



Pan American Health Organization



*Regional Office of the
World Health Organization*

Surveillance Performance Indicators: Laboratory Confirmation & Viral Detection

Carlos Castillo Solorzano, MD, MPH

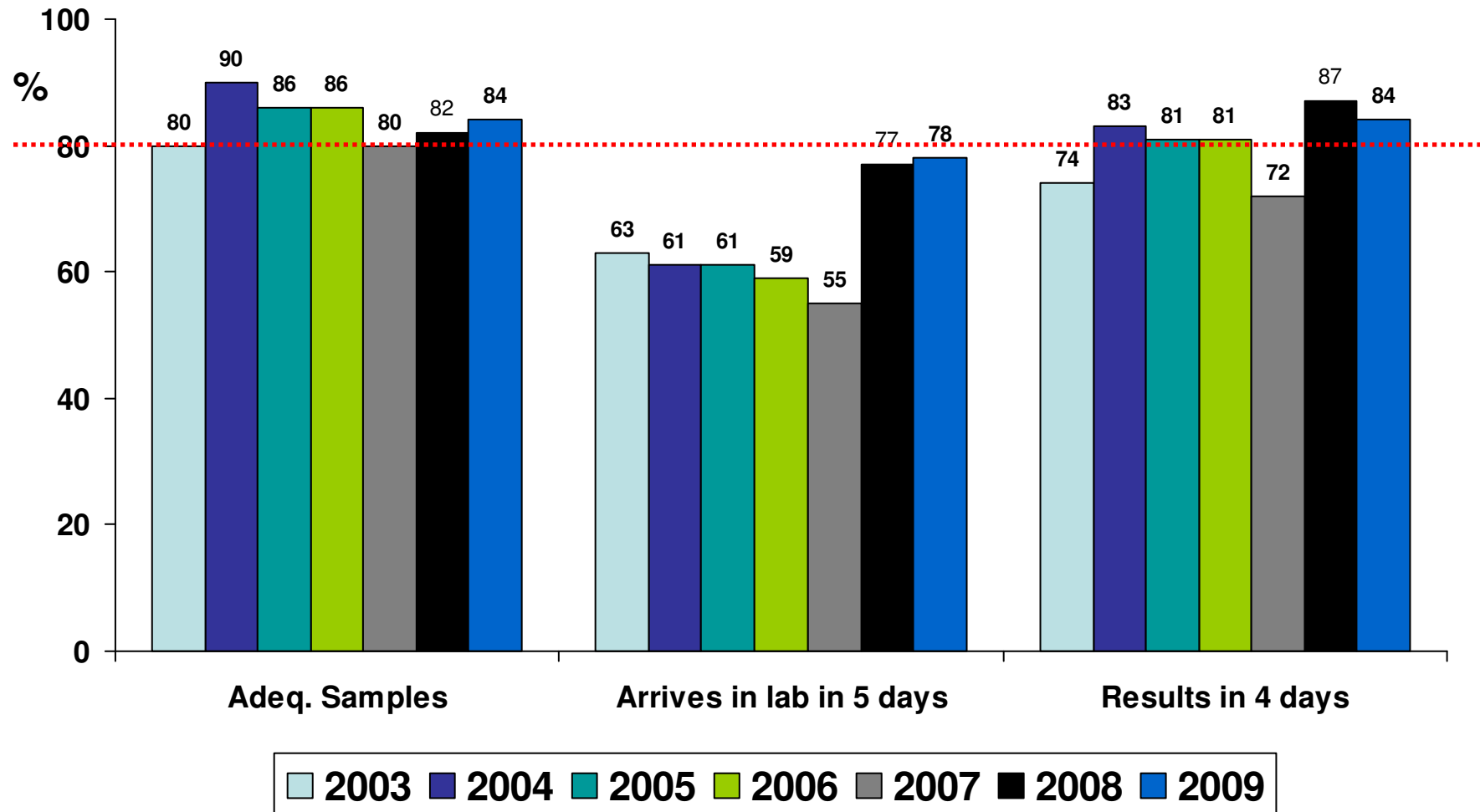
Desiree Pastor, MD, MPH

**Global Measles Management Meeting
14-16 October 2009
Geneva**

Definition of adequate sample

A single serum sample obtained at the first contact of the suspected patient with the health care system within 30 days of rash onset is considered adequate for measles surveillance.

Reporting of the Laboratory Confirmation Indicator, The Americas, 2003-2009*



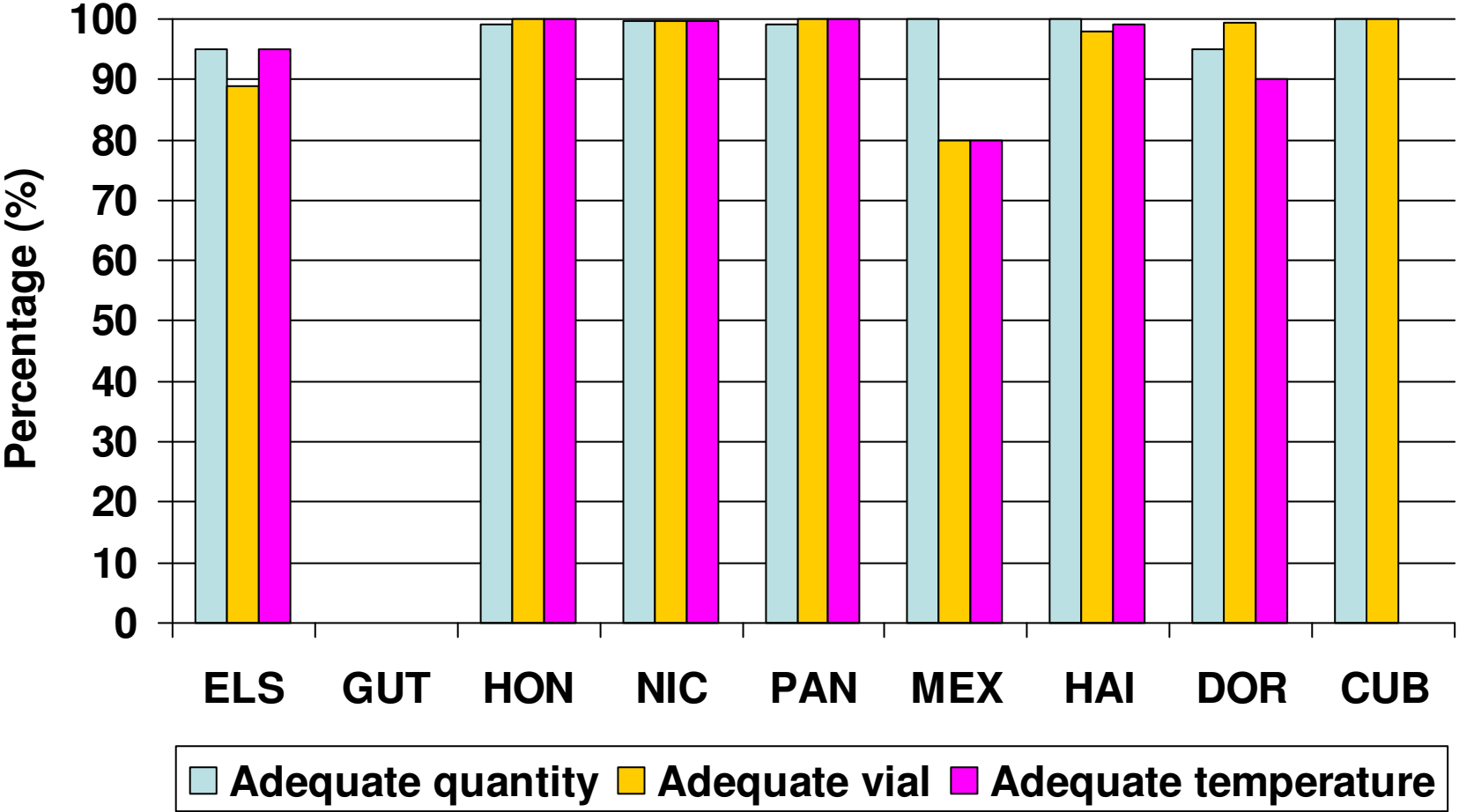
Source: Country reports to PAHO.

*Data until EW 39/2009.

Why are specimens not collected or not adequate?

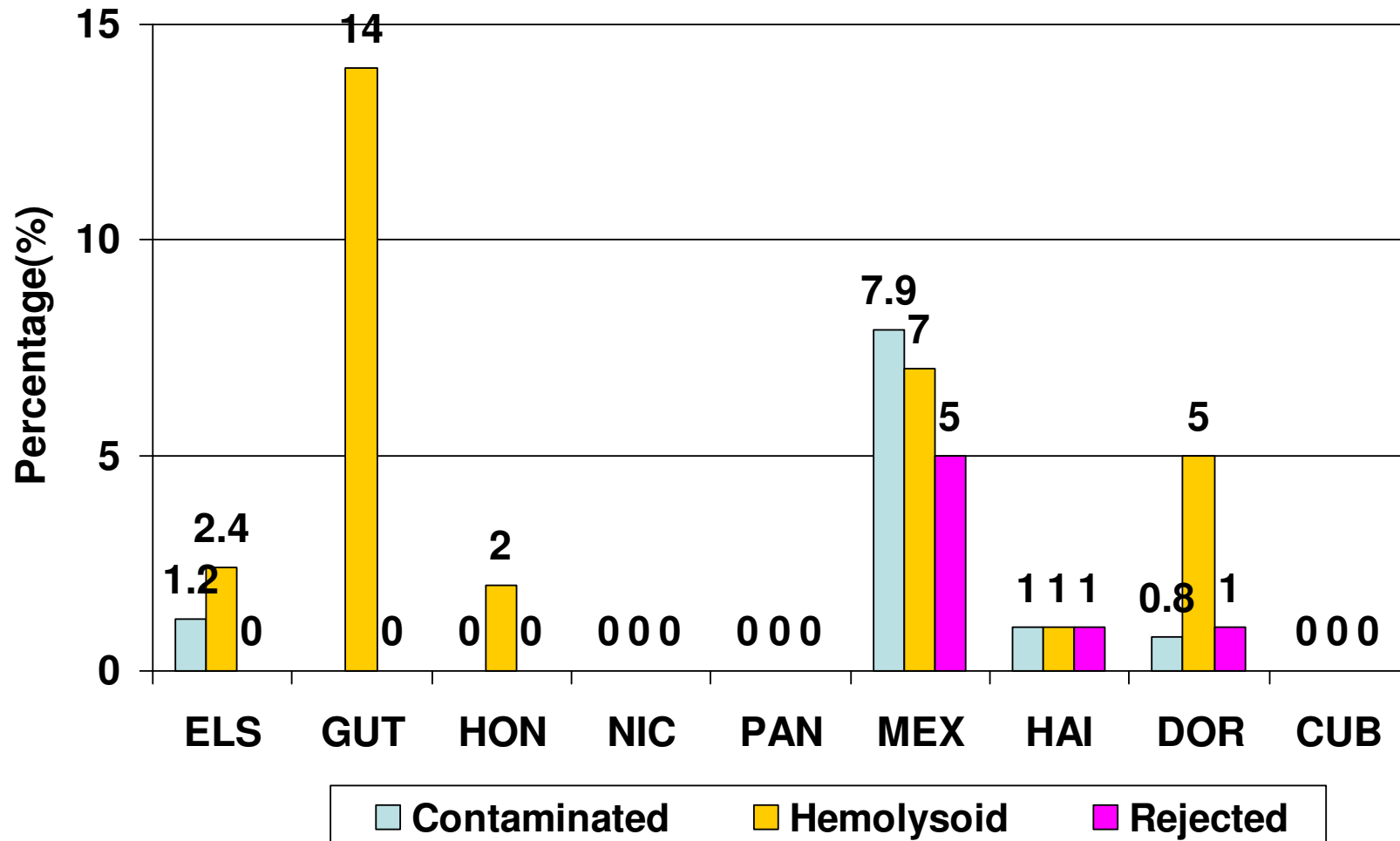
- **Most of the measles/rubella cases are captured by the public sector:**
 - ✓ **Health personnel may not be familiar with the proper procedure for the immediate collection of serum specimen.**
- **Lack of good communication between clinical-epidemiology and laboratory technicians.**
- **Measles patients are often reluctant to a second visit's doctor for the sole purpose of serum specimen collection.**
- **Lack of adequate storage and shipment of the serum sample.**

Conditions of the samples upon arriving to the laboratory, Central America, 2001



Source: Country reports to PAHO/WHO

Conditions of the samples upon arriving to the laboratory, Central America, 2001



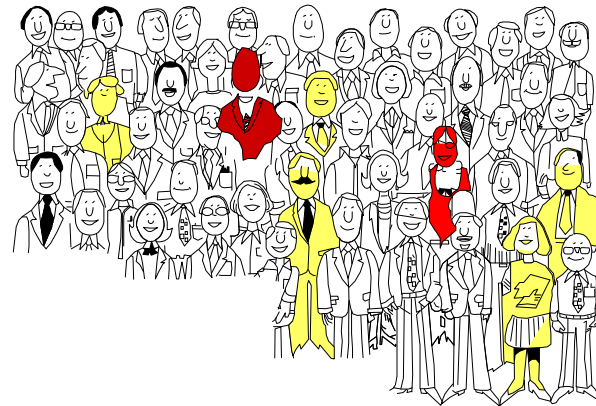
Source: Country reports to PAHO/WHO

Measles Outbreak Control in the Post-Elimination Era

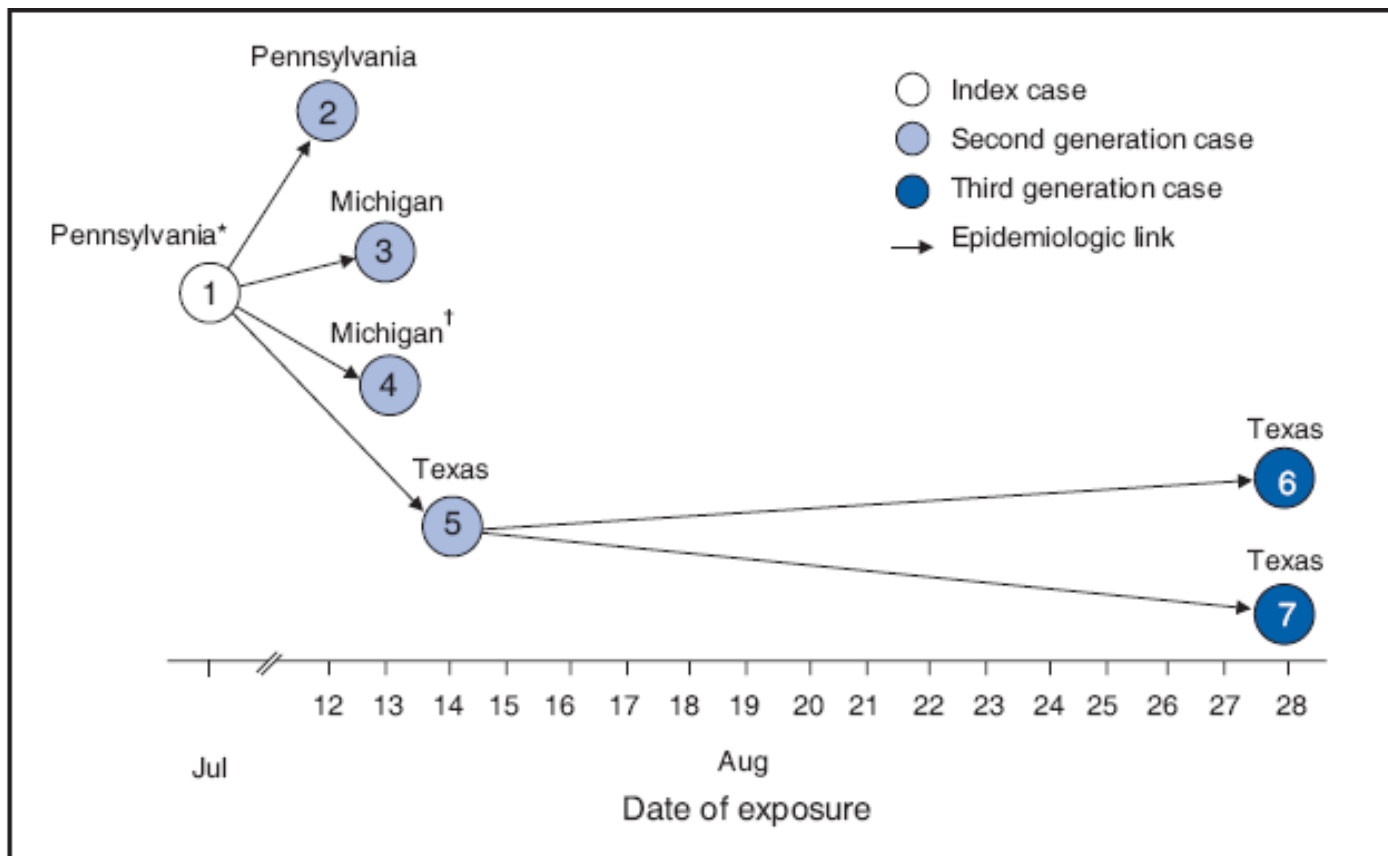
What is an outbreak?

The occurrence of one laboratory confirmed measles case is considered an outbreak.

When a measles case is suspected, investigation and control measures should begin.



Chains of transmission, spread from an international sporting event in Pennsylvania, 2007



Two or more subsequent cases

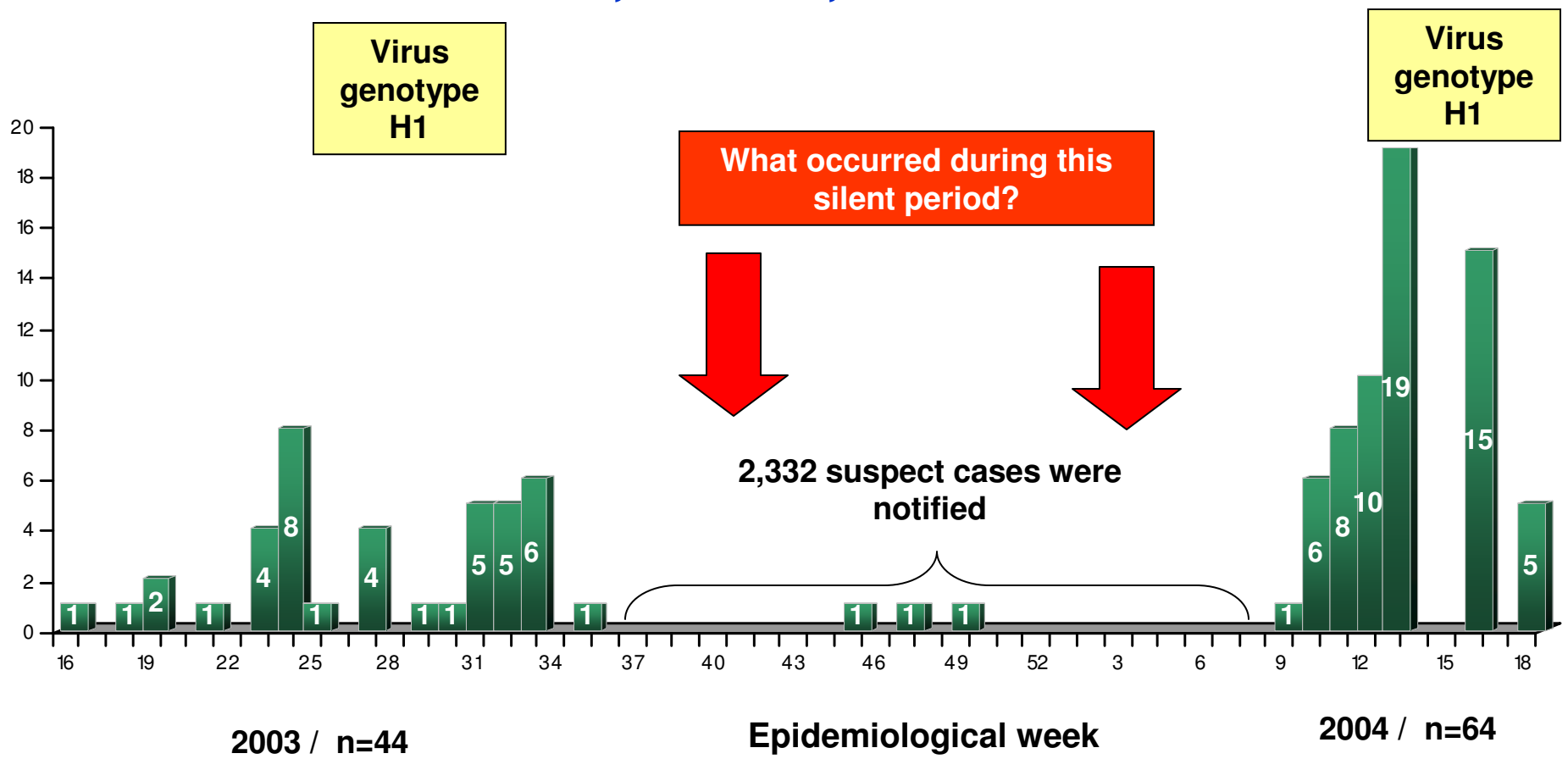
Source: Jennifer Rota/CDC

When and how many samples for viral detection/isolation should we collect?

- **For single suspected cases, each case and their contacts should be completely investigated with specimens collected for serology and for viral detection/isolation.**
- **In all outbreak, at least one successful viral detection/isolation has to be identified. To make that possible, five to ten suspect patients typically need to be sampled.**

In addition in large outbreaks, five to ten suspected patients typically need to be sampled every twelve weeks to identify the genotype that is circulating.

Number of Confirmed Measles Cases by Epidemiological Week, Mexico, 2003 - 2004



Source: Secretary of Health, Mexico

Challenge

In this stage of elimination, with limited number of secondary cases to the importation, shall we collect samples for viral detection/isolation of all measles and rubella suspected cases?

Collection at the same time of both serum and viral sample of the **“hot cases”**:

- ✓ Tourist areas
- ✓ Industrialized areas
- ✓ Travel history
- ✓ Border areas with high traffic
- ✓ Suspected cases with a high likelihood of exposure

Lessons learned

In an elimination setting, rapid exchange of sequence data is a critical component of laboratory surveillance.

Example: Imported measles case from Peru – genotype D4.

- Rapid communication between laboratory officers from the Health Protection Agency / London, FioCruz / Brazil and CDC/USA permitted the identification of the source of this outbreak.
- D4 virus is endemic in London and India; CDC and HPA compared D4 from the case from Peru with the sequences of specimens from both countries and found that they were related phylogenetically with the specimen from India.

Virologic Surveillance for Measles, USA: 2002-2008

Year	Number of cases	Number of chains	Number chains with genotype (%)	Number of outbreaks	Number of outbreaks with genotype (%)
2002	44	26	8 (31)	3	1
2003	56	29	7 (24)	3	2
2004	37	21	6 (28)	2	2
2005	66	25	12 (48)	3	2
2006	55	31	14 (45)	4	2
2007	43	27	7 (26)	4	3
2008	141	39	15 (39)	9	9
Total	442	198	69 (35)	28	21 (75)

Source: Paul Rota/CDC

Indicators for the Measles/Rubella Documentation and Verification Process

Criteria	Indicator	Minimum threshold
Laboratory Confirmation	% suspected cases with adequate blood specimen.	$\geq 80\%$
Viral Detection	% outbreaks with adequate specimens and genotype information available from at least one viral specimen.	$\geq 80\%$