

Overview of Vaccine Preventable Disease (VPD) Surveillance in the United States

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Overview of Vaccine Preventable Disease (VPD) Surveillance in the US



Presentation Objectives

Discuss:

- Purpose of vaccine-preventable disease (VPD) surveillance
- Types of surveillance data collected
- Surveillance systems/methods
- Support for VPD surveillance

Purpose of vaccine-preventable disease (VPD) surveillance

Purpose of Vaccine-Preventable Disease Surveillance

- Estimate burden of disease
- Evaluate control measures
- Determine geographic distribution
- Portray the natural history
- Detect epidemics/define a problem
- Generate hypotheses, stimulate research
- Monitor changes in infectious agents
- Detect changes in health practices
- Facilitate planning

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% |
| <i>Haemophilus influenzae</i> | 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% |

† Source: JAMA. 2007;298(18):2155-2163

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

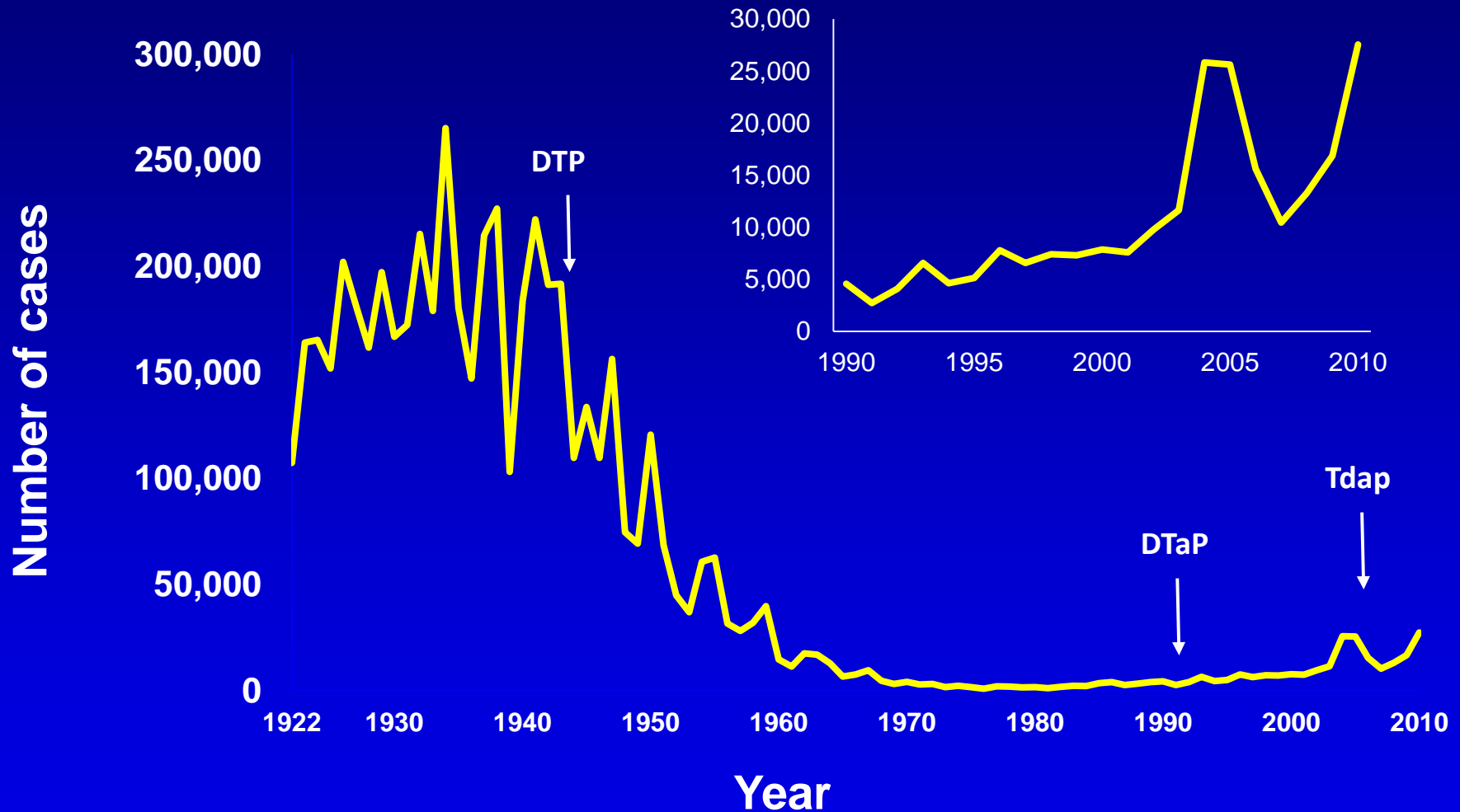
Source: CDC. Active Bacterial Core surveillance Provisional Report; S. pneumoniae 2010. <http://www.cdc.gov/abcs/reports-findings/survreports/spneu09.html>

Source: 2010 (provisional) Active Bacterial Core surveillance

Source: New Vaccine Surveillance Network (unpublished)

Types of VPD surveillance data collected

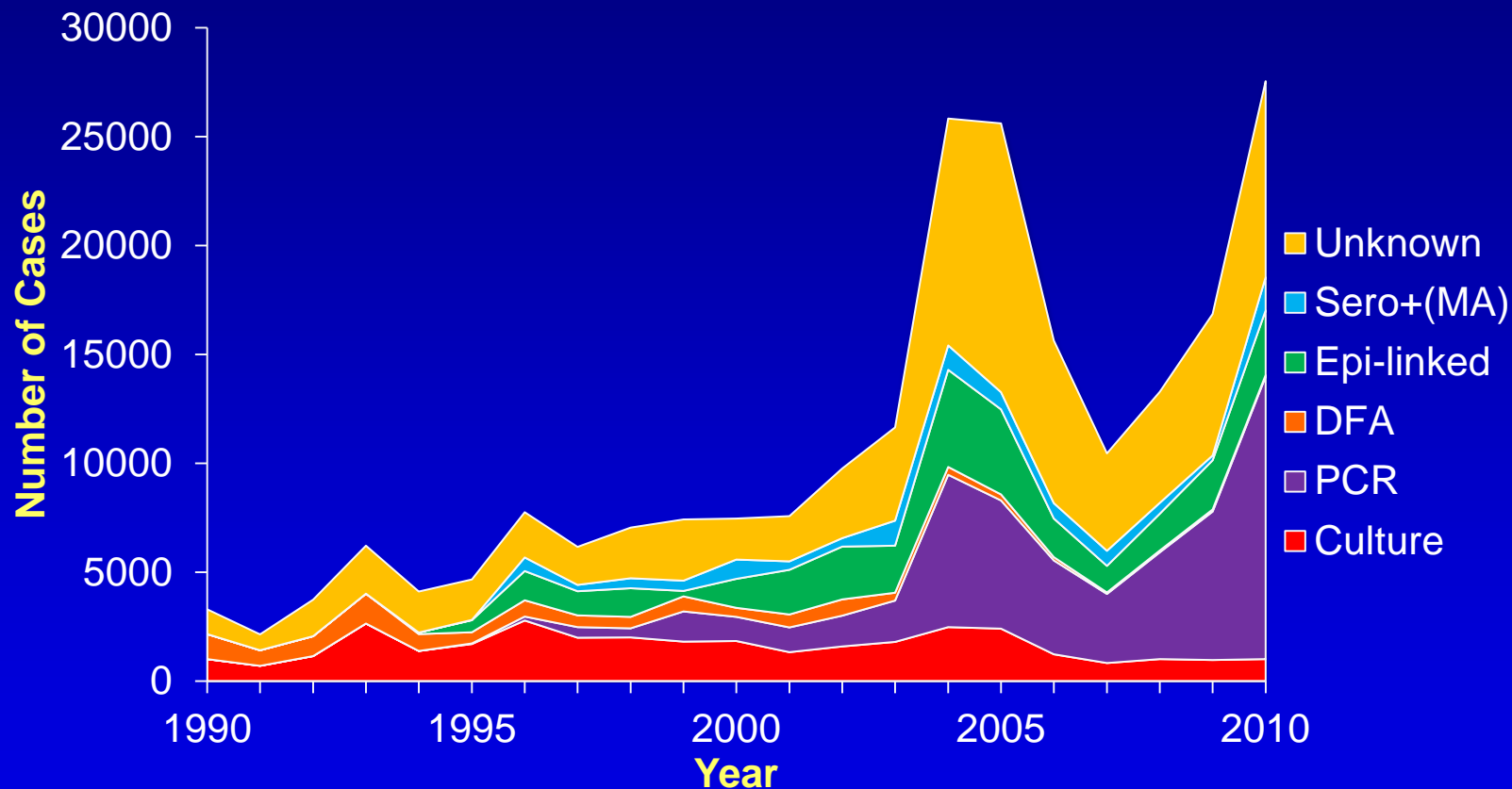
Reported Pertussis Cases, 1922–2010



SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System and 1922-1949, passive reports to the Public Health Service



Reported Pertussis Cases by Diagnosis[±] 1990-2010

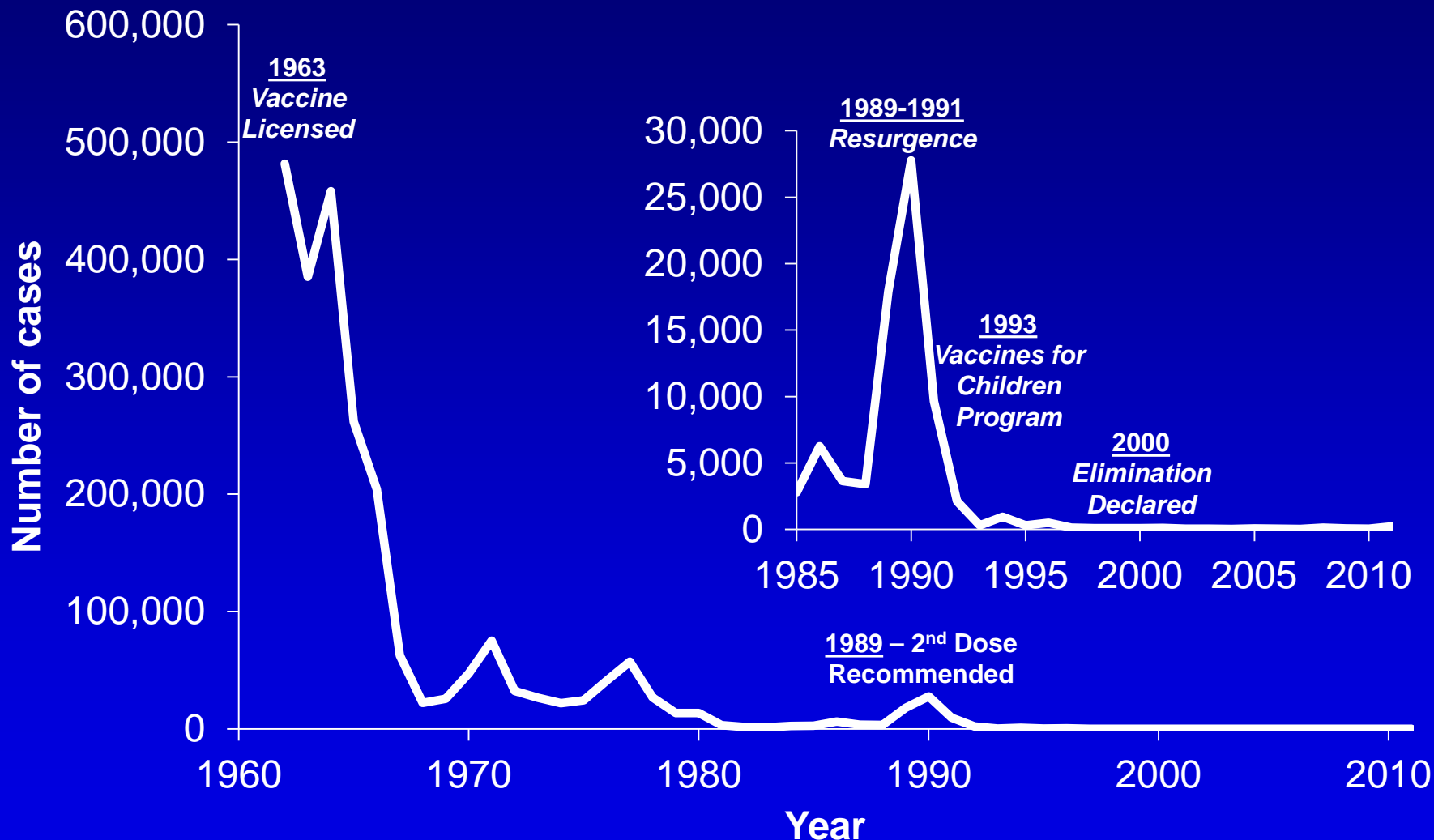


[±]Data collection for PCR and Epi-Link began in 1995

Source: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System, 2010

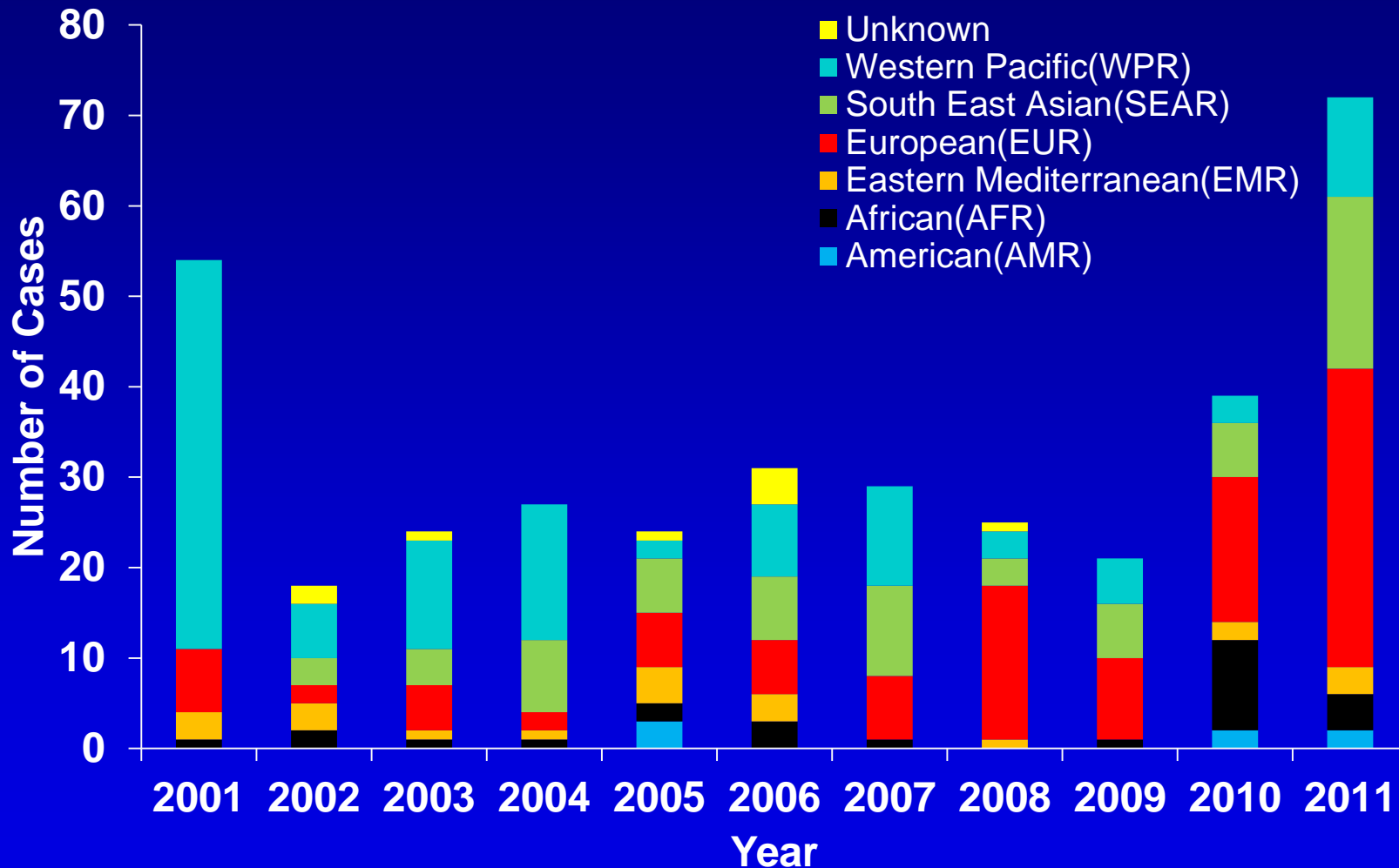


Measles Cases, United States, 1962-2011



Measles, United States, 2001-2011

Importations by WHO Region



Critical Elements in National Surveillance for VPDs

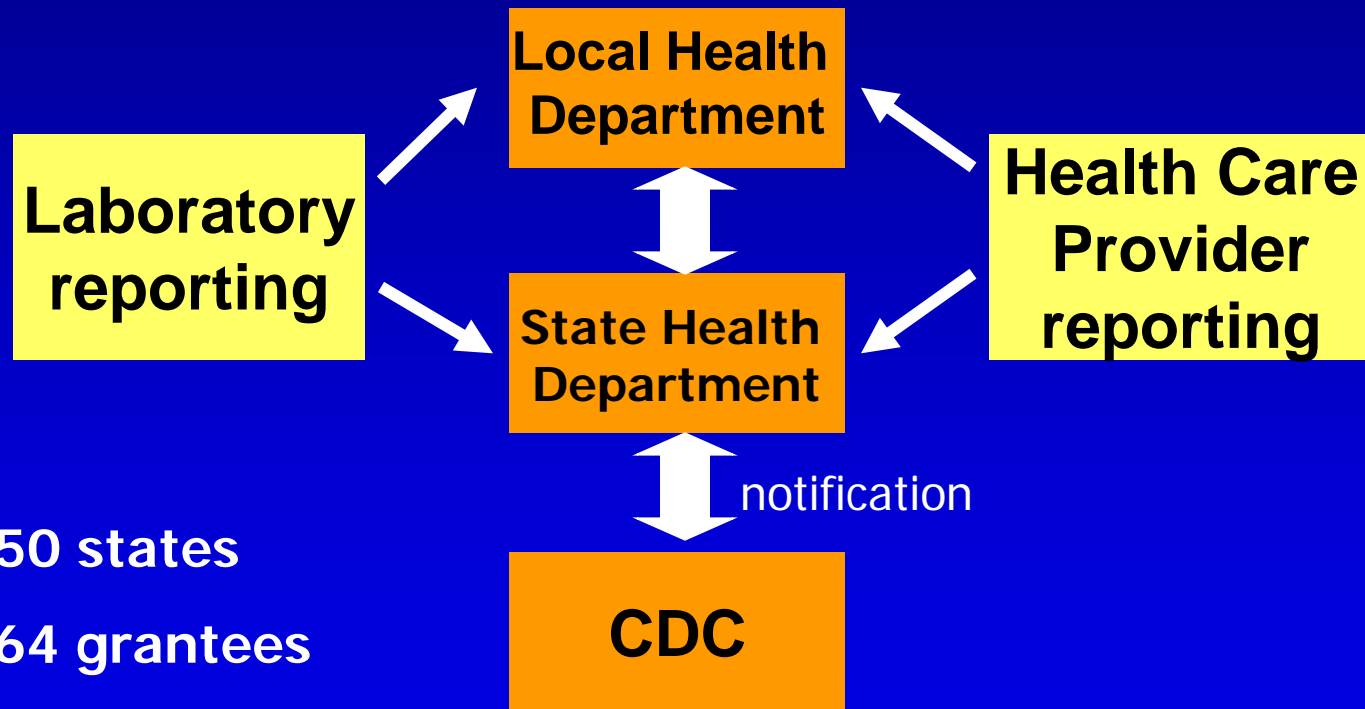
- Demographic data
- Clinical history
- Vaccination history
- Laboratory testing, confirmation, and molecular epidemiology
- Role of importation

Surveillance systems/methods

VPD Surveillance Data Sources in the U.S.

- State-based national passive surveillance (National Notifiable Disease Surveillance System - NNDSS)
- Sentinel sites with active surveillance
- Administrative data reviews (hospital discharge data and other resources)
- Special studies for specific diseases or conditions
- Laboratory-based studies

NNDSS: Case Reporting and Case Notification in the U.S.



- 50 states
- 64 grantees
- > 3,000 counties

States' Participation in National VPD Surveillance

- List of nationally notifiable diseases from the Council of State and Territorial Epidemiologists (CSTE), with individual state implementation
- Case definitions determined by CSTE, to improve specificity and enhance comparability of cases (suspect, probable, confirmed)
- Laboratory support from Association of Public Health Laboratories (APHL)

National VPD Surveillance Data in the U.S.

- Reporting completeness varies (10%-90%)
- Limited federal funding is available specifically for surveillance
- Number of case reports changes related to disease incidence, but also due to testing technology, state laws, provider awareness

Support for vaccine-preventable disease (VPD) surveillance

Federal Assistance for VPD Surveillance

- Immunization program grant/cooperative agreement and special projects
- Technical assistance
 - Consultation and epidemiologic response
 - Standards of practice: Manual for the Surveillance of Vaccine-Preventable Diseases
<http://www.cdc.gov/vaccines/pubs/surv-manual/>
and Immunization Program Operations Manual
- Laboratory support

Federal Assistance for VPD Surveillance, *continued*

- Information dissemination
 - Weekly/annual MMWR surveillance summaries
 - Manuscripts and other venues
- Electronic data transmission, including demographic and epidemiologic case information (NETSS, NEDSS)
- Monitoring national surveillance indicators (imported cases, laboratory confirmation, timeliness, completeness, and others)

Thank you!

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