Controlling Vaccine Preventable Diseases in the US and Global Immunization Efforts

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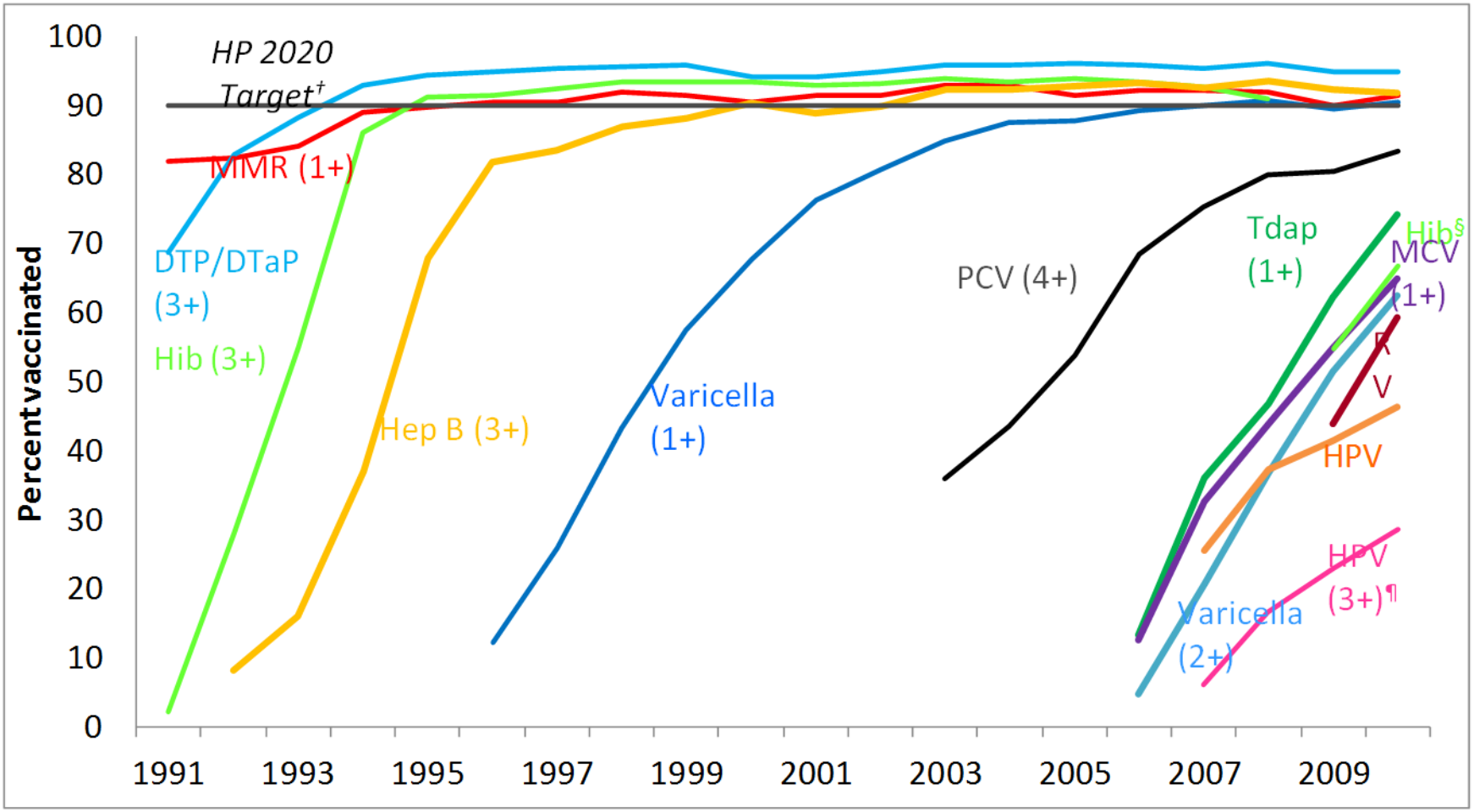
Estimated Vaccination Coverage, Children 19-35 Months and 13 – 15 years, 1991-2010*



* Source: NHIS (1991-1993); NIS (1994-2010) children 19-35 months and NIS-Teen (2006-2010) teens 13-15 years

† Target is 80 percent for Rotavirus, Tdap (1+), MCV4 (1+), HPV (3+) and 90% for varicella (2+)

§ Full series Hib (≥3 or ≥4 doses, depending on product type received). Brand of Hib vaccine received was not collected on the NIS prior to 2009.

¶ Among females

Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

Disease	20th Century Annual Morbidity†	2011 Reported Cases ††	Percent Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Measles	530,217	212	> 99%
Mumps	162,344	370	> 99%
Pertussis	200,752	15,216	92%
Polio (paralytic)	16,316	0	100%
Rubella	47,745	4	> 99%
Congenital Rubella Syndrome	152	0	100%
Tetanus	580	9	98%
Haemophilus influenzae	20,000	8*	> 99%

†Source: JAMA. 2007;298(18):2155-2163

†† Source: CDC. MMWR January 6, 2012;60(51);1762-1775. (provisional 2011 data)

* *Haemophilus influenzae* type b (Hib) < 5 years of age. An additional 14 cases of Hib are estimated to have occurred among the 237 reports of Hi (< 5 years of age) with unknown serotype.

Comparison of Pre-Vaccine Era Estimated Annual Morbidity with Current Estimate: Vaccine-Preventable Diseases

Disease	Pre-Vaccine Era Annual Estimate	2010 Estimate	Percent Decrease
Hepatitis A	117,333 †	*7,138*	*94%*
Hepatitis B (acute)	66,232 †	*9,428*	*86%*
Pneumococcus (invasive)			
all ages	63,067 †	39,500 #	37%
< 5 years of age	16,069 †	4,400##	73%
Rotavirus (hospitalizations, < 3 years of age)	62,500 ††	2,500###	96%
Varicella	4,085,120 †	*281,873*	*93%*

† JAMA. 2007;298(18):2155-2163

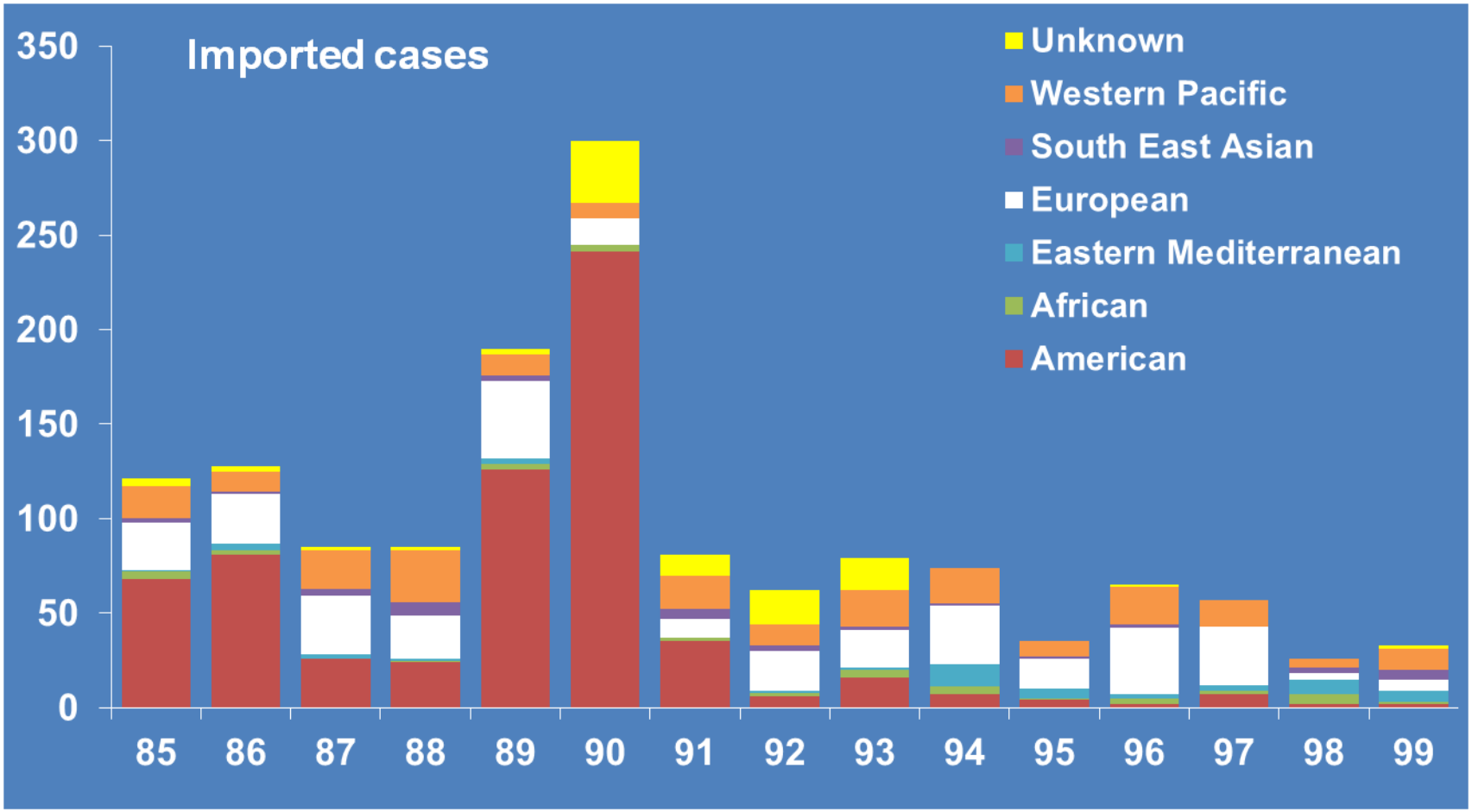
†† CDC. MMWR. February 6, 2009 / 58(RR02);1-25

CDC. Active Bacterial Core surveillance Provisional Report; S. pneumoniae 2010. http://www.cdc.gov/abcs/reports-findings/survreports/spneu09.html

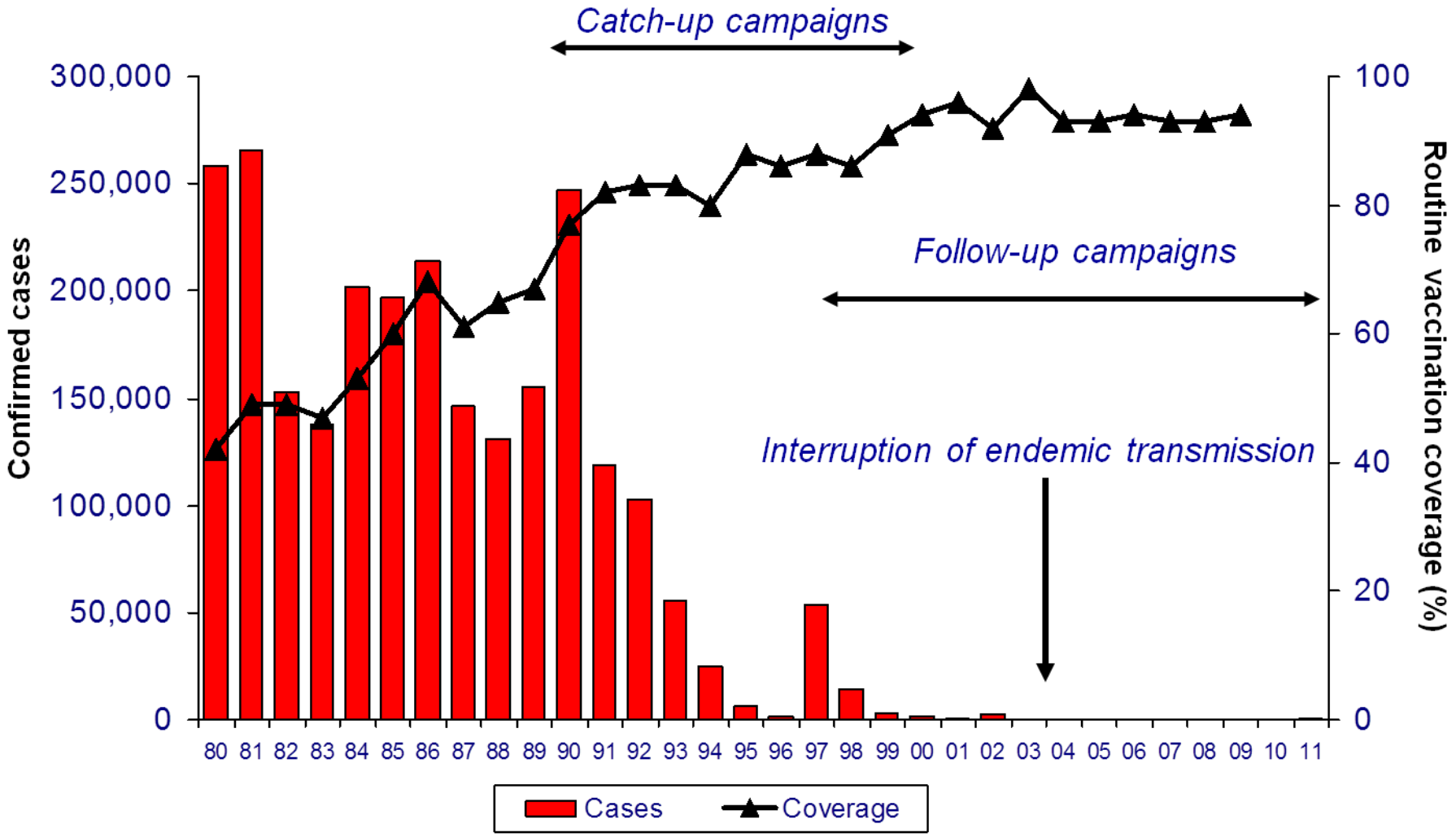
2010 (provisional) Active Bacterial Core surveillance

New Vaccine Surveillance Network (unpublished)

Measles, United States, 1985-1999
Importations by WHO Region



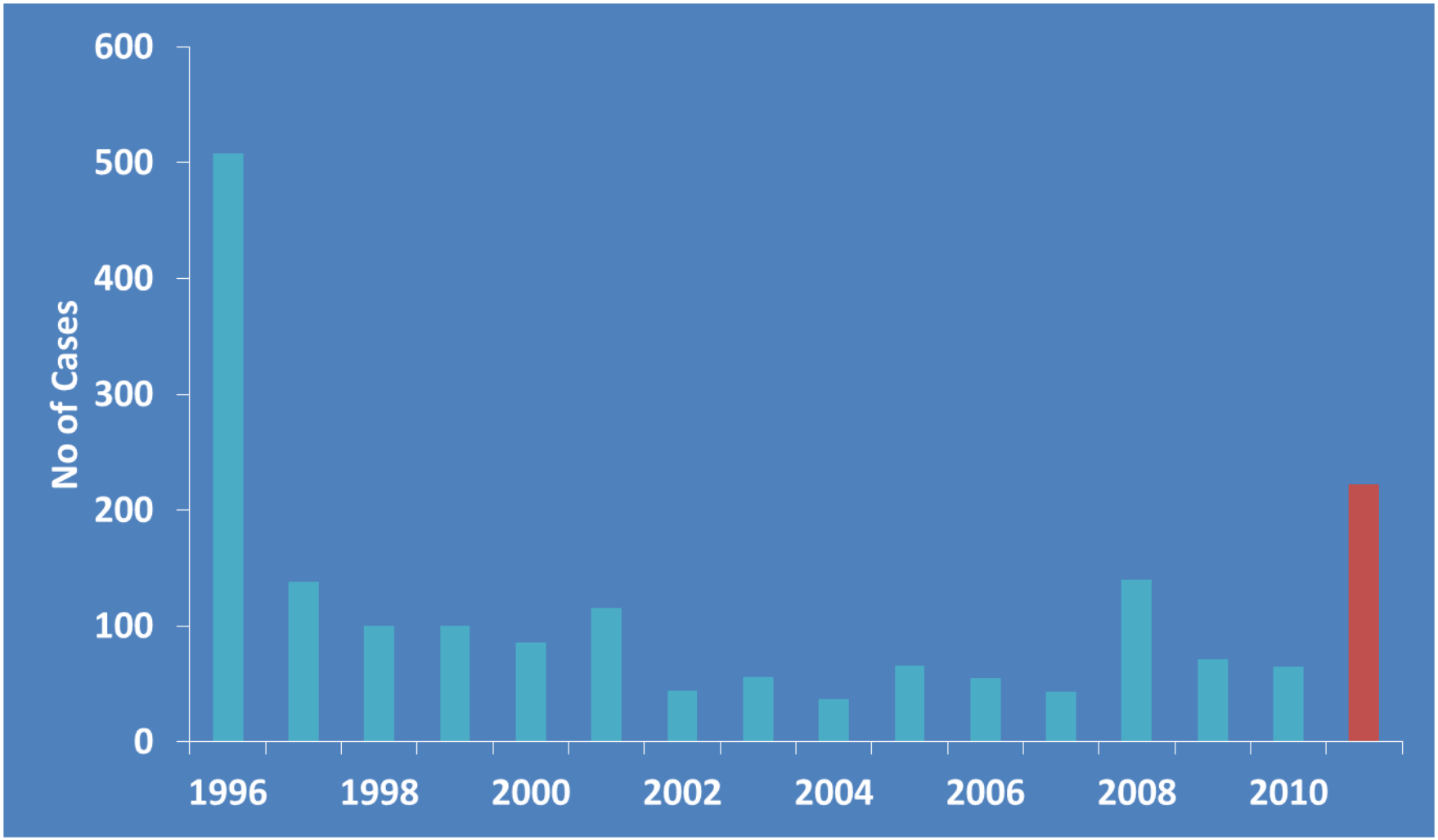
Measles Elimination, the Americas, 1980-2011*



A total of 3.2 million measles cases and 16,000 deaths would have occurred between 2000-2020 if PAHO strategies were not implemented. This resulted in a savings of US$ 208 million in treatment costs.[1]

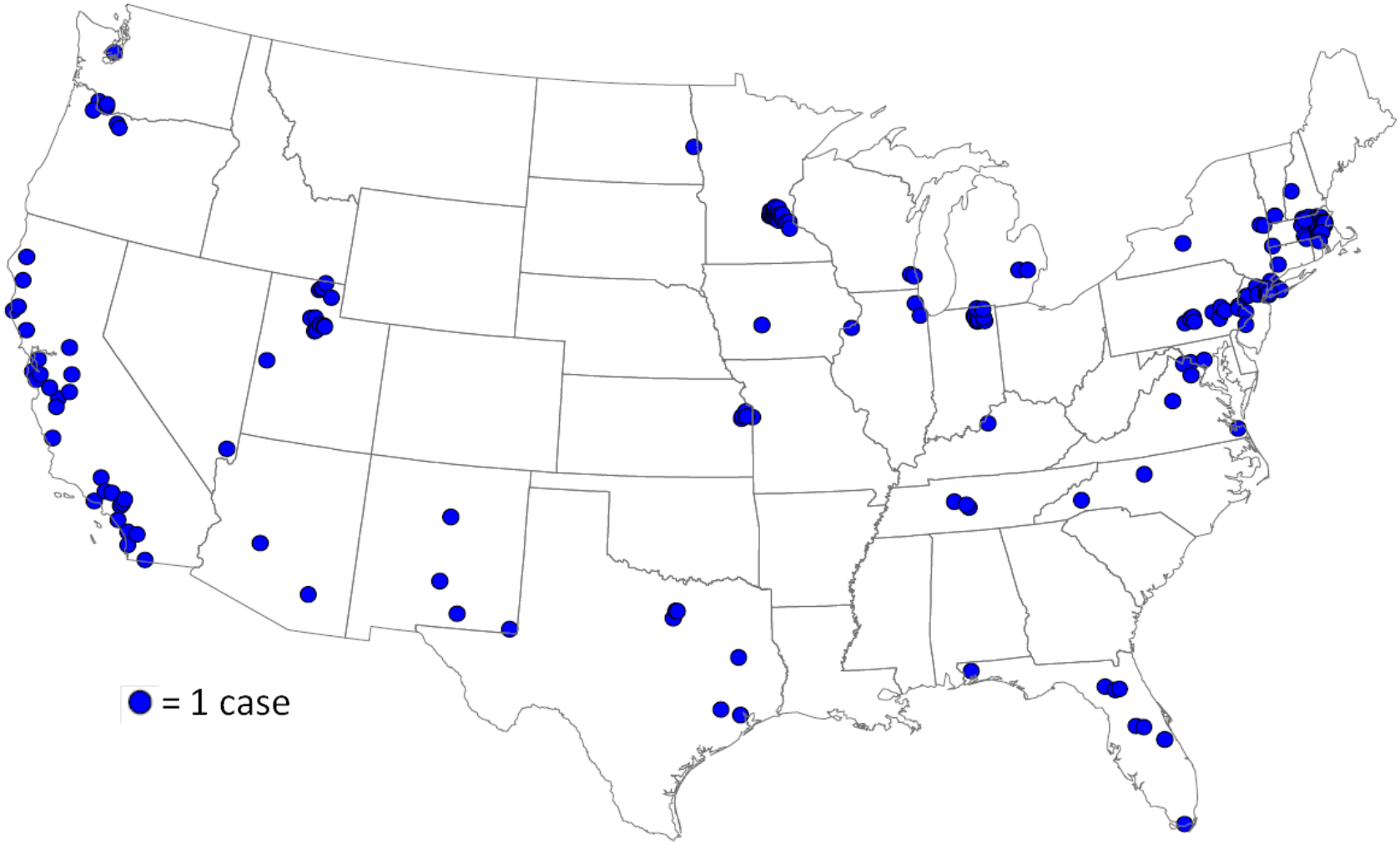
Source: Country reports to PAHO/WHO.
*Data until EW 35/2011; coverage data not available for 2010.
[1] Ibdem Acharya et. al.

Measles, United States, 1996-Present



CDC Immunization

Measles, United States, 2011
Geographic Distribution of Cases (n=222)



Measles, United States, 2011
Source of Importations, n=72

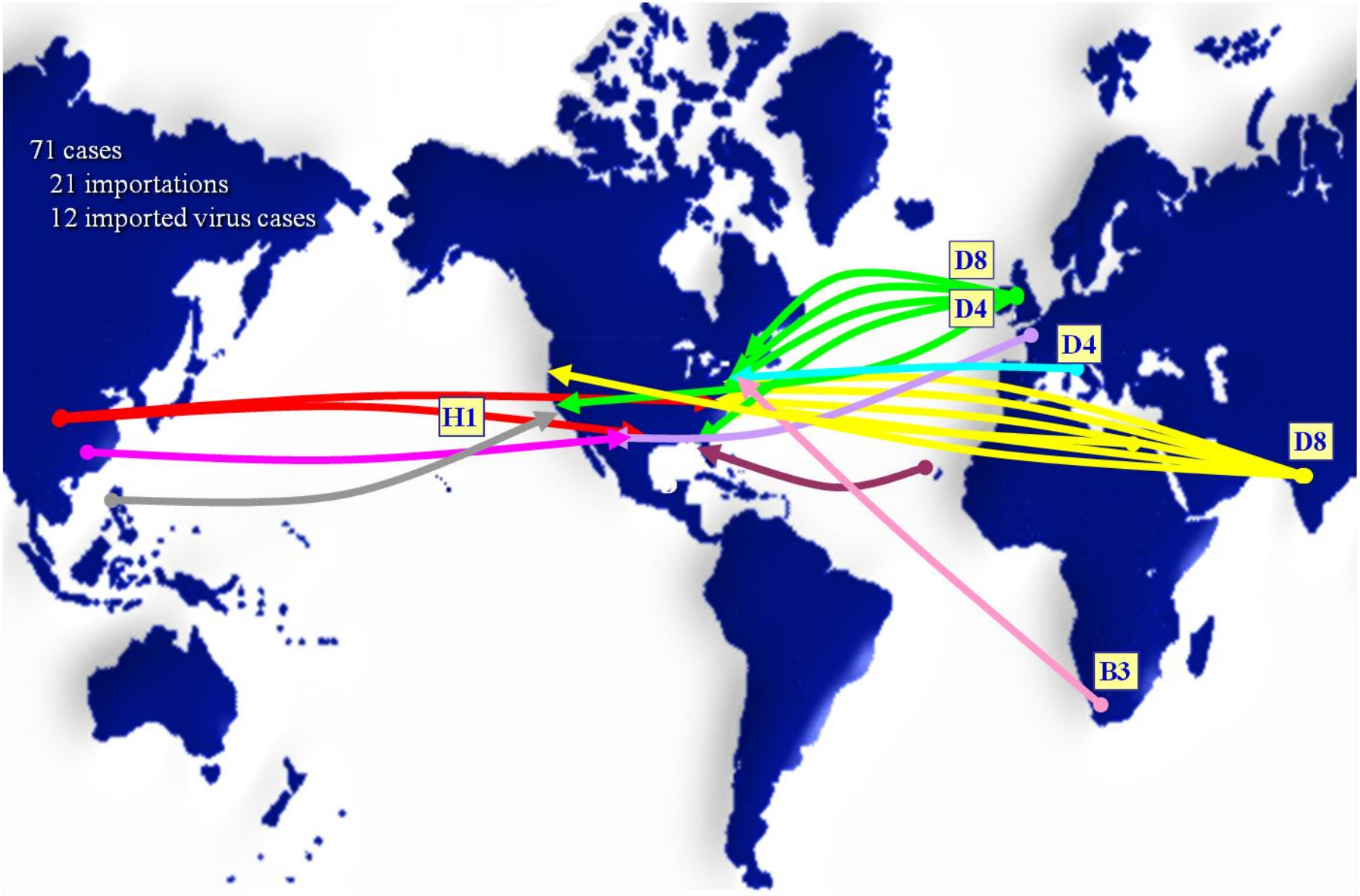
WHO Region	Total no. of cases	Countries	Genotype identified
African	4	Ethiopia (1), Kenya (2), Nigeria (1)	B3 (4)
Eastern Mediterranean	3	Jordan (1), Pakistan (2)	D4 (1)
European	33	Bulgaria (1), **France (13),** Italy (4), Poland (1), Romania (1), Spain (1), United Kingdom (5), France/Germany/Italy/Spain*(1), France/Germany/Spain* (1), France/Italy* (1), France/Spain/United Kingdom* (1), France/United Kingdom*(1), Hungary/Romania* (2)	D4 (16), G3 (1)
Americas	2	Canada (1), Dominican Republic†(1)	D4 (1)
South-East Asia	19	Bangladesh (1), **India (16),** Indonesia (2)	D8 (5), D4 (1)
Western Pacific	11	China (2), Malaysia (2), Philippines (6), Malaysia/Philippines/Singapore/Vietnam*(1)	H1 (1), D9 (6)

72% of importations were among U.S. residents traveling abroad

*Patient visited more than 1 country during the incubation period

† Likely acquired disease from French tourist

2009 Imported Measles, U.S., as of 12/31/2009

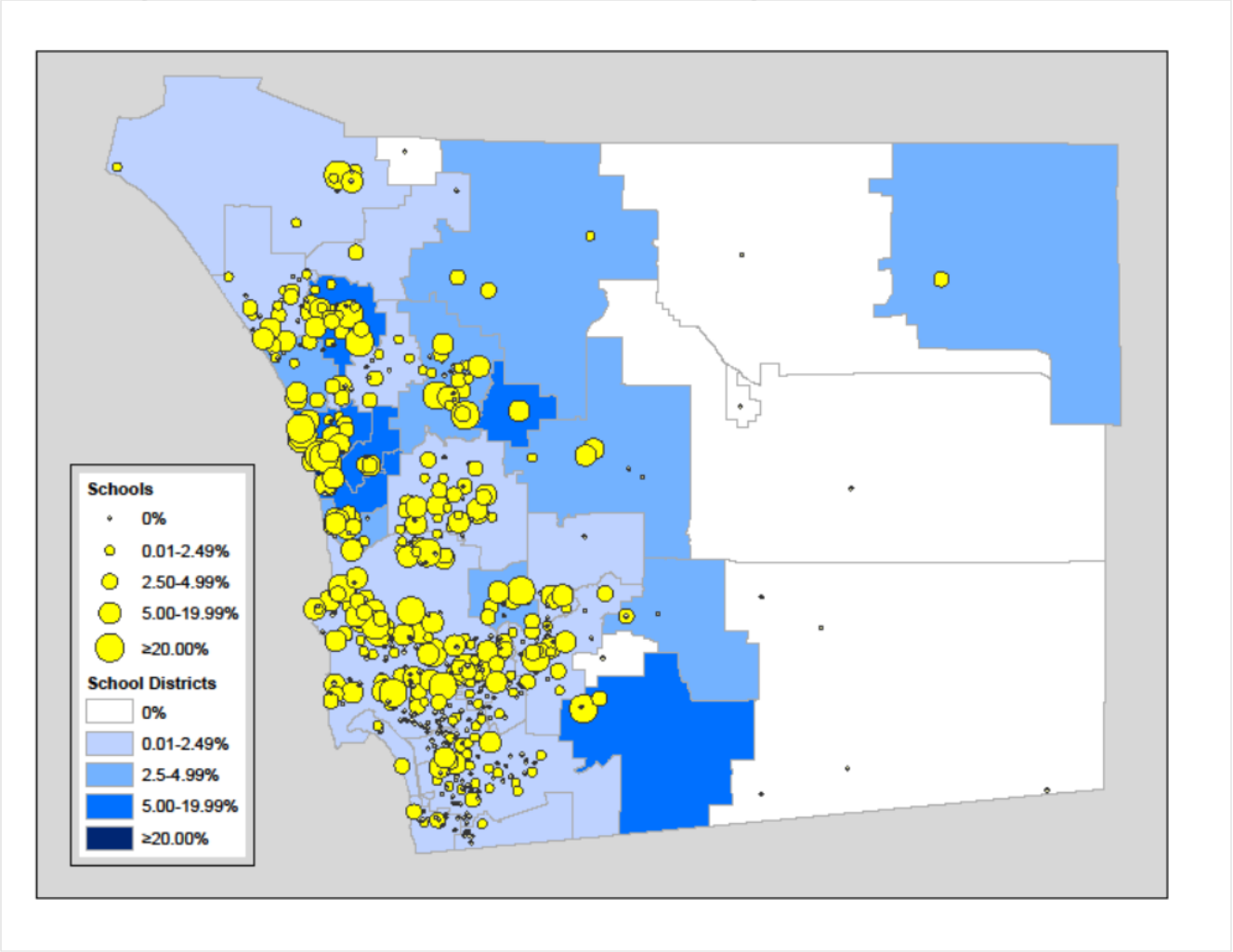


Measles Outbreaks*, United States, 2011

- 112/222 (50%) annual cases were outbreak-associated
- 17 total outbreaks
- Median outbreak size was 6 (range: 3 – 21)
- 44% of outbreak-associated cases were unvaccinated philosophical belief exemptors

*Outbreak = 3 or more epidemiologically linked cases

Personal Belief Exemptions in Kindergarteners, San Diego County, 2008 *



* Courtesy of D. Sugerman et al.

Implications for Disease Control

TABLE. Locations visited by six measles patients while contagious — Pennsylvania, March–April 2009

Patient	Age	Locations visited
A (Index patient)	23 mos	Hospital ED and otolaryngology clinic, community hospital ED, doctor's office
B	4 yrs	Hospital ED and otolaryngology clinic, community hospital ED, doctor's office
C	33 yrs	Doctor's office, construction worksite
D (ED physician)	NA	Hospital ED, medical conference, child-care center
E	11 mos	Hospital primary-care clinic, city buses, children's play center
F (Source patient)	10 yrs	International flight, hotel, doctor's office, hospital ED

Abbreviations: ED = emergency department; NA = not available.

Hospital-associated measles outbreak, PA, Mar-Apr 2009, MMWR, January 20, 2012 / 61(02);30-32

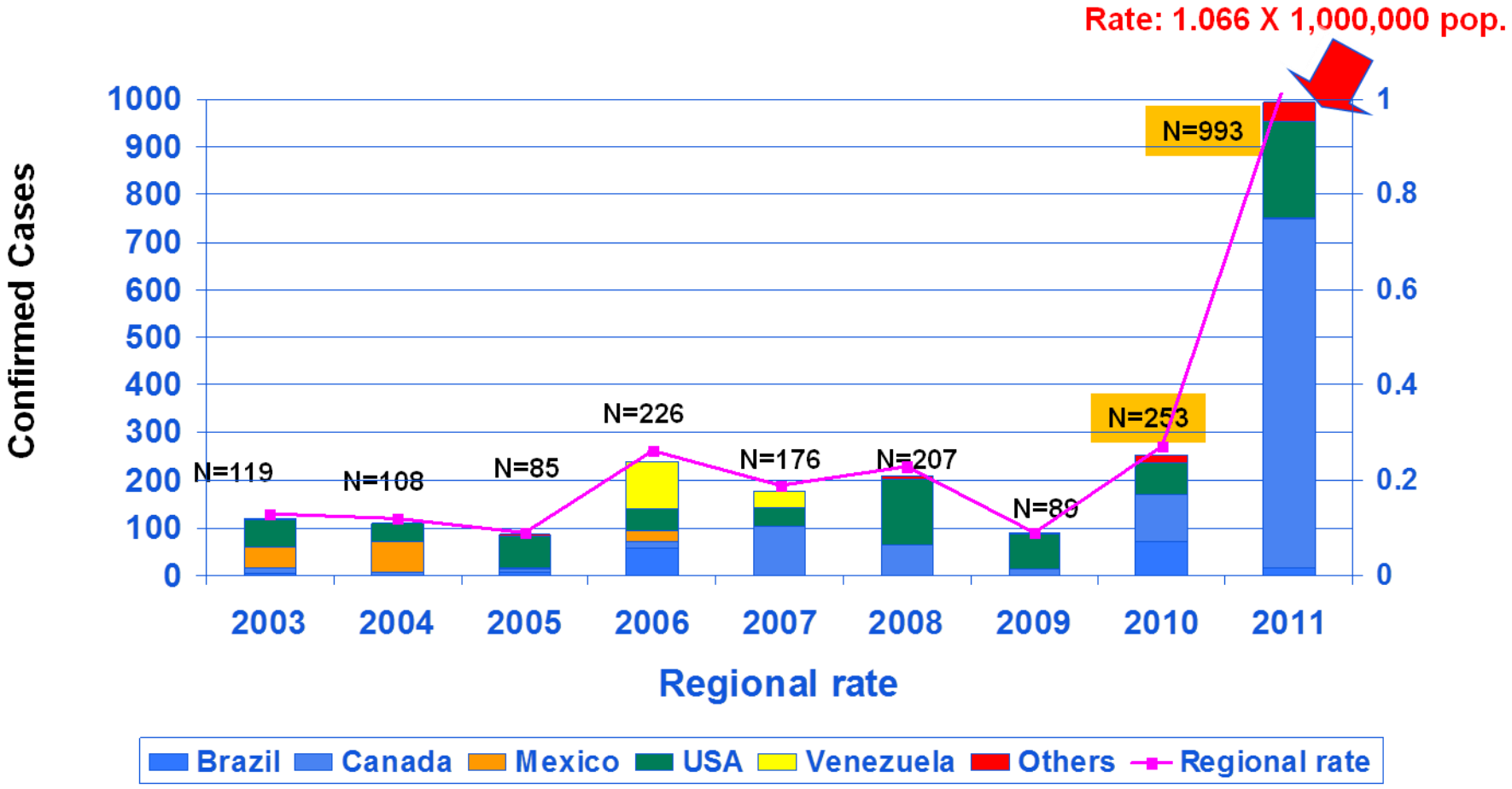
CDC Immunization

Keys to Maintaining Measles Elimination in the U.S.

Thinking beyond our borders

- High 2-dose MMR vaccination coverage
- High quality surveillance system
- Rapid identification of and response to measles cases
- Measles is reportable within 24 hours per Council of State and Territorial Epidemiologists guidelines
- Aggressive outbreak control measures
- Access to reliable laboratory testing capabilities
- Genotyping can give clues to source in some instances
- Information sharing tools (Epi-X, HAN)

Distribution of Confirmed Measles Cases Following the Interruption of Endemic Transmission, the Americas, 2003-2011*

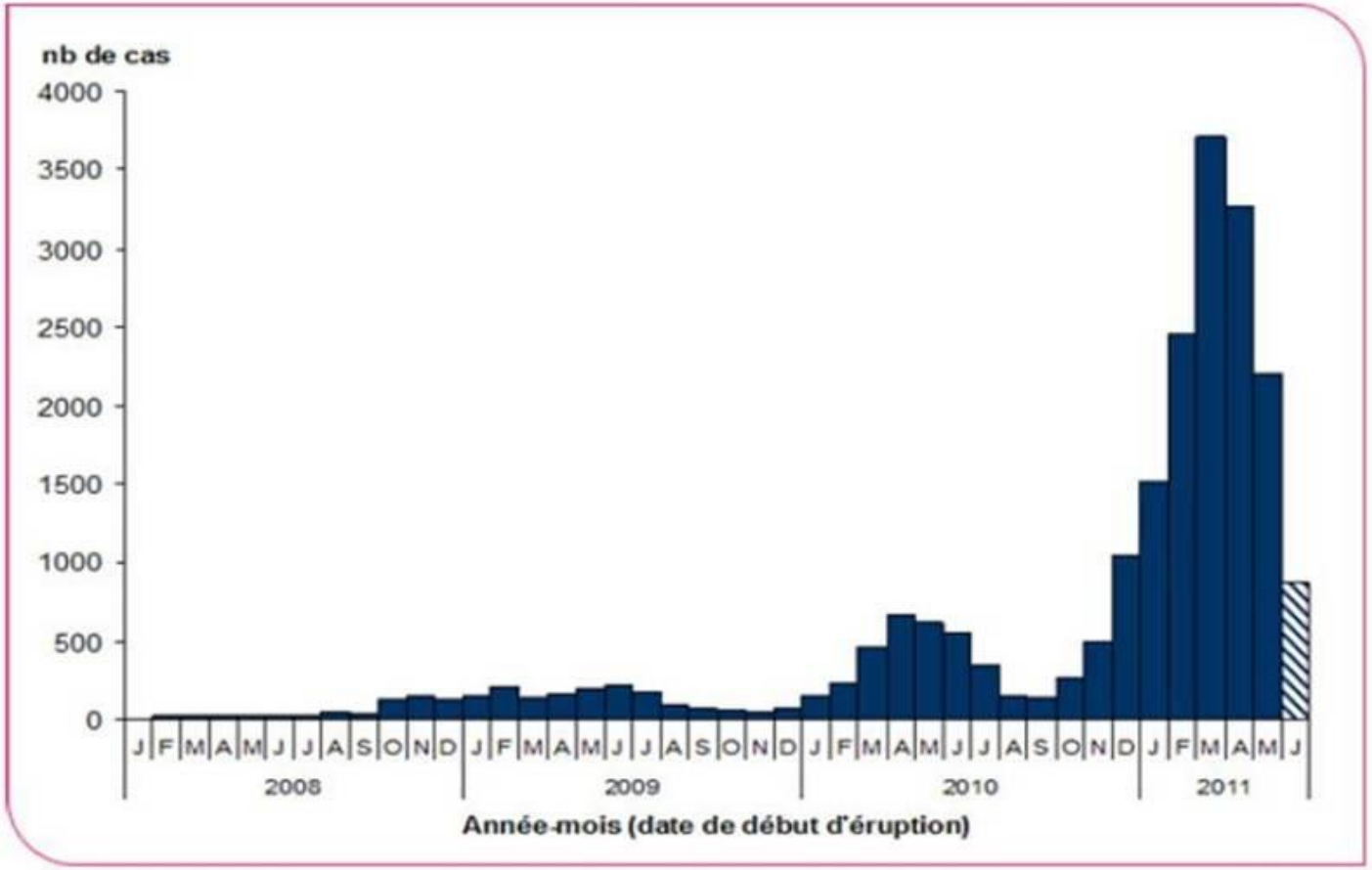


*Data as of EW 35/2011

Source: Country reports to PAHO/WHO.

Measles is Epidemic in France

Measles cases per month - Mandatory reporting, France, January 2008-June 2011 (provisional data for June) / *Number of measles boxes per month - Mandatory notification, France, January 2008 - June 2011 (provisional data for June)*



Vaccination of U.S.-Bound Refugees

- **70,000 refugees resettled (70 nationalities from 100 countries) to 49 states annually**
- **Refugees not legally required to get vaccinations before U.S. resettlement**
  - ~ 1/3 of refugees arrive in U.S. with no documented vaccinations
- **> 40 VPD outbreaks in last 5 years**
  - 1 recent imported measles case in Burmese refugee from Malaysia led to 8 cases in U.S., costly state/local PH response, and delayed resettlement of refugees
- **Missed opportunity to vaccinate refugees between required overseas health assessment & arrival in U.S. (4-6 months)**

Impact of Global Measles Mortality Reduction Efforts, 2000 - 2008

WHO Region	Estimated deaths 2000	Estimated deaths 2008	Percent reduction in deaths
Africa	371,000	28,000	92%
Americas	<1,000	<1,000	-
Eastern Mediterranean	101,000	7,000	93%
European	<1,000	<1,000	-
SE Asia	234,000	126,000	46%
W. Pacific	25,000	2,000	92%
TOTAL	733,000	164,000	78%

Source: MMWR 2009; 58(47):1321-1326

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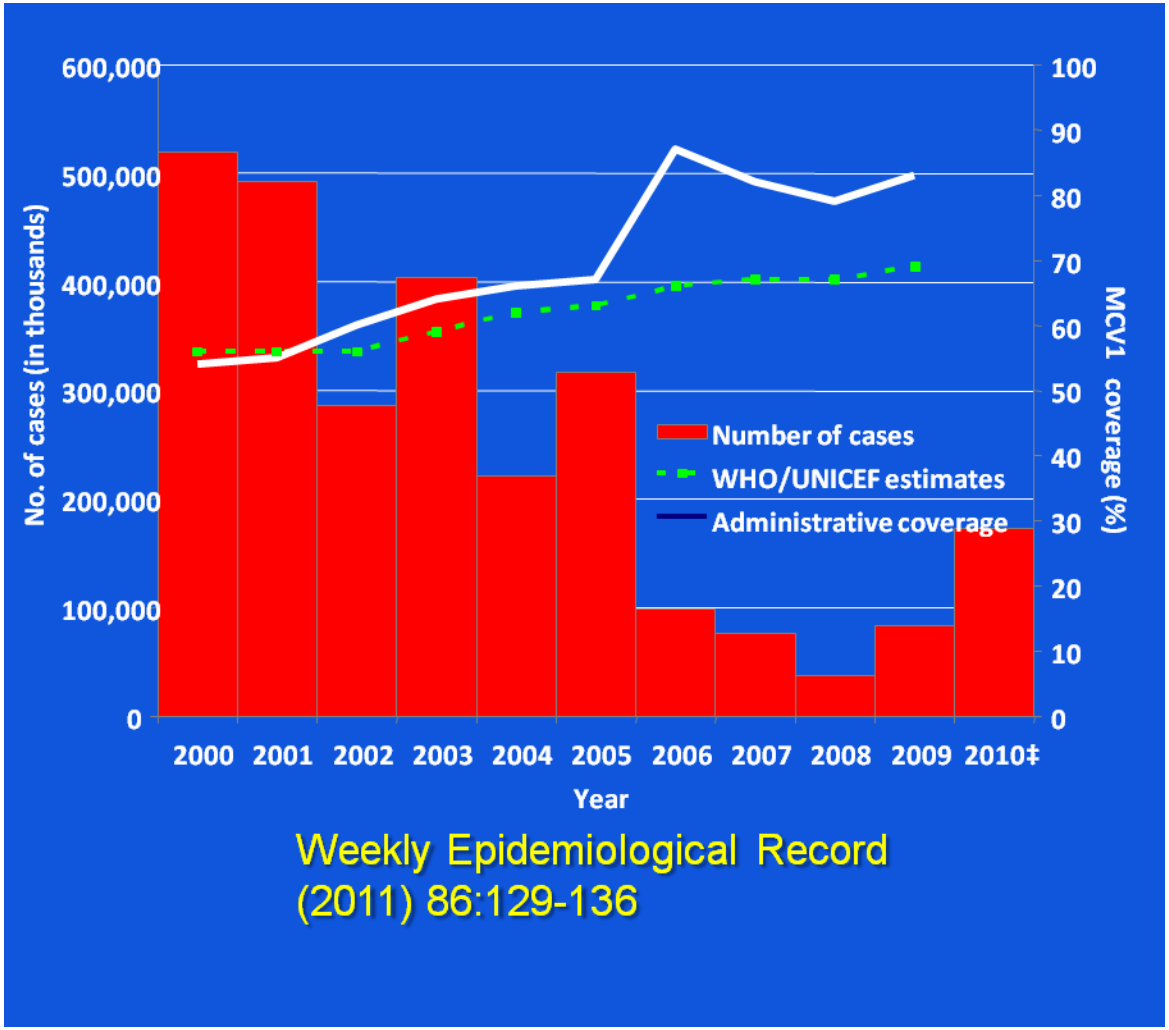
Deaths Averted: 12.7 million

Source: MMWR 2009; 58(47):1321-1326

Measles Resurgence in Africa



- 4-fold increase in cases since 2008
- Outbreaks in 28 countries with large outbreaks in Burkina Faso (2009), S. Africa (2010), and DRC (2011)
- Outbreaks in drought affected Horn of Africa
  - High case-fatality

Fatal Respiratory Diphtheria in a U.S. Traveler to Haiti --- Pennsylvania, 2003

- In October 2003, the Pennsylvania Dept of Health and CDC were notified of a suspected case of respiratory diphtheria in a previously healthy Pennsylvania man aged 63 years who reported that he had never been vaccinated against diphtheria. He and seven other men from NY, PA, and W. VA. had returned from a week-long trip to rural Haiti, where they helped build a church.

MMWR, January 9, 2004 / 52(53);1285-1286

Haiti's National Immunization Program 2012 Partnership Plans

Measles-Rubella & Polio Campaign (April 2012)

-vaccine supply, logistics

-social mobilization

-supervision and microplanning

-capacity building

Introduce New Vaccines (June 2012)

-introduce pentavalent vaccine "catch up"

-increase operational capacity of cold chain

-social mobilization

Rotavirus & Pneumoccocal

Strengthen Routine Immunization

-strategies to reach every child

-improve surveillance

-cold chain improvement

-vaccine supply & logistics

Pan American Health Organization
Regional Office of the World Health Organization

USAID FROM THE AMERICAN PEOPLE

Canadian International Development Agency

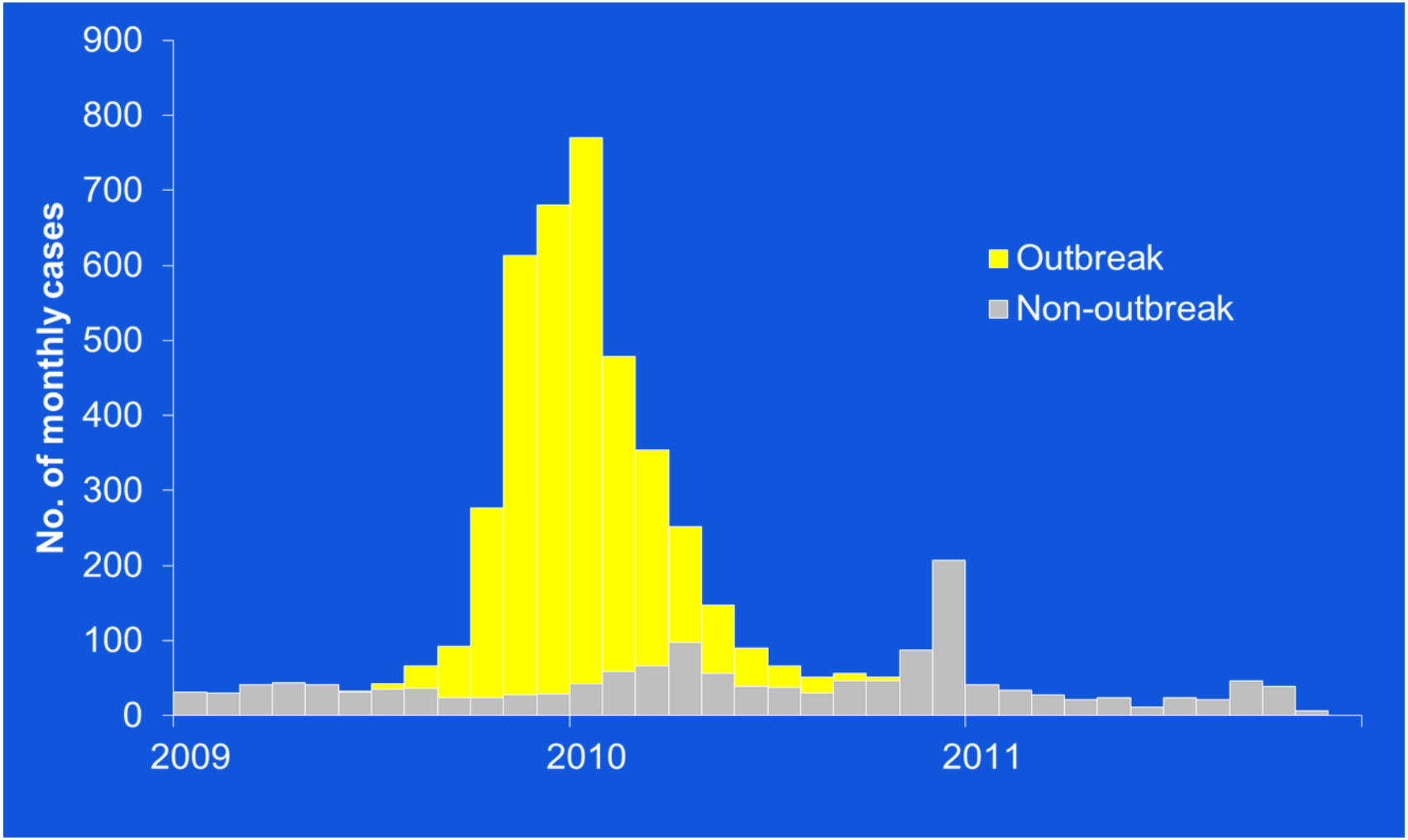
Ministério da Saúde BRASIL

unicef

GAVI ALLIANCE

CDC Centers for Disease Control and Prevention

US Mumps Outbreak, 2009-2011



US Mumps Outbreak, 2009-2011

- 97% of cases within an Orthodox Jewish community
- Unique schools, large households conducive to transmission
- Prolonged, intense exposures likely overcame protection afforded by the vaccine
- Source - 11 y.o. M returning from UK where outbreak was ongoing
- US outbreak likely source of a subsequent outbreak in Israel

Summary

- Sustaining elimination and/or control of vaccine-preventable diseases in the US requires substantial public health and clinician efforts
- Infectious diseases know no borders
- Improving immunization in other countries protects all of us
- Reduced public and social support for immunization in other countries threatens all of us
- Global immunization efforts - ‘best buy’ for health and foreign aid investments
  - support security, diplomacy and humanitarian USG goals
  - embody our nation’s values

Acknowledgments

- Stephanie Bialek
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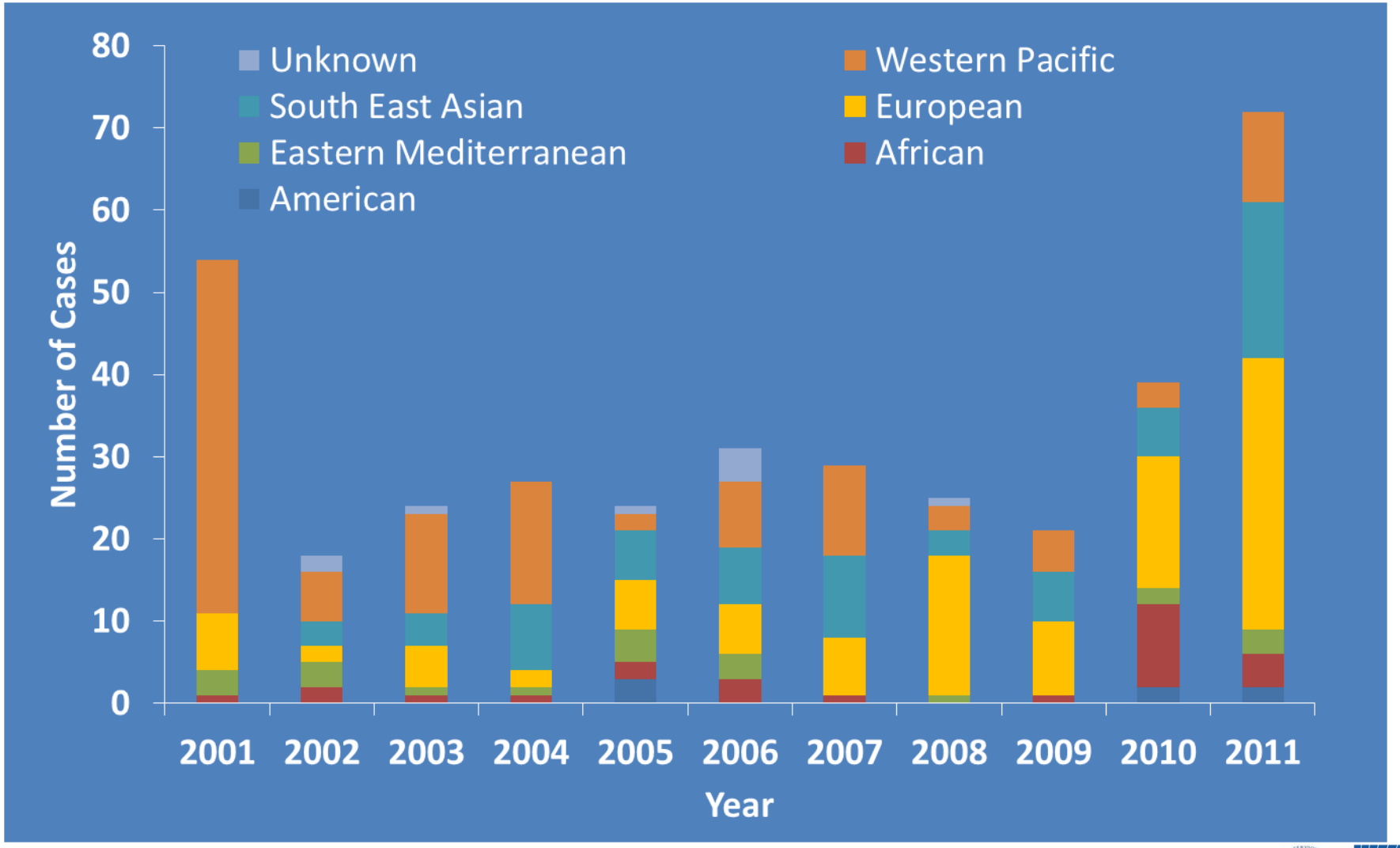
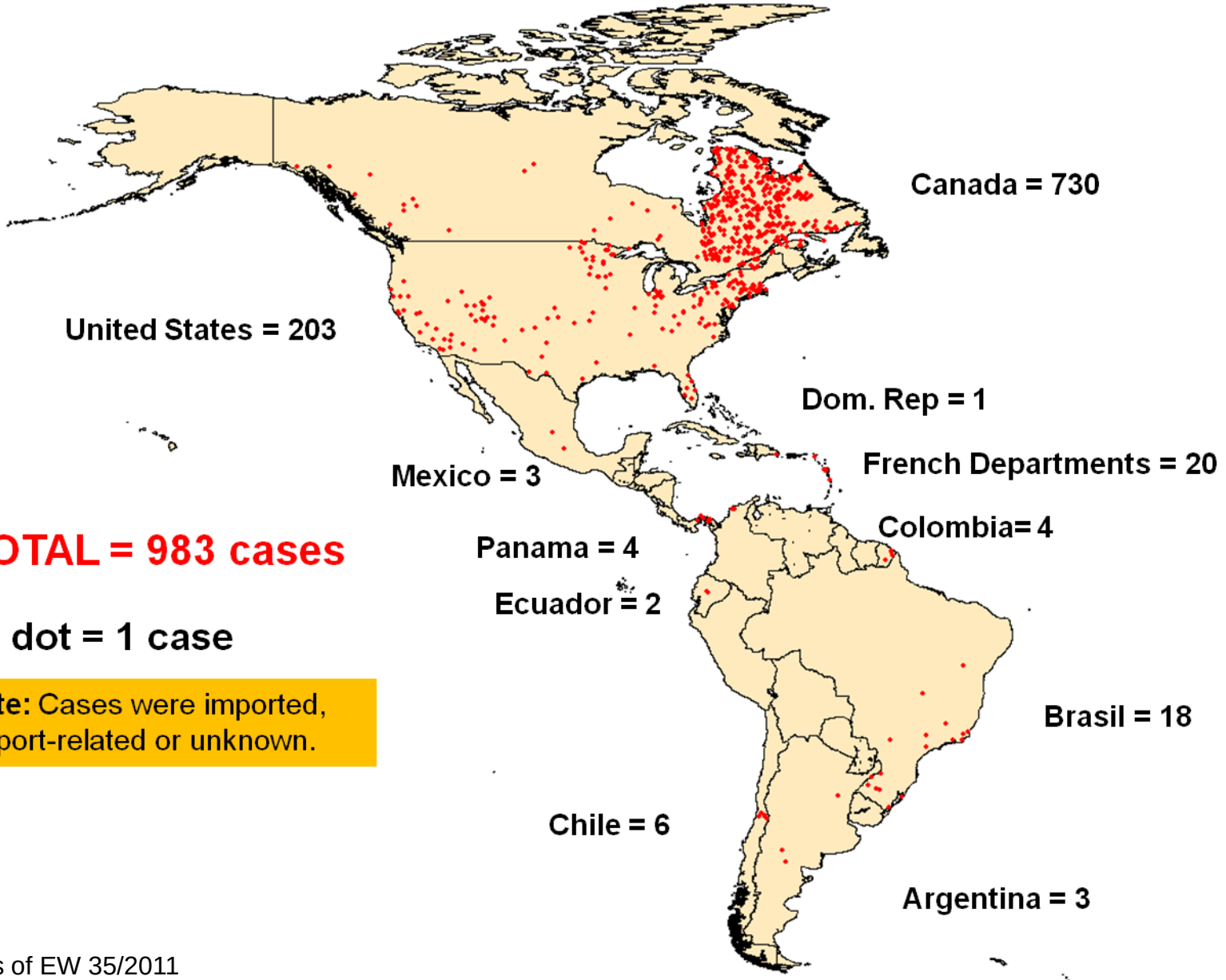
- John Fitzsimmons
- Dan Payne
- Sandy Roush
- Jane Seward
- Abbie Shefer
- Greg Wallace

EXTRA SLIDES

Measles, United States, 2001-2011
Importations by WHO Region



Confirmed measles cases in the Americas, 2011*



TOTAL = 983 cases

1 dot = 1 case

Note: Cases were imported, import-related or unknown.

*Data as of EW 35/2011

Source: MESS and country report to PAHO/WHO

Measles Europe, 2011*

- 26,236 reported cases
- 7 deaths
- France: 14,040
- Italy: 4,000
- Spain: 2,407
- Romania: 2,072
- Germany 1,361

*Jan 1 – July 31