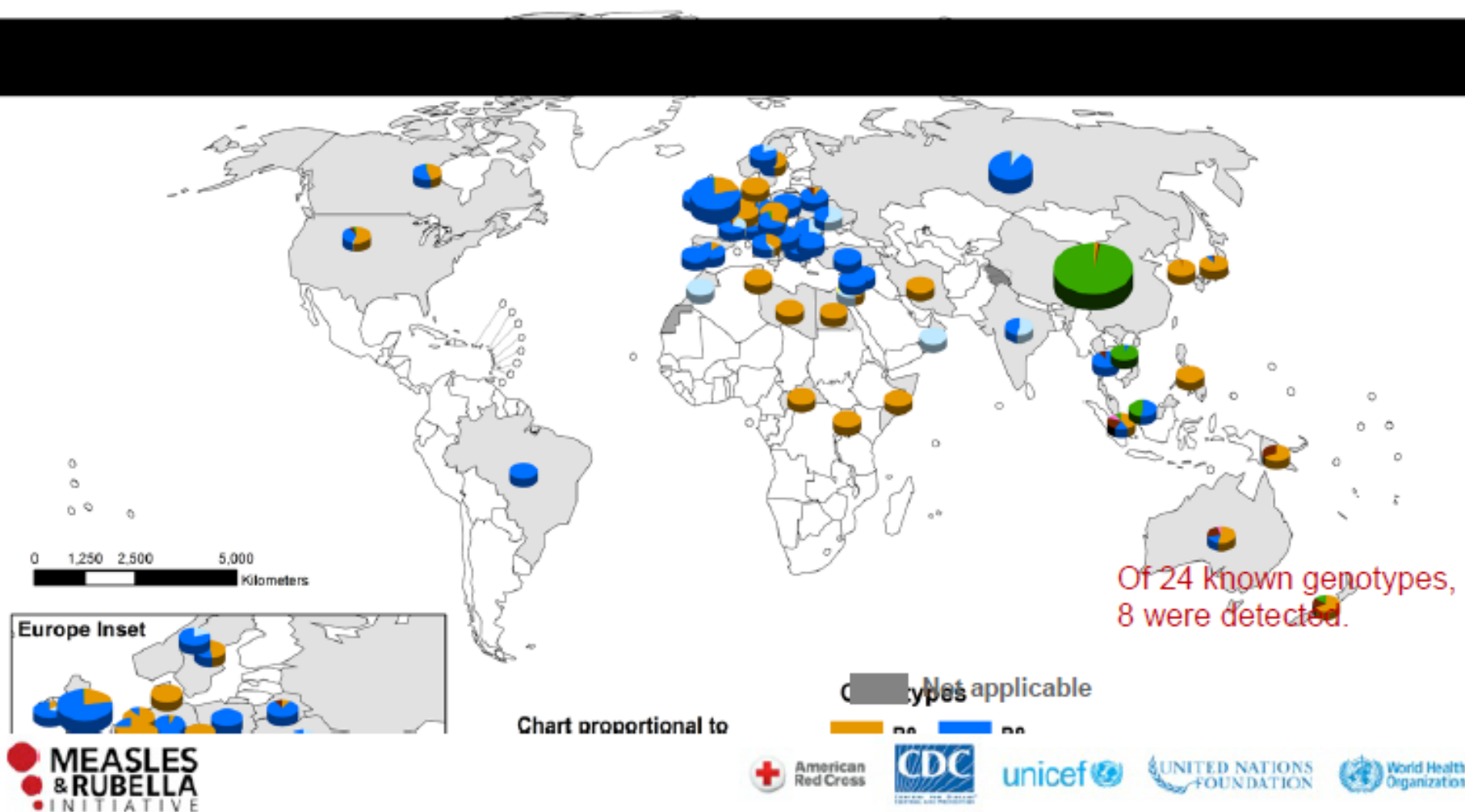


Vitamin A – 14
De-worming – 12
Other interventions – 5

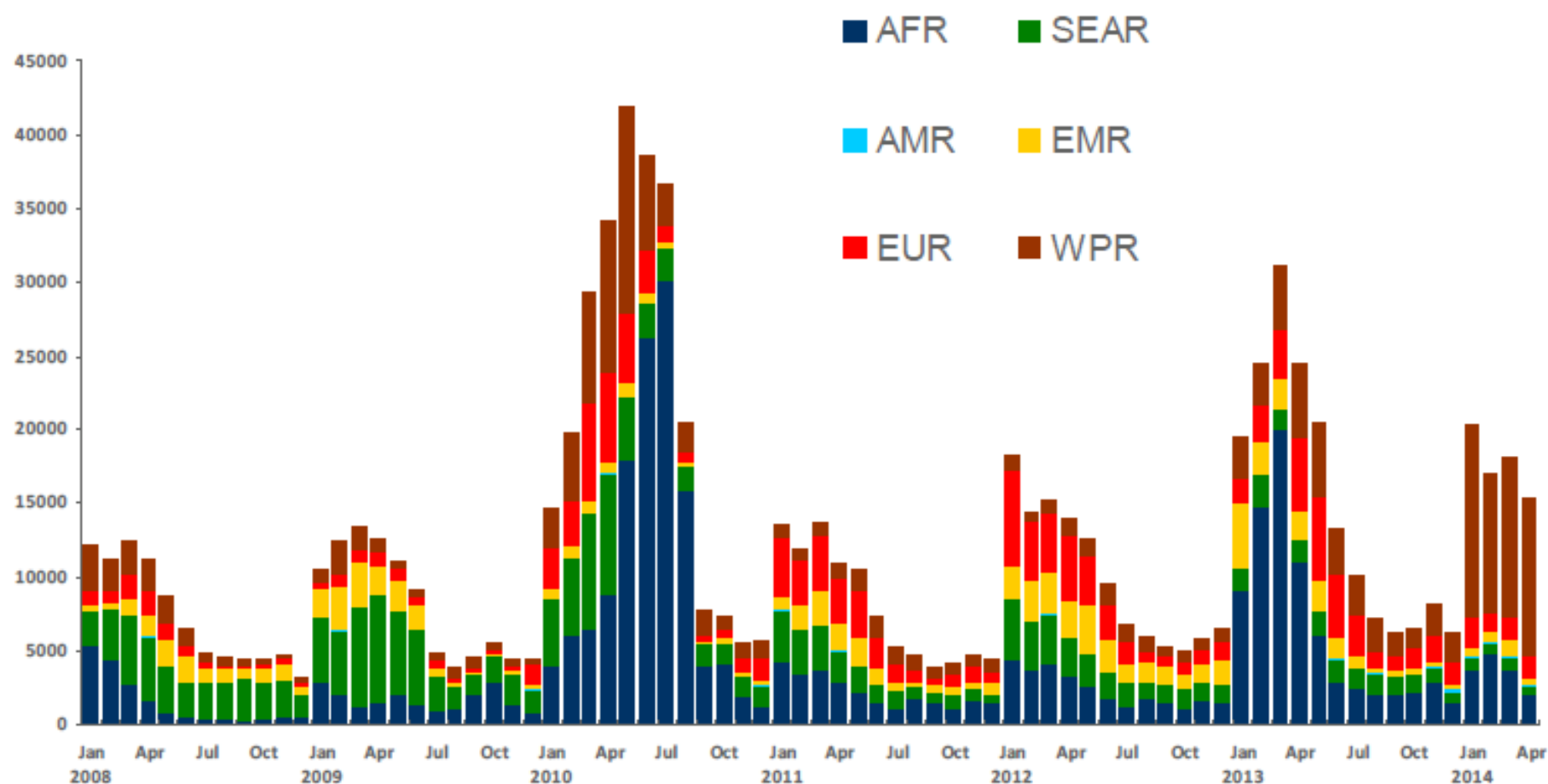
Global Measles and Rubella Laboratory Network: 711 Laboratories in 2013



Distribution of Measles Virus Genotypes, Apr 2013–Mar 2014



Measles Case Distribution by Month and WHO Regions, 2008–2014



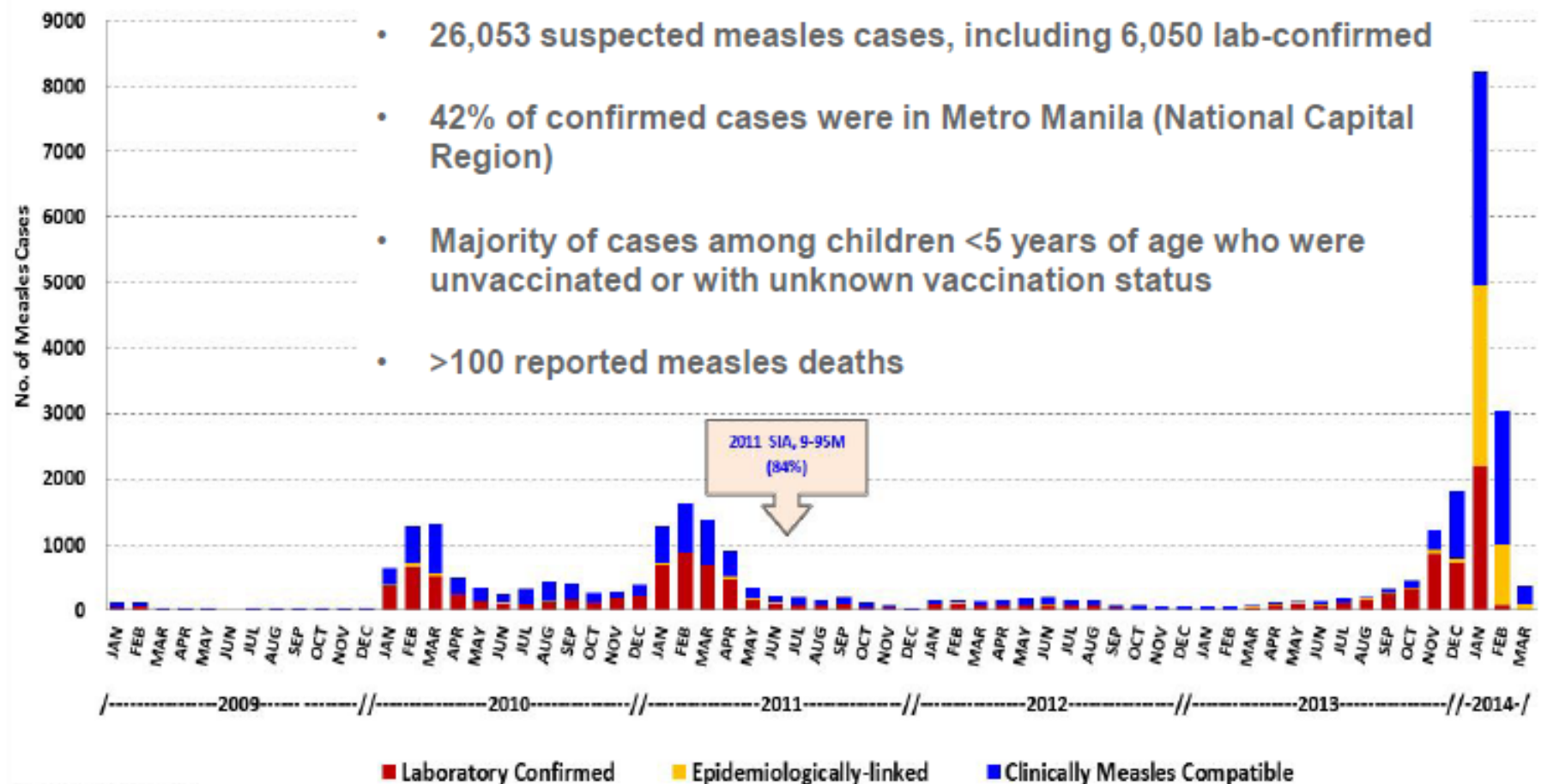
Data source: Surveillance DEF file
Data in HQ as of 10 June 2014

This is surveillance data, hence for the last month, the data may be incomplete.
SEAR: India is not included in this graph.

As of 27 May 2013, South Sudan has reassigned to the Africa region (AFR) from the Eastern Mediterranean region (EMR).



Measles Cases by Month of Rash Onset, Philippines, 2009–2014*



*as of March 15, 2014

Source: National Epidemiology Center

Measles Vaccines...

2009, 84, 349–360

No. 35



**World Health
Organization**

Organisation mondiale de la Santé

Weekly epidemiological record Relevé épidémiologique hebdomadaire

28 AUGUST 2009, 84th YEAR / 28 AOÛT 2009, 84^e ANNÉE

No. 35, 2009, 84, 349–360

<http://www.who.int/wer>

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WHO position paper

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note d'information de l'OMS

Measles vaccines: WHO position paper

In accordance with its mandate to provide guidance to Member States on health policy matters, WHO issues a series of regularly updated position papers on vaccines and combinations of vaccines against diseases that have an international impact on public health. These papers, which are concerned primarily with the use of vaccines in large-scale immunization programmes, summarize essential background information on diseases and vaccines, and conclude with the current WHO position concerning their use in the global

Vaccins contre la rougeole: note d'information de l'OMS

Conformément à son mandat, qui est de fournir des conseils aux États Membres sur les questions relatives aux politiques de santé, l'OMS publie une série de notes d'information régulièrement actualisées sur les vaccins et les associations vaccinales contre les maladies qui ont un impact sur la santé publique au niveau international. Ces notes d'information, qui portent essentiellement sur l'utilisation des vaccins dans le cadre de programmes de vaccination à grande échelle, résument les considérations générales essentielles sur les maladies et vaccins respectifs et présentent en conclusion la position actuelle de

Measles vaccines

WHO position paper

- Measles virus is highly infectious and in the absence of vaccination, about 90% of individuals would be infected by 10 years of age.
- In 2007, worldwide measles vaccination coverage had reached 82% and between 2000 and 2007, the estimated annual number of deaths from measles dropped from 750 000 to 197 000.
- Attenuated, live measles vaccines are
 - internationally available
 - safe
 - effective
 - provide long-lasting protection
 - inexpensive
 - may be used interchangeably in immunisation programmes.



Measles vaccines WHO position paper

Immunization program standards

- All national immunization programmes should provide children with 2 doses of measles-containing vaccine (MCV) delivered:
 - continuously (i.e. through routine services) or
 - periodically through supplemental immunization activities (SIAs)
- In countries aiming at measles mortality reduction, immunization coverage should be $\geq 90\%$ nationally and $\geq 80\%$ in each district.
- Countries aiming at measles elimination should achieve $\geq 95\%$ coverage in every district.
 - Population immunity needs to be $>93\%$ – 95% in all districts to prevent measles epidemics



Measles vaccines WHO position paper

Optimal age for MCV1

- Where risk of measles mortality among infants remains high, the first dose of MCV (MCV1) should be administered at 9 months of age.
- In countries with low risk of measles infection among infants (i.e. near elimination), MCV1 can be administered at 12 months
 - Higher sero-conversion rates are achieved at 12 months than 9 months
 - Increasing the age of administration of MCV1 from 9 months to 12 months represents a rational and desirable policy change.
 - Before increasing age of MCV1, policy-makers should review local measles epidemiology and programmatic data on vaccination.



Measles vaccines WHO position paper

Interval between SIAs

- SIAs should be conducted before the number of susceptible pre-school age children reaches the average size of a birth cohort.
 - Programmes should use vaccination coverage data to monitor accumulation of susceptible persons.
 - This approach has been found to be programmatically useful and sufficiently accurate to prevent large outbreaks.



Measles vaccines WHO position paper

Criteria for stopping follow-up SIAs

- Cessation of SIAs should be considered only when >90-95% immunization coverage has been achieved at the national level with both routine doses for at least 3 consecutive years.
- Before stopping SIAs, a national committee should examine:
 - historical immunization coverage data at the national and district level
 - degree of heterogeneity of routine coverage among districts
 - population immunity profile
 - predicted rate of accumulation of susceptibles in the absence of SIAs
 - current epidemiology of measles
 - performance of the measles surveillance system.



Measles vaccines WHO position paper

Outbreak response

- To limit impact of outbreaks, WHO encourages:
 - surveillance for early outbreak detection
 - thorough assessment of risk of spread and severe disease
 - rapid response including expanded use of measles vaccine
- The nature and extent of the vaccination response should be based on an assessment of risk of spread, risk of severe outcomes, and capacity to respond. Because of the diversity of situations in which outbreaks occur, a district outbreak coordination committee with broad representation should take the decisions as to the type of vaccination response at the local level.



Measles Vaccines: WHO pre-qualified 2012

Vaccine	Manufacturer	WHO Prequal.	Formul.	Sched.	Vial	Shelf Life	Cold Chain Capacity / ds
MV	Bio Farna (Indonesia)	1997	Lyophilised	2 ds	10 ds	24 months	1.3 cm ³
		2006	Lyophilised	2 ds	20 ds	24 months	0.75 cm ³
	GPO-MBP (Thailand)	2010	Lyophilised	2 ds	10 ds	36 months	2.13 cm ³
	Sanofi Pasteur (France)	2002	Lyophilised	2 ds	10 ds	36 months	2.46 cm ³
	Serum Institute of India Ltd	1993	Lyophilised	2 ds	1 ds	24 months	26.11 cm ³
		1993	Lyophilised	2 ds	2 ds	24 months	13.1 cm ³
		1993	Lyophilised	2 ds	5 ds	24 months	5.22 cm ³
		1993	Lyophilised	2 ds	10 ds	24 months	2.611 cm ³
MR	Serum Institute of India Ltd	2000	Lyophilised	1 ds	1 ds	24 months	26.11 cm ³
		2000	Lyophilised	1 ds	2 ds	24 months	13.1 cm ³
		2000	Lyophilised	1 ds	5 ds	24 months	5.22 cm ³
		2000	Lyophilised	1 ds	10 ds	24 months	2.611 cm ³
MMR	GlaxoSmithKline (Belgium)	2001	Lyophilised	1 ds	1 ds	24 months	9.6 cm ³
		2011	Lyophilised	1 ds	2 ds	24 months	4.8 cm ³
	Merck (USA)	2009	Lyophilised	1 ds	1 ds	24 months	15 cm ³
	Sanofi Pasteur (France)	2002	Lyophilised	1 ds	1 ds	24 months	12.66 cm ³
		2002	Lyophilised	1 ds	10 ds	24 months	2.46 cm ³
	Serum Institute of India Ltd	2003	Lyophilised	1 ds	1 ds	24 months	26.11 cm ³
		2003	Lyophilised	1 ds	2 ds	24 months	13.1 cm ³
		2003	Lyophilised	1 ds	5 ds	24 months	5.22 cm ³
		2003	Lyophilised	1 ds	10 ds	24 months	2.611 cm ³

Source: WHO.

Measles Vaccines...

- Other combinations: MMRV (Varicella)
- Single dose, Multi-dose

Rubella Vaccines

2011, 86, 301–316

No. 29



Organisation mondiale de la Santé

Weekly epidemiological record Relevé épidémiologique hebdomadaire

15 JULY 2011, 86th YEAR / 15 JUILLET 2011, 86^e ANNÉE

No. 29, 2011, 86, 301–316

<http://www.who.int/wer>

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Rubella vaccines: WHO position paper

In accordance with its mandate to provide guidance to Member States on health policy matters, WHO issues a series of regularly updated position papers on vaccines and combinations of vaccines against diseases that have an international public health impact. These papers are concerned primarily with the use of vaccines in large-scale immunization programmes; they summarize essential background information on diseases and vaccines, and

Note de synthèse: position de l'OMS concernant les vaccins antirubéoleux

Conformément à son mandat qui est de fournir des recommandations aux États Membres sur les questions de politique de santé, l'OMS publie une série de notes de synthèse régulièrement actualisées sur les vaccins et les associations vaccinales utilisés contre des maladies qui ont des conséquences sur la santé publique internationale. Ces notes portent essentiellement sur l'utilisation des vaccins dans le cadre de programmes de vaccination à grande échelle; elles résument les informations géné-

Background (2)

- Why do we get Measles outbreaks?
 - Unimmunised: but why?
 - Under Immunised: but why?
 - Poor herd immunity
 - = Failure to vaccinate
 - Temperature chain
 - = Vaccine failure
 - Vaccine effectiveness:

500,000 birth cohort

Vaccine coverage = 80%

400,000 vaccinated

Vaccine efficacy = 85%

100,000 unvaccinated

and

340,000 immunised

60,000 vaccinated
but unprotected

340,000 immunised

160,000 susceptible

Population immunity = 68%

Effect of 2nd Opportunity of Measles Vaccination of Children >12 m old (18m)

After 1st dose at 9 m with 80% coverage:

$$500,000 \times 0.80 \times 0.85 = 340,000 \text{ immune}$$

After 2nd opportunity with 90% coverage*:

$$160,000 \times 0.90 \times 0.95 = 137,000 \text{ immune}$$

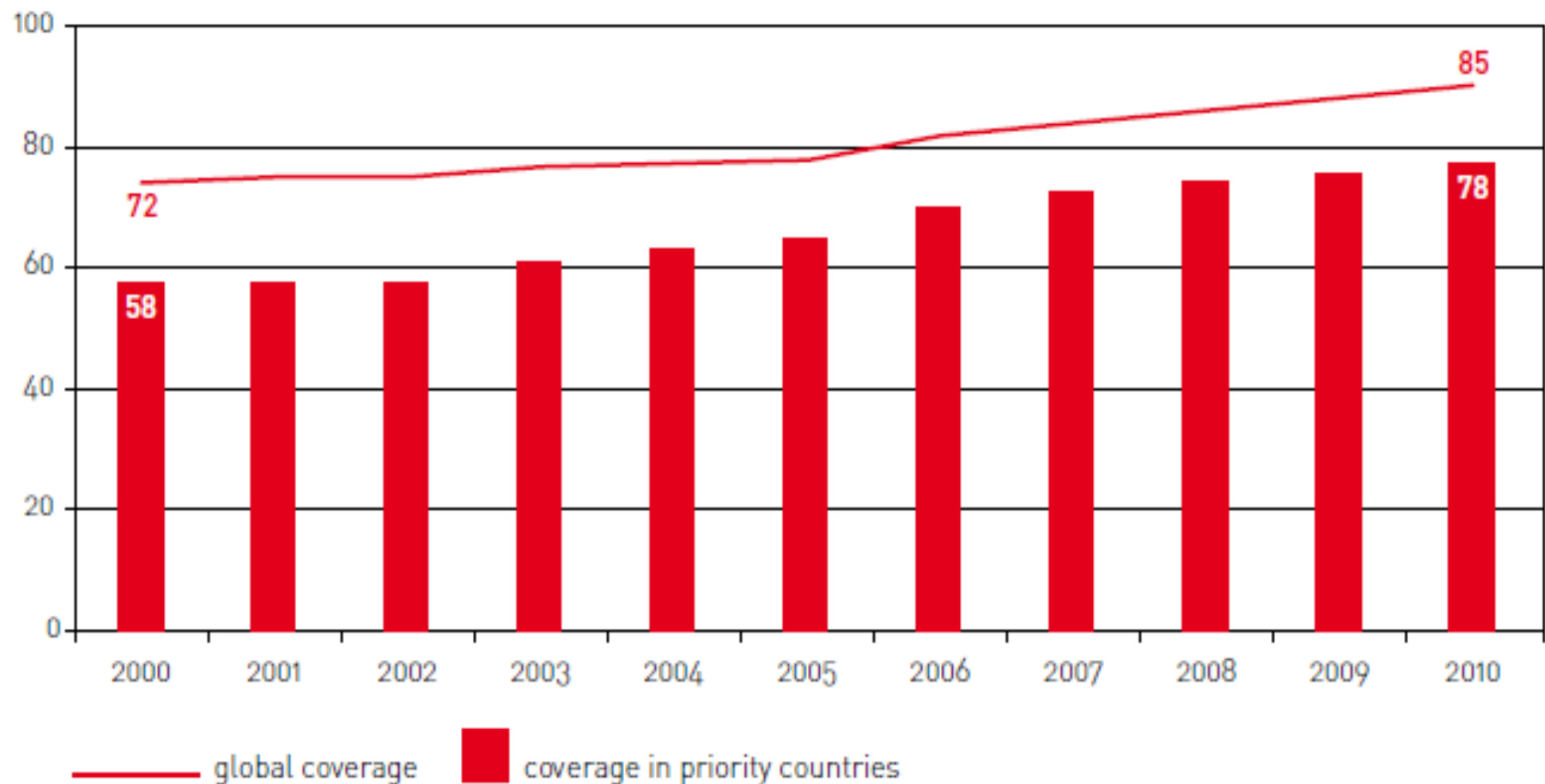
$$\begin{aligned} 1^{\text{st}} + 2^{\text{nd}} \text{ dose} &= (340,000 + 137,000) / 500,000 \\ &= 0.954 \text{ (95\% immunity)} \end{aligned}$$

➔ **Herd immunity threshold achieved**

*WHO Assume independent vaccinations – 1st dose could be routine and 2nd dose SIA/2 x routine

Figure 2: 1st Dose Measles Coverage Globally and in 47 Measles Priority Countries 2000-2010

Percent vaccination coverage (%)



Source: WHO / UNICEF coverage estimates, 1980-2010 as of August 2011

Improving Measles Coverage

- Routine
 - Keep up: Schedule
 - Individual catch-up (Drive)
- Supplementary Immunisation Activities (SIA)/Mass Campaigns
 - Catch-up (initially 9 m to <15 years)
 - Follow-up (9 m to <60 m/5 years)

Prevents build-up of susceptibles

Rationale for mass immunization

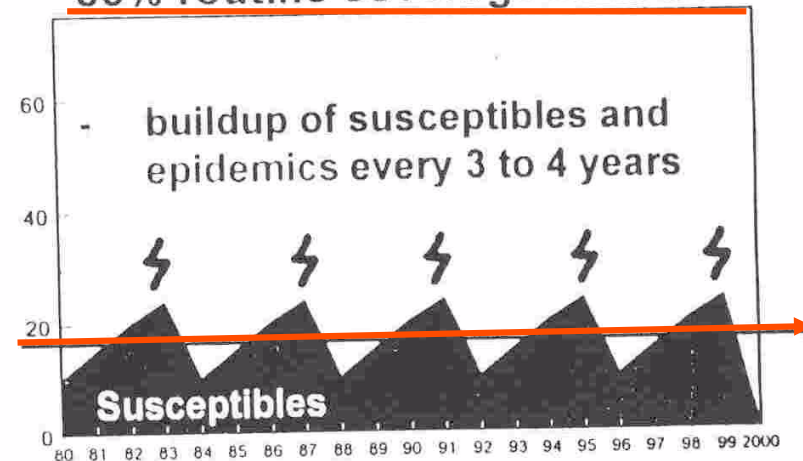
Routine EPI only: build-up of susceptibles still leads to epidemics every 3/4 years

Mass immunization for 9 mo. to < 15 yrs reduces susceptibles to minimum

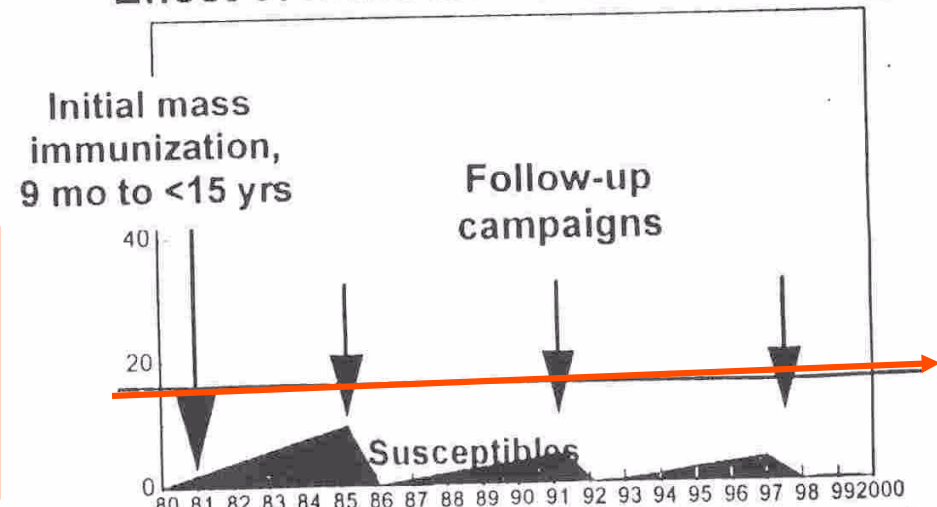
Susceptibles still build up, but at slower rate

Follow-up immunization keeps susceptibles below epidemic threshold

85% routine coverage scenario



Effect of mass immunization strategy



Timing & Target Age for Measles Follow-up Campaigns

*Based on 2005 WHO AFRO TAG recommendations, assuming uniform coverage

Previous campaign coverage	Routine Measles coverage	Interval (Years)	Age Group
>95% in all districts	>95% in ALL districts for 3 years	No follow-up campaigns	
<90%	>80%	3	9 – 47m
	<80%	2	9 – 35m
>90%	>80%	4	9 – 59m
	60 – 79%	3	9 – 47m
	<60%	2	9 – 35m

POLIO: LAST CASES



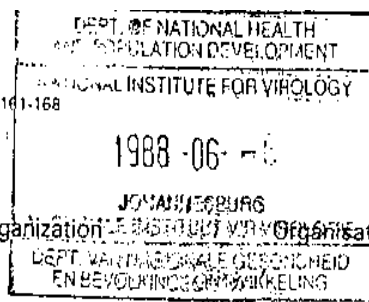
**Americas Region
Luis Fermin Tenorio
Peru 1991**



**European Region
Melik Minas
Turkey 1998**



**Western Pacific Region
Mum Chanty
Cambodia 1997**



World Health Organization / Organisation mondiale de la Santé
Geneva / Genève



WEEKLY EPIDEMIOLOGICAL RECORD RELEVÉ ÉPIDÉMIOLOGIQUE HEBDOMADAIRE

Telegraphic Address: EPIDNATIONS GENEVA Telex 27821

Adresse télégraphique: EPIDNATIONS GENÈVE Télex 27821

Automatic Telex Reply Service
Telex 28150 Geneva with ZCZC and ENGL for a reply in English

Service automatique de réponse par télex
Télex 28150 Genève suivi de ZCZC et FRAN pour une réponse en français

27 May 1988

63rd YEAR - 63^e ANNÉE

27 mai 1988

GLOBAL ERADICATION OF POLIOMYELITIS BY THE YEAR 2000

The Forty-first World Health Assembly,

Appreciating the rapid progress being achieved by the Expanded Programme on Immunization, as evidenced by coverage for a third dose of poliomyelitis, or diphtheria/per-

ÉRADICATION MONDIALE DE LA POLIOMYÉLITE D'ICI L'AN 2000

La Quarante et Unième Assemblée mondiale de la Santé,

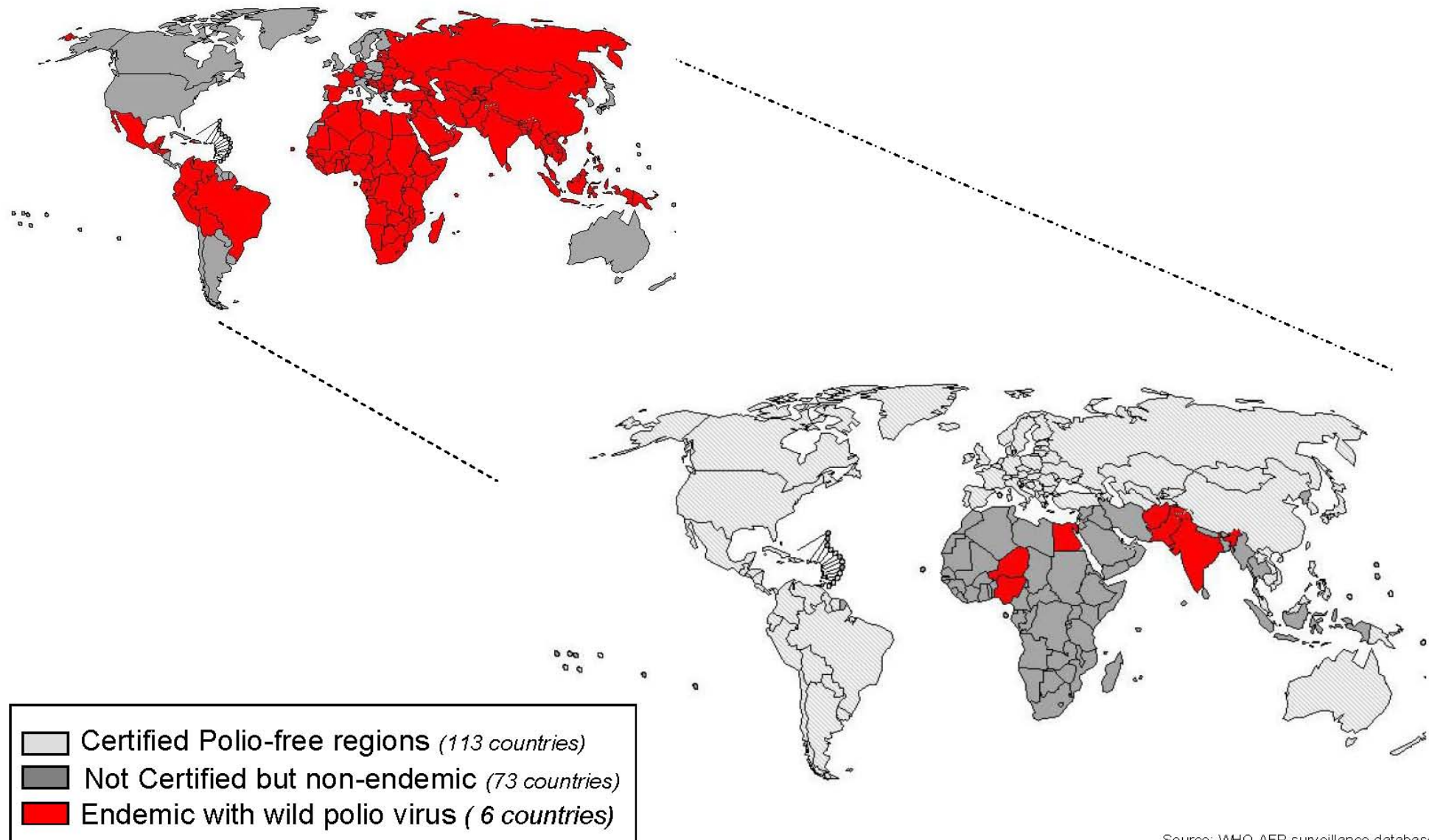
Appréciant les rapides progrès accomplis par le programme élargi de vaccination, comme en témoignent la couverture, par une troisième dose de vaccin antipoliomyélitique ou par le vaccin antidiphthérie/tétanos/coqueluche, de plus de 50% des enfants de moins d'un an dans les pays en développement, ainsi que la prévention de plus d'un million de décès d'enfants par rougeole, tétanos néonatal ou coqueluche



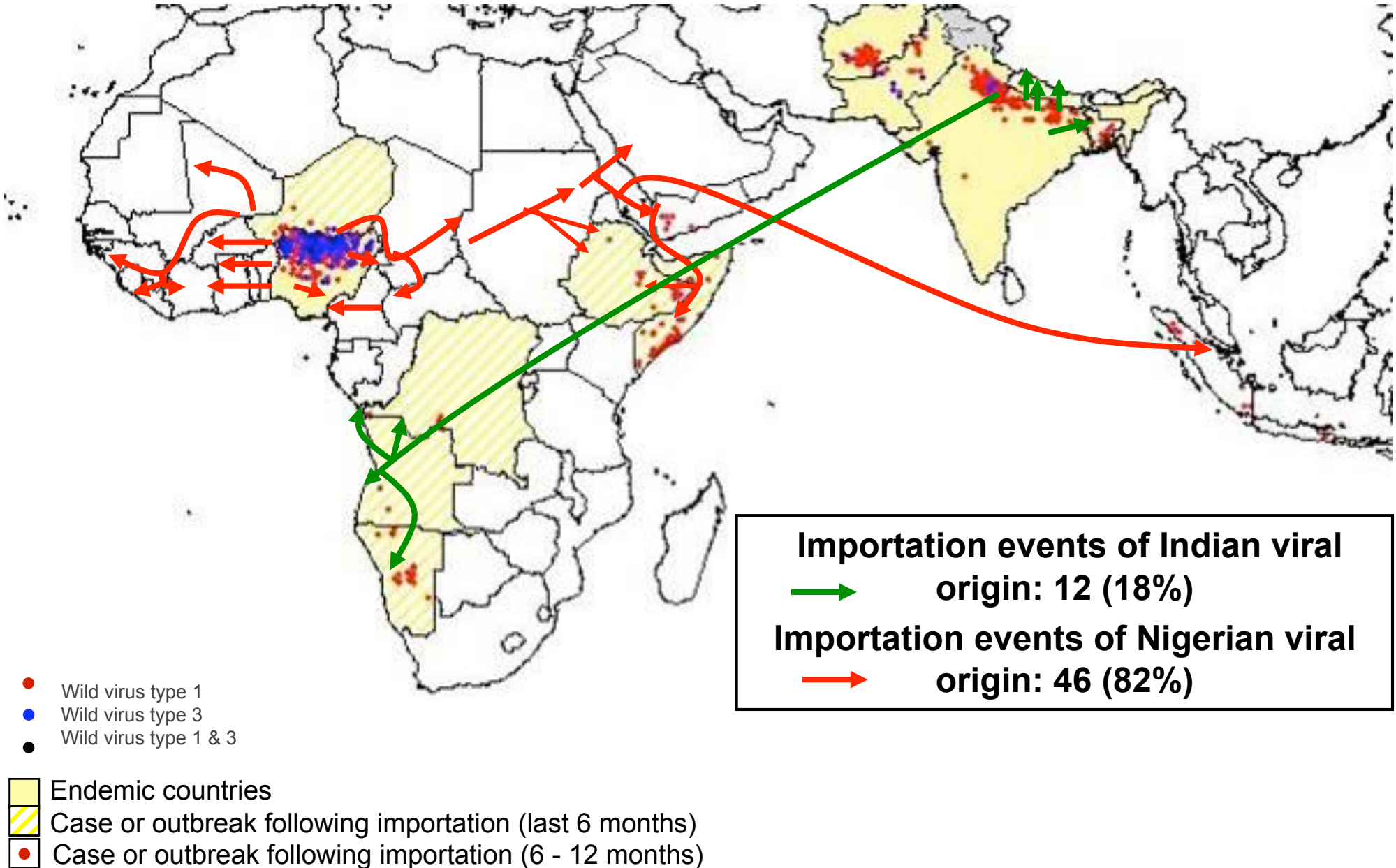
**GLOBAL
POLIO ERADICATION
INITIATIVE**



Polio Eradication Progress, 1988 - 2003



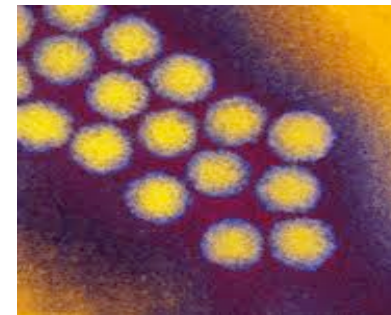
POLIOVIRUS SPREAD, 2003-2006



Wild Poliovirus 2009 - 2014

Country or territory ³	Wild virus confirmed cases										Wild virus reported from other sources ²						
	Total					01 Jan - 05 Aug ¹		Advance notice	Onset of most recent type 3	Onset of most recent type 1	Total						Date of most recent virus
	2009	2010	2011	2012	2013	2013	2014				2009	2010	2011	2012	2013	2014	
Pakistan	89	144	198	58	93	22	104		18-Apr-12	09-Jul-14	18	79	136	89	66	46	24-Jun-14
Cameroon	3	0	0	0	4	0	5		15-Oct-09	09-Jul-14							
Afghanistan	38	25	80	37	14	3	8		11-Apr-10	17-Jun-14	2						27-Jul-09
Somalia	0	0	0	0	194	100	4		NA	03-Jun-14							
Nigeria	388	21	62	122	53	42	5		10-Nov-12	27-May-14			1	15	3	1	05-May-14
Equatorial Guinea	0	0	0	0	0	0	5		NA	03-May-14							
Iraq	0	0	0	0	0	0	2		NA	07-Apr-14							
Israel ⁴	0	0	0	0	0	0	0		NA	NA					136	14	30-Mar-14
Syria	0	0	0	0	35	0	1		NA	21-Jan-14							
Ethiopia	0	0	0	0	9	0	1		NA	05-Jan-14							
West Bank and Gaza	0	0	0	0	0	0	0		NA	NA					7	1	05-Jan-14
Kenya	19	0	1	0	14	10	0		NA	14-Jul-13					1		12-Oct-13
Egypt	0	0	0	0	0	0	0		NA	03-May-04		1		2			06-Dec-12
Niger	15	2	5	1	0	0	0		19-Jan-11	15-Nov-12							
Chad	64	26	132	5	0	0	0		10-Mar-11	14-Jun-12							
DRC	3	100	93	0	0	0	0		24-Jun-09	20-Dec-11							
CAR	14	0	4	0	0	0	0		09-Aug-09	08-Dec-11							
China	0	0	21	0	0	0	0		NA	09-Oct-11							
Guinea	42	0	3	0	0	0	0		03-Aug-11	03-Nov-09							
Côte d'Ivoire	26	0	36	0	0	0	0		24-Jul-11	06-Aug-09							
Angola	29	33	5	0	0	0	0		17-Nov-08	07-Jul-11							
Mali	2	4	7	0	0	0	0		23-Jun-11	01-May-10							
Congo ⁵	0	441	1	0	0	0	0		NA	22-Jan-11							
Gabon	0	0	1	0	0	0	0		NA	15-Jan-11							
India ⁶	741	42	1	0	0	0	0		22-Oct-10	13-Jan-11	2	19					10-Nov-10
Uganda	8	4	0	0	0	0	0		NA	15-Nov-10							
Russian Federation	0	14	0	0	0	0	0		NA	25-Sep-10							
Liberia	11	2	0	0	0	0	0		NA	08-Sep-10							
Nepal	0	6	0	0	0	0	0		15-Oct-08	30-Aug-10		1					12-Jul-10
Kazakhstan	0	1	0	0	0	0	0		NA	12-Aug-10							
Tajikistan	0	460	0	0	0	0	0		NA	04-Jul-10							
Turkmenistan	0	3	0	0	0	0	0		NA	28-Jun-10							
Senegal	0	18	0	0	0	0	0		NA	30-Apr-10							
Mauritania	13	5	0	0	0	0	0		NA	28-Apr-10							
Sierra Leone	11	1	0	0	0	0	0		NA	28-Feb-10							

Data in WHO HQ as of 05 August 2014



**5 May 2014: IHR :- Poliomyelitis
Public Health Emergency of International Concern**

27 March 2014

80% of world's population now
certified polio-free



Highlights of New Wild Poliovirus and cVDPV Positive Results

From AFP cases

Wild poliovirus

21 new officially reported WPV1 cases

- 15 cases, 1 in a new district¹, in Pakistan
- 6 cases, 3 new districts¹, 1 new province¹, in Afghanistan

No advanced notification WPV cases

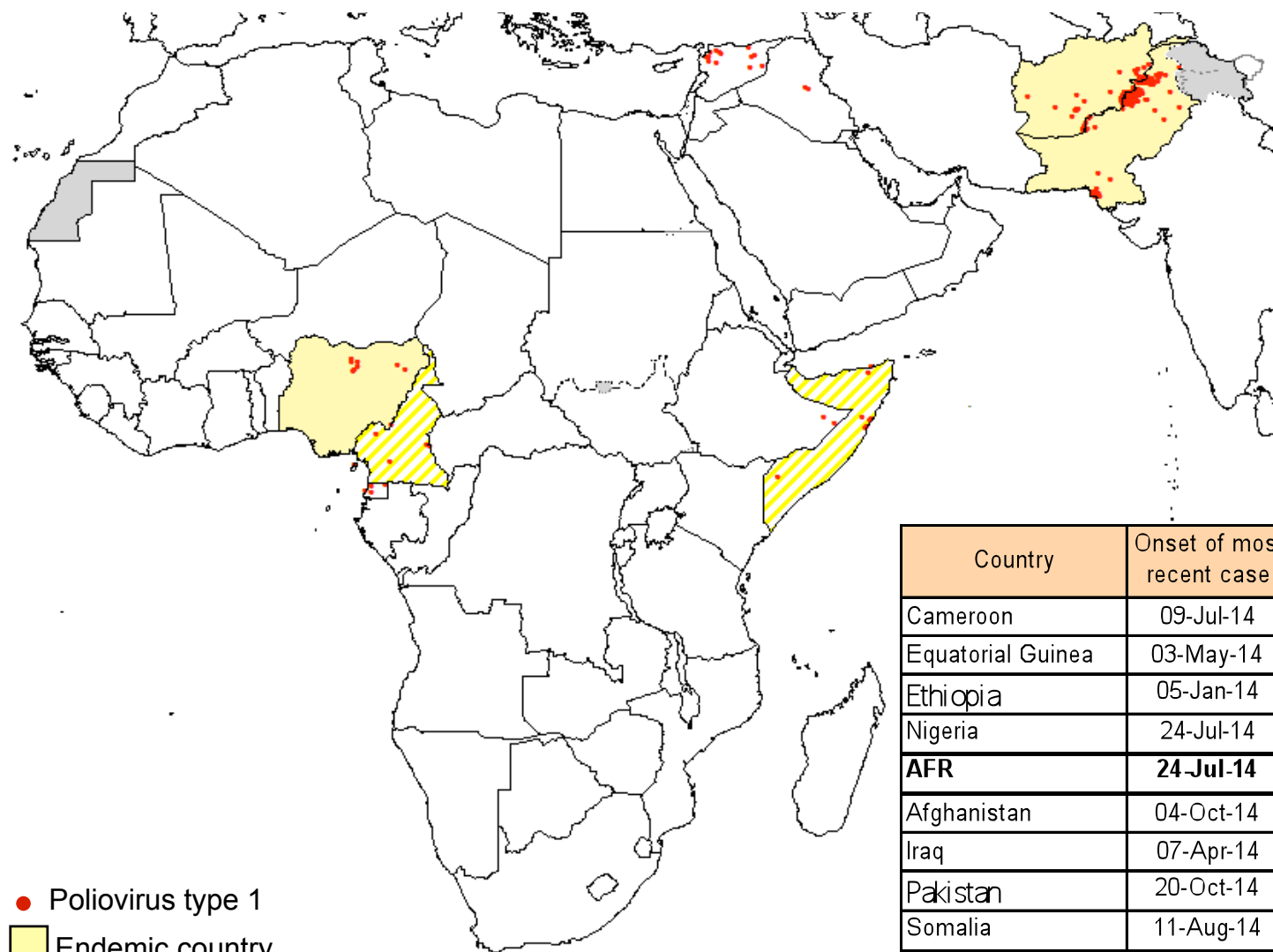
cVDPV

3 newly reported cVDPV2 cases

- 2 cases in South Sudan, a new country
- 1 case in a new state¹ in Nigeria

¹New district, province, state and country refer to areas that were previously without wild poliovirus or cVDPV2 cases respectively in 2014.

Wild Poliovirus Cases¹, Previous 12 Months²



- Poliovirus type 1
- Endemic country
- ▨ Country with WPV case in previous 6 months
- Country with WPV case 6-12 months ago

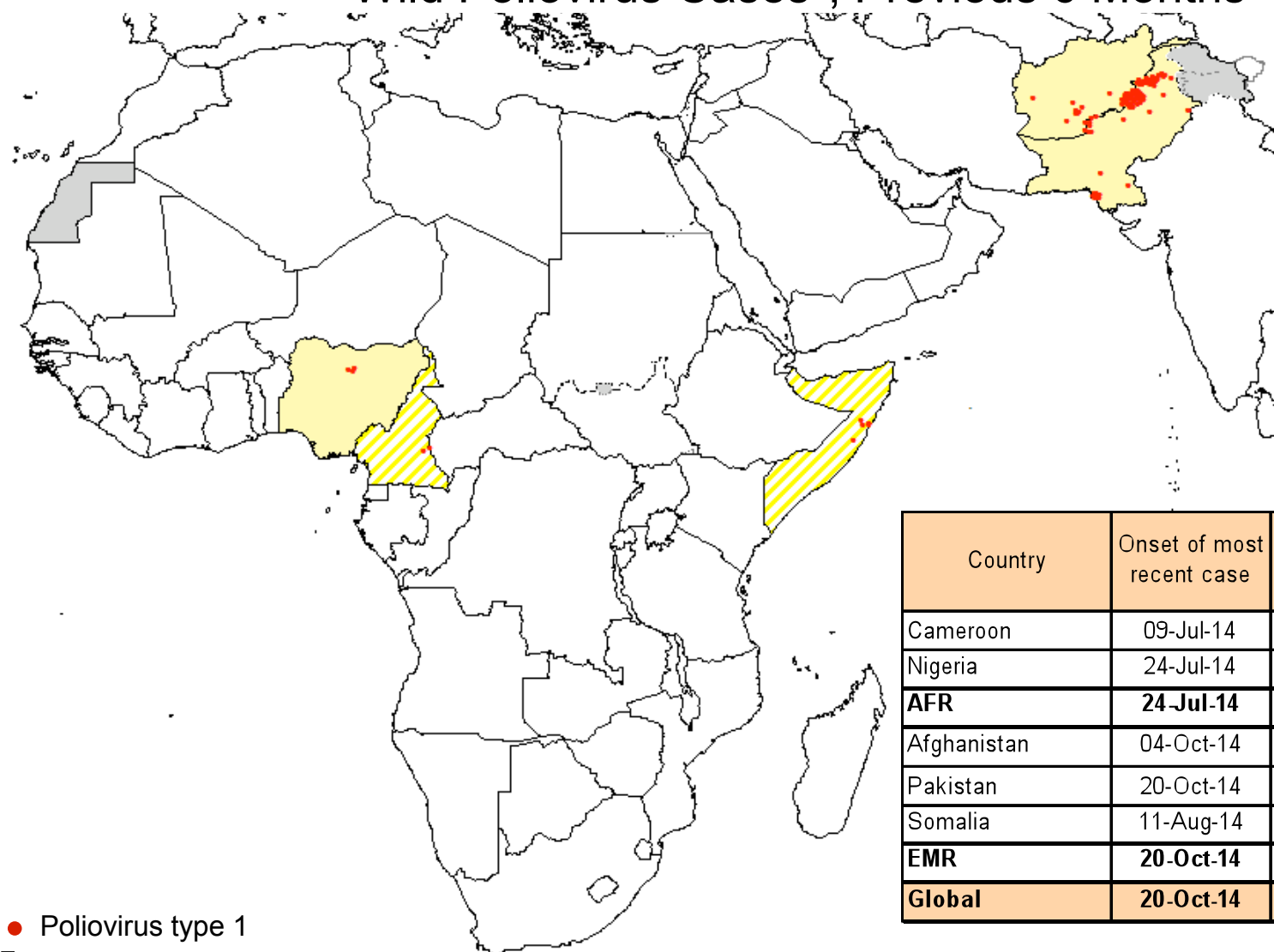
Country	Onset of most recent case	Number of districts	Total WPV (All type1)
Cameroon	09-Jul-14	4	5
Equatorial Guinea	03-May-14	4	5
Ethiopia	05-Jan-14	1	2
Nigeria	24-Jul-14	7	8
AFR	24-Jul-14	16	20
Afghanistan	04-Oct-14	18	23
Iraq	07-Apr-14	2	2
Pakistan	20-Oct-14	32	260
Somalia	11-Aug-14	4	8
Syria	21-Jan-14	11	13
EMR	20-Oct-14	67	306
Global	20-Oct-14	83	326

¹Excludes cases caused by vaccine-derived polioviruses and viruses detected from environmental surveillance.

²Onset of paralysis 05 November 2013 – 04 November 2014

Data in WHO HQ as of 04 November 2014

Wild Poliovirus Cases¹, Previous 6 Months²

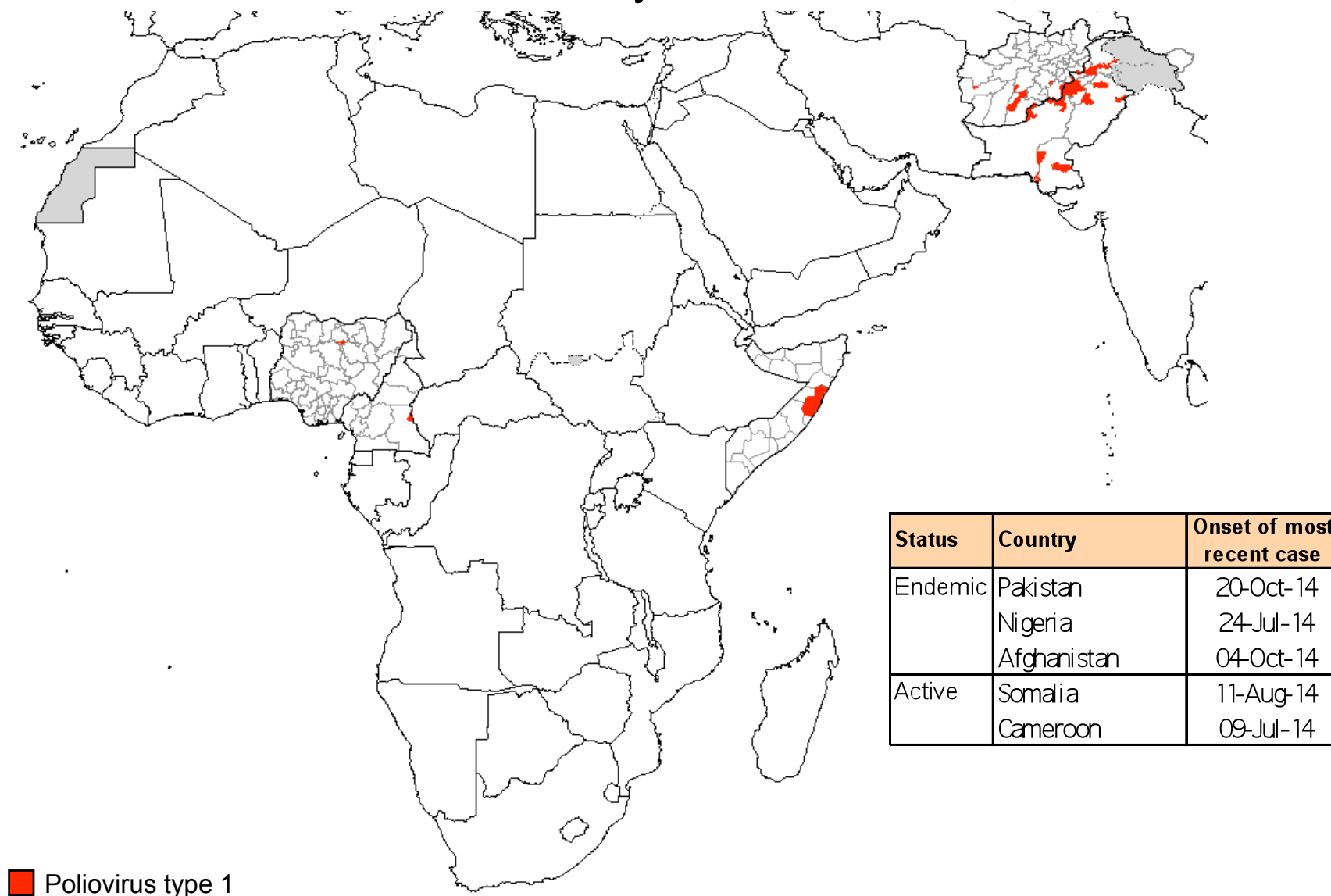


Country	Onset of most recent case	Number of districts	Total WPV (All type 1)
Cameroon	09-Jul-14	1	2
Nigeria	24-Jul-14	2	3
AFR	24-Jul-14	3	5
Afghanistan	04-Oct-14	10	14
Pakistan	20-Oct-14	28	165
Somalia	11-Aug-14	2	5
EMR	20-Oct-14	40	184
Global	20-Oct-14	43	189

¹Excludes cases caused by vaccine-derived polioviruses and viruses detected from environmental surveillance.

²Onset of paralysis 05 May – 04 November 2014

Districts with Cases Caused by Wild Polioviruses¹, Previous 6 Months²



¹Excludes cases caused by vaccine-derived polioviruses and viruses detected from environmental surveillance.

²Onset of paralyzes 05 May – 04 November 2014

Data in WHO HQ as of 04 November 2014

Wild Poliovirus 2009 - 2014

Country or territory ³	Wild virus confirmed cases									Wild virus reported from other sources ²							
	Total					01 Jan - 04 Nov ¹		Onset of most recent type 3	Onset of most recent type 1	Total						Date of most recent virus	
	2009	2010	2011	2012	2013	2013	2014			2009	2010	2011	2012	2013	2014		
Pakistan	89	144	198	58	93	56	235	18-Apr-12	20-Oct-14	18	79	136	89	66	73		20-Sep-14
Afghanistan	38	25	80	37	14	9	18	11-Apr-10	04-Oct-14	2					5		20-Sep-14
Somalia	0	0	0	0	194	180	5	NA	11-Aug-14								
Nigeria	388	21	62	122	53	51	6	10-Nov-12	24-Jul-14			1	15	3	1		05-May-14
Cameroon	3	0	0	0	4	1	5	15-Oct-09	09-Jul-14								
Equatorial Guinea	0	0	0	0	0	0	5	NA	03-May-14								
Iraq	0	0	0	0	0	0	2	NA	07-Apr-14								
Israel ⁴	0	0	0	0	0	0	0	NA	NA					136	14		30-Mar-14
Syria	0	0	0	0	35	10	1	NA	21-Jan-14								
Ethiopia	0	0	0	0	9	7	1	NA	05-Jan-14								
West Bank and Gaza	0	0	0	0	0	0	0	NA	NA					7	1		05-Jan-14
Kenya	19	0	1	0	14	14	0	NA	14-Jul-13					1			12-Oct-13
Egypt	0	0	0	0	0	0	0	NA	03-May-04		1		2				06-Dec-12
Niger	15	2	5	1	0	0	0	19-Jan-11	15-Nov-12								
Chad	64	26	132	5	0	0	0	10-Mar-11	14-Jun-12								
DRC	3	100	93	0	0	0	0	24-Jun-09	20-Dec-11								
CAR	14	0	4	0	0	0	0	09-Aug-09	08-Dec-11								
China	0	0	21	0	0	0	0	NA	09-Oct-11								
Guinea	42	0	3	0	0	0	0	03-Aug-11	03-Nov-09								
Côte d'Ivoire	26	0	36	0	0	0	0	24-Jul-11	06-Aug-09								
Angola	29	33	5	0	0	0	0	17-Nov-08	07-Jul-11								
Mali	2	4	7	0	0	0	0	23-Jun-11	01-May-10								
Congo ⁵	0	441	1	0	0	0	0	NA	22-Jan-11								
Gabon	0	0	1	0	0	0	0	NA	15-Jan-11								
India ⁶	741	42	1	0	0	0	0	22-Oct-10	13-Jan-11	2	19						10-Nov-10
Uganda	8	4	0	0	0	0	0	NA	15-Nov-10								
Russian Federation	0	14	0	0	0	0	0	NA	25-Sep-10								
Liberia	11	2	0	0	0	0	0	NA	08-Sep-10								
Nepal	0	6	0	0	0	0	0	15-Oct-08	30-Aug-10		1						12-Jul-10
Kazakhstan	0	1	0	0	0	0	0	NA	12-Aug-10								
Tajikistan	0	460	0	0	0	0	0	NA	04-Jul-10								
Turkmenistan	0	3	0	0	0	0	0	NA	28-Jun-10								
Senegal	0	18	0	0	0	0	0	NA	30-Apr-10								
Mauritania	13	5	0	0	0	0	0	NA	28-Apr-10								
Sierra Leone	11	1	0	0	0	0	0	NA	28-Feb-10								
Burkina Faso	15	0	0	0	0	0	0	NA	25-Oct-09								
Burundi	2	0	0	0	0	0	0	NA	12-Sep-09								
Sudan	45	0	0	0	0	0	0	16-Dec-08	27-Jun-09	1							09-Jan-09
Benin	20	0	0	0	0	0	0	01-Dec-08	19-Apr-09								
Togo	6	0	0	0	0	0	0	NA	28-Mar-09								
Total	1604	1352	650	223	416	328	278				23	100	137	106	213	94	
Total wild virus type 1 ⁷	482	1265	583	202	416	328	278										
Total wild virus type 3	1122	87	67	21	0	0	0										
Tot. in endemic countries	1256	232	341	217	160	116	259										
Tot. in non-end countries	348	1120	309	6	256	212	19										
No. of countries	23	20	16	5	8	8	9										
No. of endemic countries	4	4	4	3	3	3	3										

Countries in yellow are endemic Countries in pale yellow are considered to have active transmission (i.e. within the previous 6 months) of an imported poliovirus

¹Data in WHO HQ on 05 Nov 2013 for 2013 data and 04 Nov 2014 for 2014 data. ²Wild viruses from environmental samples, contacts and other sources. ³In March 2014, a serotype 1 wild poliovirus was detected in an environment specimen from Brazil, further investigation indicates this is an isolated event without evidence of circulation. ⁴Results are based on L20B positive culture. Prior to reporting week 16, results were based on a combination of direct qRT-PCR on RNA from concentrated sewage and L20B positive culture. ⁵The 2010 total includes cases with inadequate specimens that were exceptionally classified as confirmed polio based on their association with the WPV1 outbreak. ⁶As of 28 February 2012, India is no longer considered to be a polio-endemic country. ⁷Includes 1 case in 2012 with a mixture of W1W3 virus. NA - Most recent case had onset prior to 1999.

Data in
WHO HQ
as of 04
November
2014

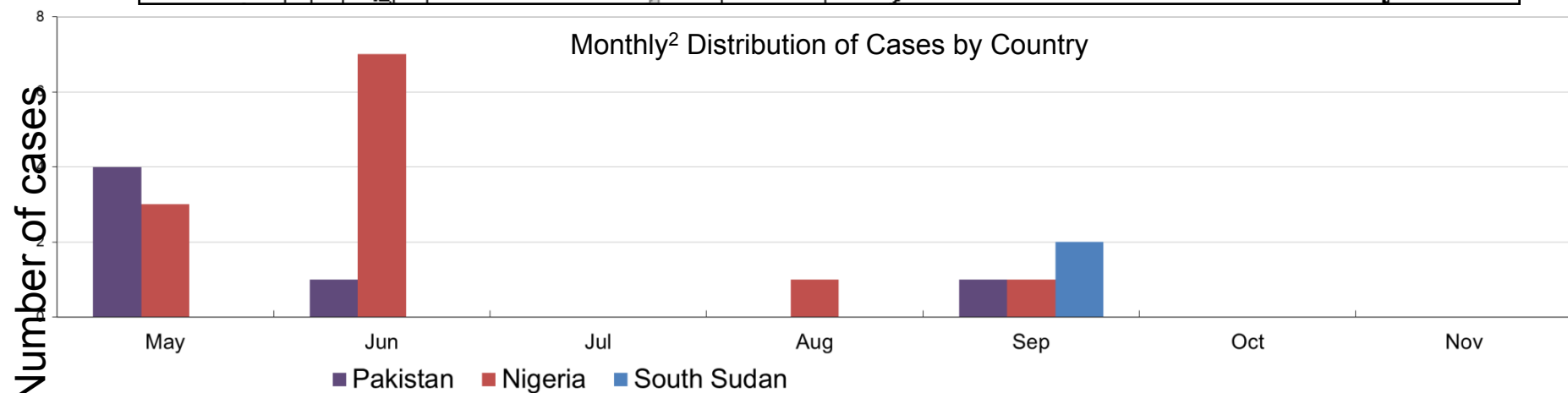
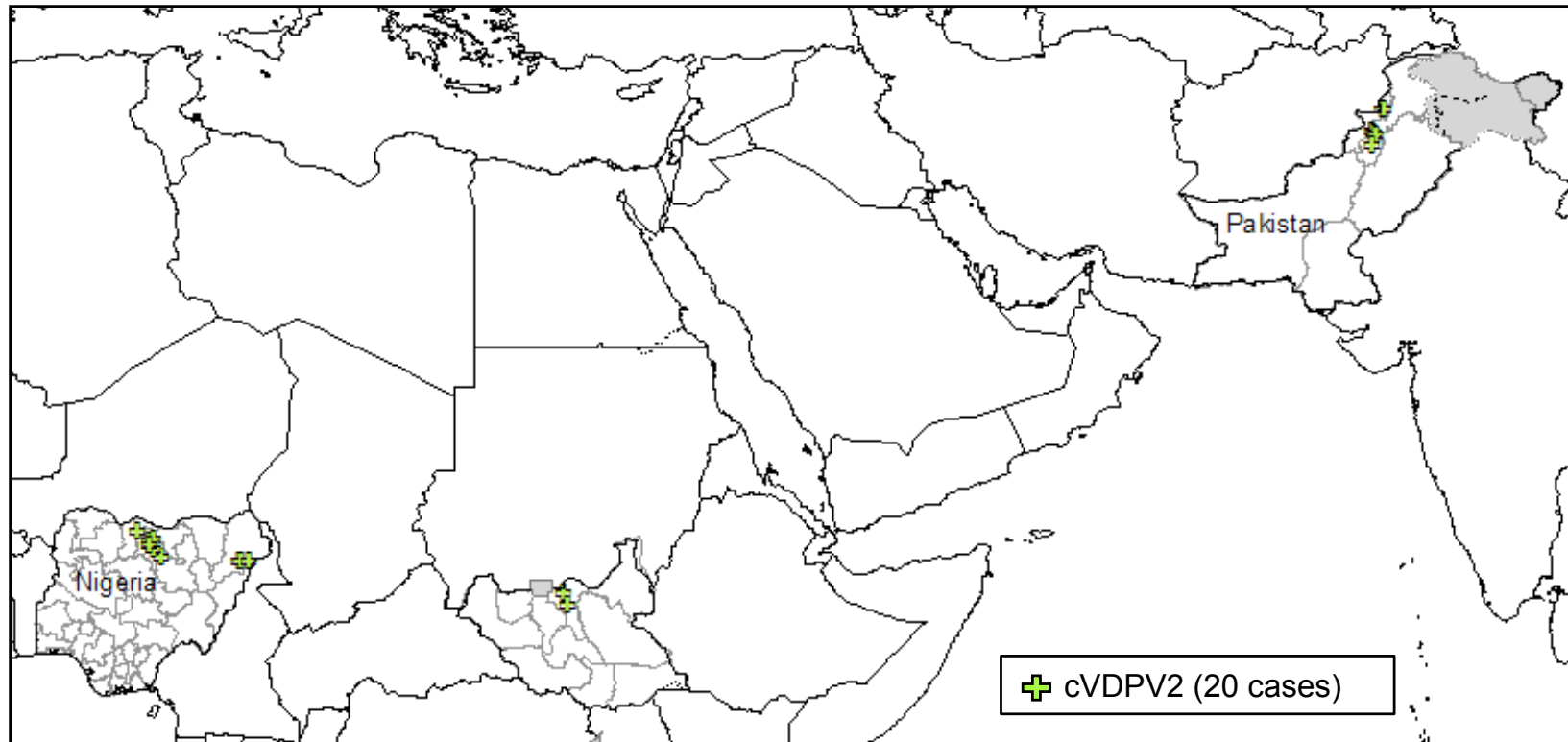
Circulating Vaccine-derived Poliovirus Cases¹, 2000 - 2014

Country	cVDPV type 1 ²															Onset of most recent case
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Mozambique												2				02-Jun-11
Myanmar							1	4								06-Dec-07
Indonesia						46										26-Oct-05
China					2											11-Nov-04
Philippines		3														26-Jul-01
DOR/Haiti	12	9														12-Jul-01
Total type 1	12	12	0	0	2	46	1	4	0	0	0	2	0	0	0	
Country	cVDPV type 2 ²															Onset of most recent case
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Pakistan													16	48	20	16-Sep-14
South Sudan														2		12-Sep-14
Nigeria						3	22	71	68	155	27	34	8	4	21	12-Sep-14
Cameroon														4		12-Aug-13
Niger							2			2	1	1		1		11-Jul-13
Chad											1		12	4		12-May-13
Afghanistan											5	1	9	3		13-Mar-13
Somalia									1	6	1	9	1	1		09-Jan-13
Kenya													3			29-Aug-12
DRCongo									13	5	18	11	17			04-Apr-12
China													2			06-Feb-12
Yemen												9				05-Oct-11
India										15	2					18-Jan-10
Ethiopia									3	1						16-Feb-09
Madagascar		1	4			3										13-Jul-05
Total type 2	0	1	4	0	0	6	24	71	85	184	55	65	68	65	43	
Country	cVDPV type 3 ²															Onset of most recent case
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Yemen													3	1		12-Jul-13
Ethiopia										1	5					17-May-10
Cambodia						1	1									15-Jan-06
Total type 3	0	0	0	0	0	1	1	0	0	1	5	0	3	1	0	

¹Circulating vaccine-derived poliovirus (cVDPV) is associated with 2 or more AFP cases. Niger 2006, Niger 2009, Niger 2010, Chad 2010 cVDPVs are linked to the Nigeria outbreak. Kenya 2012 cVDPVs are linked to the Somalia outbreak. VDPV type 2 cases with greater than or equal to 6nt difference from sabin in VP1; VDPV types 1 and 3 cases with greater than or equal to 10nt difference from sabin in VP1 are reported here. Figures exclude VDPV from non-AFP sources. Nigeria figures include the following cases with WPV1/cVDPV2 mixture: 2005 - 2, 2006 - 1, 2007 - 1, 2008 - 3, 2009 - 1, 2011 - 1; WPV3/cVDPV2 mixture 2007 - 2. ²Figures include multiple emergences and transmission chains. 1 cVDPV2 awaiting country assignment is not represented in the slide. On 22 May a case, with a date of onset of paralysis of 4 May, was reported in Niger from a Nigerian child.

Data in WHO HQ
as of 04
November 2014

Circulating Vaccine-derived Poliovirus Cases¹, Previous 6 Months²



¹Circulating vaccine-derived poliovirus (cVDPV) is associated with 2 or more AFP cases. VDPV type 2 cases with greater than or equal to 6nt difference from sabin in VP1; VDPV types 1 and 3 cases with greater than or equal to 10nt difference from sabin in VP1 are reported. Figures exclude VDPV from non-AFP source. Figures may include different chains of transmission. 1 VDPV2 awaiting country assignment is not represented in the slide. On 22 May a case, with a date of onset of paralysis of 4 May, was reported in Niger from a Nigerian child.

Comparison of 2013 and 2014 Data Year to Date (01 January to 04 November)

WHO region	AFP Cases		Wild Virus		Polio Compatible		Pending Final Classification			Data received in HQ
							Total		>90 days	
	2013	2014	2013	2014	2013	2014	2013	2014	2014	
African	15945	18037	73	18	72	60	1814	2100	852	as of 03 November
Central	2857	2903	1	11	39	15	208	326	71	
South/East	4003	4302	21	1	12	11	782	723	384	
West	9085	10832	51	6	21	34	824	1051	397	
American	1328	1274	0	0	0	1	529	291	193	as of 25 October
Eastern Mediterranean	9148	9460	255	260	2	7	1067	817	185	as of 03 November
European	1306	1270	0	0	0	0	339	394	123	as of 03 November
South East Asian	47850	46593	0	0	6	2	4673	4815	1217	as of 03 November
Western Pacific	4954	4996	0	0	1	0	1256	1324	444	as of 03 November
Global	80531	81630	328	278	81	70	9678	9741	3014	

Data for 2013 as of 05 November 2013 and for
2014 as of 04 November 2014

Wild Poliovirus Cases by Type, 2013 & 2014 - Year to Date Comparison

Country classification	2013 total cases		01 January - 04 November ¹				Date of most recent case
			2013		2014		
	W1	W3	W1	W3	W1	W3	
Endemic							
Pakistan	93		56		235		20-Oct-2014
Afghanistan	14		9		18		04-Oct-2014
Nigeria	53		51		6		24-Jul-2014
Total	160		116	0	259	0	
Outbreak							
Syria	35		10		1		21-Jan-2014
Cameroon	4		1		5		09-Jul-2014
Equatorial Guinea					5		03-May-2014
Ethiopia	9		7		1		05-Jan-2014
Kenya	14		14				14-Jul-2013
Somalia	194		180		5		11-Aug-2014
Iraq					2		07-Apr-2014
Total	256		212	0	19	0	
Global total	416	0	328	0	278	0	

¹Data in WHO/HQ as of 05 November 2013 for 2013 data and as of 04 November 2014 for 2014 data.

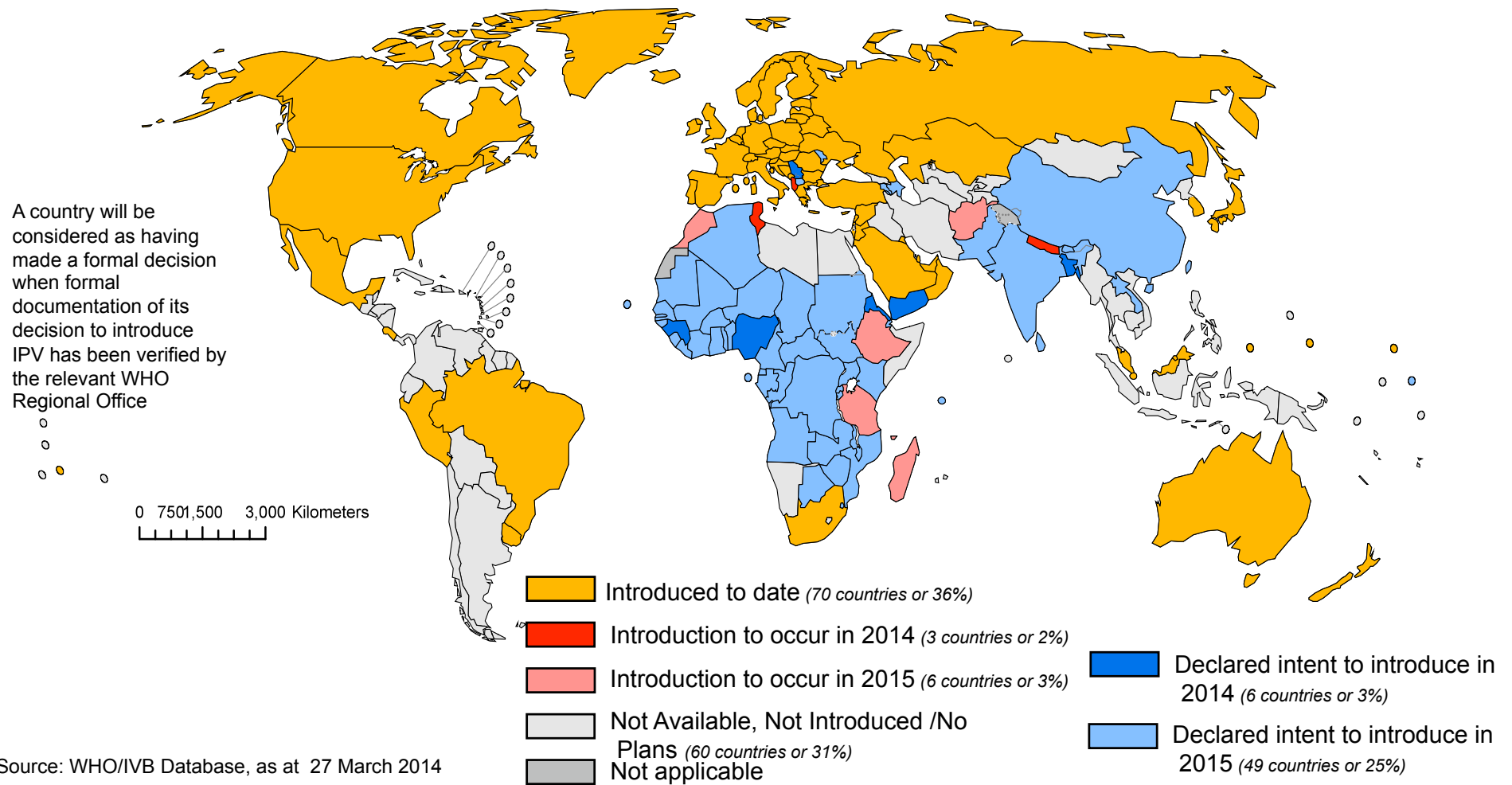
SAGE Nov 2013: Polio eradication

- SAGE recommends that all countries should add at least one dose of IPV to the national routine immunization schedule to:
 - reduce the risk of paralytic polio if exposed to a type 2 virus after OPV2 withdrawal
 - improve response to the future use of a monovalent type 2 polio vaccine in the case of an outbreak
 - reduce transmission of a reintroduced type 2 virus
 - boost immunity to the remaining wild poliovirus serotypes 1 & 3.

SAGE Nov 2013: Polio eradication

- SAGE reaffirms the importance of removing the type 2 component of the oral polio vaccine from routine immunization programmes globally in the near term in order to:
 - eliminate the most common cause of vaccine-associated polio outbreaks
 - eliminate the vaccine-associated paralytic poliomyelitis (VAPP) associated with this serotype
 - secure the serotype-specific gains that have occurred to date in global eradication
 - enhance the efficacy of the oral polio vaccine to protect against and eliminate the remaining type 1 and 3 wild virus serotypes.

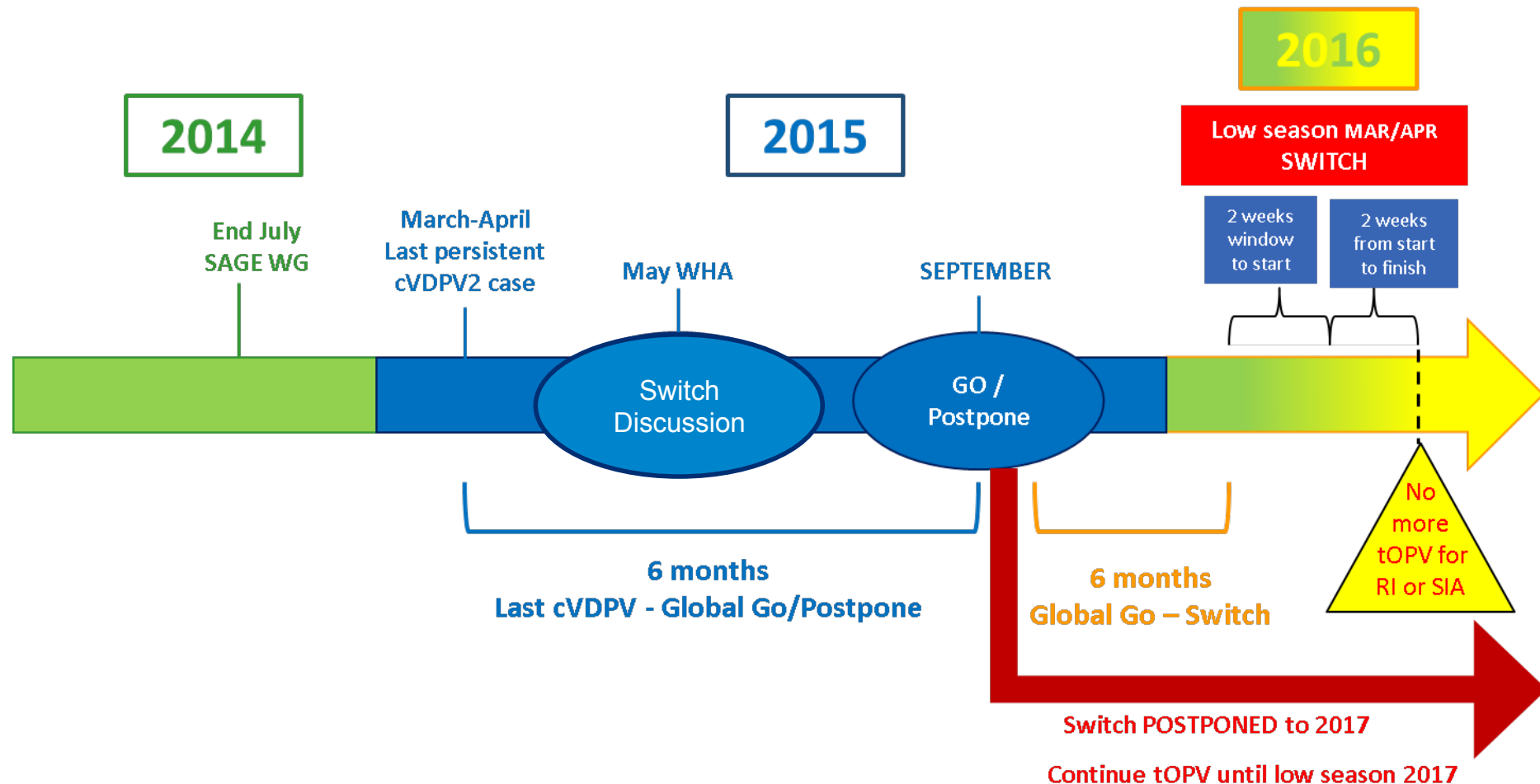
Countries using IPV vaccine to date with formal decision or declared Intent to Introduce



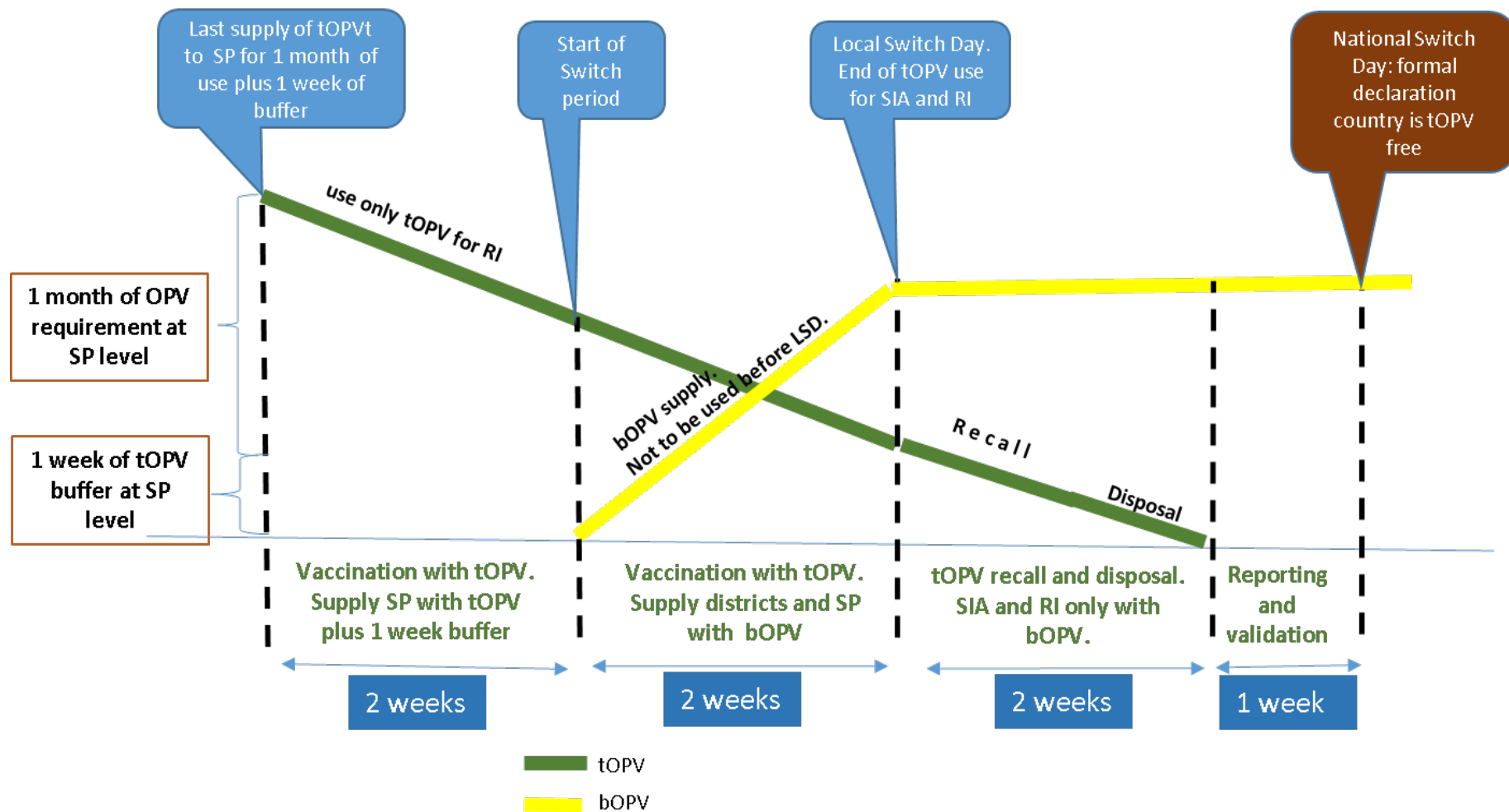
Criteria for the withdrawal of the type 2 component of tOPV

- 5 Readiness Criteria for the global withdrawal of the type 2 component of tOPV:
 - IPV: Introduction of at least one dose of inactivated poliovirus vaccine;
 - bOPV : Access to a bivalent oral polio vaccine that is licensed for routine immunization;
 - Surveillance and Stockpile : Implementation of surveillance and response protocols for type 2 poliovirus (including constitution of a stockpile of monovalent oral polio vaccine type 2);
 - Containment : Completion of phase 1 poliovirus containment activities, with appropriate handling of residual type 2 materials;
 - Verification : Verification of global eradication of wild poliovirus type 2.
- Trigger for setting a date for the withdrawal of type 2 OPV:
 - Absence of all persistent circulating vaccine-derived type 2 polioviruses for at least six months.

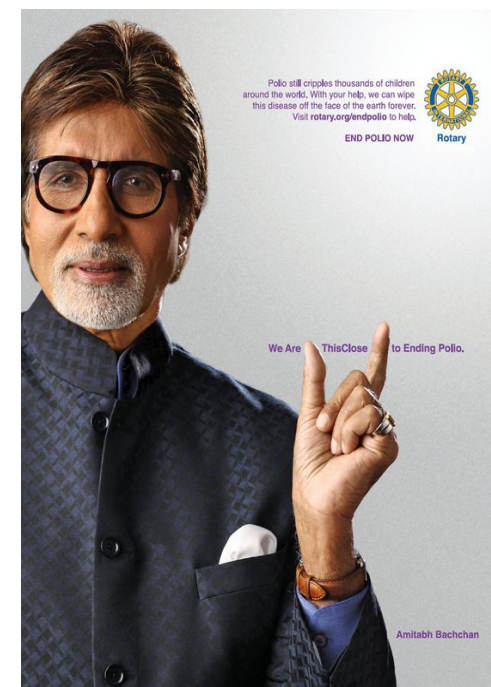
Tentative timeframe for the Switch to bOPV



Switch: Vaccine Supply and Recall



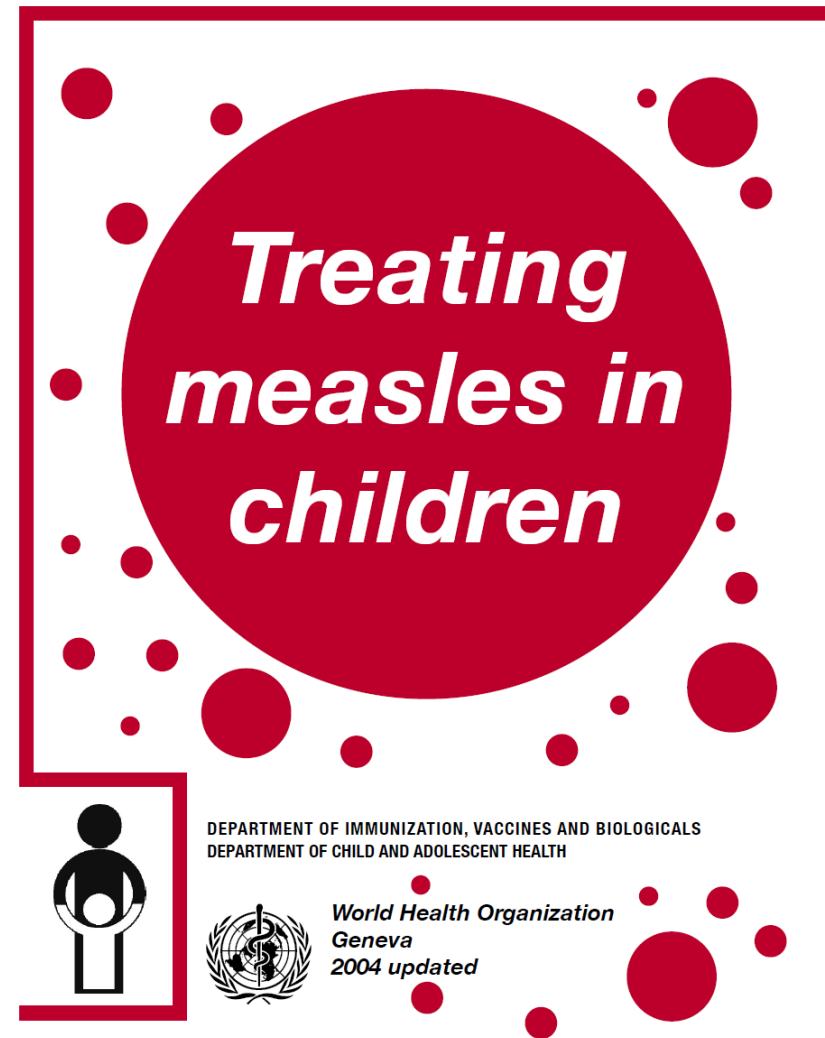




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- EPI Data 2014
- EPI Surveillance 2014



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- Dr Rudi Eggers: Dept. of Immunization, Vaccines and Biologicals, World Health Organization, Geneva
- DHIS, NDoH, South Africa

**Measles-Containing Vaccines:
Supply Update**

UNICEF Supply Division

December 2013

