

Surveillance for Vaccine-preventable Disease and Immunization Coverage

Anne Schuchat, MD

Director, National Center for Immunization
and Respiratory Diseases, CDC

IOM Committee – National Vaccine Plan
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New, complex outcomes

Old clinical presentations now unfamiliar

Recommended Immunization Schedule for Persons Aged 0–6 Years—UNITED STATES

For those who fall behind or start late, see the catch-up schedule

Vaccine ▼	Age ►	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19–23 months	2–3 years	4–6 years
Hepatitis B ¹	HepB	HepB	HepB	<i>see footnote 1</i>	HepB							
Rotavirus ²			Rota	Rota	Rota							
Diphtheria, Tetanus, Pertussis ³			DTaP	DTaP	DTaP	<i>see footnote 3</i>	DTaP					DTaP
<i>Haemophilus influenzae</i> type b ⁴			Hib	Hib	<i>Hib</i> ⁵	Hib						
Pneumococcal ⁶			PCV	PCV	PCV	PCV					PPV	
Inactivated Poliovirus			IPV	IPV		IPV						IPV
Influenza ⁸							Influenza (Yearly)					
Measles, Mumps, Rubella ⁷							MMR					MMR
Varicella ⁹							Varicella					Varicella
Hepatitis A ¹⁰							HepA (2 doses)				HepA Series	
Meningococcal ¹¹											MCV4	

Newly preventable pathogens

Challenging Surveillance Climate, Increasingly Complex Needs

§ Health care sector:

- fragmented delivery, financing strains

§ Health IT:

- EMRs, PHRs, privacy, interoperability, IIS uptake

§ Complex needs for surveillance systems

- Justify return on public investments
- Monitor national, state, local programs
- Track vax performance over time and pops.
- Forecast resurgent disease, pockets of “need”
- Initiate timely public health responses

Role for Surveillance for Vaccine-Preventable Disease



- § Vital link between immunization policy & health outcomes
- § Early warning system for changes in population susceptibility and force of infection
- § Informs program monitoring

What	Where	Why
Reportable, Nationally Notifiable systems	All states	Support elimination Prompt public health response Monitor national trends
Enhanced systems	Selected locations	Identify nat'l dis. trends Monitor new vaccine performance Assess policy
Laboratory-based systems	Selected laboratories	Inform vaccine formulation (flu, Pnc) Assess vaccine performance
Vaccination coverage (e.g. NIS)	All states, selected cities	Monitor state and national program Identify disparities

Laboratory-based systems

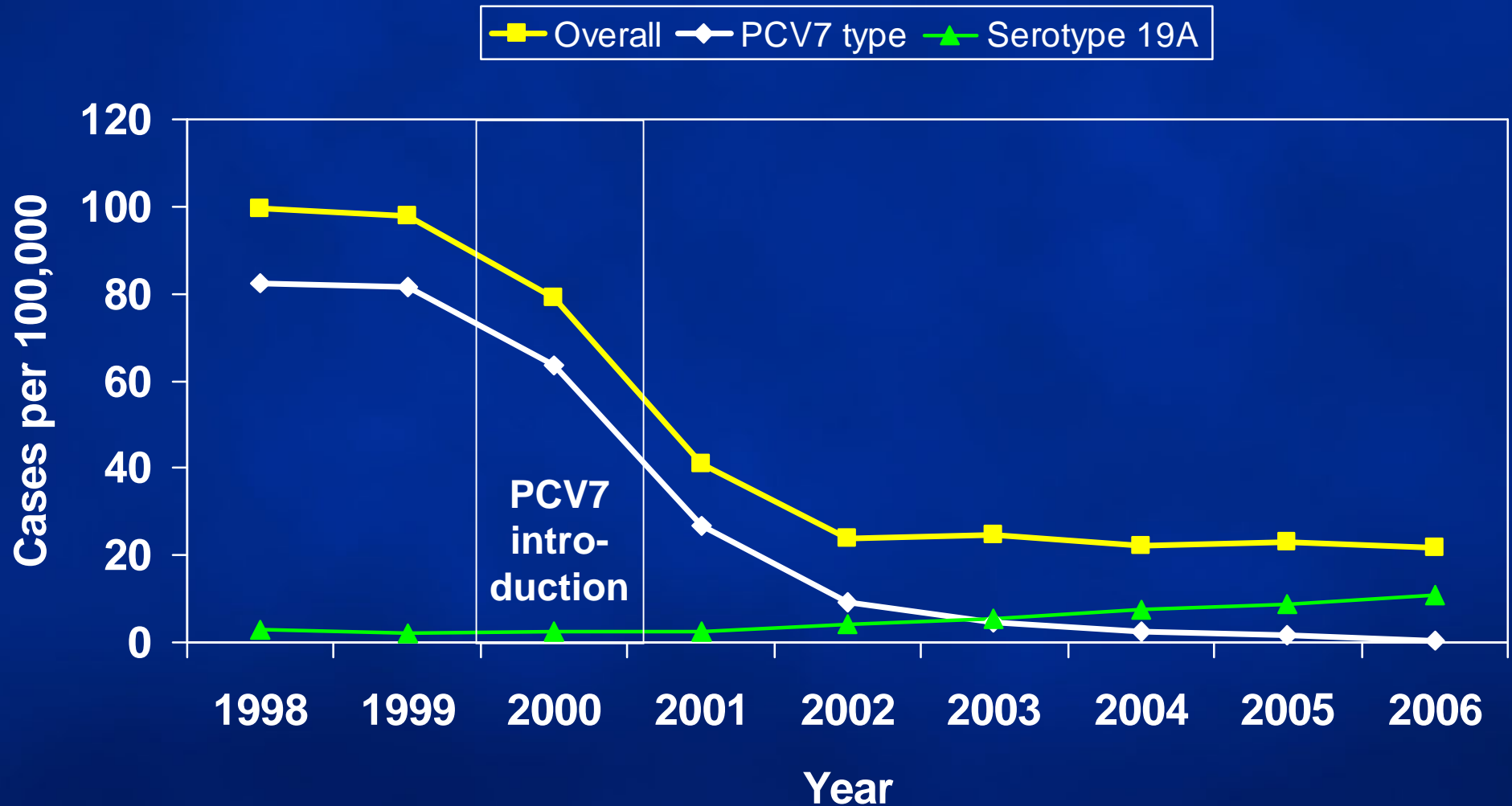


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Invasive Pneumococcal Disease rates in children aged <5 years, 1998 through 2006



New Vaccine Surveillance Network



University of Rochester

**Cincinnati Children's
Hospital Medical Center**

Vanderbilt University

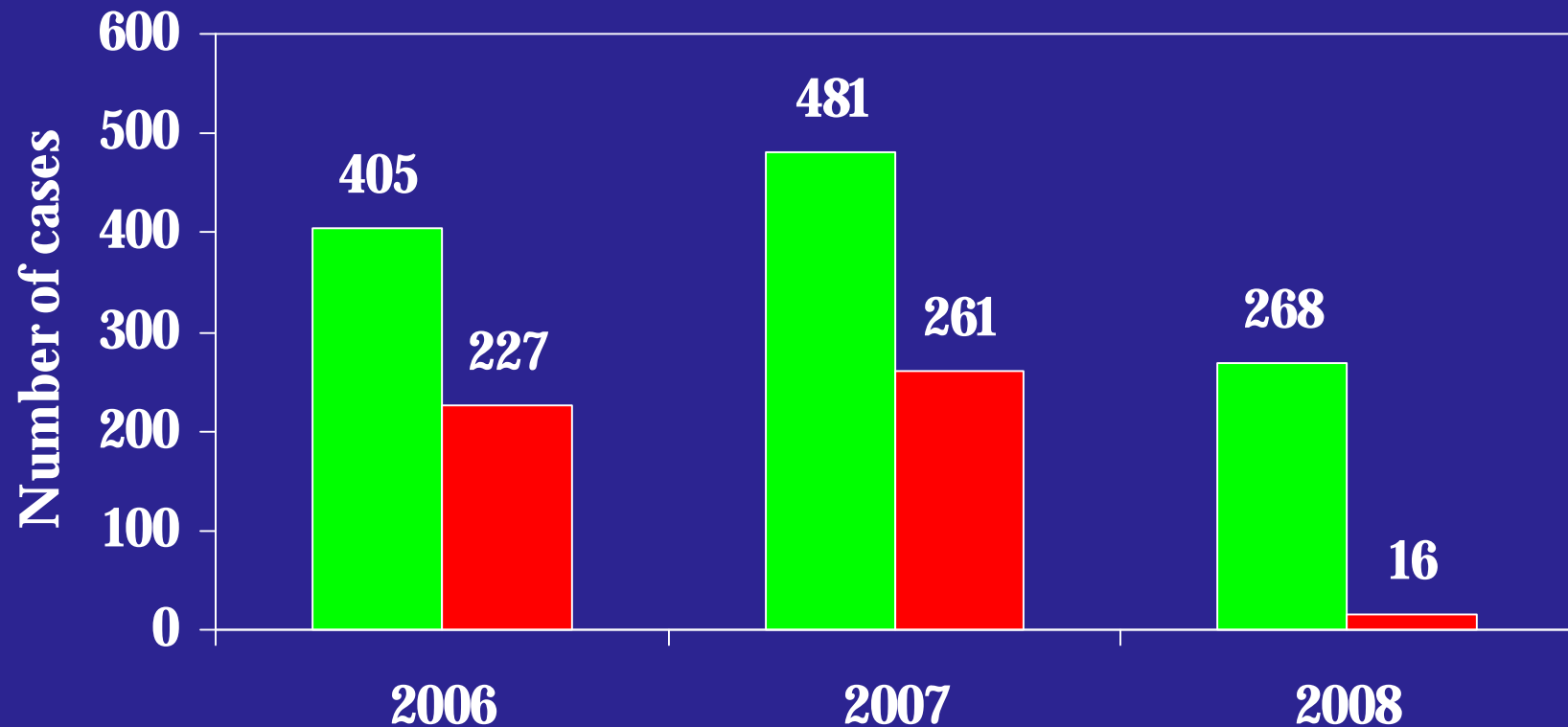


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Total Acute Gastroenteritis (AGE) and Rotavirus AGE cases, Jan-April, 2006-2008

■ Total AGE ■ Rotavirus



New Vaccine Surveillance Network

Address More Complex Outcomes



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Monitoring Complex Outcomes of New Vaccines and Recommendations

§ HPV Vaccine

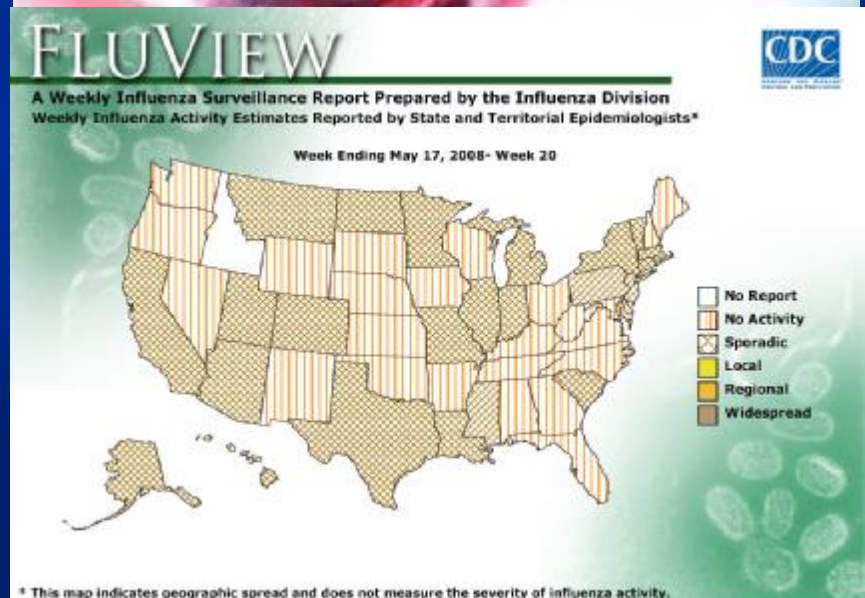
- Cervical ca, other ca
- HPV prevalence
- CIN, Genital warts

§ Influenza, PCV13

- P&I, ILI - nonspecific
- Pneumonia hosp's

§ Rotavirus vaccines

- Diarrhea hospitalizations



Aggregating disparate information



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Clinical and demographic data
(age, outcome, complications)

Laboratory data,
+/- clinical specimen

Case definition

Immunization history

Reasons unimmunized
(Eg PBEs)

Epidemiologic context
Travel hx
Outbreak associated
School or Day-care information

Future Needs in Aggregating Data and Addressing More Complex Outcomes: Better Use of Technology

- § IT can address some, not all needs
- § Large-linked databases useful when vax effects large, outcomes specific

But...

- § Special lab testing needed for some key outcomes and interview needed for PH response
- § Role for human touch in VPD tracking will evolve, but can't be eliminated
- § Improved dx tests still needed for some VPDs

Duration of Protection

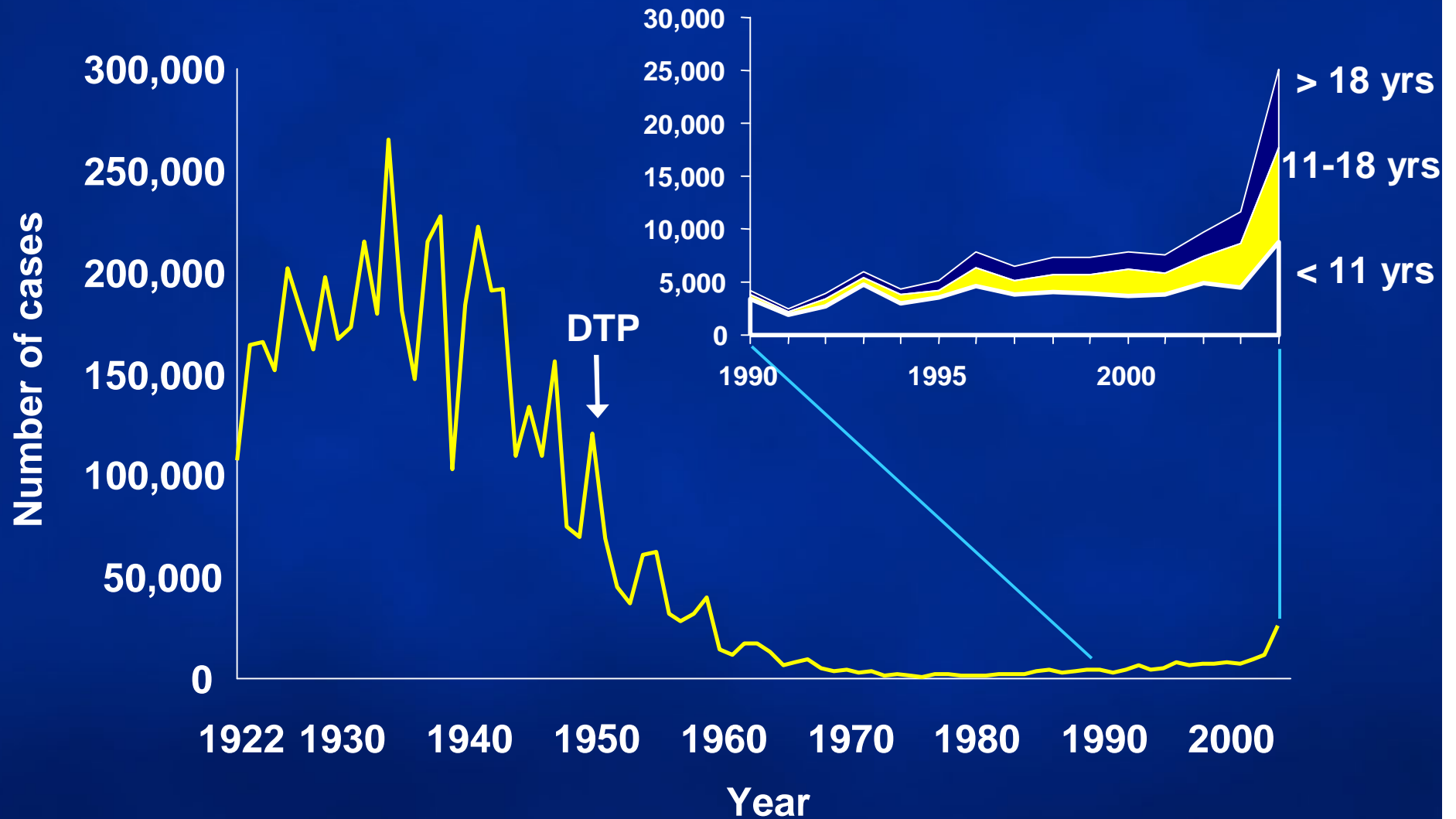


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Reported Pertussis Cases U.S., 1922-2004



National Notifiable Disease Surveillance System (NNDSS)

Duration of Protection: Future challenges

- § Low levels of many VPDs
- § Less circulation → less natural boosting
- § Assessing of long-term protection requires reliable correlate
- § Surv. for breakthrough cases can inform booster dose policy
- § Long-term monitoring of new outcomes needed (e.g., HPV, Tdap)

Indirect Effects

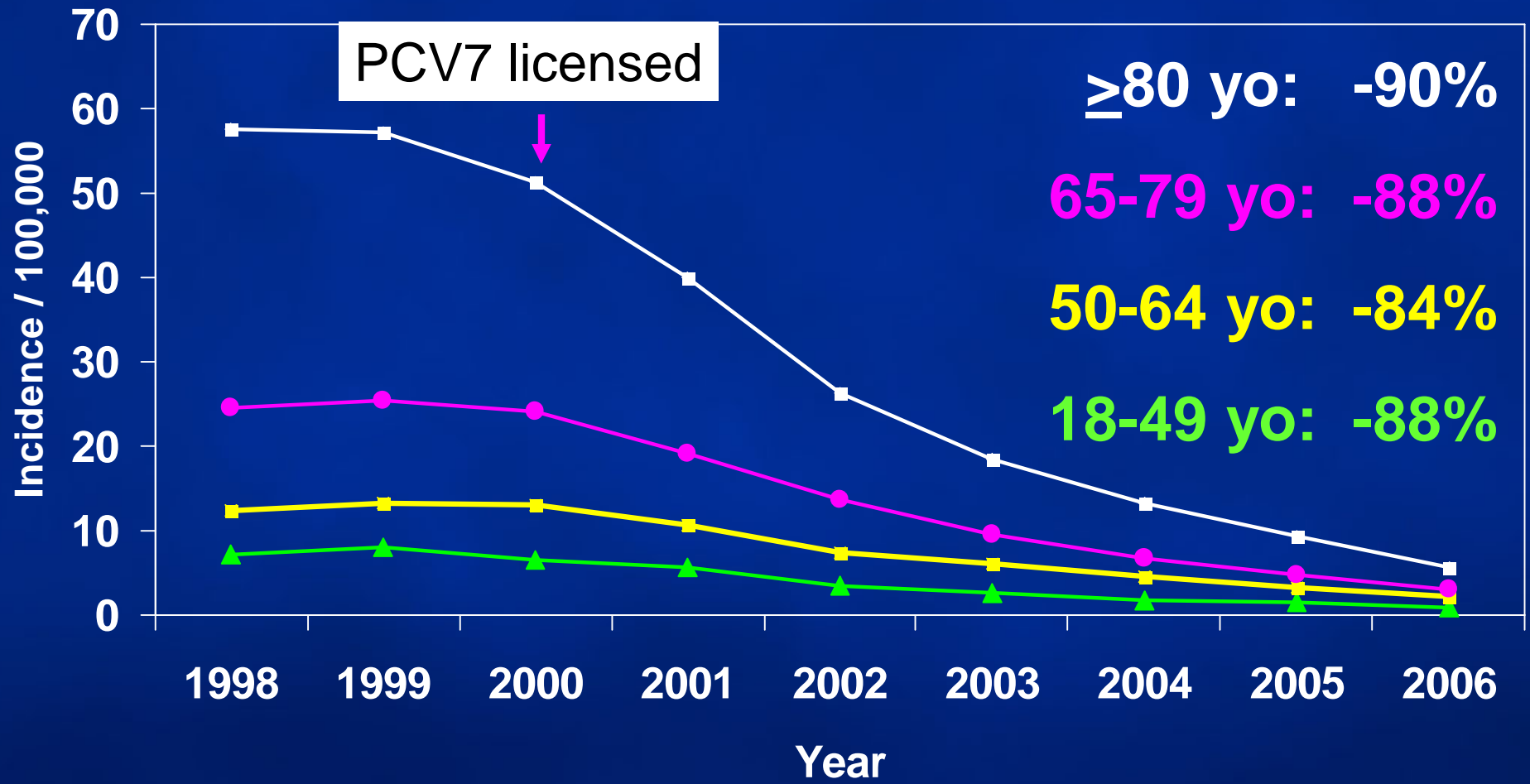


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Herd (Indirect) Effect: Invasive pneumococcal disease in adults >18 years, 1998/99-2006, PCV7 serotypes



ABCs/Emerging Infections Program
Network (CDC unpublished)

Indirect Effects: Future Issues

- § Influenza vaccine recently recommended for all children 6 mo – 18 years
- § Demonstrating important indirect or herd effects of influenza vaccination would
 - support sustainability of school-aged programs
 - overcome impact of stalled rates of influenza vaccination in elderly and high risk
 - reduce need to find more effective formulations for elderly and immunocompromised
- § Other needs: Assess indirect benefits of Tdap, rotavirus, meningococcal vaccination

Assess immunization coverage

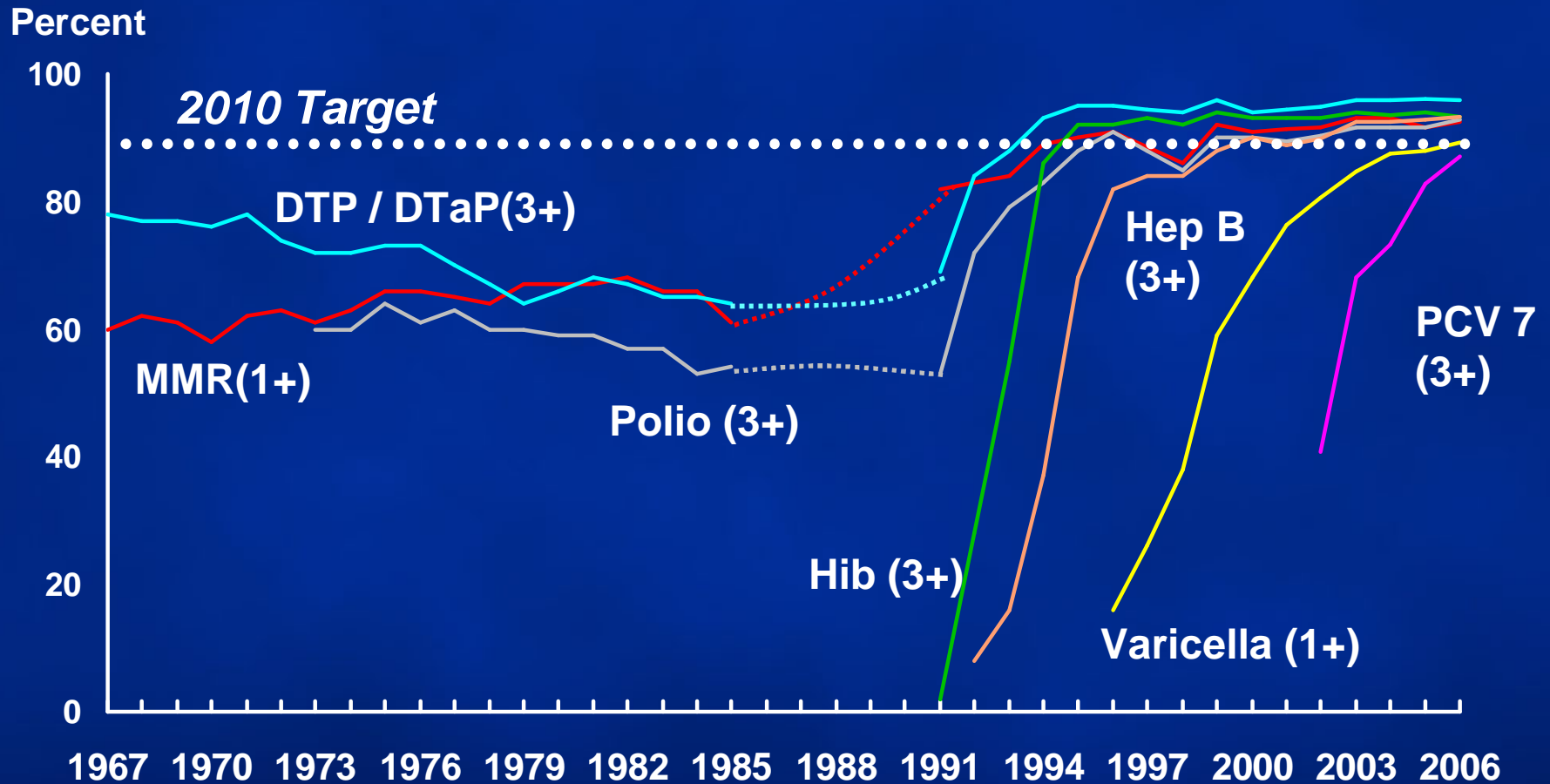


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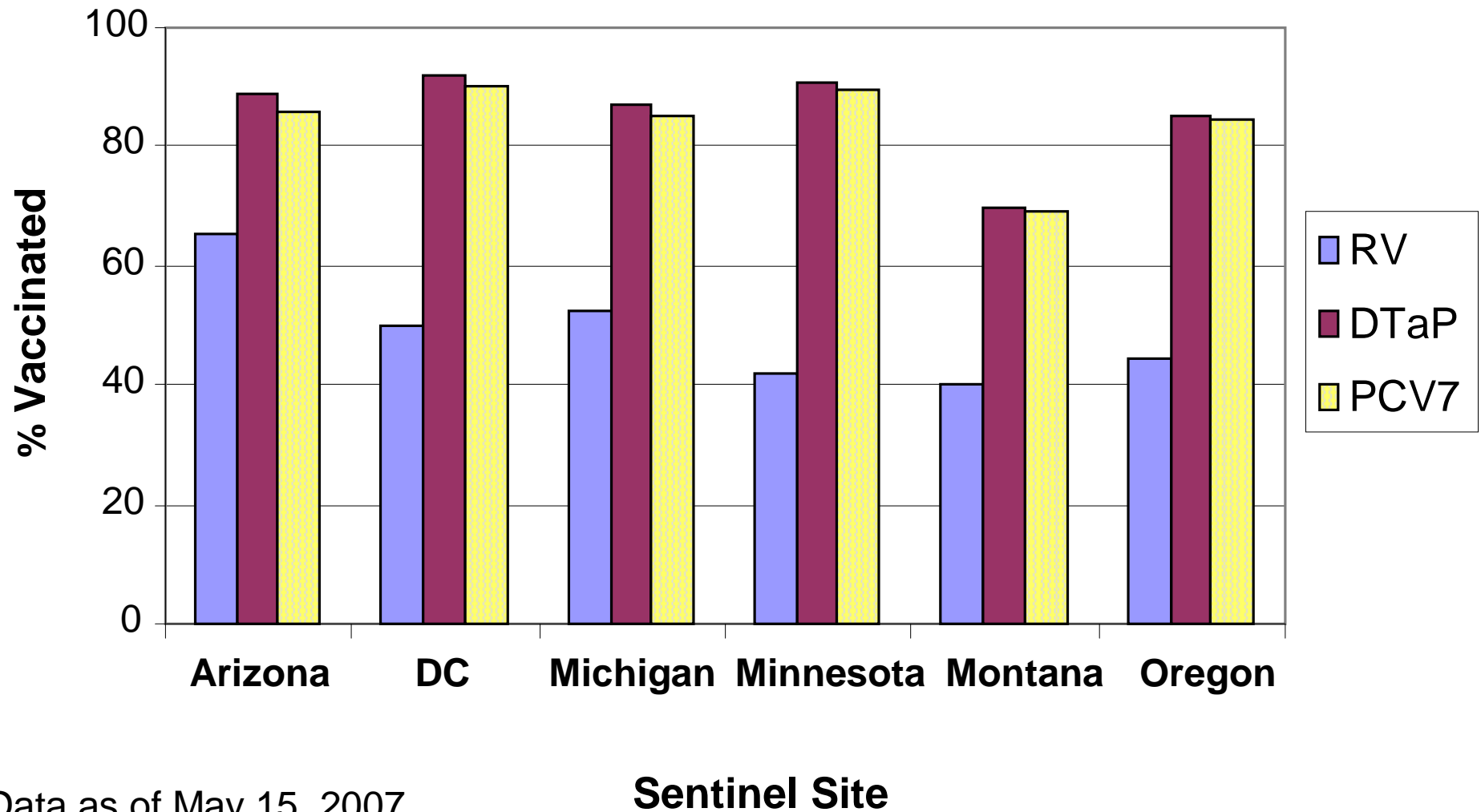
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Sustained High Levels of Protection in Preschool-Aged Children



National immunization survey

Immunization Registry Sentinel Sites: Dose 1 coverage in <3 mo olds of rotavirus vs. DTaP, PCV7



Data as of May 15, 2007

Immunization Coverage: The Way Forward

- § Implement recent Strategic Assessment*
- § Annual Teen NIS – state-specific, national
- § Vax acceptance and SES modules
- § Develop methods for sustainability:
 - Less landline use → census pilot (sample frame)
- § Use Immunization Information Systems when uptake sufficient (pvt use << public currently)
- § Address small-area variation, exemptors
 - Develop targeted approaches for hot spots
 - Registry efforts; stdzing school entry surveys

*Summary of internal/external strategic review to be distributed

Permit rapid public health response

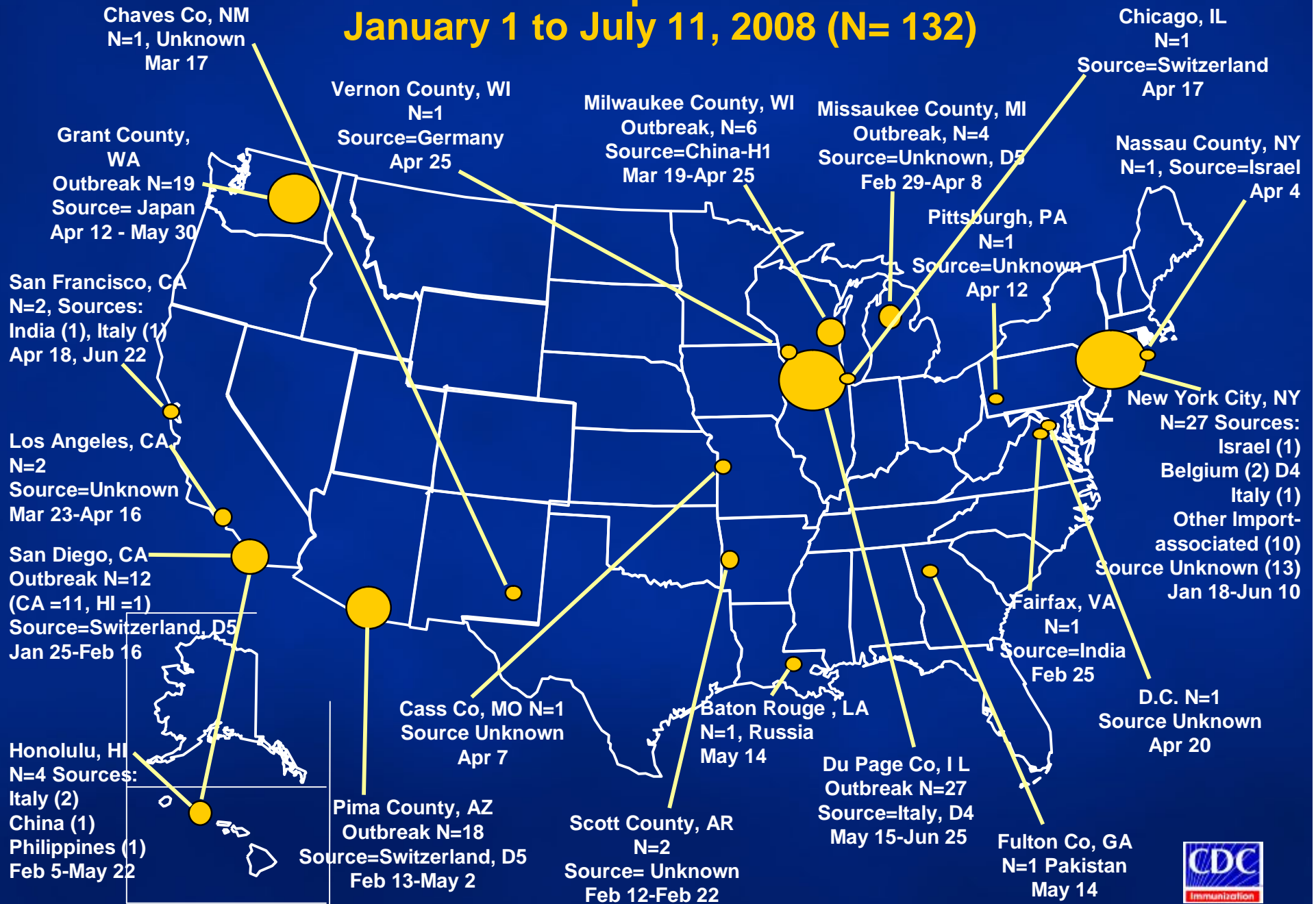


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Measles Cases Reported to CDC/NCIRD January 1 to July 11, 2008 (N= 132)



Measles, US, 2008

*As of July 11, N=132**

§ # Cases	Age Group
– 20 (16%)	< 12 mos
– 32 (25%)	12 mos - 4 years
– 41 (33%)	5-19 years
– 28 (22%)	20-49 years
– 5 (4%)	> 50 years old

§ 38/41(93%) of the school-aged children were PBEs

* *Information on age was available for 126 cases*

Need for VPD & IZ Monitoring: Greater than ever but getting more difficult?

- § Complacency about disease risk**
- § Clinicians, parents lack familiarity with sx**
- § Lab assay challenges in vaccinated people**
- § Global interdependence**
 - VPD risk around the world impacts risk here**
- § Local level coverage data most useful for program improvements – but least available**
 - Resource-intensive unless comprehensive IIS or comparable system available**

How will we know we're there?

Evaluation plans

- § Measure progress toward disease elimination/reduction targets
- § Measure progress toward achievement of coverage goals
- § Report VPD burden and immunization coverage on annual basis
- § Availability of data (coverage, incidence) at the program level where it is needed