

Responding to the 2012 Pertussis Epidemic in Washington State

2013 Arizona Infectious Disease Conference
Phoenix, AZ

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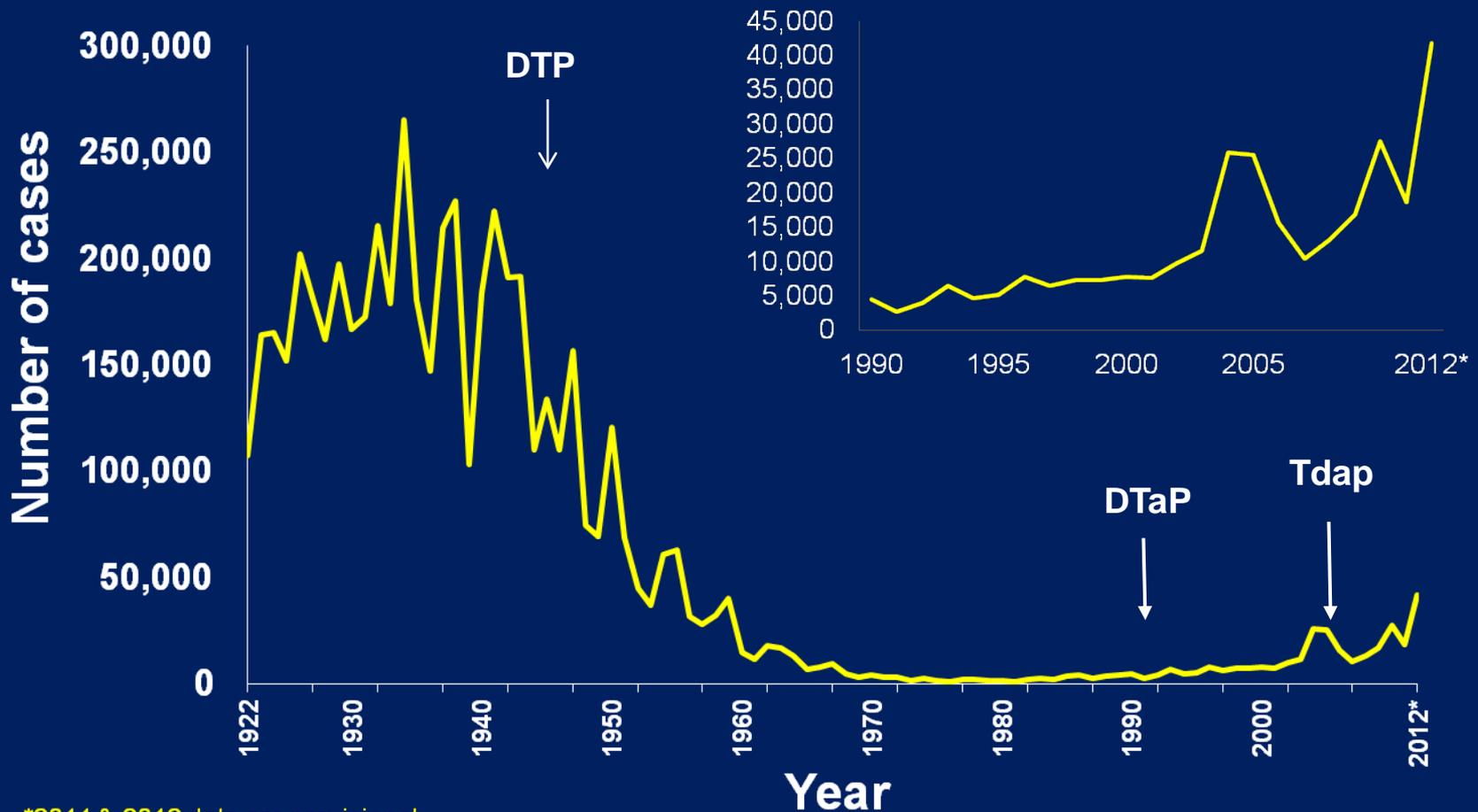
Communicable Disease Epidemiology
Washington State Department of Health



Pertussis

- **Highly contagious bacterial disease**
 - Spreads easily by aerosols or droplets
 - High community immunity level needed to stop transmission
- **Severe, debilitating cough illness in all ages**
 - Infants have highest morbidity and mortality
- **Estimated deaths > 300,000/yr worldwide**
- **Vaccine-preventable**
 - Poorly controlled, despite high vaccine coverage

Reported NNDSS pertussis cases 1922-2012*



*2011 & 2012 data are provisional

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

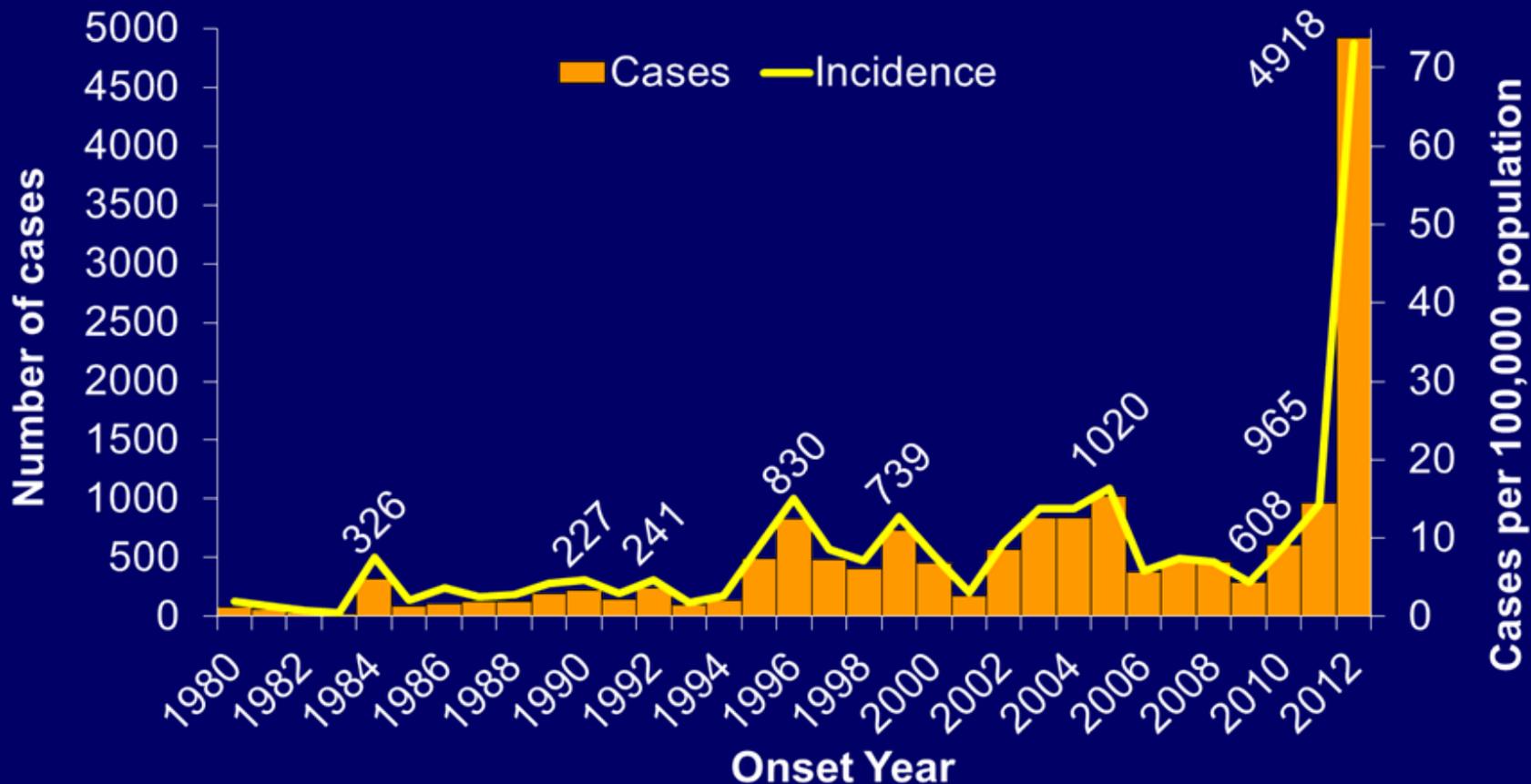
Objectives

- Describe the epidemiology of 2012 WA State pertussis cases
- Explain decision-making process for declaring the epidemic
- Describe public health response to the epidemic

Surveillance Case Definitions

- Probable (clinical case definition)
 - 2-week cough AND
paroxysms OR post-tussive vomiting OR whoop
- Confirmed
 - Culture positive
 - Clinical case definition + PCR positive
 - Clinical case definition + link to lab-confirmed case
- Suspect (definition used in WA since 2007)
 - PCR+ but does not meet clinical case definition
(PCR+ suspect)

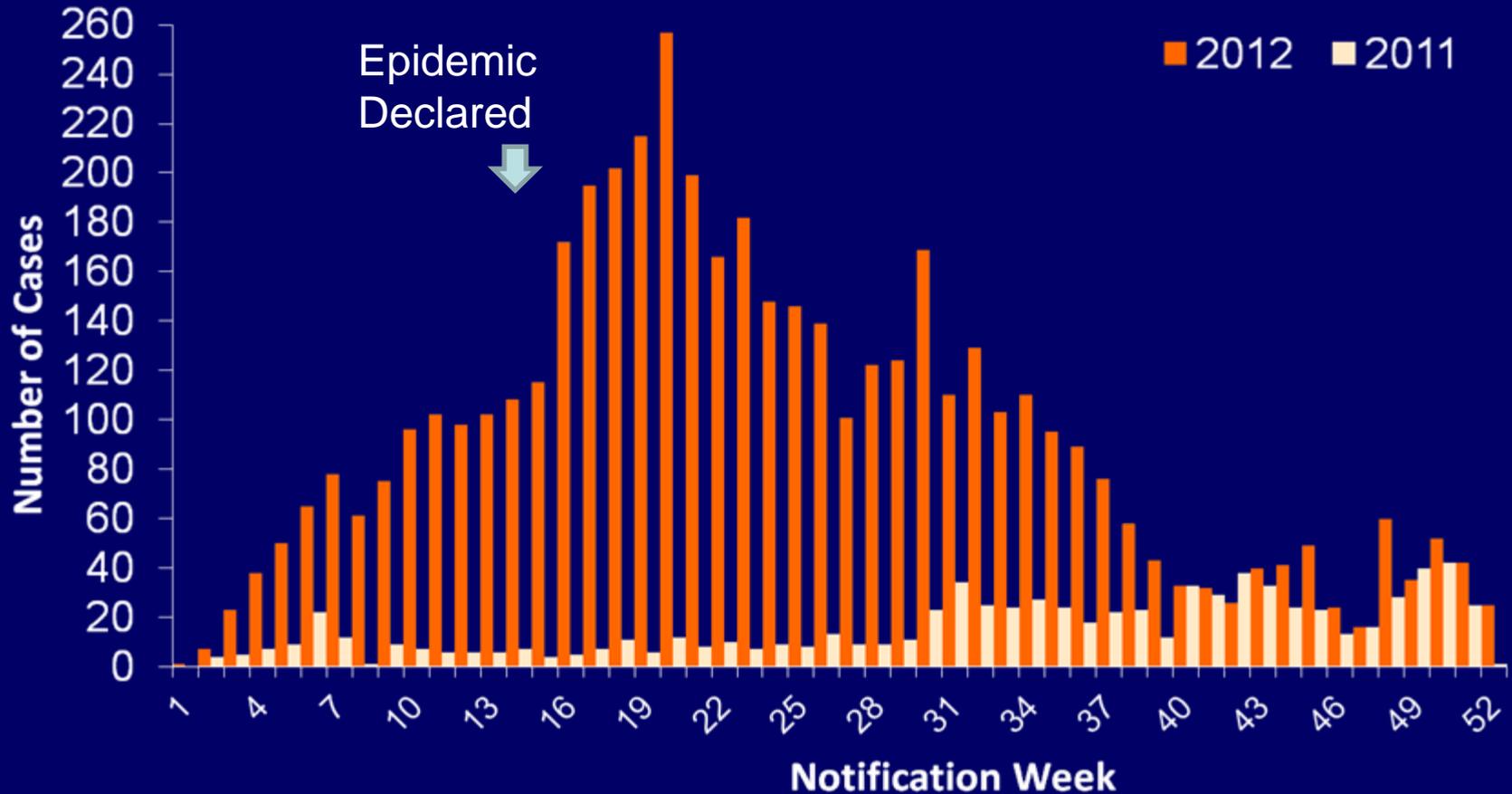
Number & Incidence of Reported Pertussis Cases WA State, 1980 – 2012



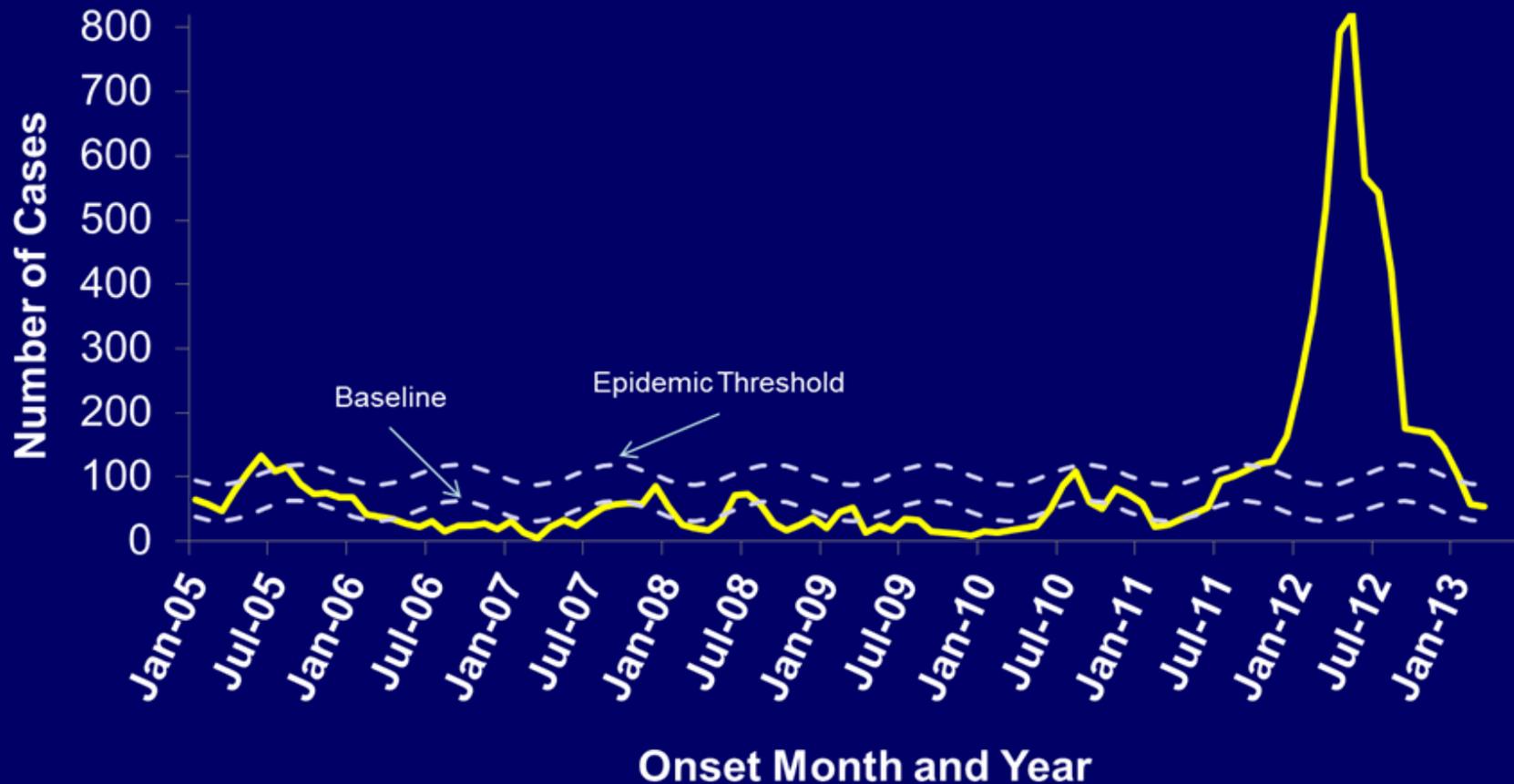
Key Dates

- August 2011**
 - **Localized outbreaks reported**
 - Infant death; Case burden among school-aged children
 - Counties send out health care provider alerts;
 - State encourages adult vaccination
- December 2011**
 - **Several LHJs report infrastructure burden**
- February 2012**
 - **DOH CD Epi office alerted other DOH offices**
- March 2012**
 - **DOH forms cross-divisional pertussis workgroup**
- April 3, 2012**
 - **Secretary of Health declares epidemic**
 - 640 cases, 6-fold increase from same time period in 2011
- May 3, 2012**
 - **Gov. Chris Gregoire provides emergency funds**
- May 4, 2012**
 - **Call for CDC Epi Aid**
- December 2012**
 - **4,918 confirmed and probable cases**
plus 600 PCR+ suspect cases

Pertussis Cases by Notification Week 2011 versus 2012



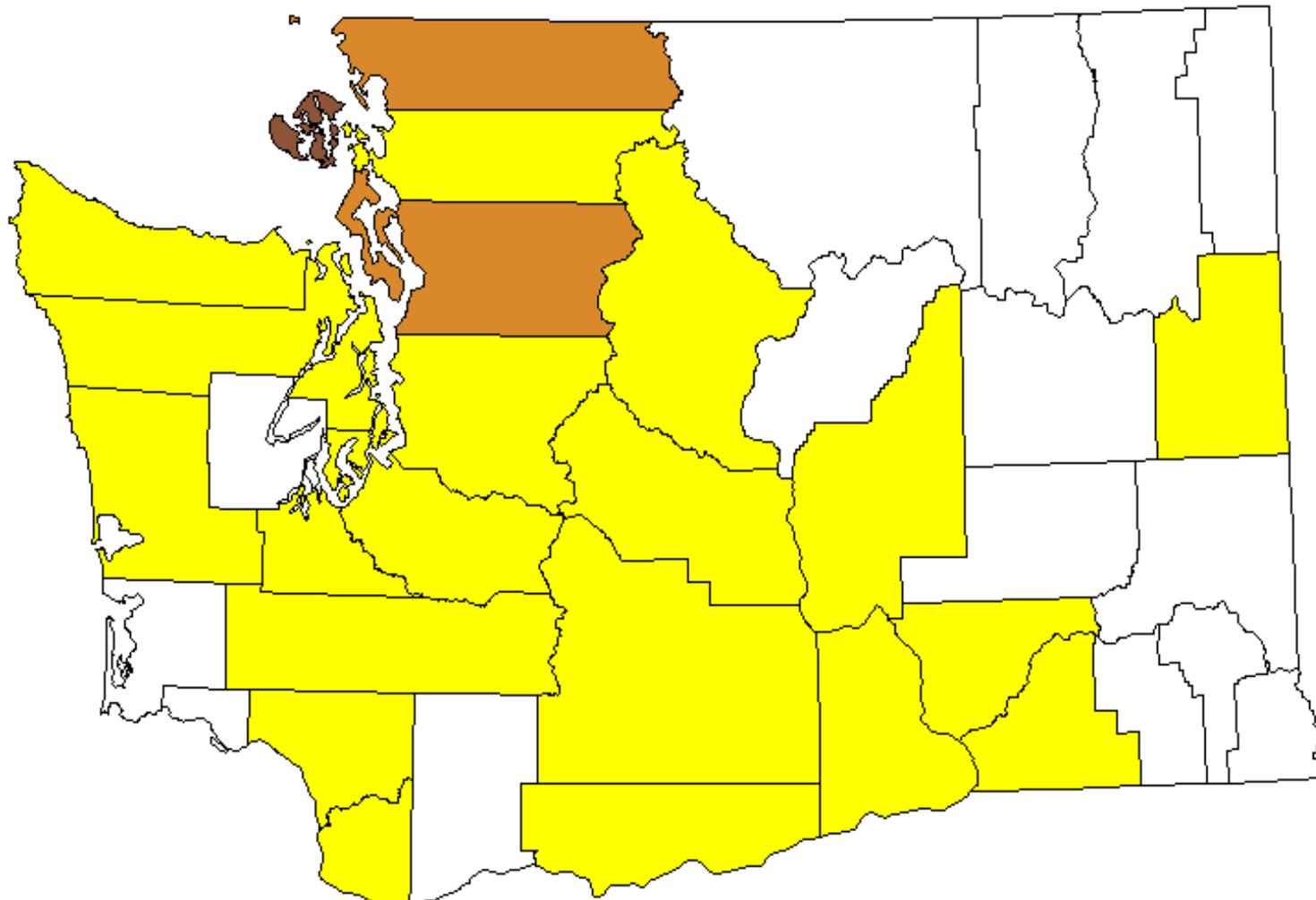
Pertussis Cases by Onset Month 2005–2012 and 2013 YTD (March)



Case Classification 2007-2012

Onset Year	All reports	Cases Reported to CDC (Confirmed & Probable)	PCR+ Suspect	Confirmed, Probable, & PCR+ Suspect
2007	510	482	13	495
2008	502	461	19	480
2009	342	291	18	309
2010	682	608	32	640
2011	1,080	965	68	1,023
2012	5,864	4,918	600	5,518

Pertussis Rates by County October – December 2011



Incidence per 100,000 population per year

0.0

10.0–19.9

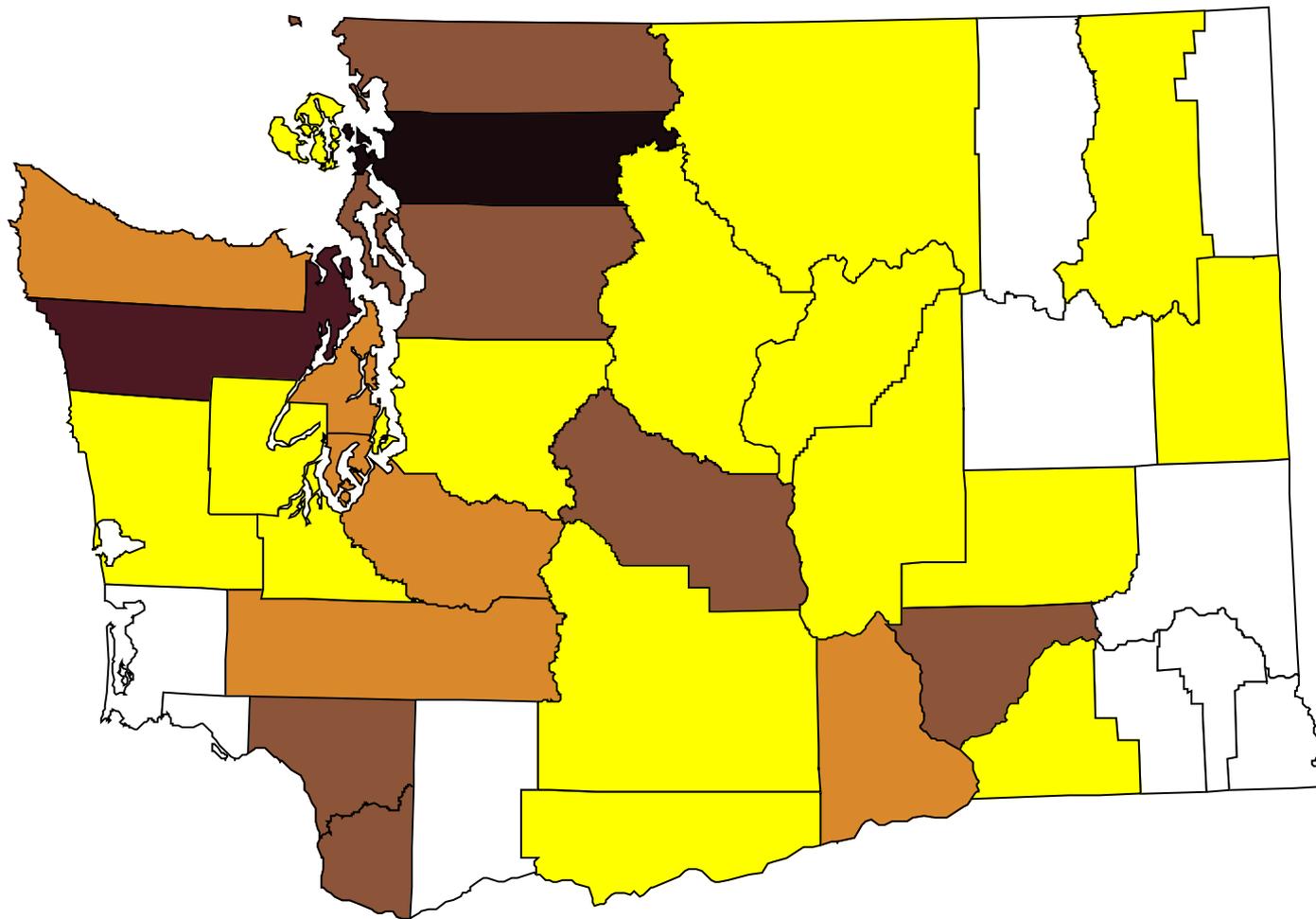
60.0–99.9

0.1–9.9

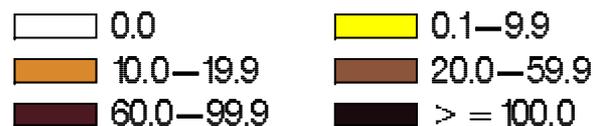
20.0–59.9

>= 100.0

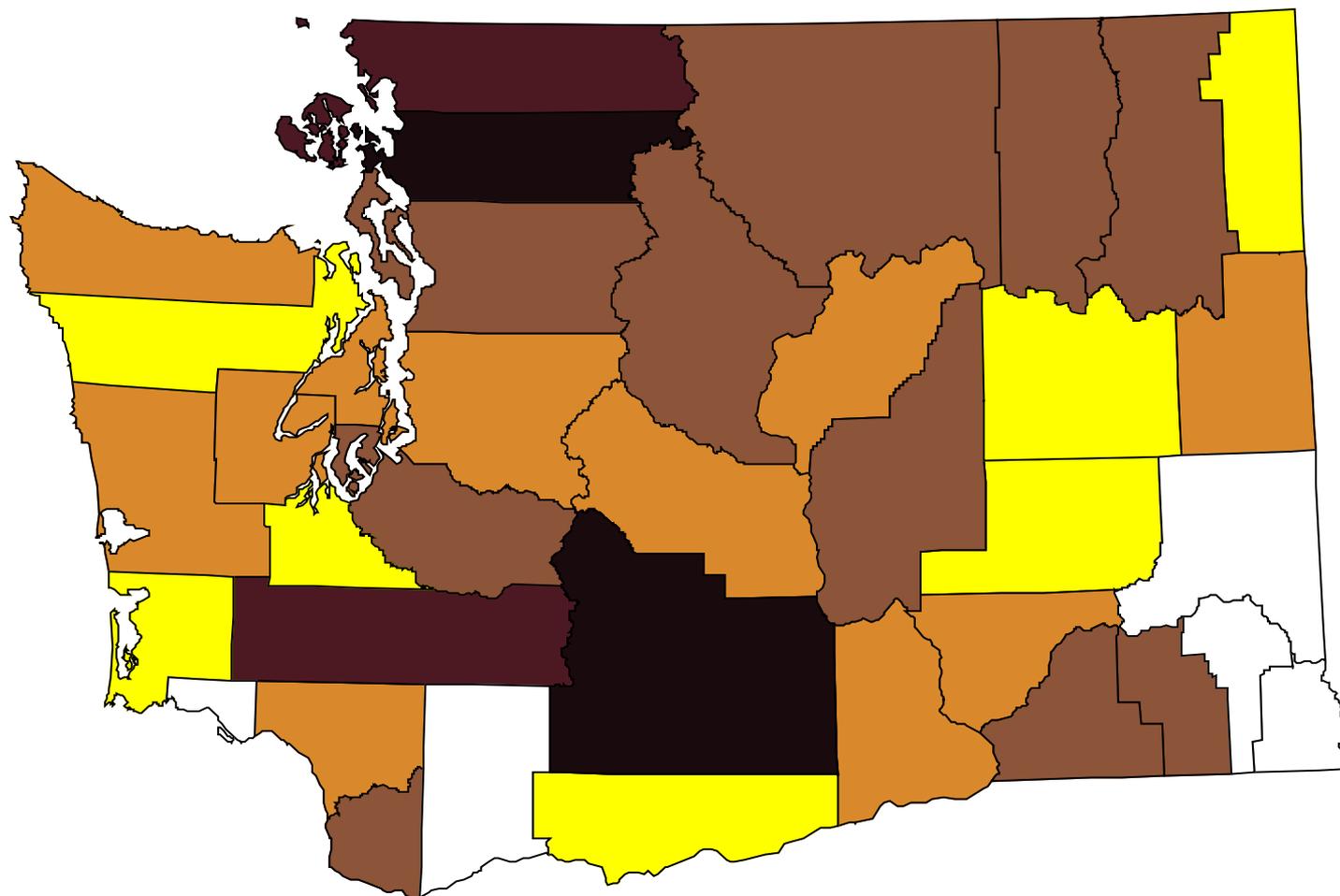
Pertussis Incidence Rates by County January – March 2012



Incidence per 100,000 population Jan_Mar12



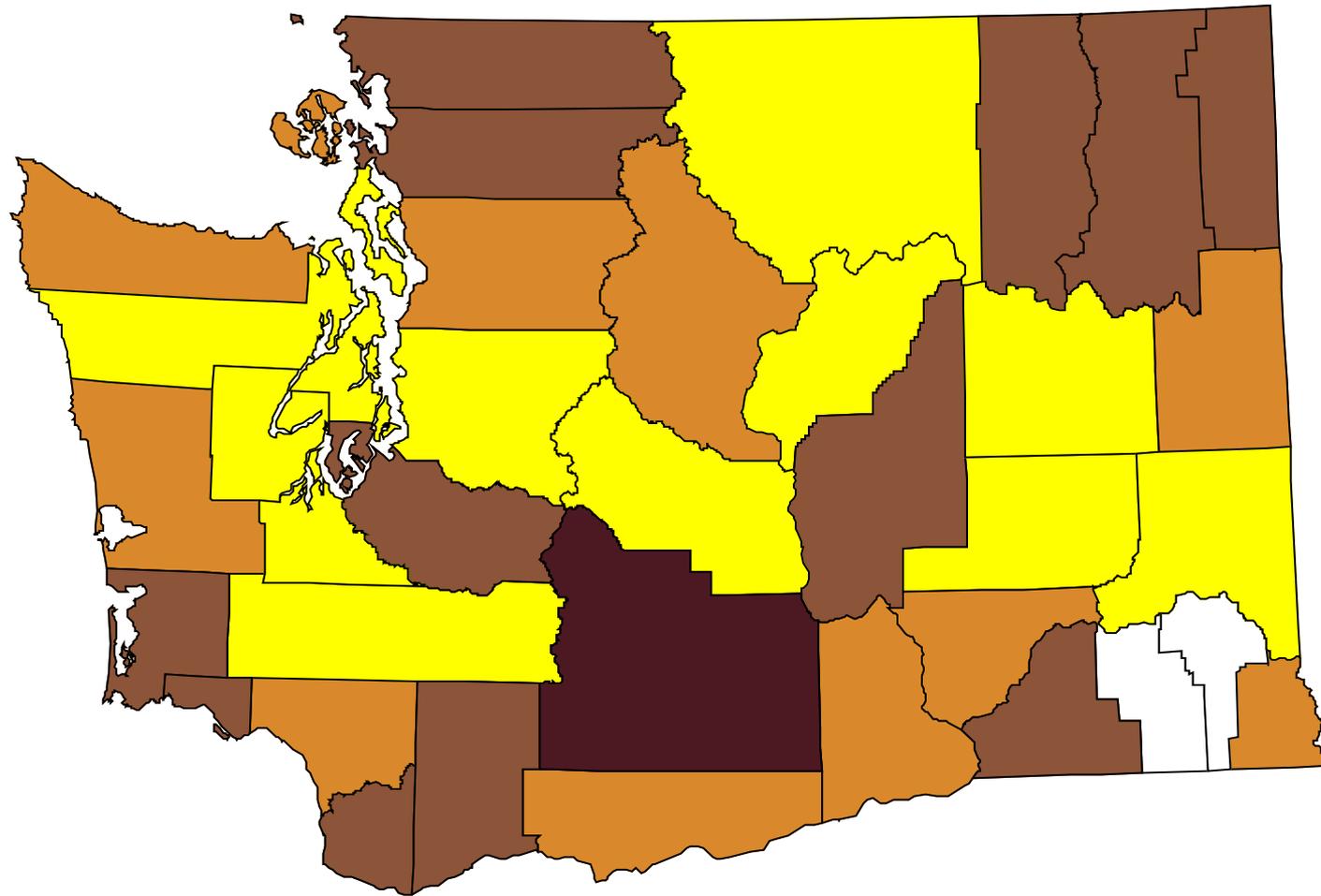
Pertussis Incidence Rates by County April – June 2012



Incidence per 100,000 population Apr_Jun'12



Pertussis Incidence Rates by County July – September 2012



Incidence per 100,000 population Jul_Sep12

0.0

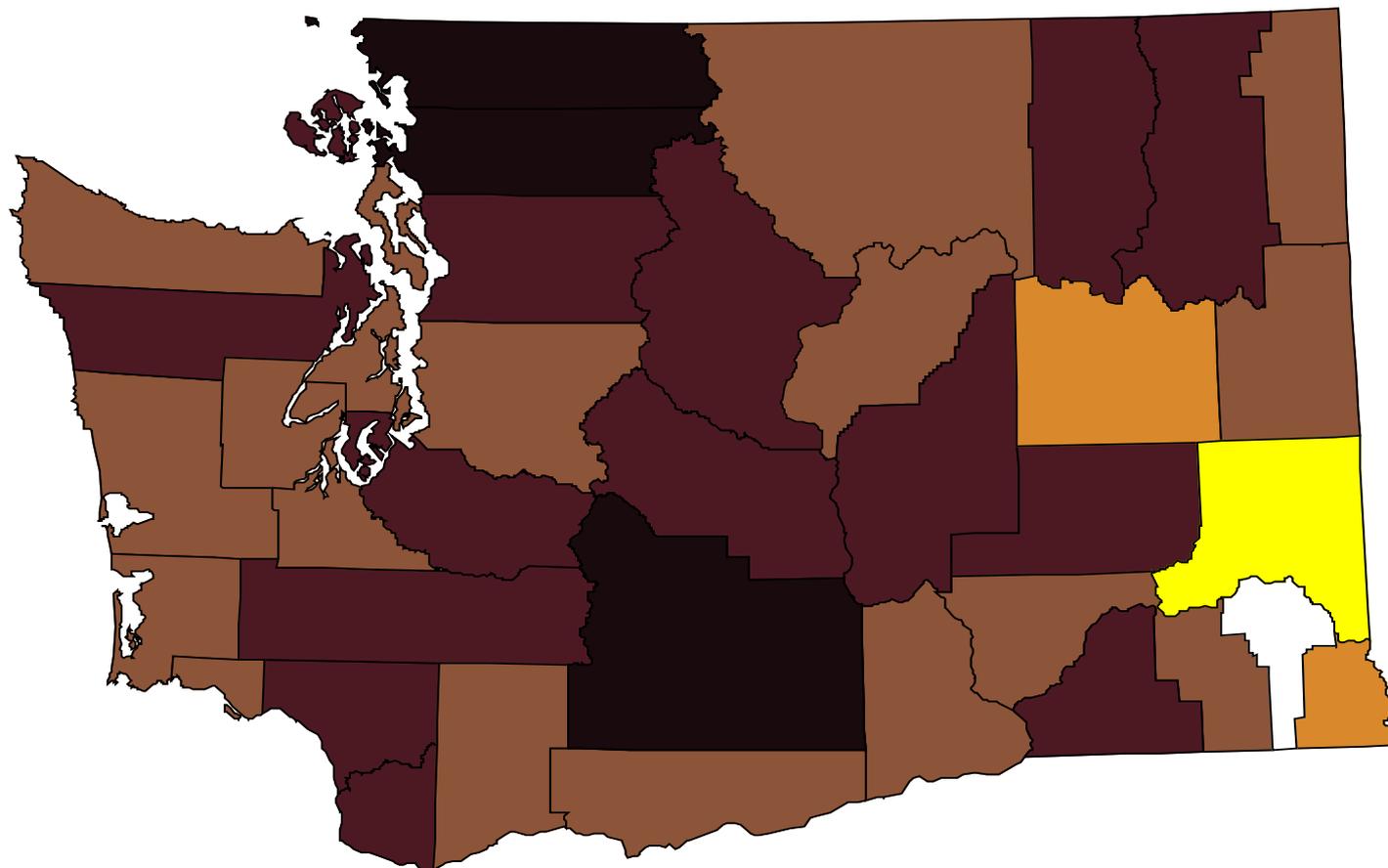
10.0–19.9

60.0–99.9

0.1–9.9

20.0–59.9

Pertussis Incidence Rates by County 2012



Incidence per 100,000 population Jan_Dec12

0.0

10.0–19.9

60.0–99.9

0.1–9.9

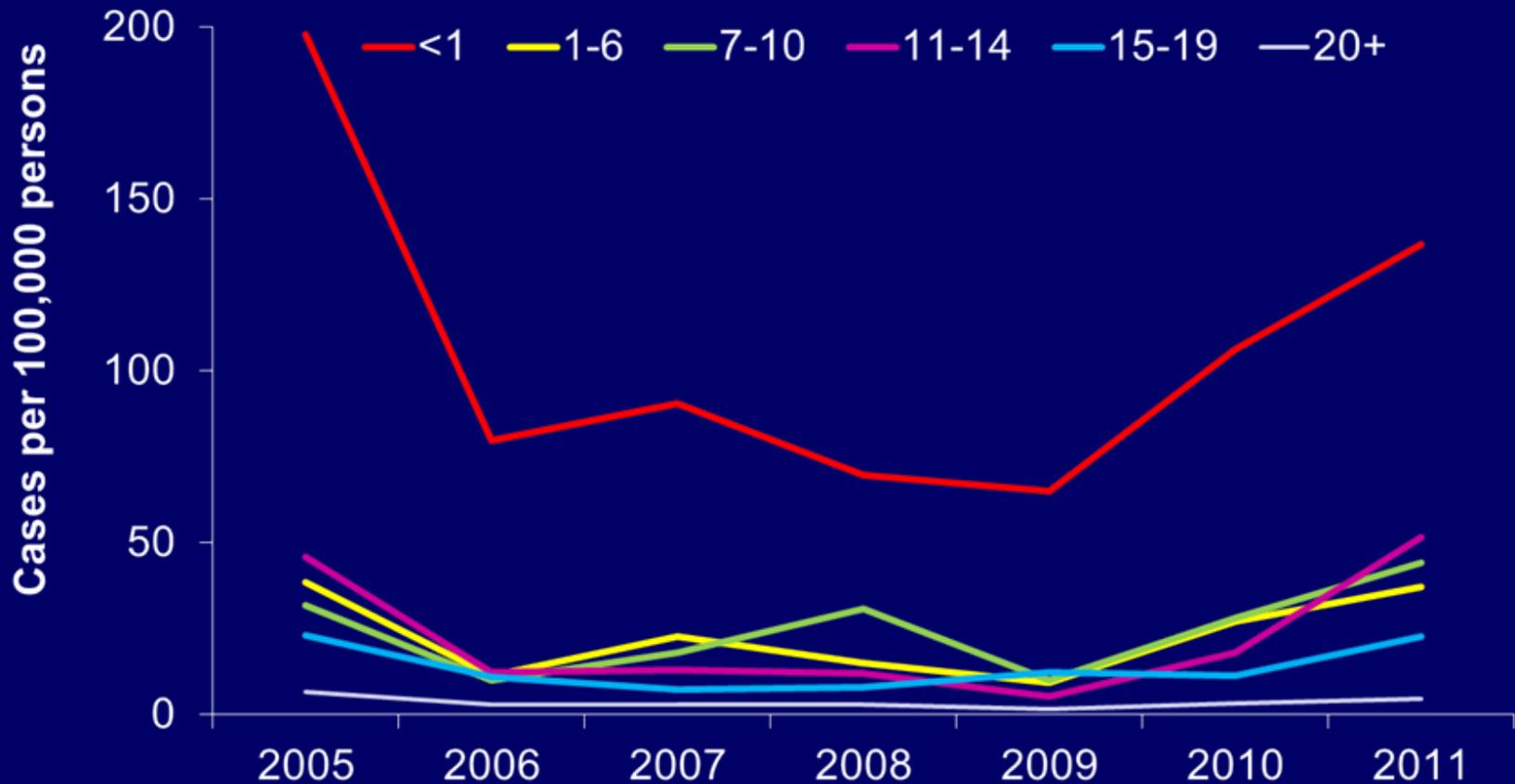
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>= 100.0

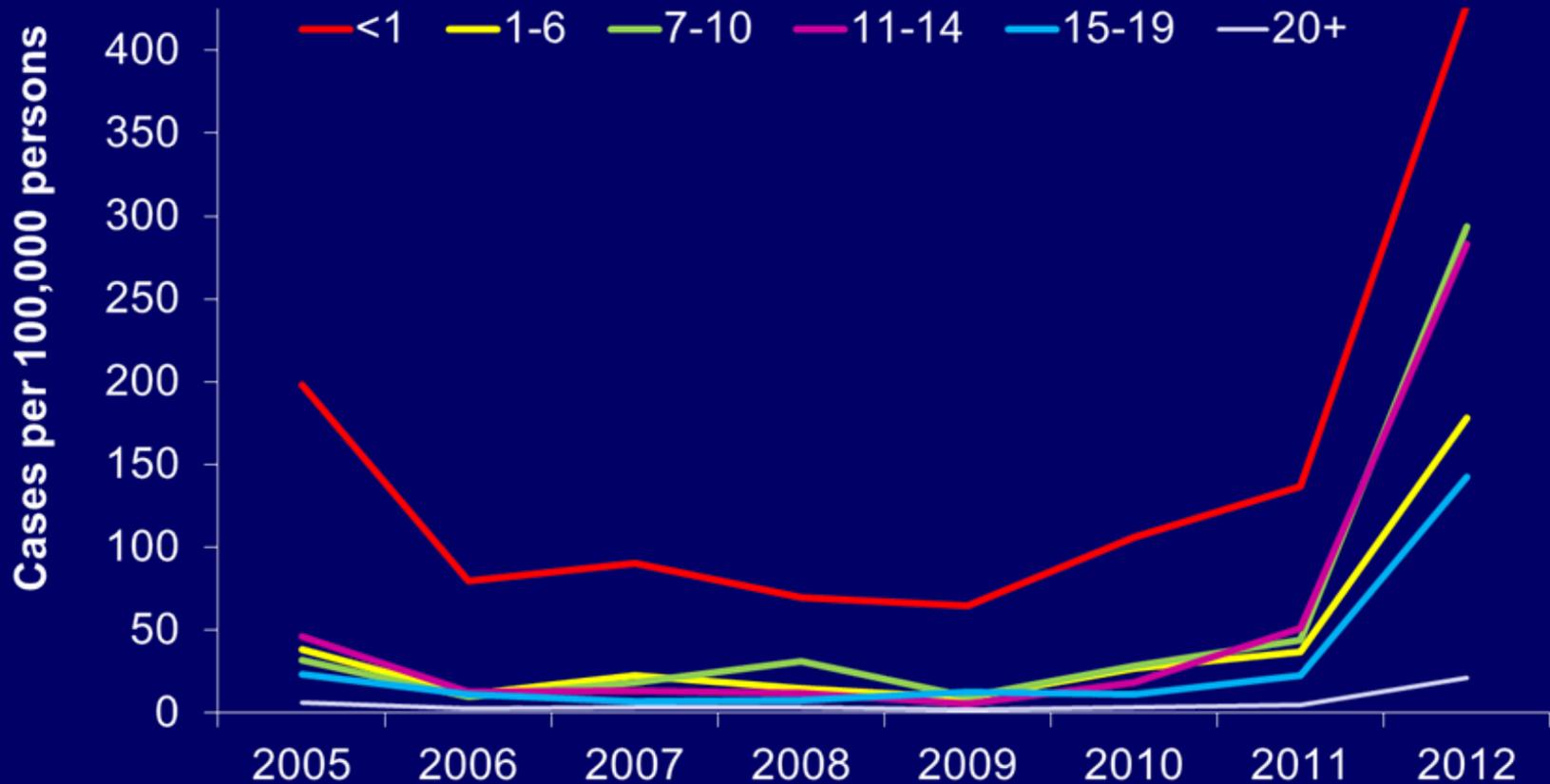
Case Characteristics (n=4,918)

	N	%	Rate per 100,000
Female	2,651	54%	
Age Group (years)			
<1	378	8%	428.0
1-6	940	19%	177.8
7-10	1,012	20%	293.6
11-14	989	20%	283.2
15-19	523	11%	142.4
20+	1,075	22%	21.3
Race			
Hispanic	752	23%	99.5
American Indian	61	2%	57.4
White	2,257	70%	45.0
Asian/ Pacific Islander	91	3%	16.1
Black	48	1%	17.0
Western Washington	3,389	79%	

Pertussis Rates by Age Group 2005-2011



Pertussis Rates by Age Group 2005-2012



Lab Confirmation

2012 Confirmed Cases (n=4,230)

	N	%
Lab-confirmed	3,585	85
PCR only	3,266	91
Culture only	81	2
PCR & Culture	238	7
Epi-linked	645	18

Severity of Disease 2011 versus 2012

Outcome	2011 N=965 % (n)		2012 N=4,918 % (n)		p-value
Hospitalized	5.1	(49 / 965)	2.1	(105 / 4913)	<0.0001
Pneumonia	4.4	(40 / 906)	2.4	(110 / 4546)	<0.001
Death §	0.2	(2 / 965)	0*	(0/ 4918)	--

§ All reported deaths were among infants under one year of age

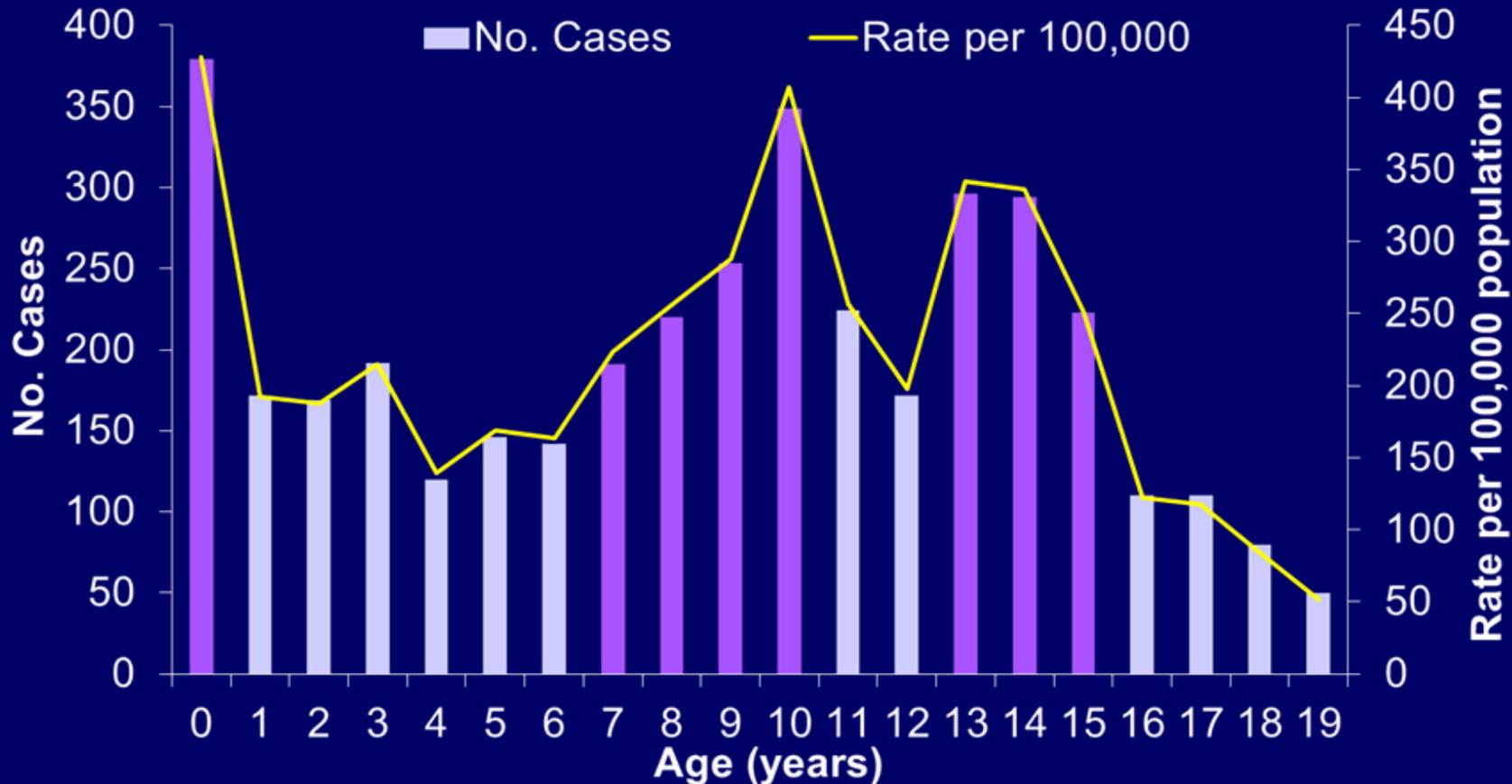
* Note: there was one death in an infant who tested positive for pertussis by PCR in late 2012

Vaccination Status of Cases 2012

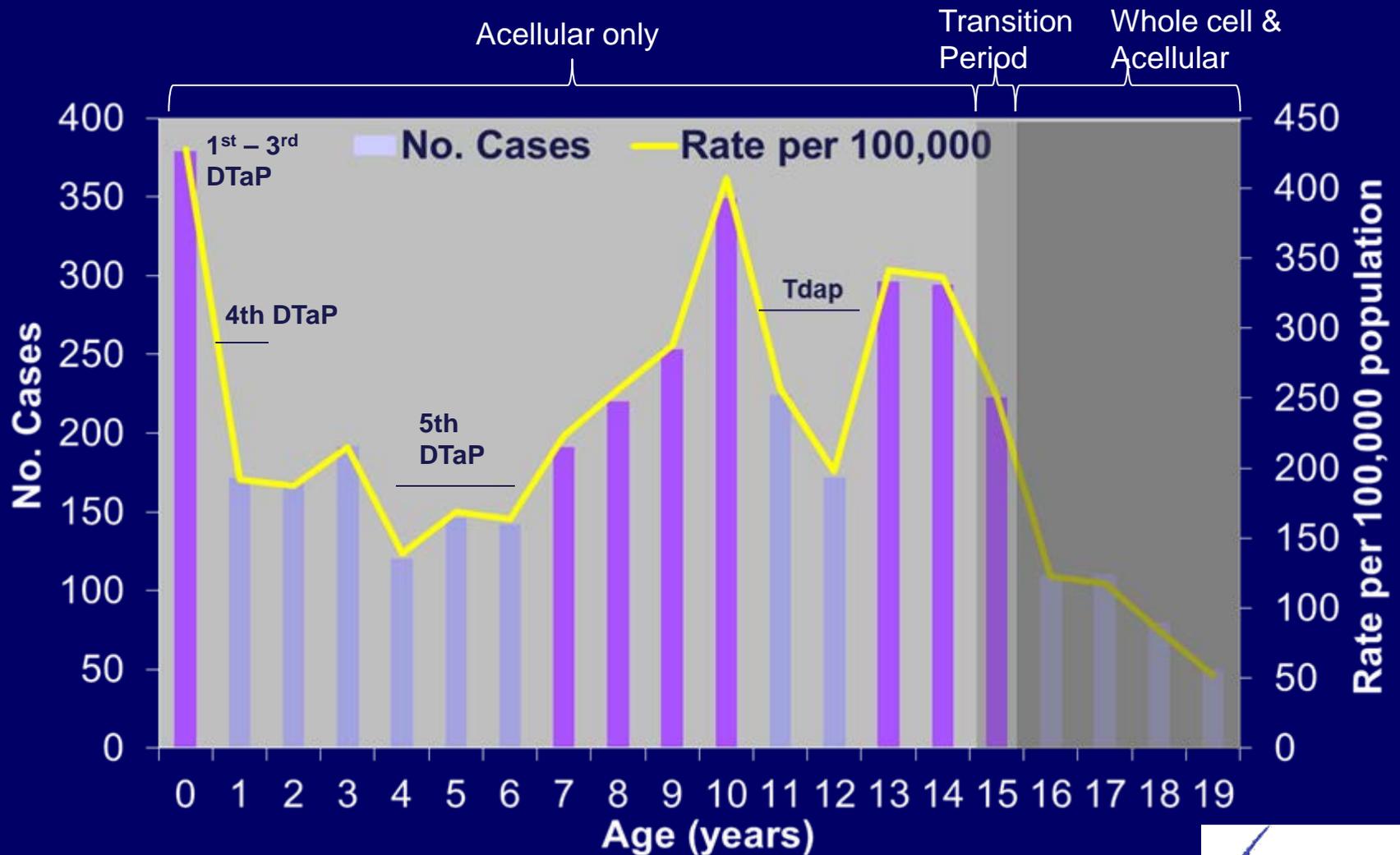
Age Group	Total Number of Cases	Cases with Valid Vaccination History		Up-to-date (UTD)	
		n	%	n	%
UTD for age per ACIP					
3m-10 y	2,218	2,101	95	1,530	73
11-12 y	397	376	95	282	75
Receipt of Tdap					
13-14 y	592	558	94	449	80
15-18 y	523	479	92	362	76

Note: Surveillance case report vaccination information is “self-reported”

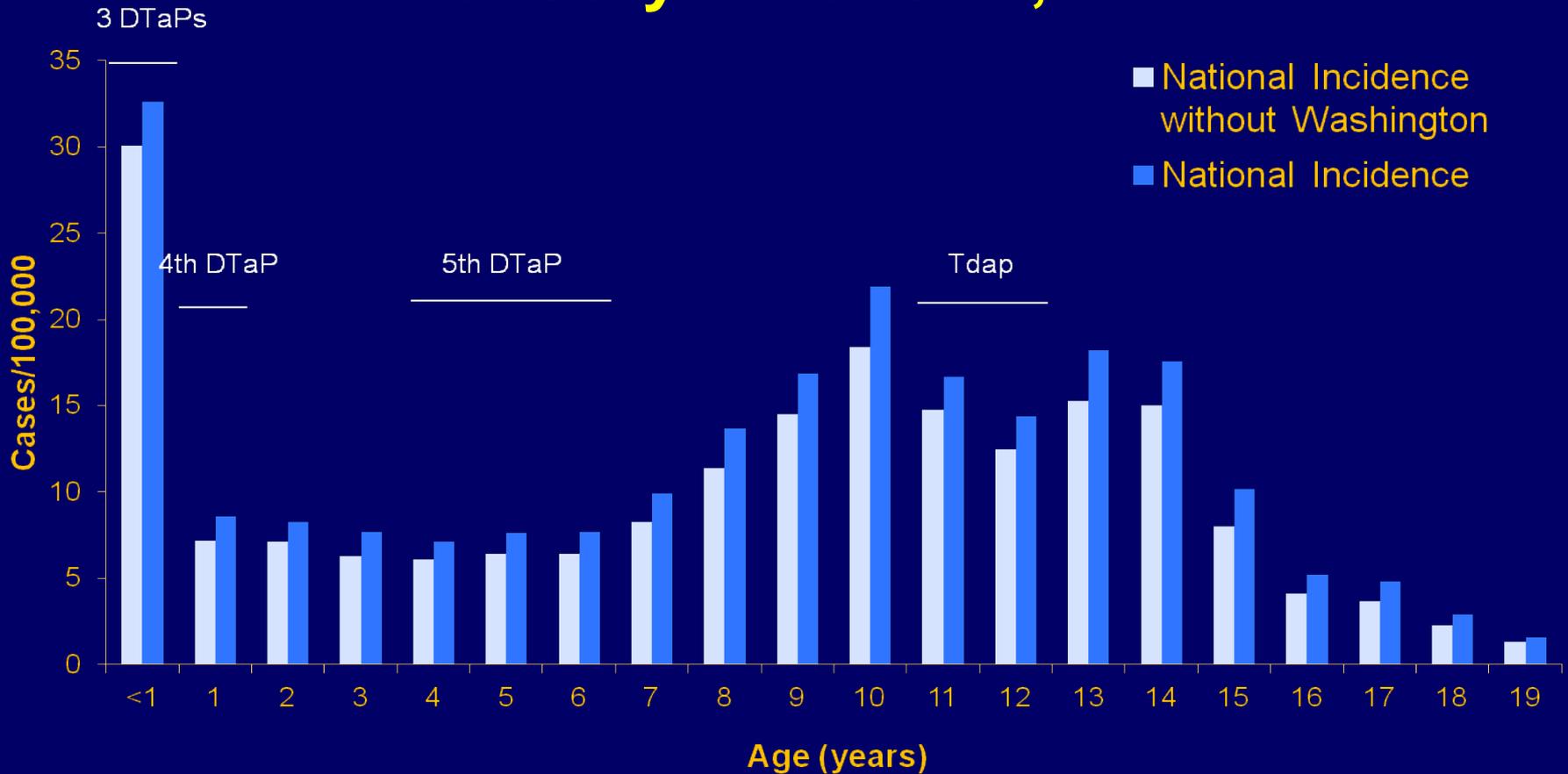
2012 Pertussis Cases & Rates by Single-year Age Group



2012 Pertussis Cases & Rates by Single-year Age Group



United States and WA State Pertussis Rates by Age, January 1–June 14, 2012



Vaccine Type Received*	Acellular Only	Transition Period	Whole Cell and Acellular

Sounding the Alarm

- **February 2012 – growing concern about sustained increase in reported pertussis cases**
 - **Alerted other DOH offices**
 - **Began planning for more streamlined surveillance**
 - **Worked with CD Epi Office Director to ensure adequate pertussis surveillance resources**

Why Declare an Epidemic?

- Growing number of cases, babies at risk
- Coordinate public health response
- Mobilize resources
- Alert and engage providers
- Inform and educate public

WA Department of Health (DOH) Pertussis Response Structure



Revision of Investigation Guidelines

- April 9 – convened LHJ workgroup to discuss surveillance changes
- April 30 – rolled out revised guidelines and new algorithm for pertussis investigation work flow to all LHJs
- Developed tools/templates to facilitate reporting to public health
 - provider, school, and child care
- May 9 – held statewide conference call to discuss changes with all LHJs

Triage reports of pertussis

An indication of a high-risk contact/setting will increase the priority of a report.

Investigations need to be performed even if resources are extremely limited for:

- Culture- or PCR-positive cases (includes those whose illness does not yet meet the clinical case definition)
- Epi-linked cases that meet the clinical case definition
- Infants < 12 months of age

Investigations can be temporarily suspended if resources are limited for (in order of importance): (Reports should be entered in PHIMS as usual whether further investigated or not.)

1. Cases that meet the clinical case definition but have no epi-link or lab confirmation ('probable' cases)
2. Cases with classic symptoms (paroxysmal cough, post-tussive emesis, or whooping) and < 2 week cough duration with no testing or a negative test
3. Cases with an epi-link that do not yet meet the clinical case definition (symptomatic contacts of a case)

Contact Provider

- Verify that patient is aware of the diagnosis
- Request pertussis immunization history and pertinent clinical information
- Ask about high-risk* contacts/settings
- Verify appropriate treatment
- Determine what exclusion recommendations were made
- Determine whether high-risk household contacts received chemoprophylaxis

Interview Patient

Case

- Determine clinical symptoms and onset of illness
- Provide education about period of communicability, method of transmission, and avoidance of high-risk persons/settings
- Recommend avoiding all public settings until 5 days of antibiotics (Day 6) or 21 days after onset of cough if not treated

Contacts

- Identify high-risk close contacts* or setting for follow-up
- If no high-risk close contacts or setting are identified, instruct patient to inform contacts of exposure and to seek advice from their own healthcare provider regarding chemoprophylaxis

Symptomatic

High-risk Close Contacts*

Asymptomatic

Activities

- Educate
- Facilitate evaluation, testing, treatment, and exclusion as appropriate
- Notify facility if high-risk setting identified
- Report those who meet clinical case definition

Activities

- Educate
- Advise symptom watch
- Facilitate chemoprophylaxis

CDC Epi Aid

- **Confirm *B. pertussis* as etiologic agent**
 - Rule-out pseudo-outbreak due to contamination
 - Rule out co-circulation of *B. holmesii*
- **Conduct in-depth analysis of WA cases & compare to national data**
- **Submit WA State pertussis isolates to CDC lab for molecular characterization testing**
- **Survey WA clinical labs to determine statewide pertussis PCR practices**

Alerting and Engaging Providers

- State Health officer requests action from all providers
- Joint letter from WA Hospital Assn/DOH → all hospitals
- Held CDC webinar training for providers (CME's)
- Regular updates to local/tribal health and professional medical associations

Call for Provider Action

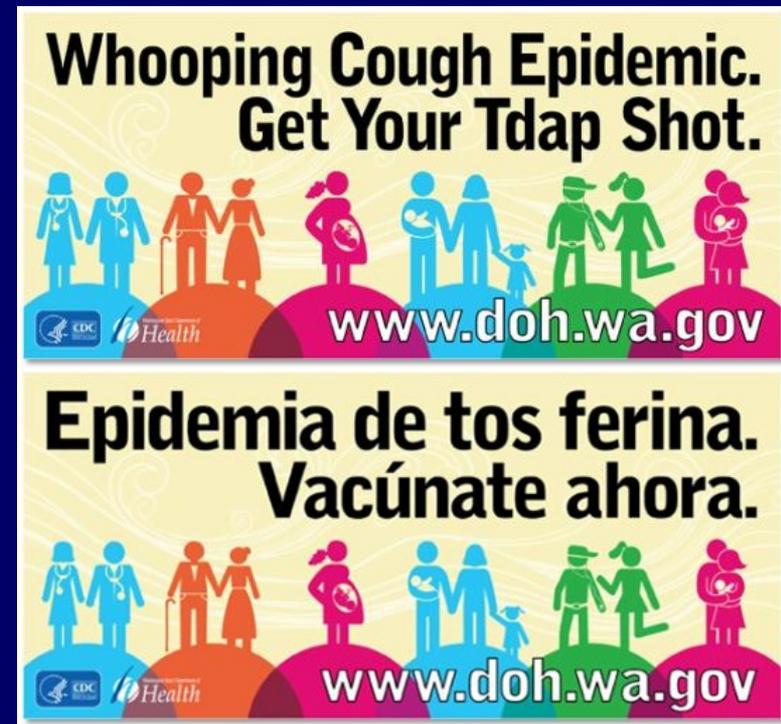
- ✓ Ensure staff and patients up-to-date for pertussis immunization
- ✓ Vaccinate all women of childbearing age and postpartum patients
- ✓ Recommend and refer household contacts and caregivers for Tdap vaccination at least 2 weeks before baby due
- ✓ Early testing of symptomatic patients
- ✓ Early treatment
- ✓ Prompt reporting of suspected cases

Access to Tdap Vaccine

- Promoted national program that provides free vaccine
- Allocated >32,000 federally funded Tdap doses to LHJs and tribes for under- and uninsured adults
- Worked with LHJs to organize community vaccination clinics
- State immunization registry: tracked Tdap doses administered; made annual comparisons

Informing the Public

- Tdap vaccination mailings
 - reached 470,000 families
- Radio/TV ads, English/Spanish
- YouTube, other social media
- Regular website updates
- News releases and news conferences
- Billboards and bus ads



Evaluation of Tdap Vaccine

- Collaborative project between CDC and WA DOH
- Objectives
 - Assess Tdap vaccine effectiveness (VE)
 - Evaluate duration of immunity
 - Evaluate impact of brand on Tdap VE

Summary

- Record number of cases in WA in 2012
- Pertussis continues to be a public health problem despite a well-implemented vaccination program
 - Unexpected high rates in 13-14 year olds with high Tdap coverage
- WA trends reflect national trends
- Observational data suggesting early waning of immunity from acellular vaccines

Summary

- Will we see a new baseline in terms of expected cases?
- Prevention and control efforts should continue to focus on protecting infants too young to be vaccinated and at highest risk of disease

Acknowledgements

Disease Investigators and Health Officers from the 35 Local Health Jurisdictions in WA State

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- ❑ Marisa D'Angeli, MD, MPH
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CDC NCIRD

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- ❑ Sarah Meyer, MD, MPH
- ❑ Anna Acosta, MD
- ❑ Stacey Martin, MS

Resources

- www.doh.wa.gov
 - Frequently asked questions
 - Weekly updates on reported cases
 - Guidance on surveillance, testing, treatment and vaccination
 - Posters, facts sheets and more that you can order for free
- MMWR article “Pertussis Epidemic – Washington, 2012”, July 20, 2012
- www.cdc.gov/MMWR

QUESTIONS?

PUBLIC HEALTH

ALWAYS WORKING FOR A SAFER AND

HEALTHIER WASHINGTON

Multitarget PCR Results

■ Seattle Children's Clinical Microbiology Lab

□ 5,086 specimens tested

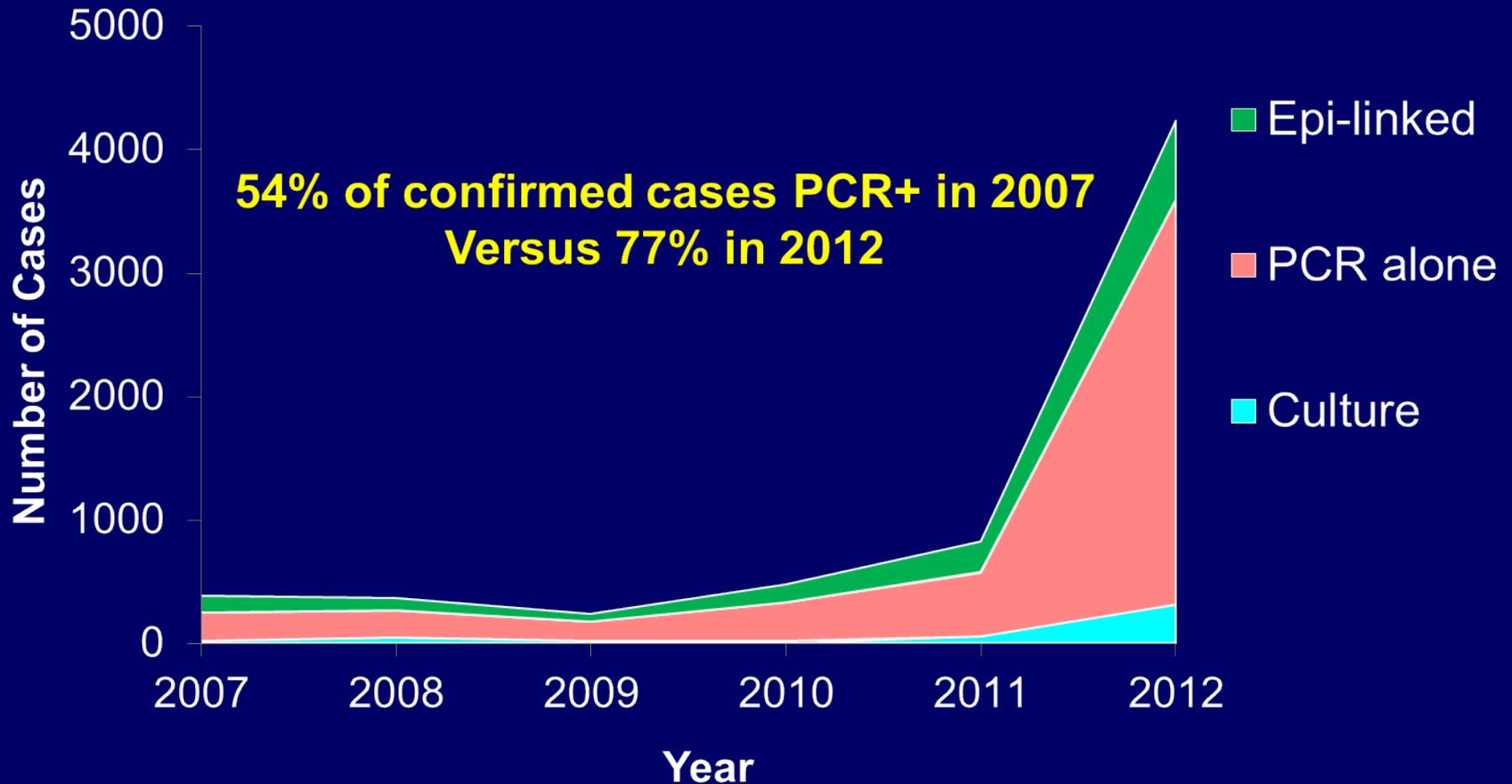
- *B. pertussis* 175 (90.7%)
- *B. parapertussis* 11 (5.7%)
- *B. holmesii* 2 (1%)
- Indeterminate 5 (2.6%)

■ CDC confirmation of positive specimens from WA PHL and a commercial lab

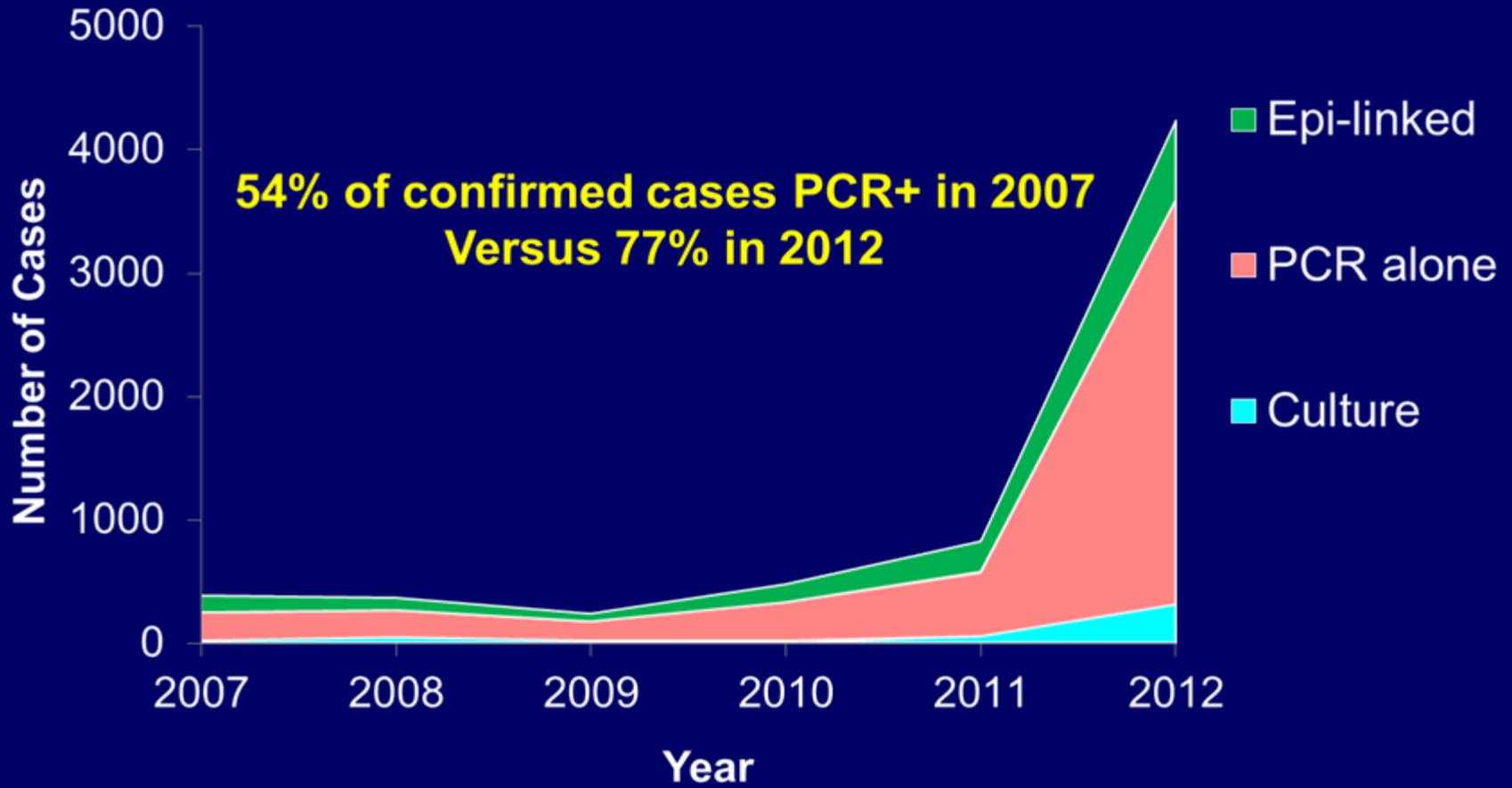
□ 69 specimens tested

- *B. pertussis* 59 (85.5%)
- *B. holmesii* 1 (1.5%)
- Indeterminate 9 (13%)

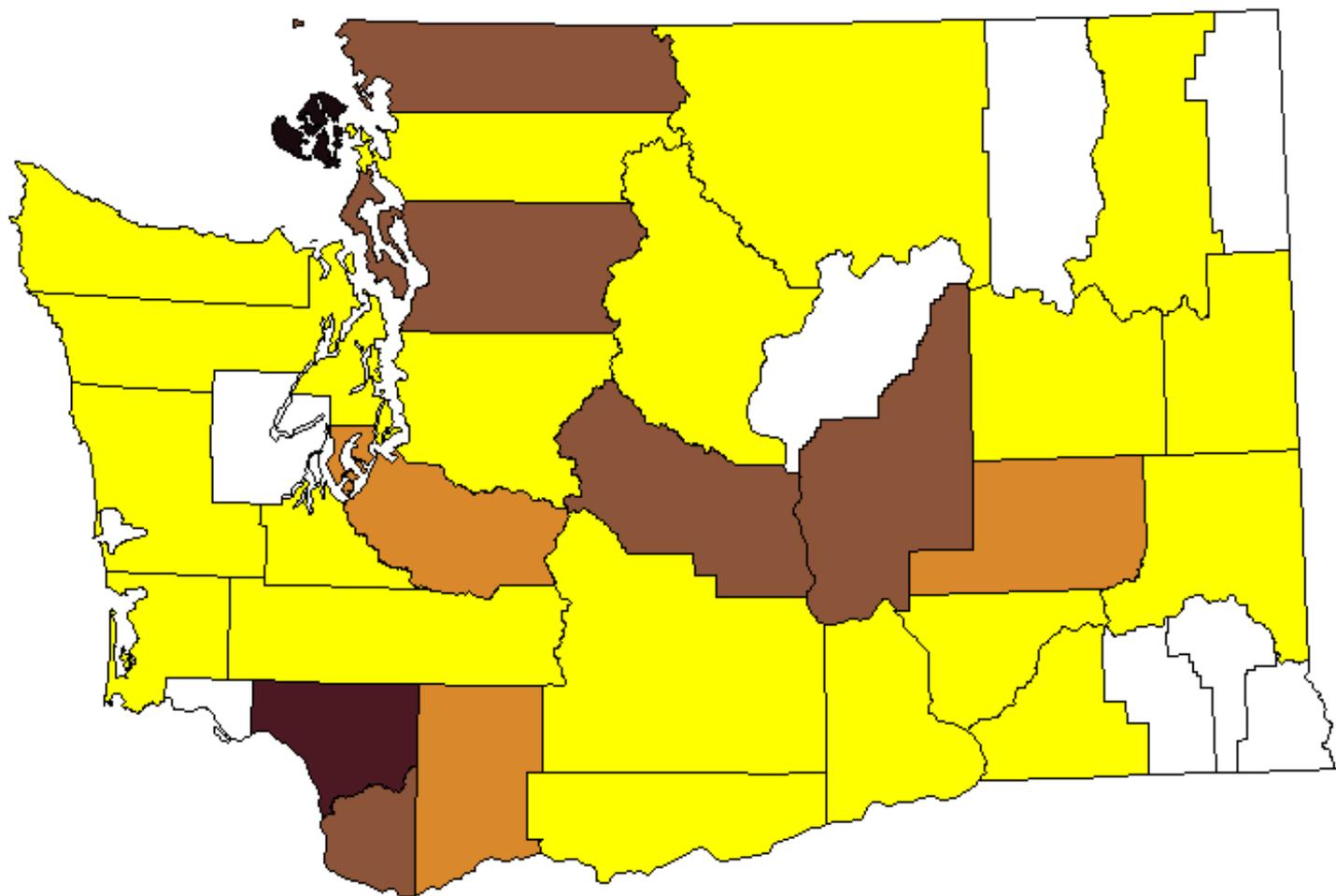
Confirmed pertussis cases by diagnosis method



Confirmed pertussis cases by diagnosis method



2011 Cumulative Pertussis Incidence Washington State



Incidence per 100,000 population per year

