



School of Medicine

UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

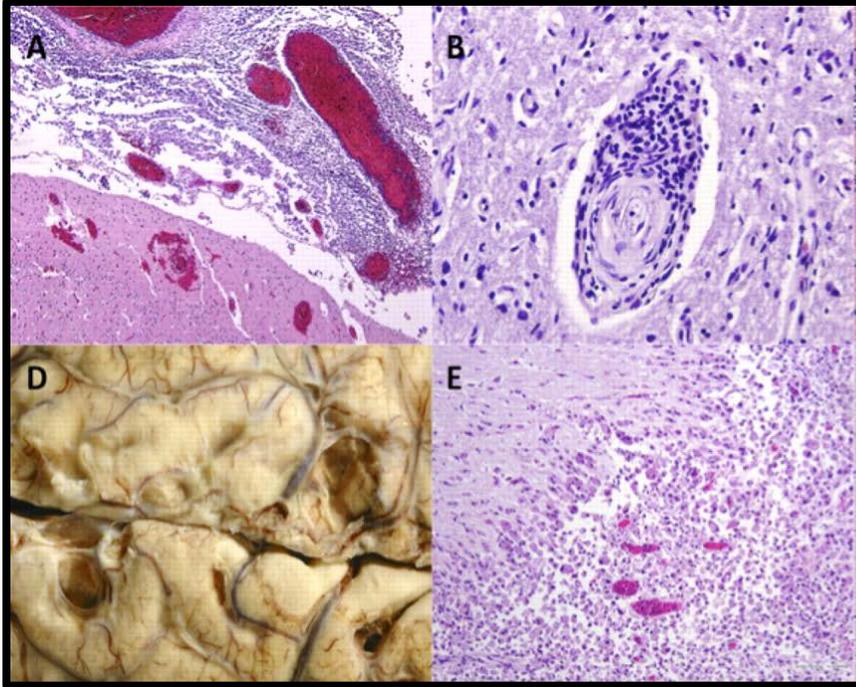
Effectiveness of pneumococcal vaccination in children in the United States

Edwin J. Asturias MD

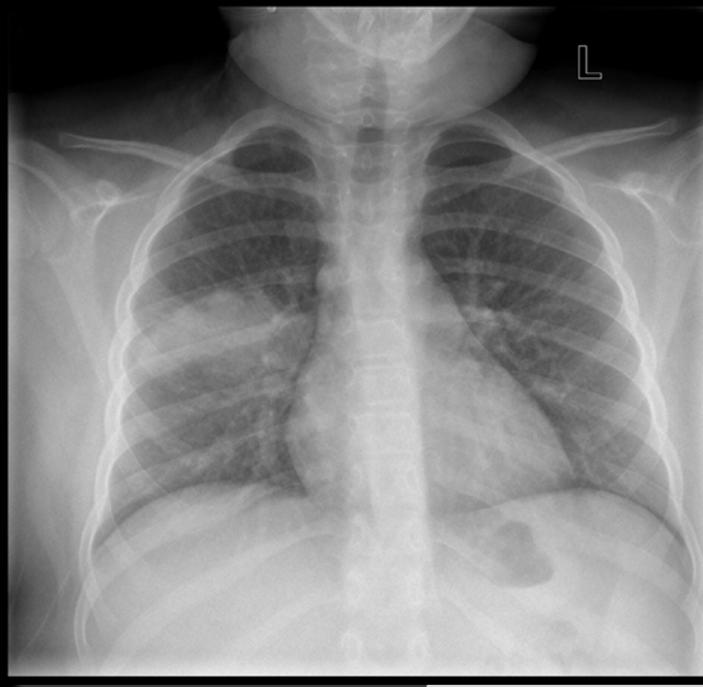
Associate Professor of Pediatrics and
Pediatric Infectious Diseases

Director for Latin America

Pneumococcal disease in the pre-vaccine era



Acute meningitis
~30-40%

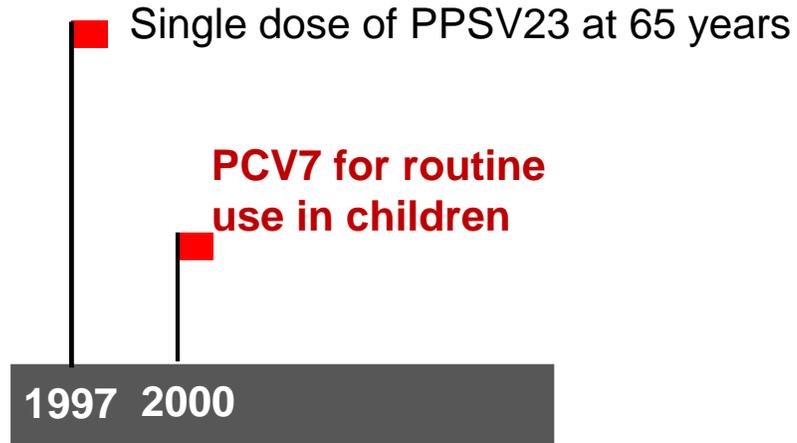


CA-Pneumonia
~20%



Acute otitis media
~30%

Evolution of US ACIP pneumococcal vaccine recommendations

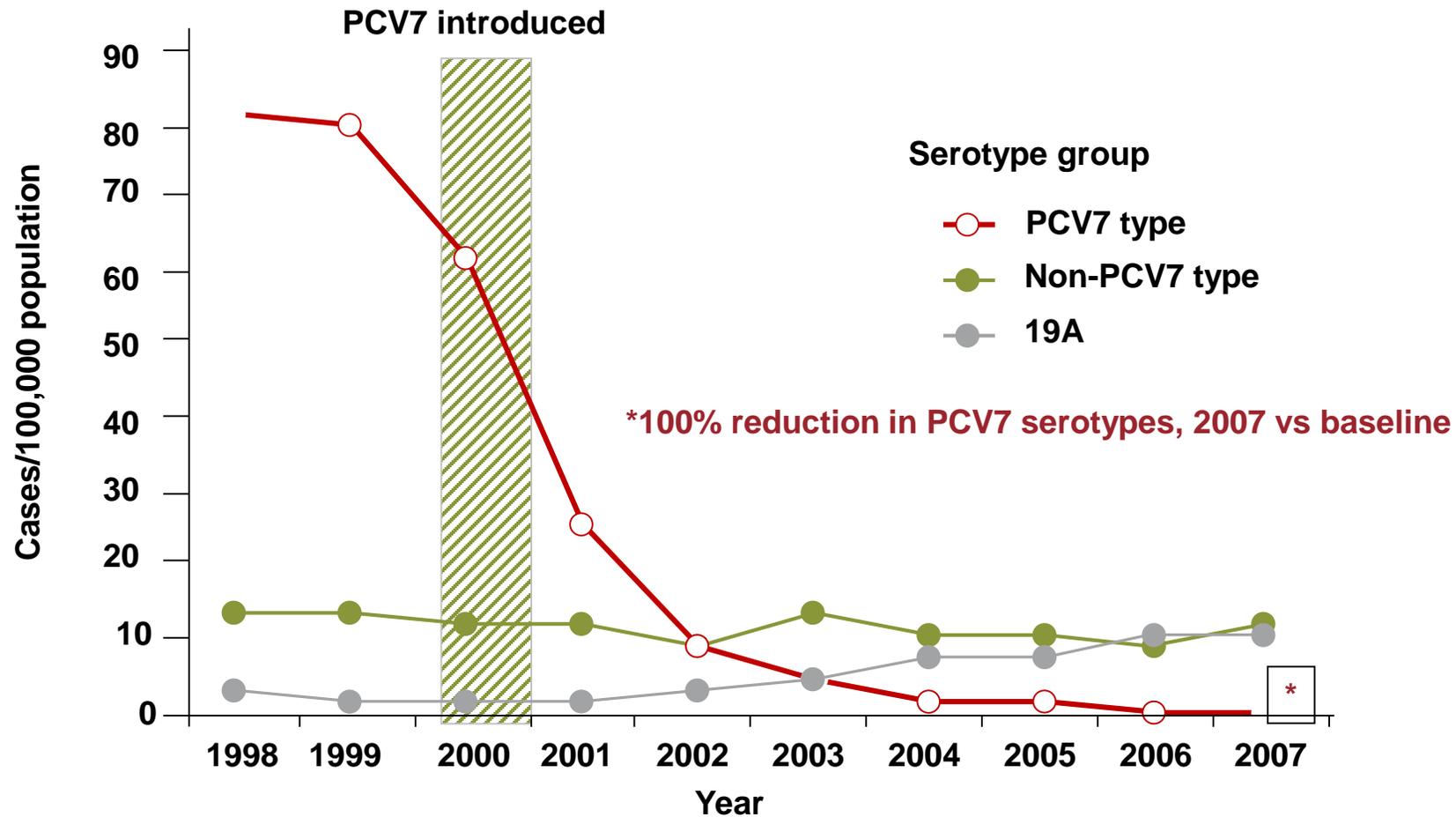


PPSV23: 23-valent pneumococcal polysaccharide vaccine

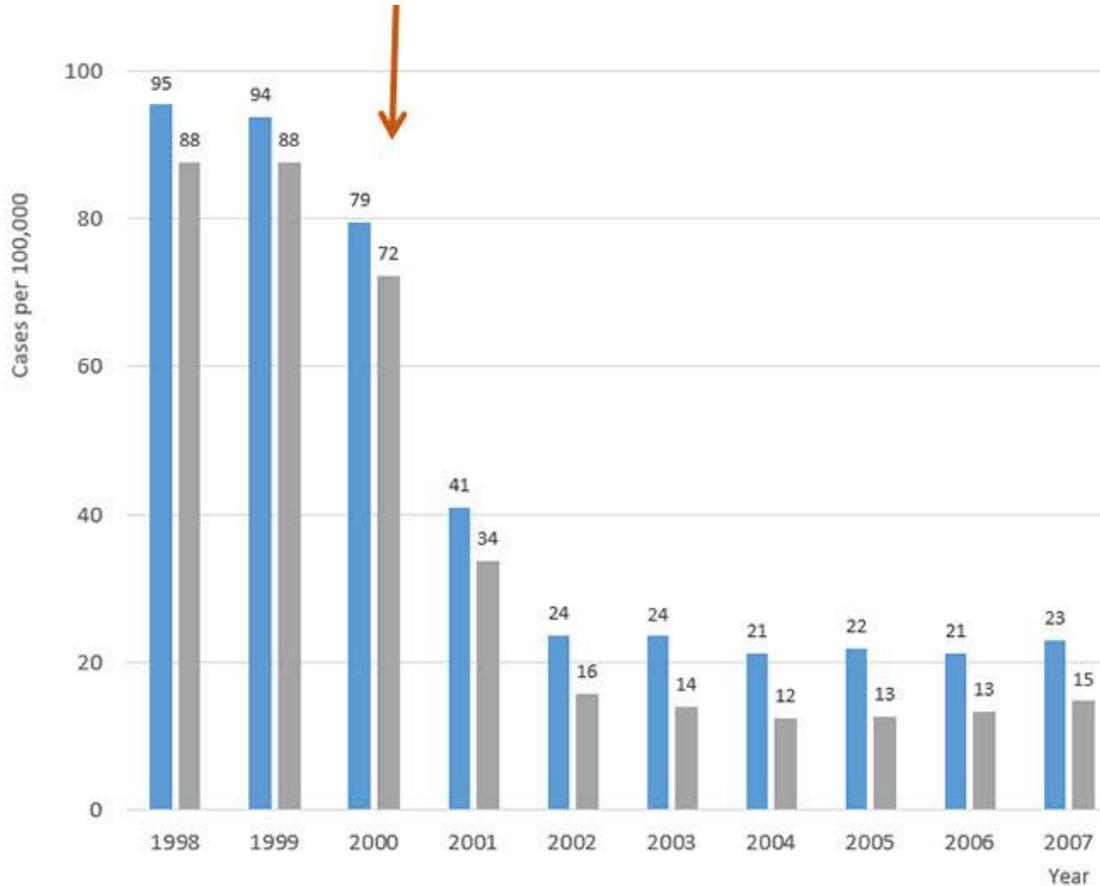
PCV13: 13-valent pneumococcal conjugate vaccine

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PCV-7 Direct Effect of Vaccination: Invasive Pneumococcal Disease Among Children < 5 Years, 1998/99–2007 in the US



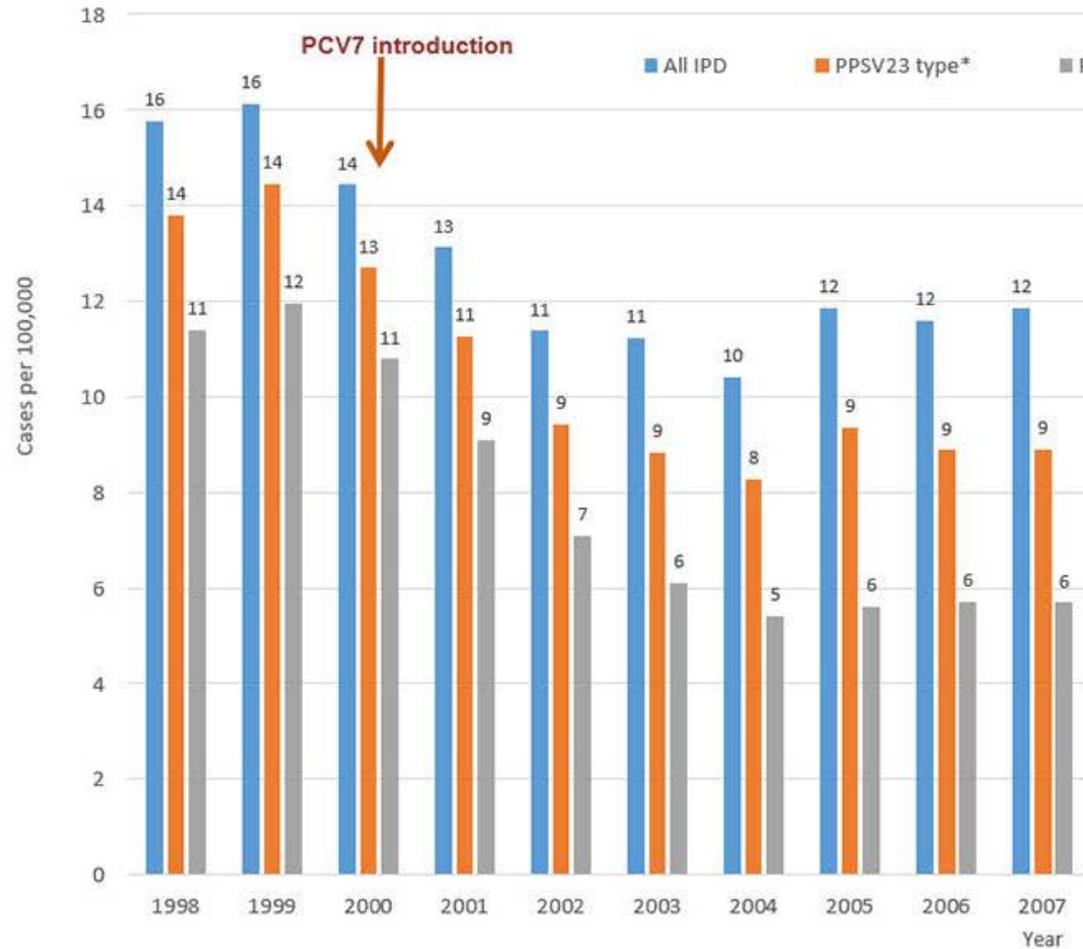
Changes in the incidence of invasive pneumococcal disease (IPD) among children <5 years old from 1998- 2015 in the United States



*PCV13 serotype: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F

<https://www.cdc.gov/abcs/reports-findings/survreports/spneu-types.html>

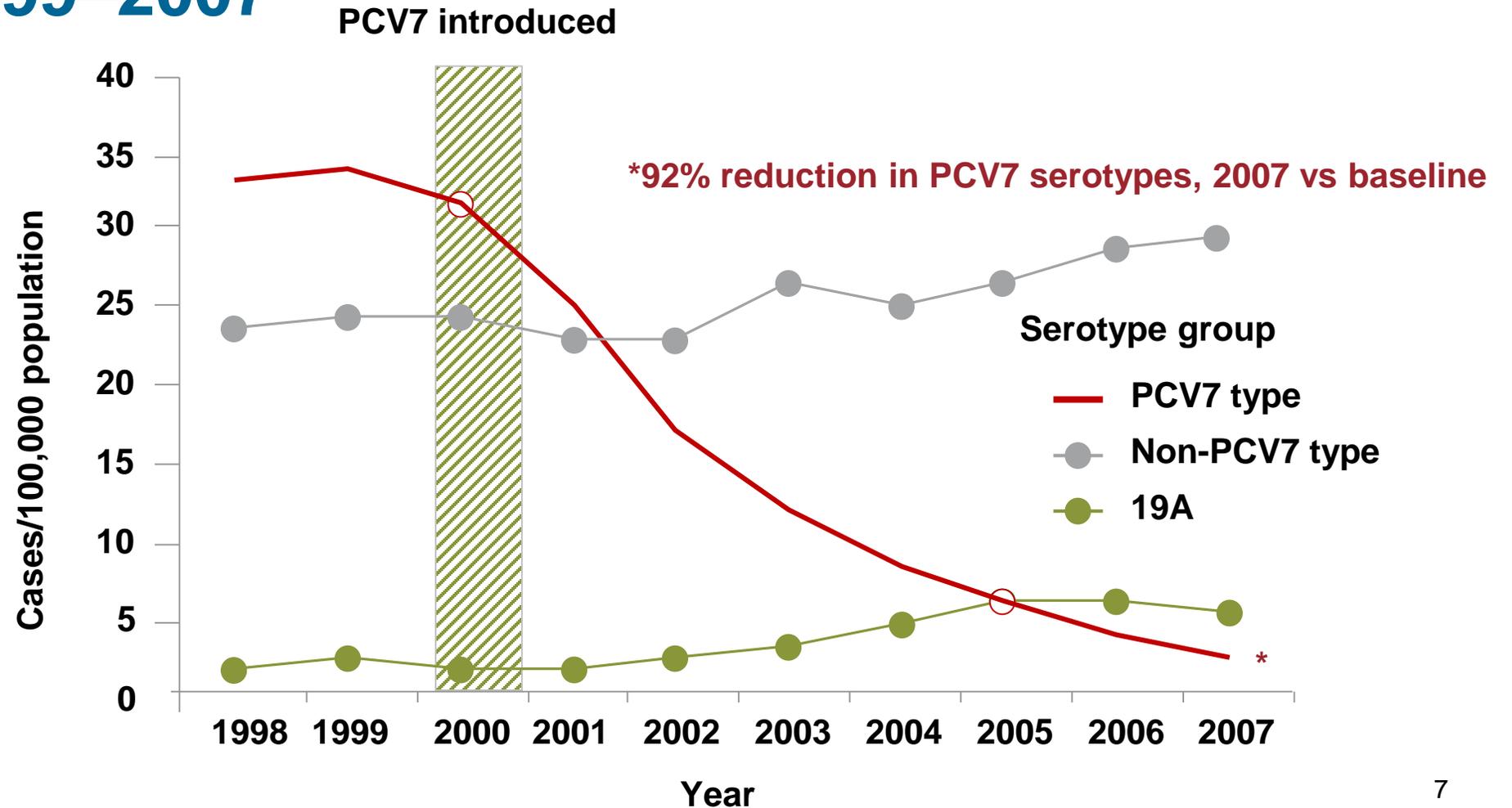
Incidence of invasive pneumococcal disease (IPD) among adults 19 through 64 years of age 1998-2015 in the United States.



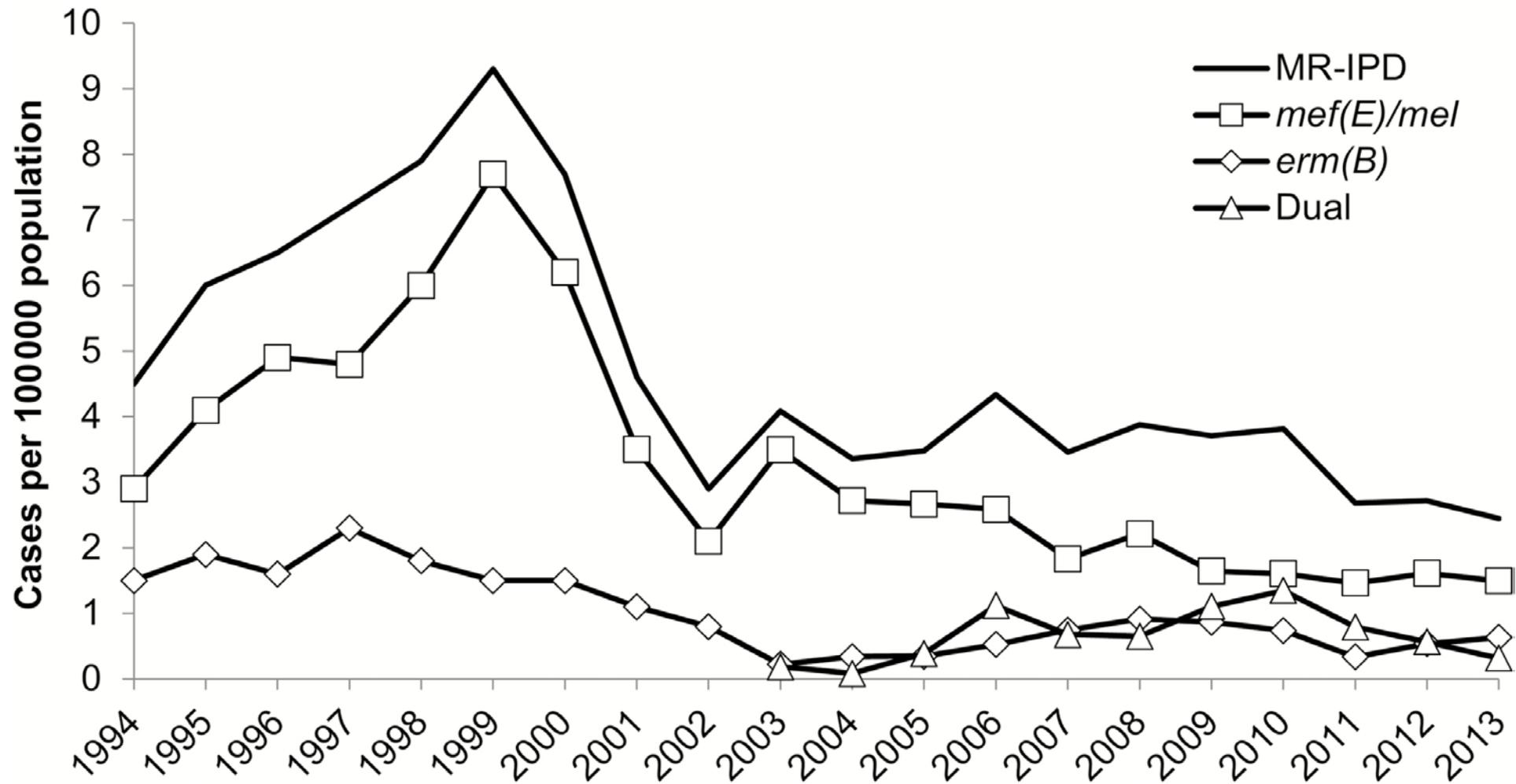
*PPSV23 serotypes: 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, and 33F

*PCV13 serotype: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F

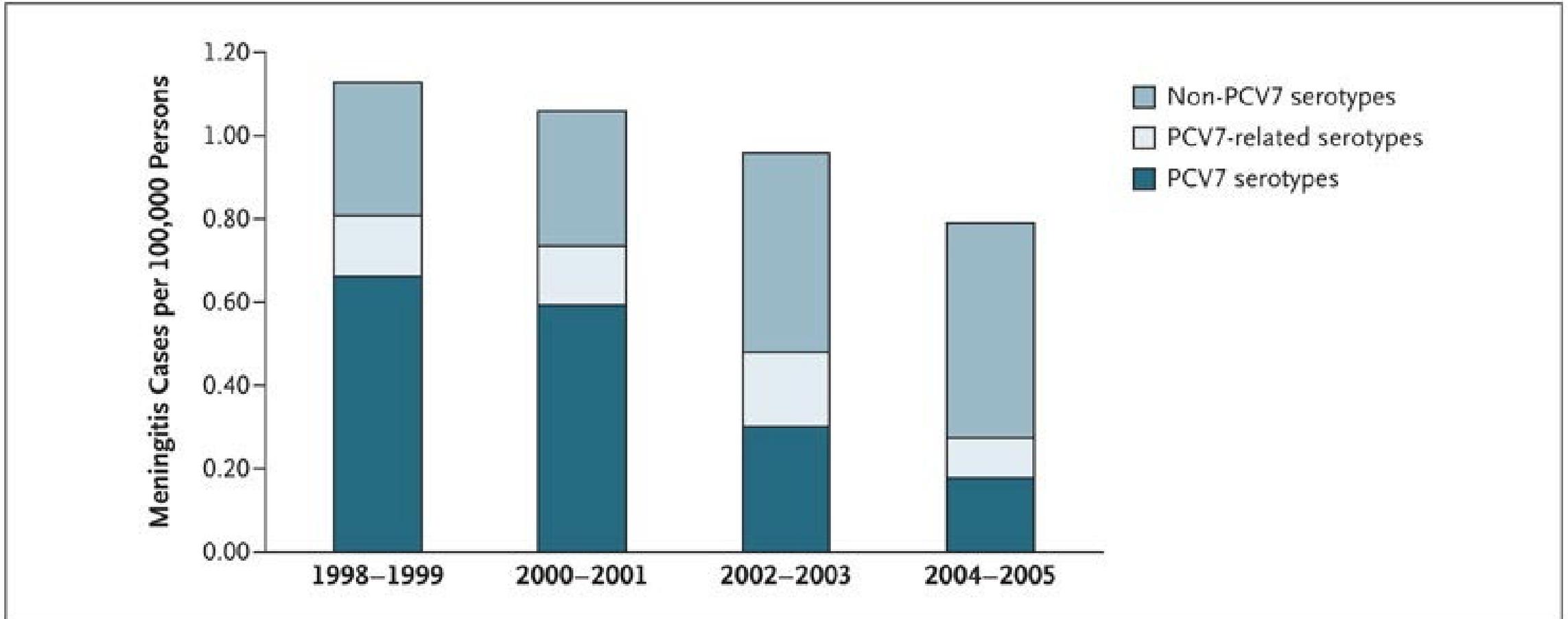
Invasive Pneumococcal Disease Among Adults ≥ 65 Years, 1998/99–2007



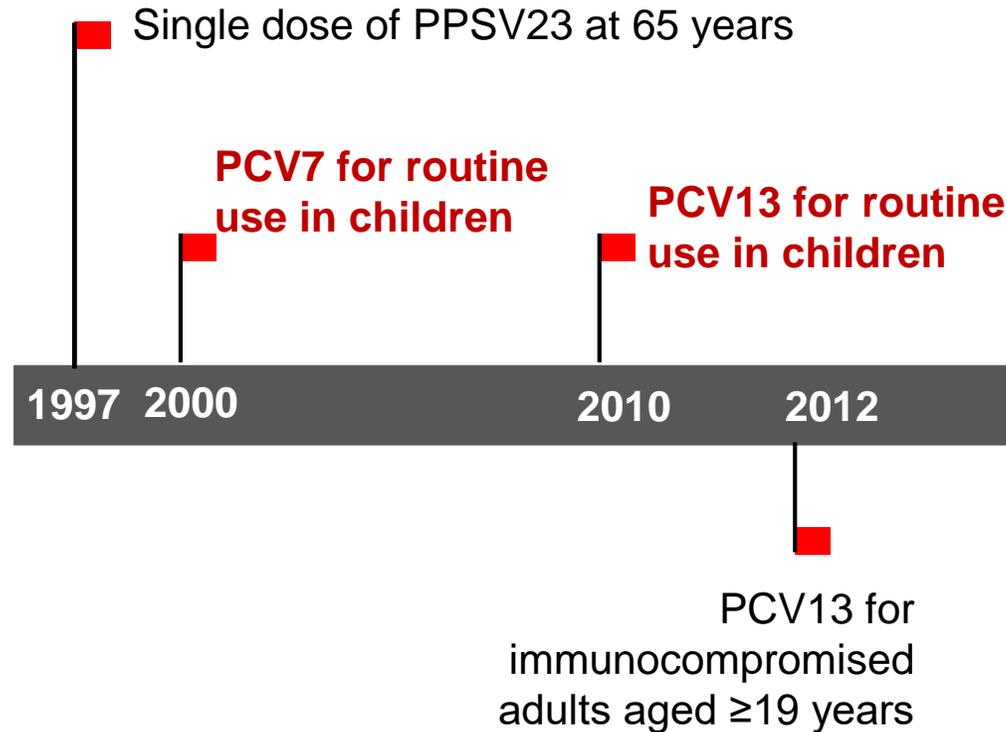
Incidence (1994–2013) of macrolide-resistant invasive pneumococcal disease in metropolitan Atlanta, GA, USA



Mean Annual Incidence of Pneumococcal Meningitis in the US According to Serotype Group and Time Period 1998-2005



Evolution of US ACIP pneumococcal vaccine recommendations

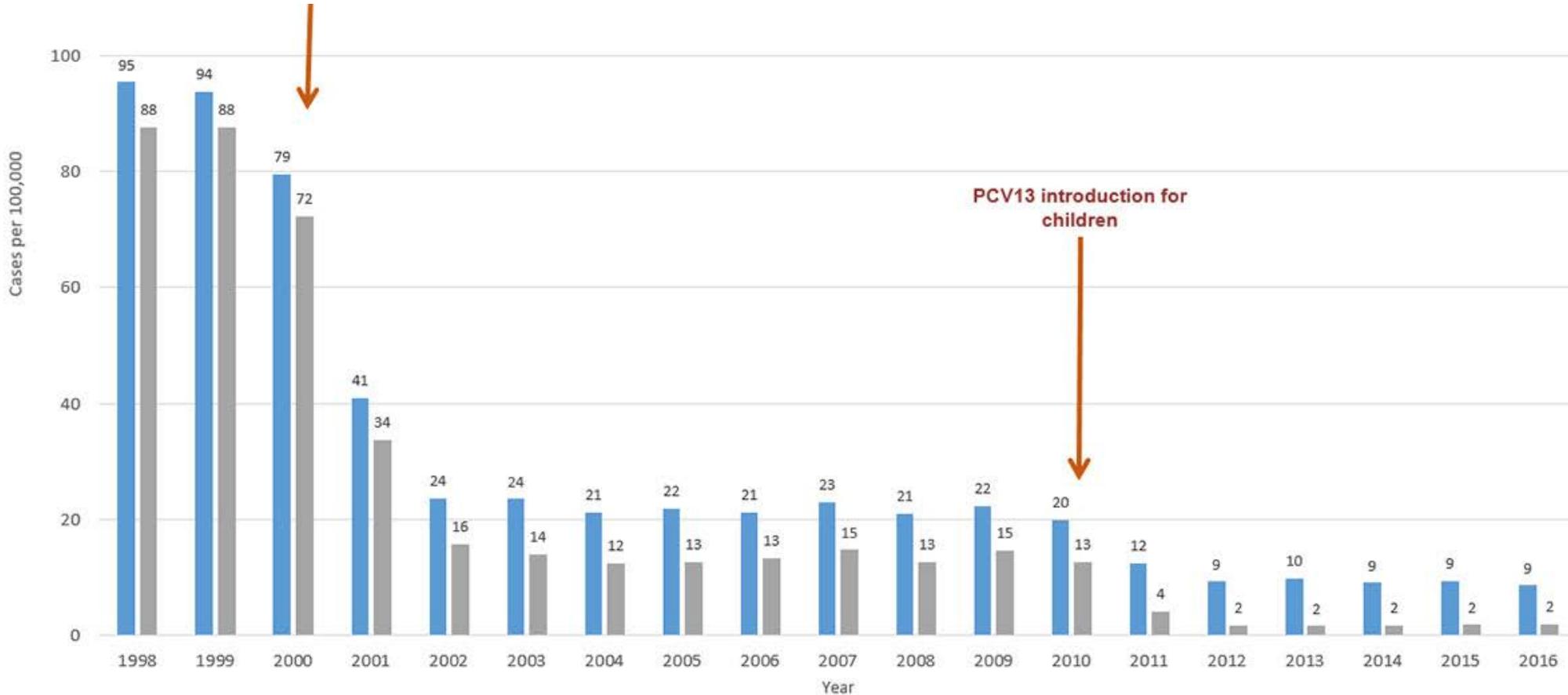


PPSV23: 23-valent pneumococcal polysaccharide vaccine

PCV13: 13-valent pneumococcal conjugate vaccine

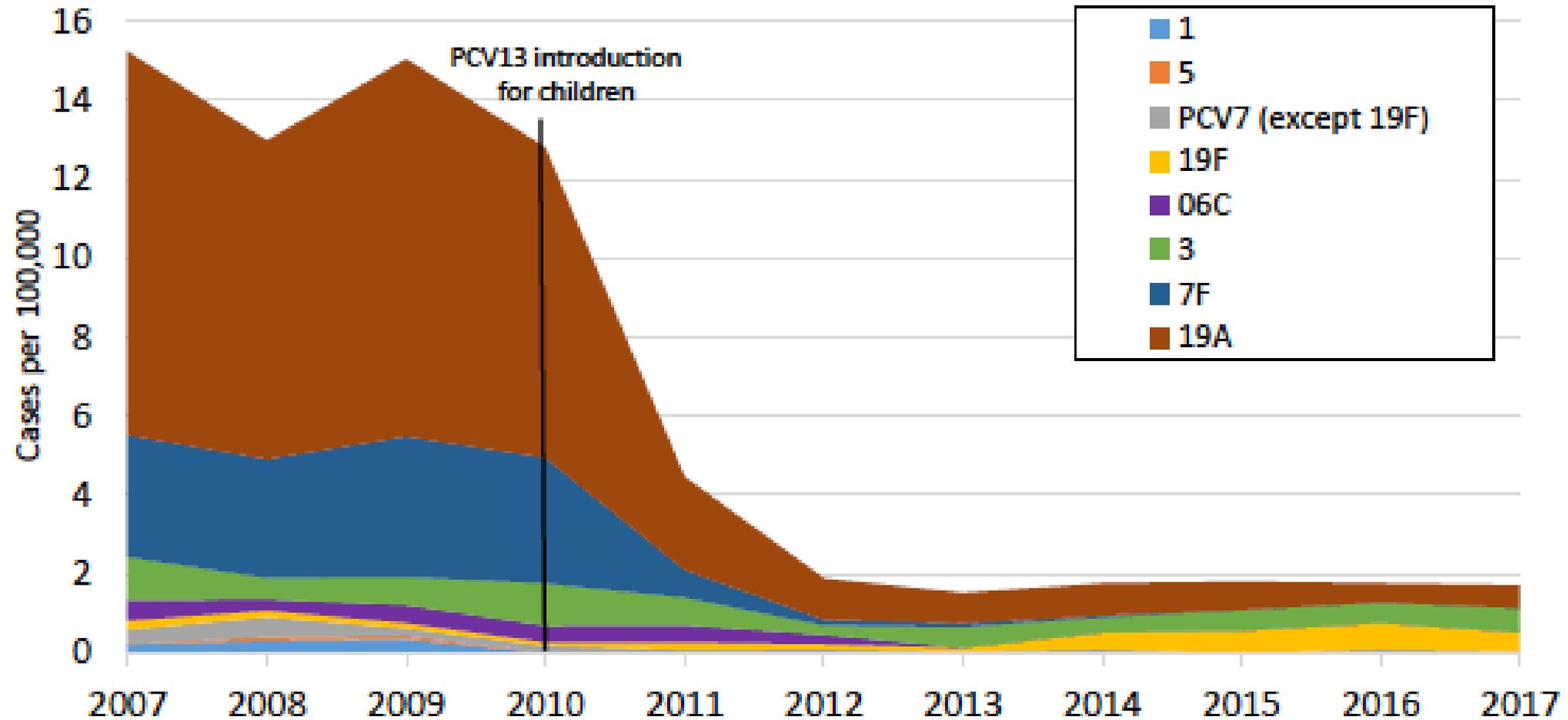
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Changes in the incidence of invasive pneumococcal disease (IPD) among children <5 years old from 1998- 2015 in the United States

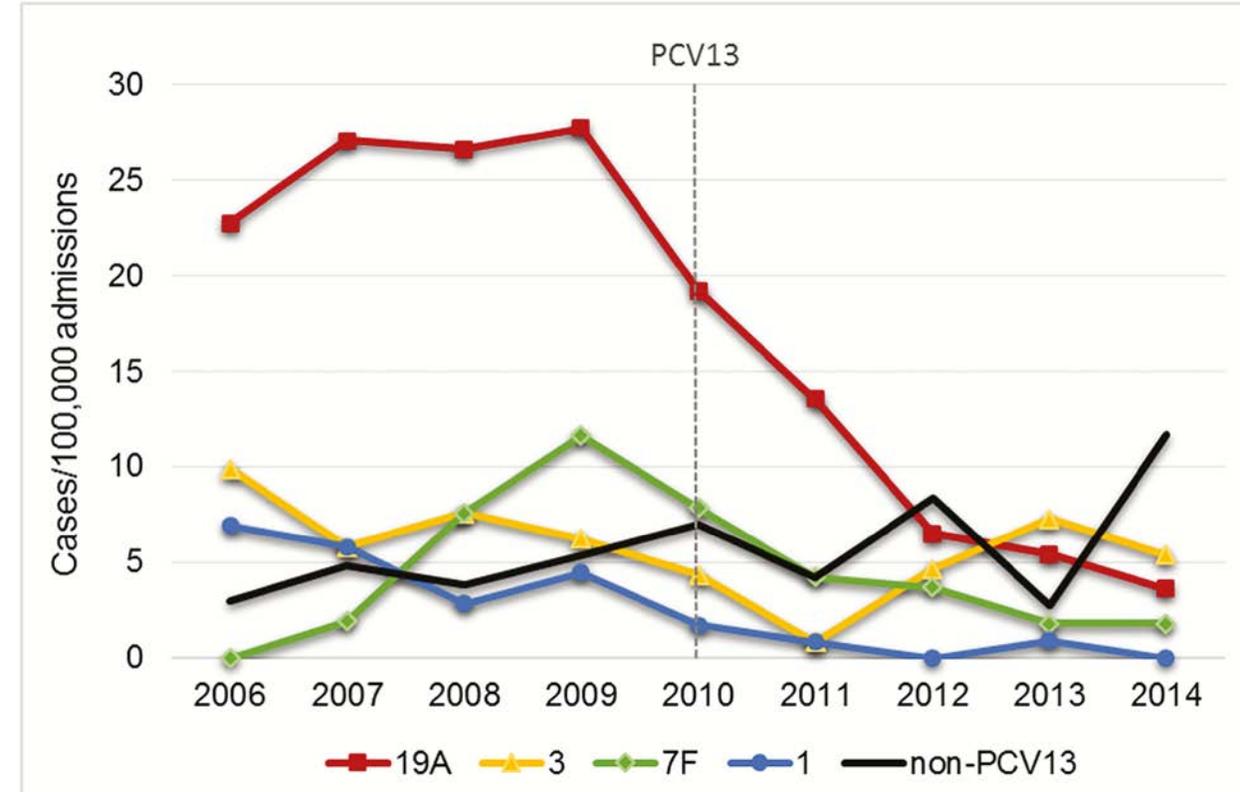
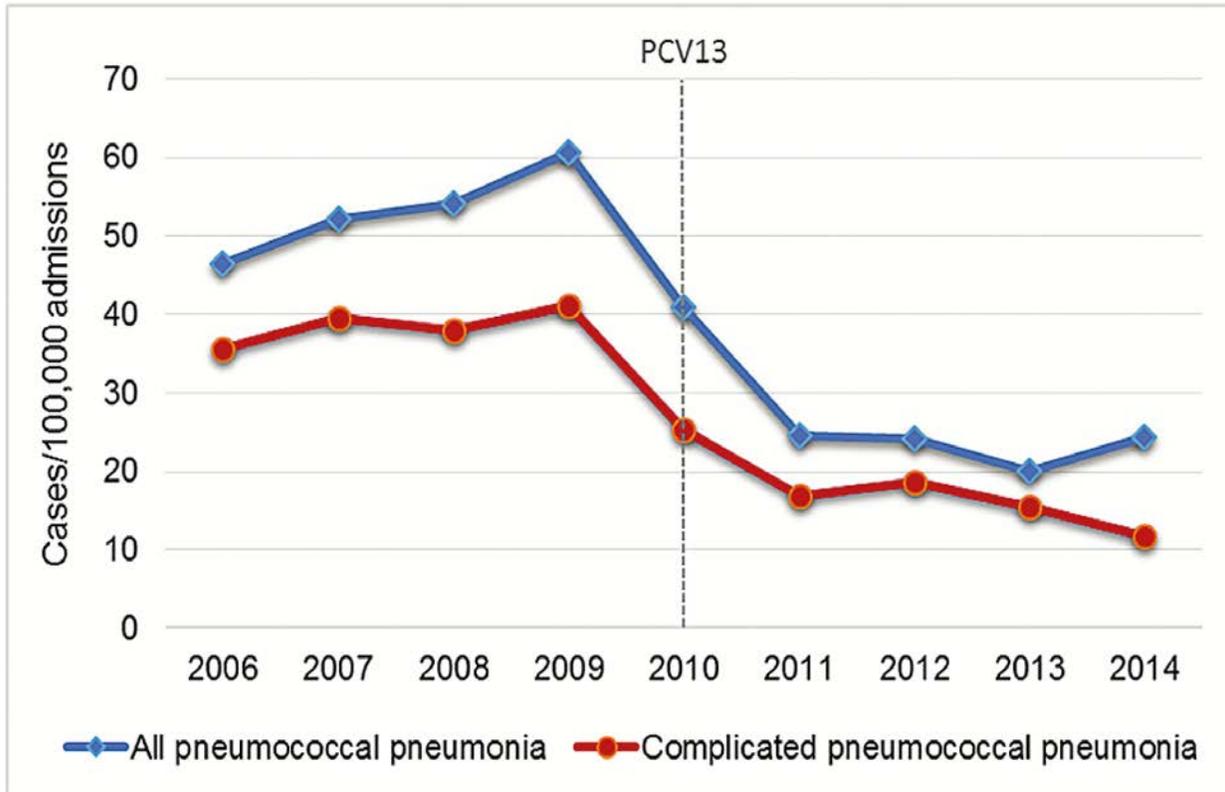


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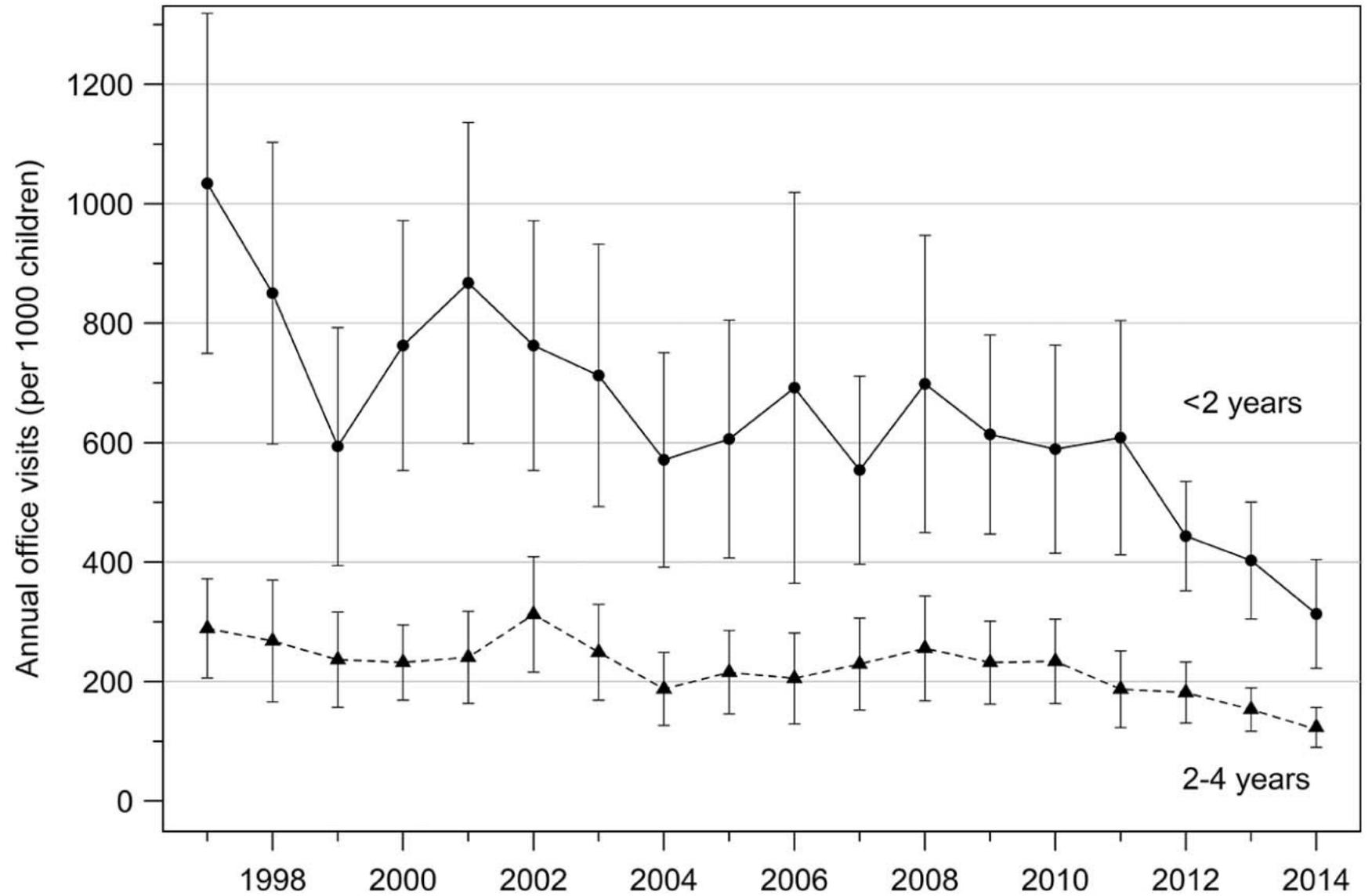
Incidence of IPV by PCV-13 serotype in children < 5 years of age in the United States 2007-2017



Annual hospitalization rates of all Spn pneumonia, complicated pneumonia and serotype-specific per 100000 in the US

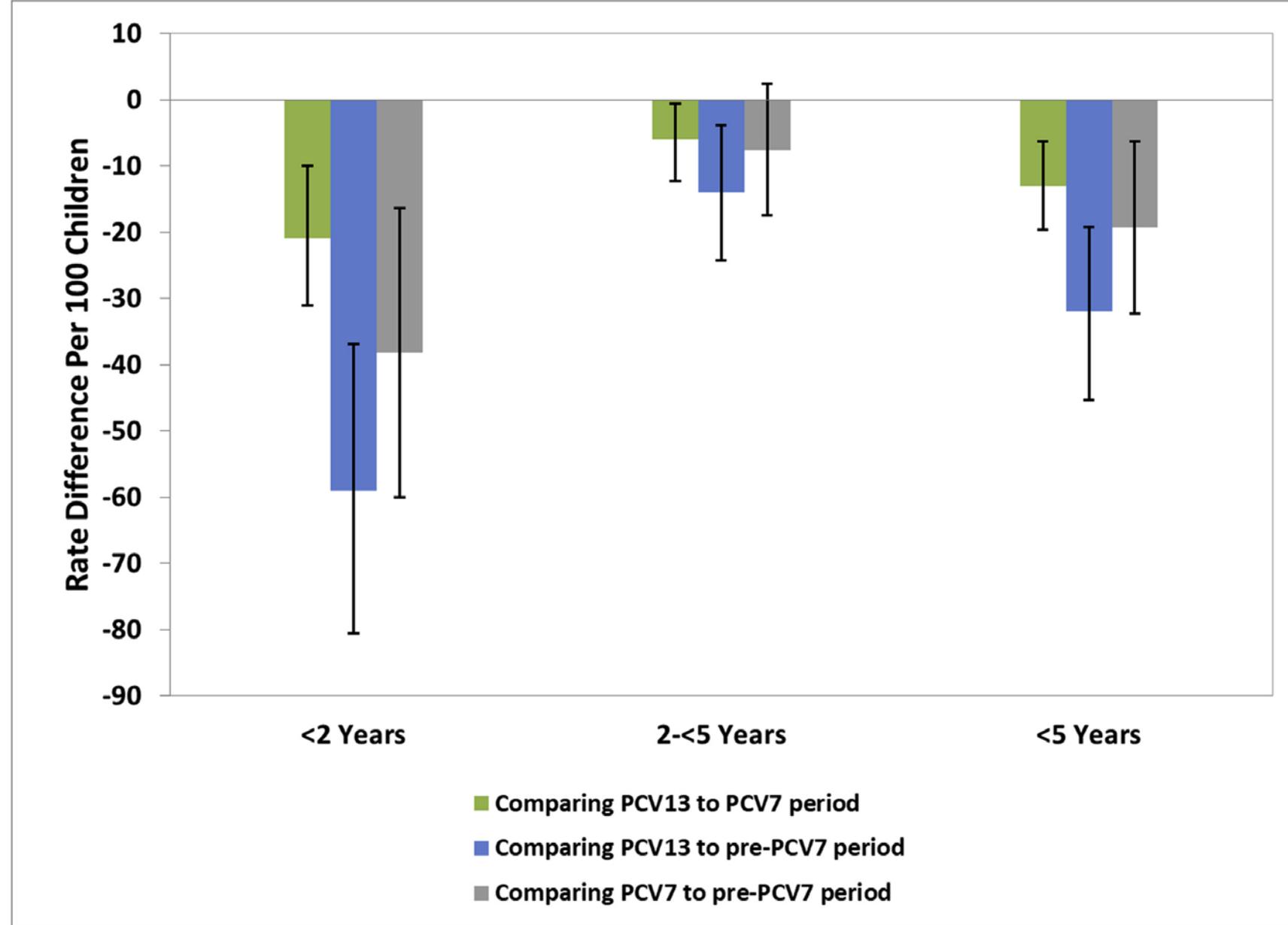


Annual office visits for OM among children < 5 years of age in the US 1997-2014

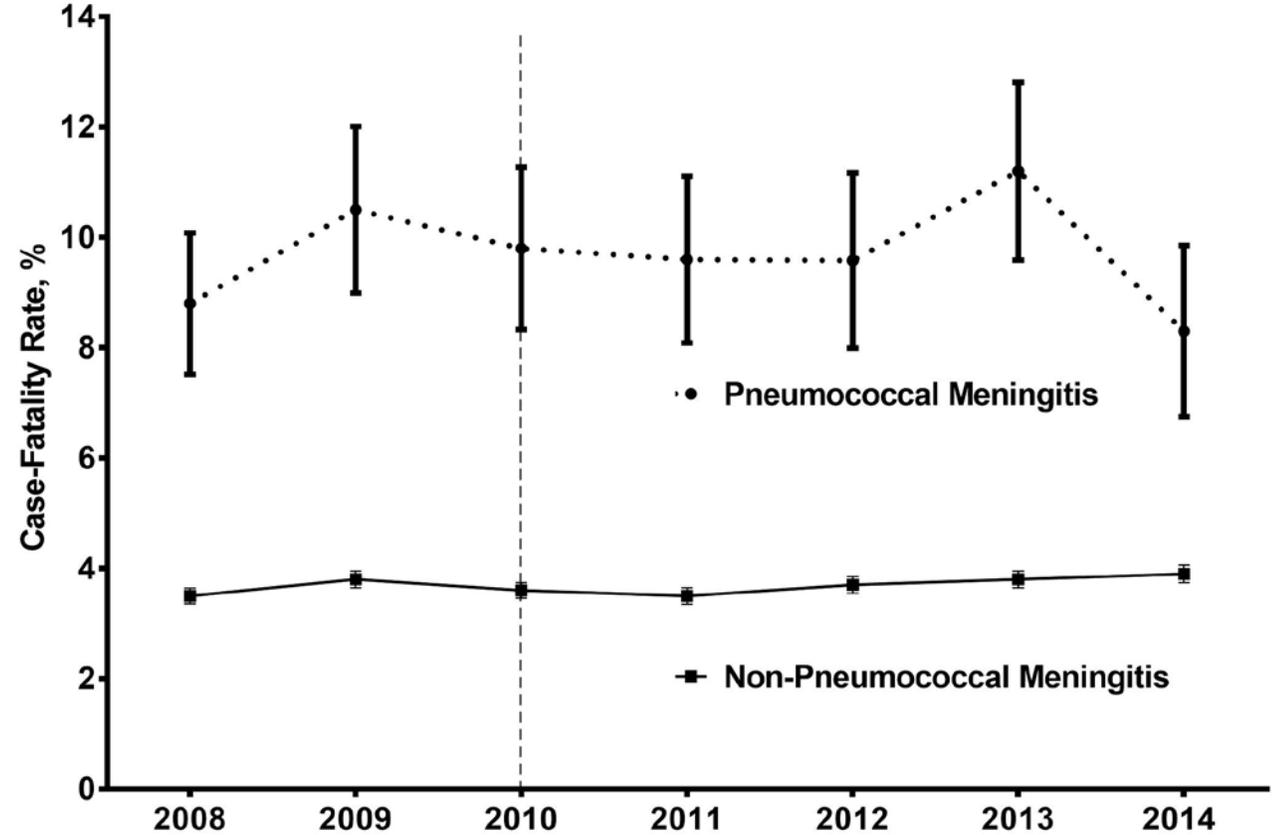


Differences in OM visit rates per 100 children

Reduction in OM visit rates after introduction of PCV13 and PCV7 was most marked among children <2 years

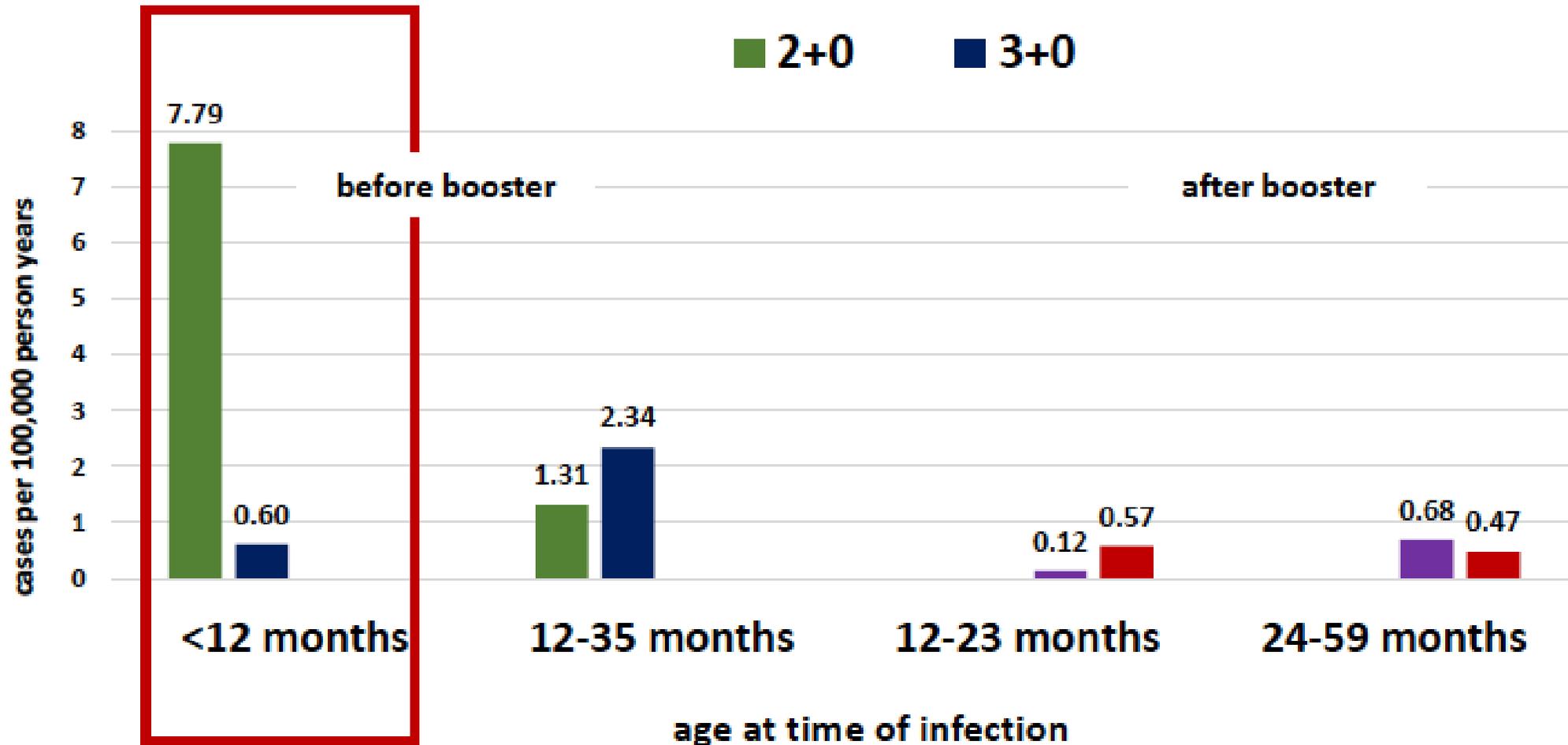


Impact of PCV vaccines on mortality from acute bacterial meningitis

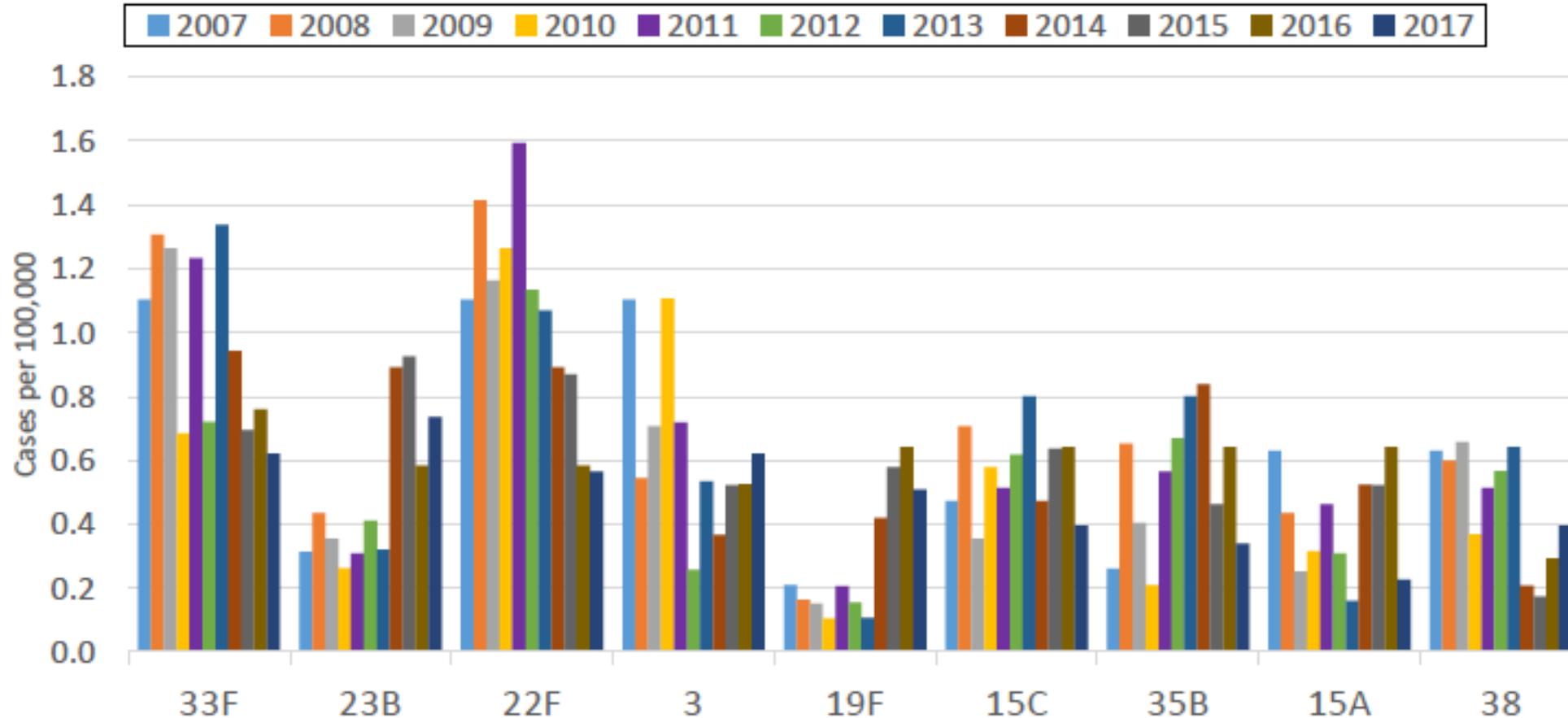


PM		2008	2009	2010	2011	2012	2013	2014
Cases		1886	1578	1575	1464	1305	1475	1210
Mortality (n)		166	166	154	140	125	165	100
CFR (%)		8.8	10.5	9.8	9.6	9.6	11.2	8.3
Non-PM		2008	2009	2010	2011	2012	2013	2014
Cases		64872	63539	68506	61404	61215	58690	57720
Mortality (n)		2302	2388	2453	2160	2270	2215	2280
CFR (%)		3.5	3.8	3.6	3.5	3.7	3.8	3.9

Incidence of IPD breakthrough infections in the US according to PCV schedule 2010-2016

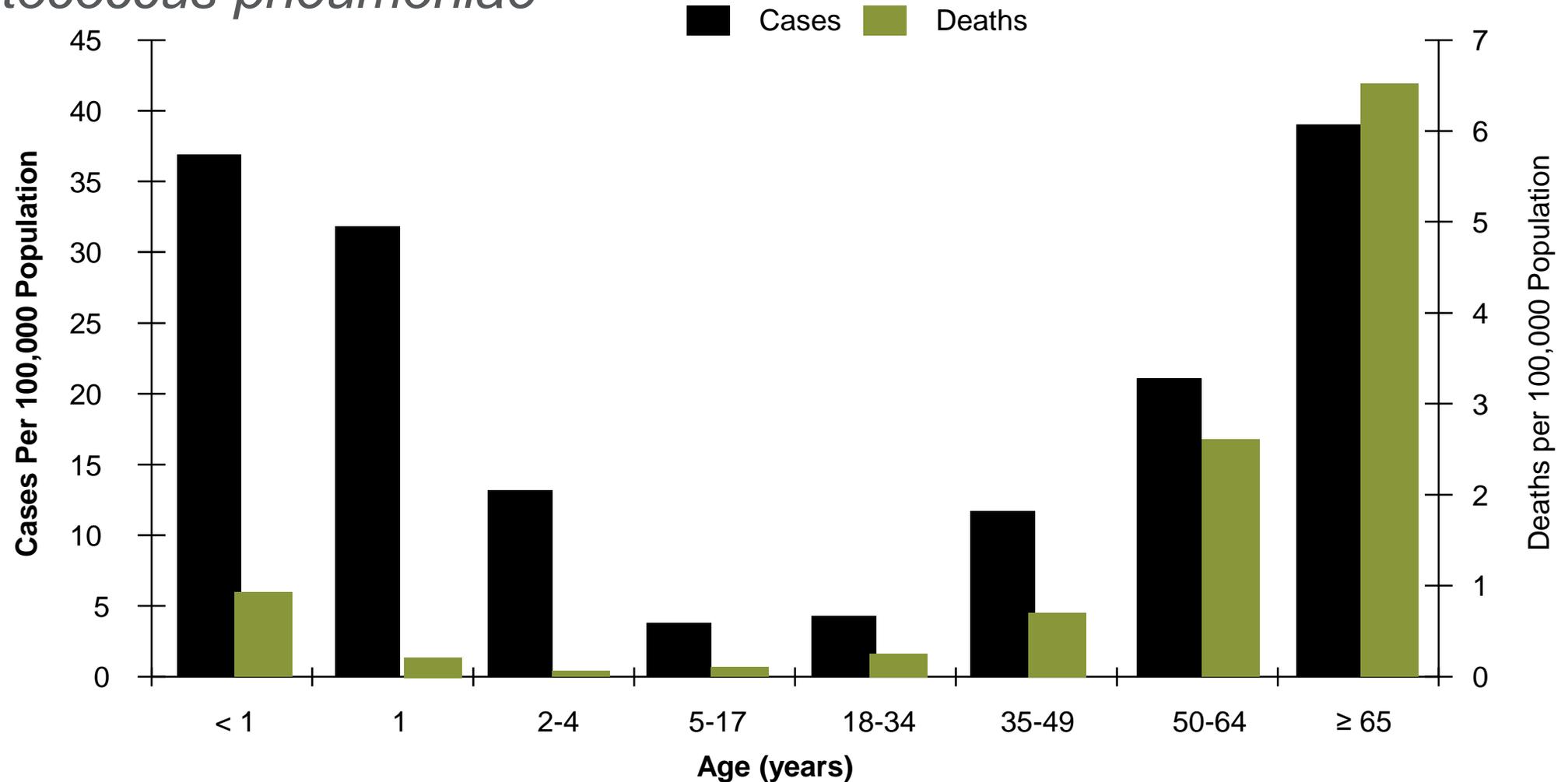


Invasive pneumococcal disease in children <5 years according to serotypes 2007-2017 (* most important ST)

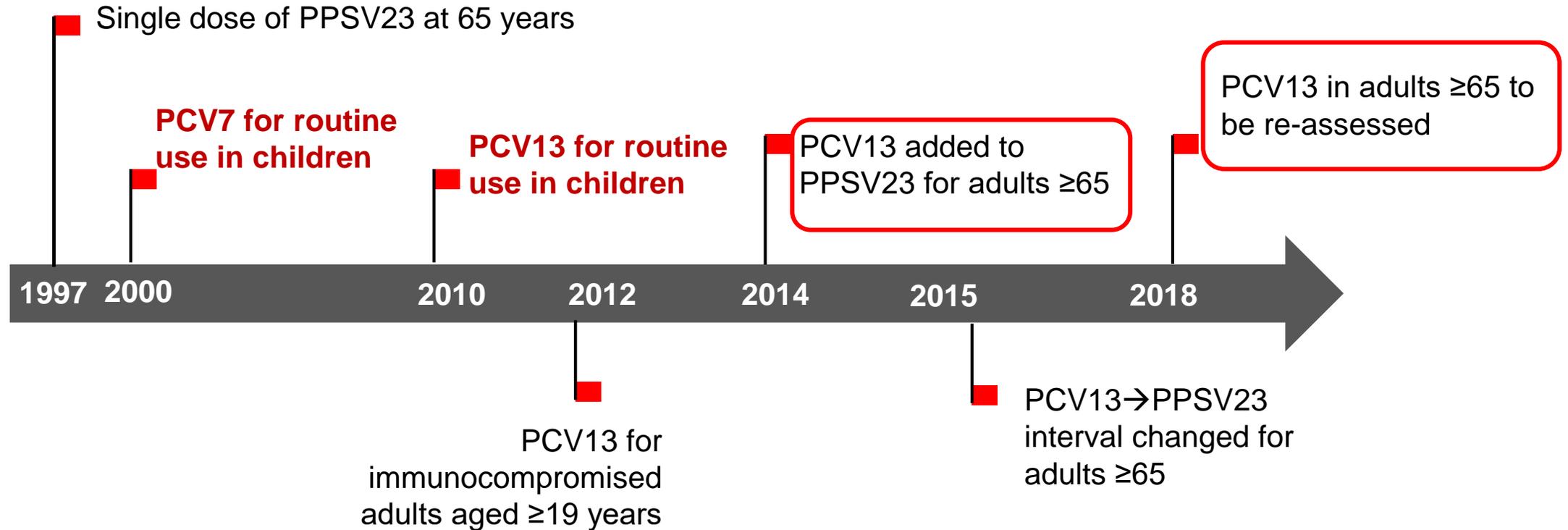


ABC surveillance Report – US Data – 2009

Streptococcus pneumoniae



Evolution of US ACIP pneumococcal vaccine recommendations

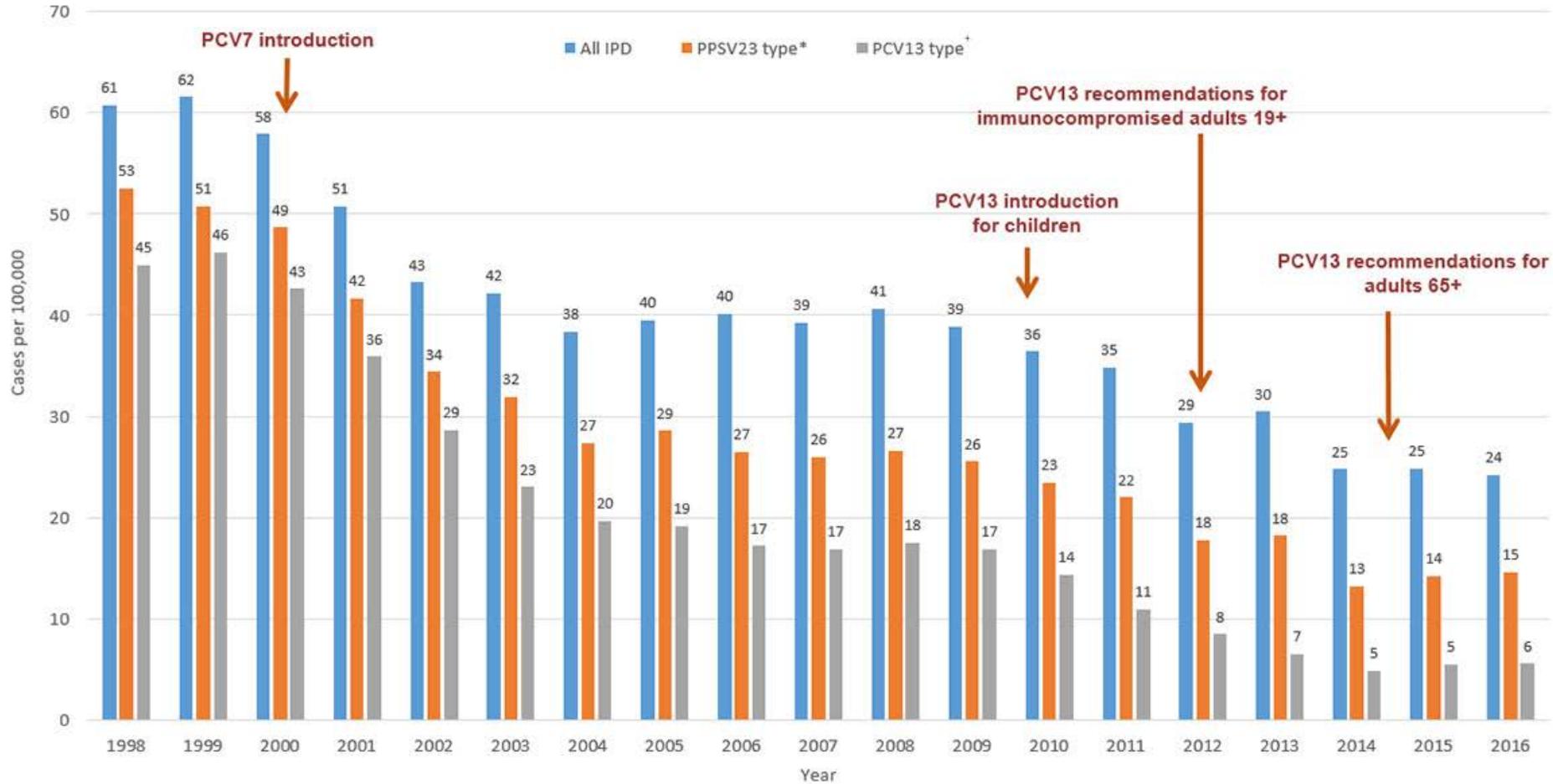


PPSV23: 23-valent pneumococcal polysaccharide vaccine

PCV13: 13-valent pneumococcal conjugate vaccine

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Incidence of invasive pneumococcal disease (IPD) among adults 65 years or older 1998-2015 in the United States.

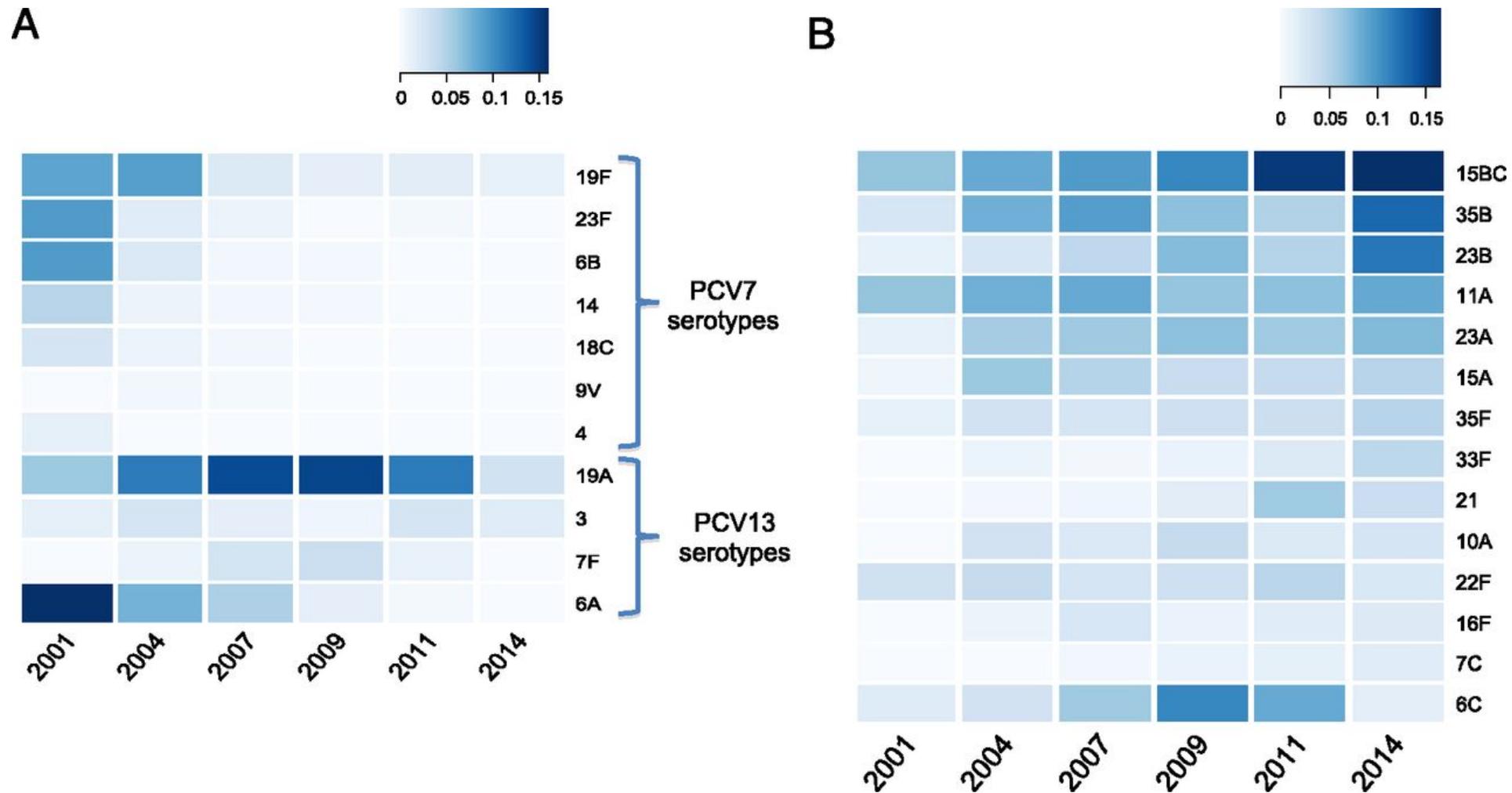


*PPSV23 serotypes: 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, and 33F

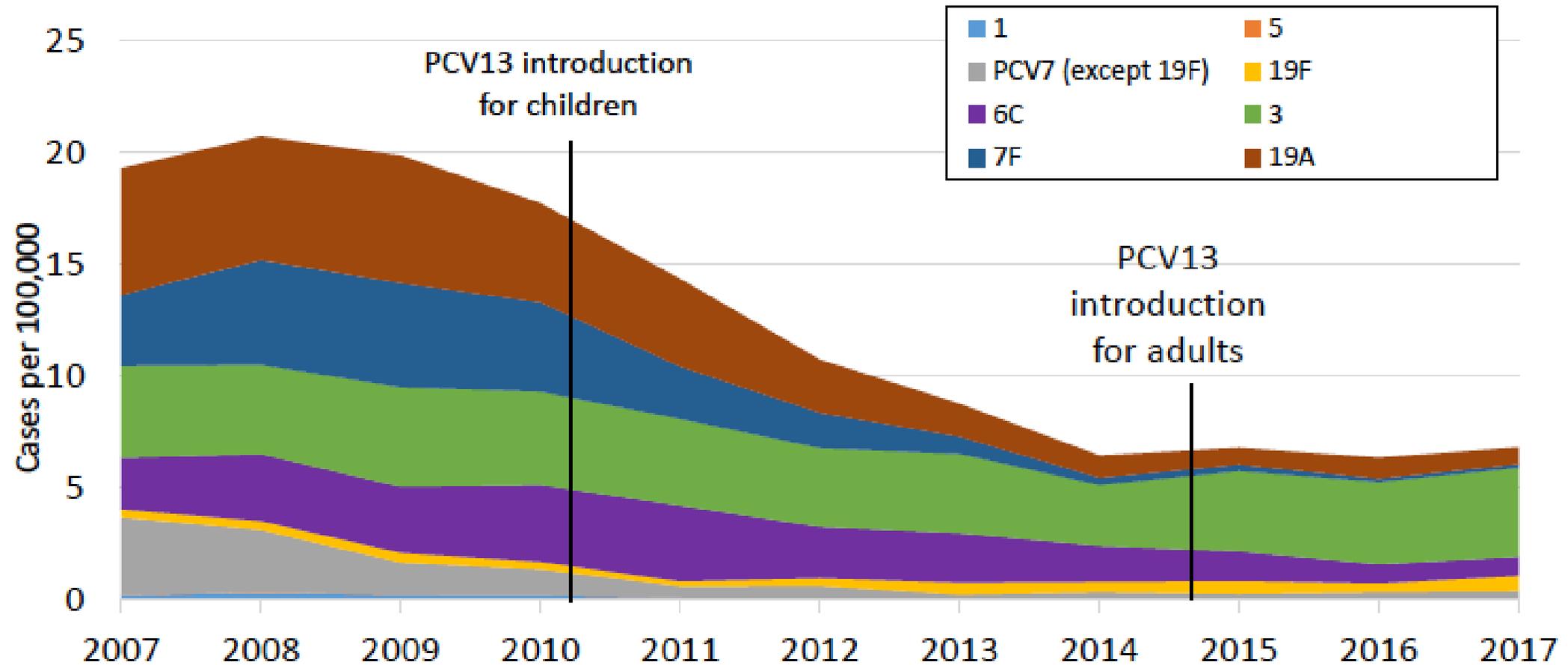
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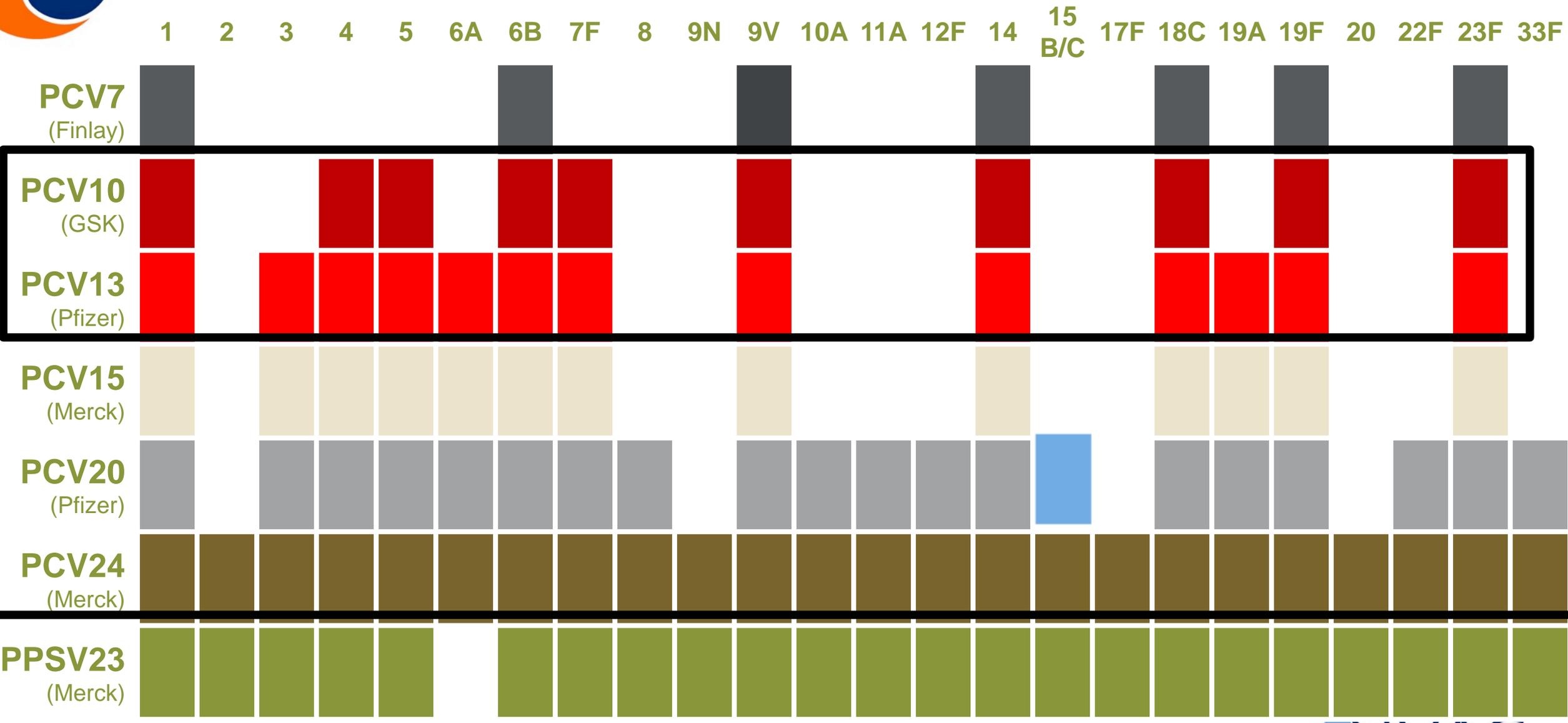
<https://www.cdc.gov/abcs/reports-findings/survreports/spneu-types.html>

Trends in pneumococcal colonization by serotype from 2001 to 2014 for PCV-7 and PCV-13 serotypes.



Incidence of IPD in adults ≥ 65 years in US, 2007-2017 by PCV13 serotypes





Summary

- The impact of **PCV vaccines** in the US has had a dramatic **direct and indirect** effect on the incidence of disease
- While other countries have introduced fewer-dose schedules (2+1 and 1+1) the incidence of **breakthrough disease** is still a problem in the US
- Continuation of the **≥ 65 year-old schedule** is being evaluated and will depend on the development of new vaccines