Yale Institute for Global Health

The policy and epidemiology of mandates in the US & Europe

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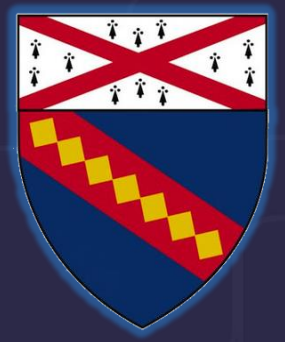
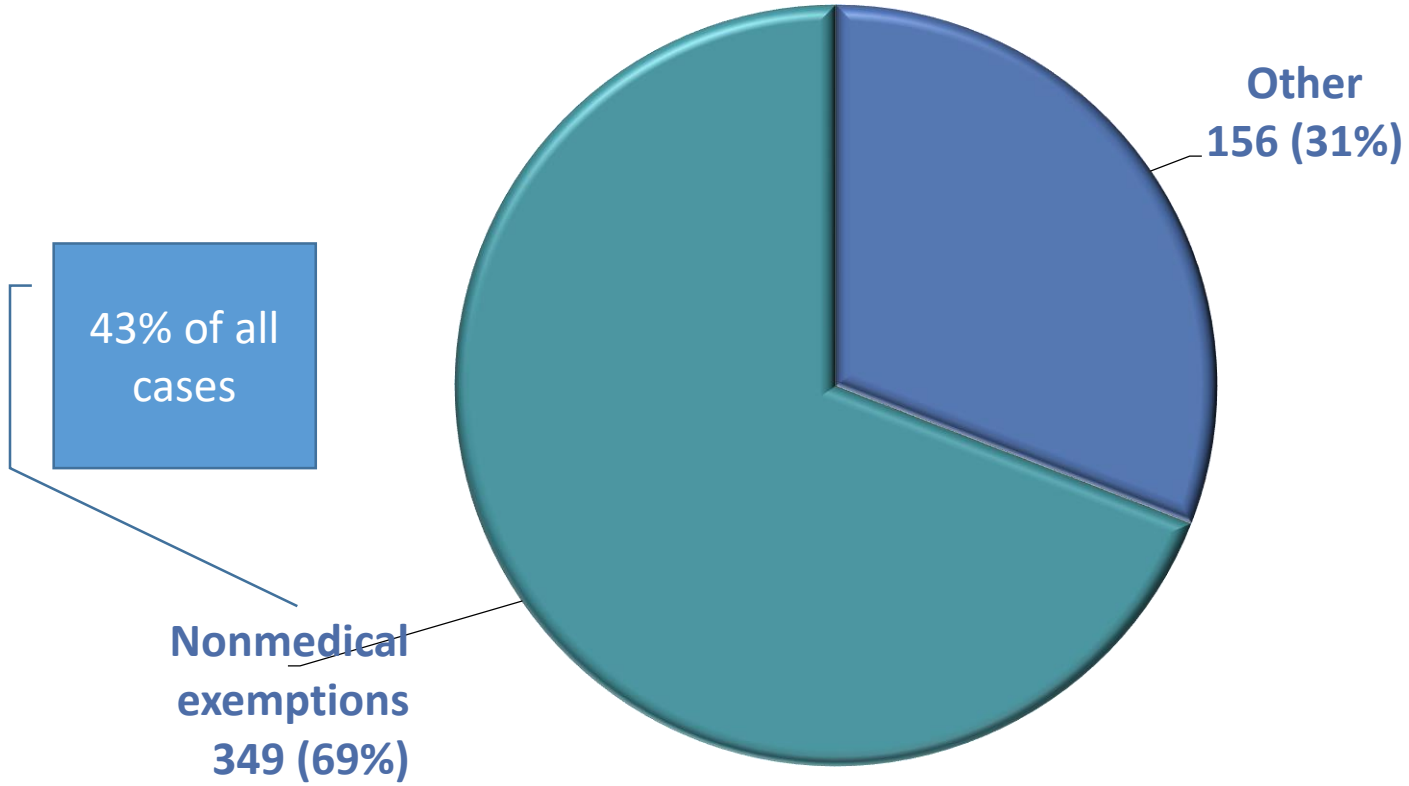


@SaadOmer3

Reasons For Non-Vaccination Among Measles Cases

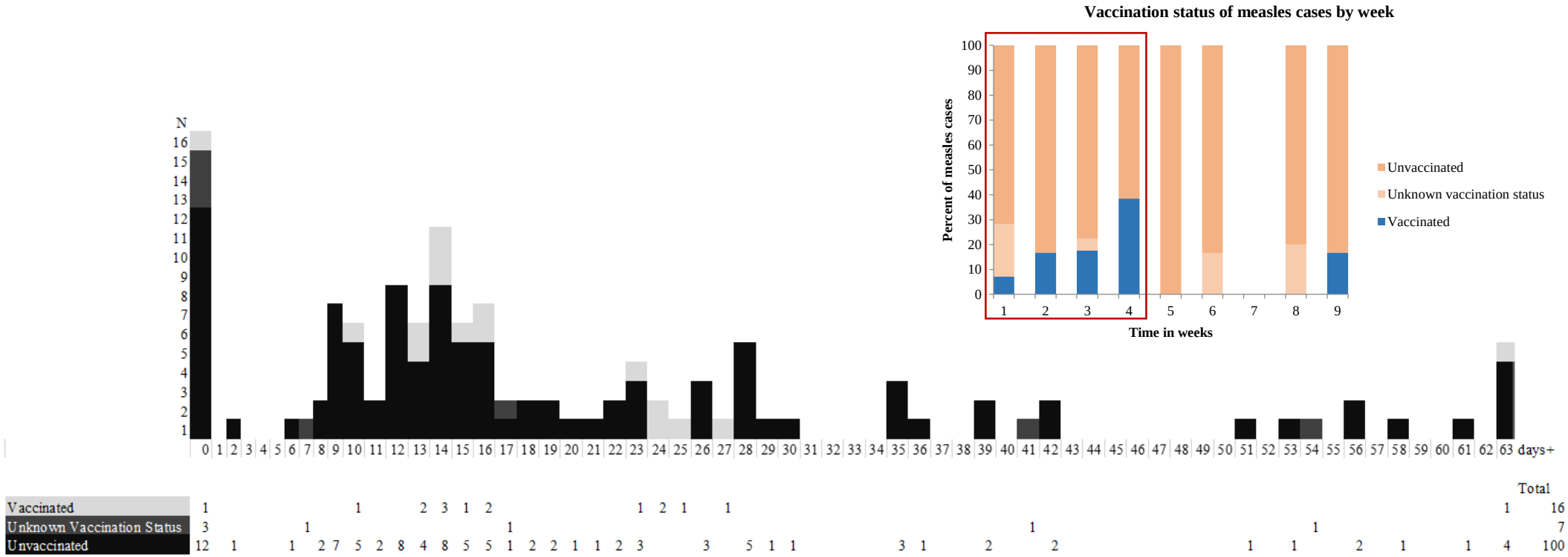
2000-2015



Phadke et al. JAMA, 2016

Cumulative Epidemic Curve of 16 Measles Outbreaks

2000 - 2015, United States



Phadke et al. JAMA, 2016

Table 4. Likely Impact of Interventions to Increase Vaccination Coverage Based on Available Evidence

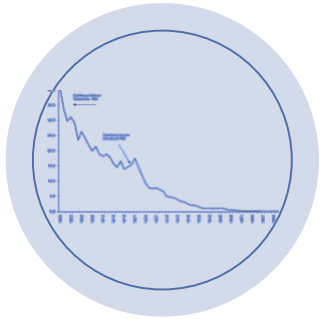
Article section	Intervention	Likely impact	Especially effective when...	Amount of evidence		Amount of causal evidence	
				Any behavior	Vacc	Vacc	Vacc in LMICs
2	Messages that increase disease risk appraisals	○	People have low disease-risk appraisals or have become complacent about disease risk	2	2	1	1
2	Education campaigns that increase confidence	○	People have low confidence that vaccination is effective and safe	2	2	1	1
2	Decision aids	○	People initially do not agree to vaccination because they have questions	2	1	1	0
2	Motivational interviewing	○	People initially express ambivalence about vaccination	2	1	1	0
3	Descriptive norm messages	◎	People are unsure or misunderstand what others are doing	2	2	0	0
3	Social network interventions that build on contagion	◎	People are at least minimally connected to a social network	2	0	0	0
3	Messages that change altruism or free-riding beliefs	○	People have low altruism or high free-riding motivation	2	2	0	0
2, 3, 4	Healthcare provider recommendations	●	People have favorable, ambivalent, or unfavorable intentions	2	2	2	0
4	Presumptive health-care provider recommendations	●	People have favorable or ambivalent intentions	2	1	1	0
4	Reminders and recalls	◎	People have favorable intentions but do not get vaccinated	2	2	2	1
4	Implementation-intention interventions	◎	People have favorable intentions but do not get vaccinated	2	1	1	1
4	Mere-measurement interventions	◎	People have favorable intentions but do not get vaccinated	2	1	1	0
4	On-site vaccination	●	People have favorable intentions but do not get vaccinated	2	2	2	2
4	Default appointments	●	People have favorable intentions but do not get vaccinated	2	1	1	0
4	Incentives	●	People have favorable, ambivalent, or unfavorable intentions	2	2	2	2
4	Vaccination requirements	●	Vaccination rates are already high; most people affected by requirement support it	2	2	1	0

Note: Vacc = vaccination coverage; LMICs = low- or middle-income countries; ○ = little or no impact; ◎ = modest impact; ● = substantial impact; 0 = no evidence; 1 = some evidence; 2 = substantial evidence. Conclusions about evidence are based on consensus among authors who considered the available evidence, including the number of available studies, evidence for causal association, the quality of the studies, and the size of the effect. See the relevant section of the article for more information on the interventions.

Brewer et al., Psychol Sci Public Interest. 2017

School Immunization Requirements

State laws
(not federal)



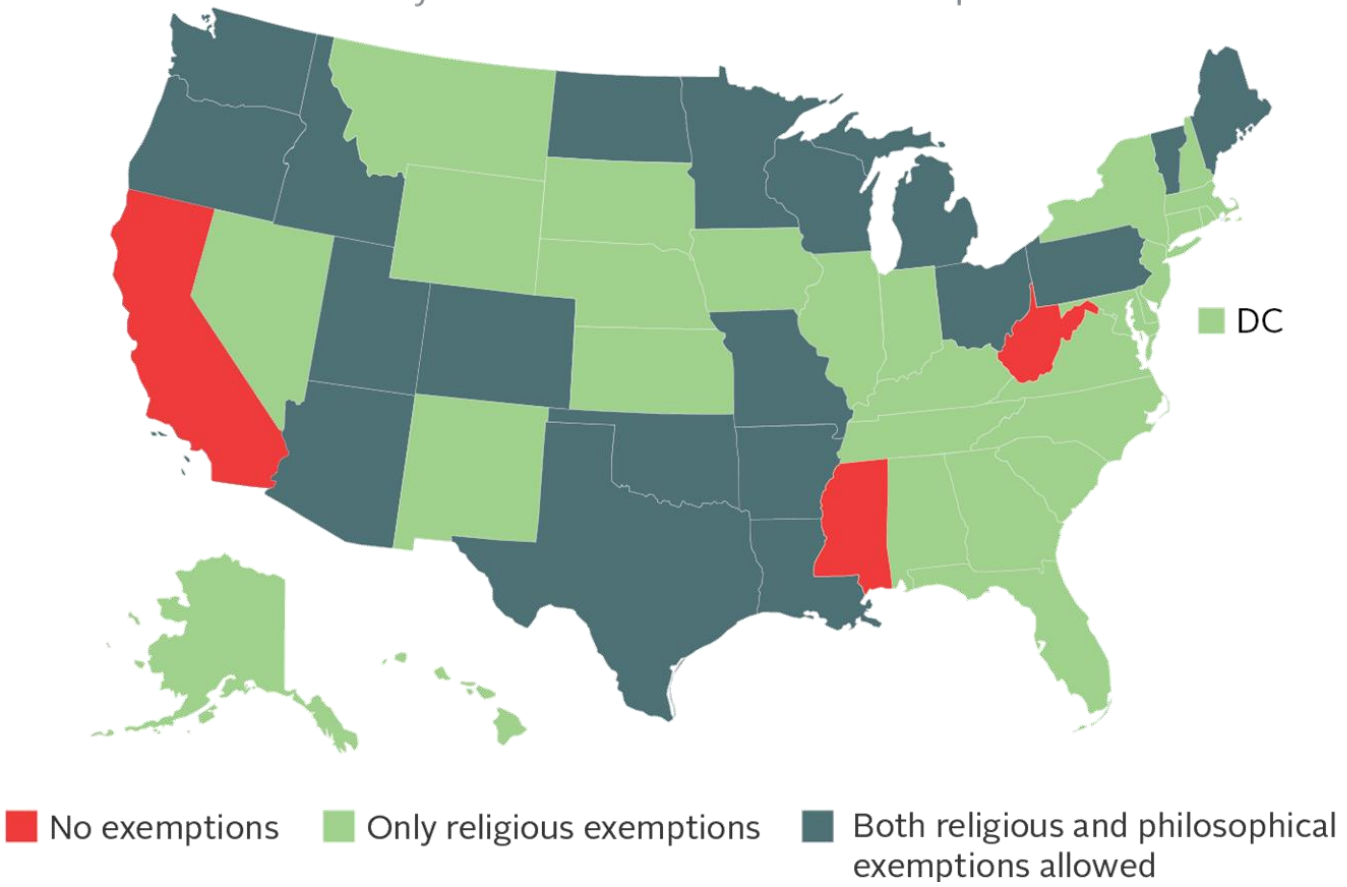
Major role in low
rates of vaccine
preventable diseases

3 types of
exemptions allowed

1. Medical
2. Religious
3. Personal belief
(philosophical)

School vaccine exemptions by state

Only 3 states have no vaccine exemptions



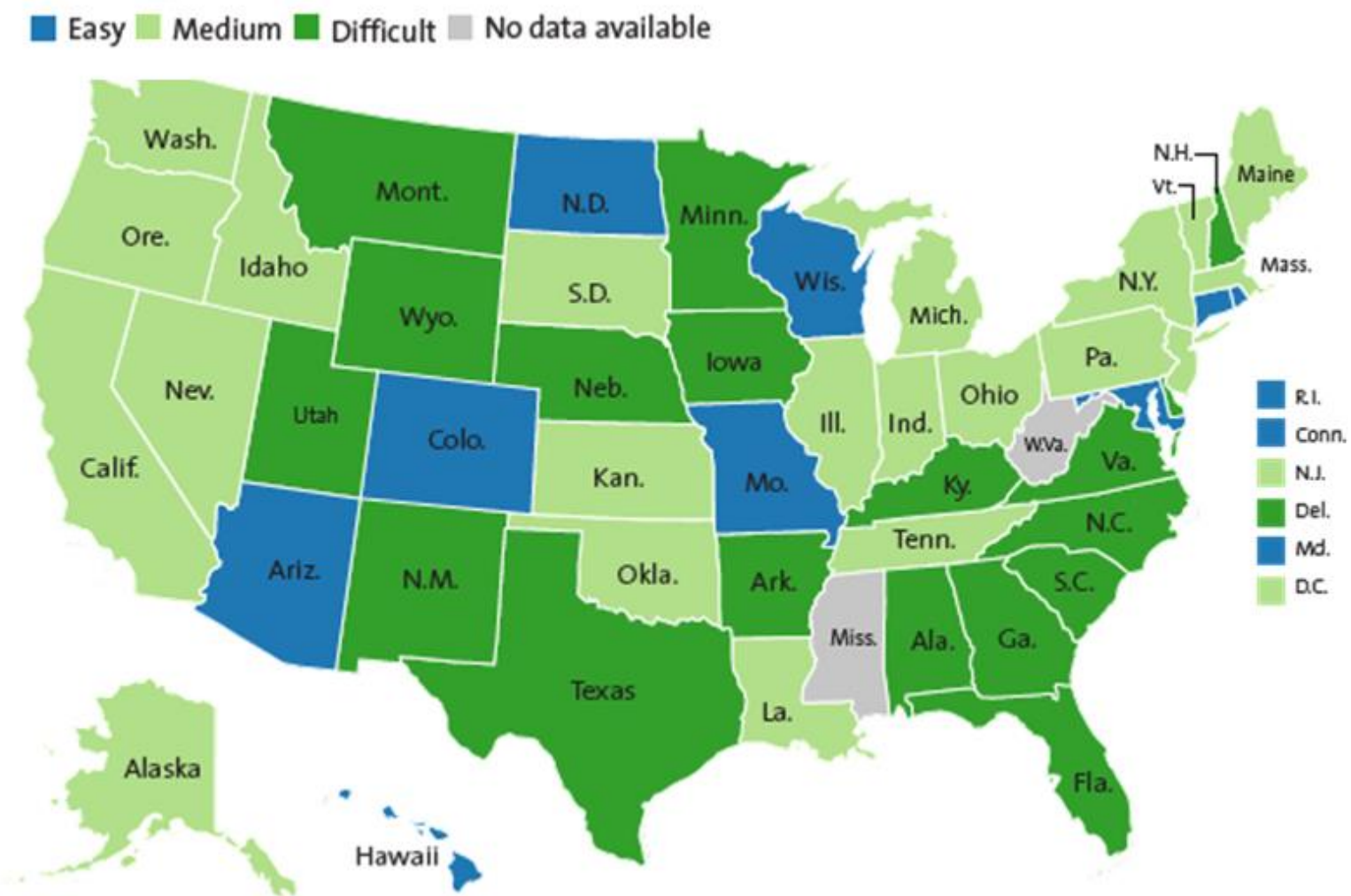
Vox

All states have medical exemptions.

Missouri's philosophical exemption only applies to daycare, preschool and nursery school.

SOURCE: National Conference of State Legislatures

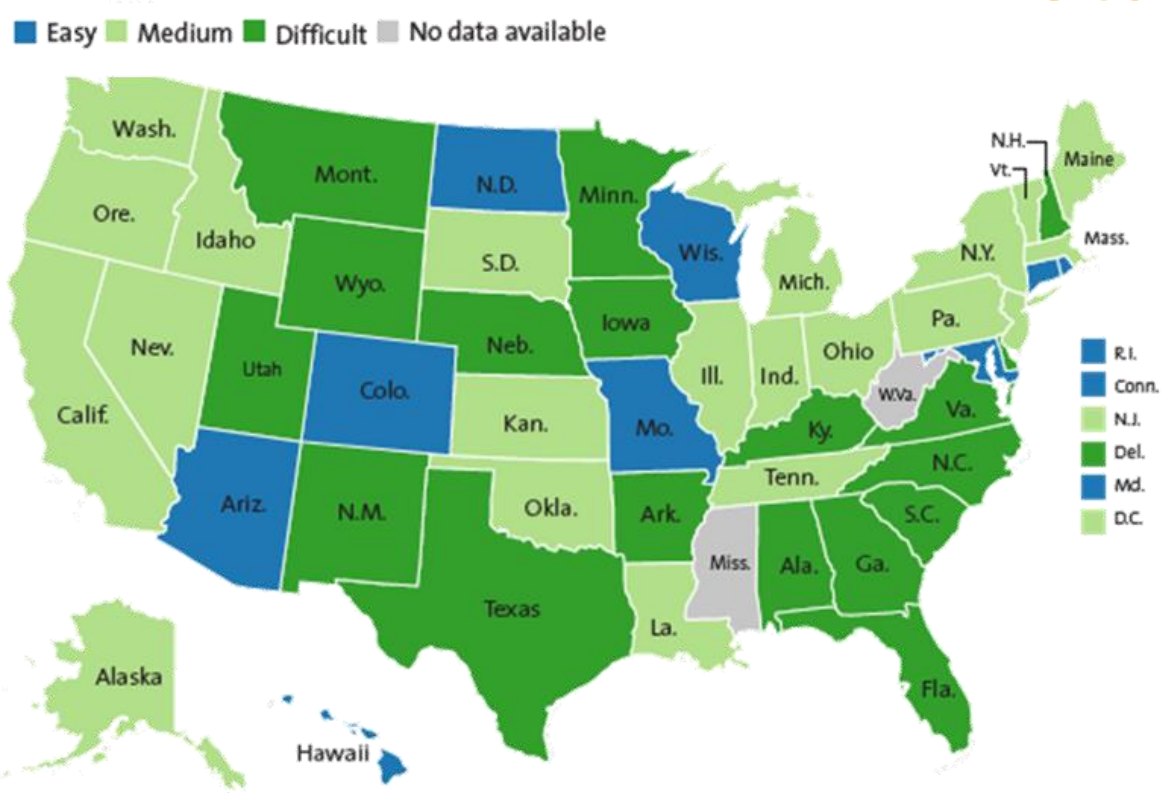
Ease of Obtaining Vaccine Exemptions –by State



Omer et al., New England Journal of Medicine . 2012

Figure (with updated 2013 data) created by Mother Jones

Ease of Obtaining Vaccine Exemptions in the U.S. - by State



Exemption Policies & Whooping Cough Incidence, 1986-2004

Exemption ease	Incidence Rate Ratio
Difficult	Reference
Medium	1.35 (0.96-1.91)
Easy	1.53 (1.10-2.14)

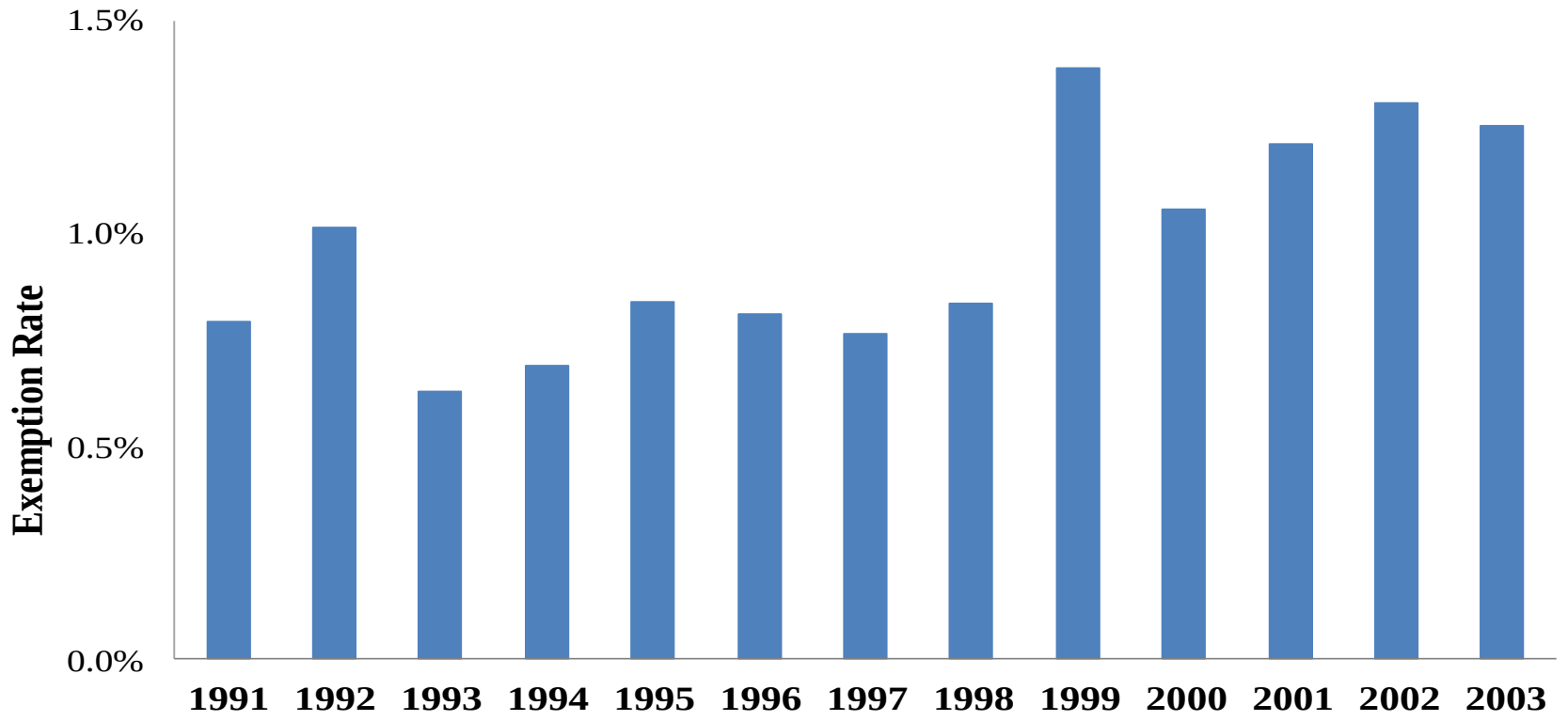
Omer et al., New England Journal of Medicine . 2012

Figure (with updated 2013 data) created by Mother Jones

Omer et al., JAMA, 2006

Non-Medical Exemptions by Year

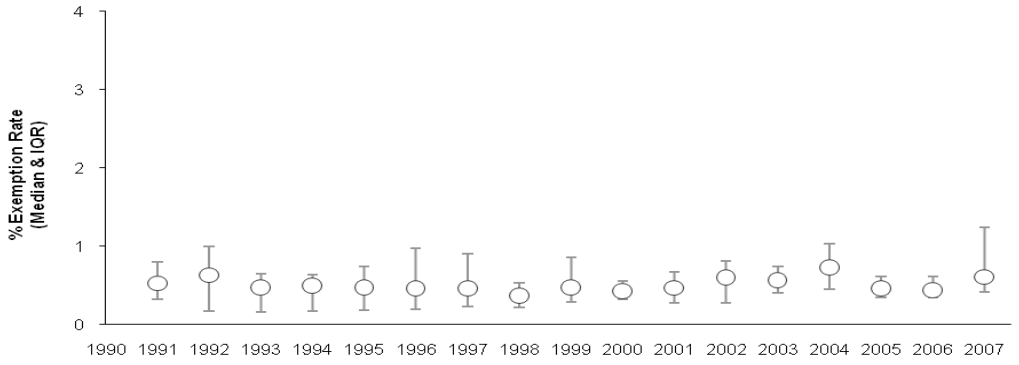
1991 - 2003



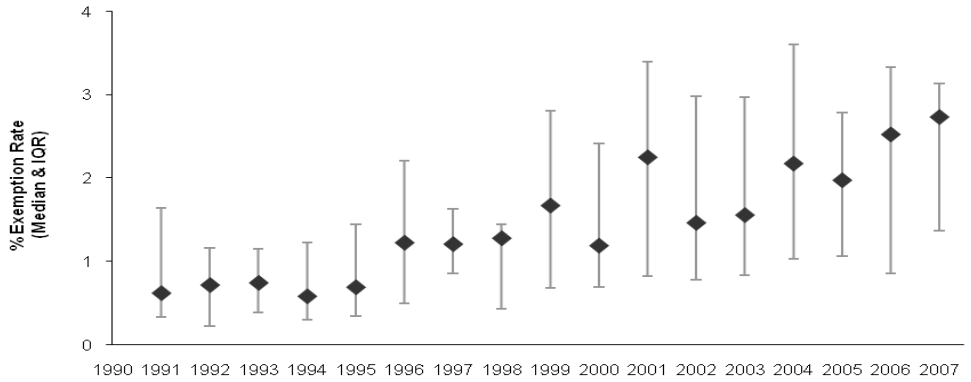
Nonmedical Exemptions for States With Religious Exemptions and With Personal Belief Exemptions

1991 - 2004

Only Religious Exemptions Permitted



Personal Belief Exemptions Permitted

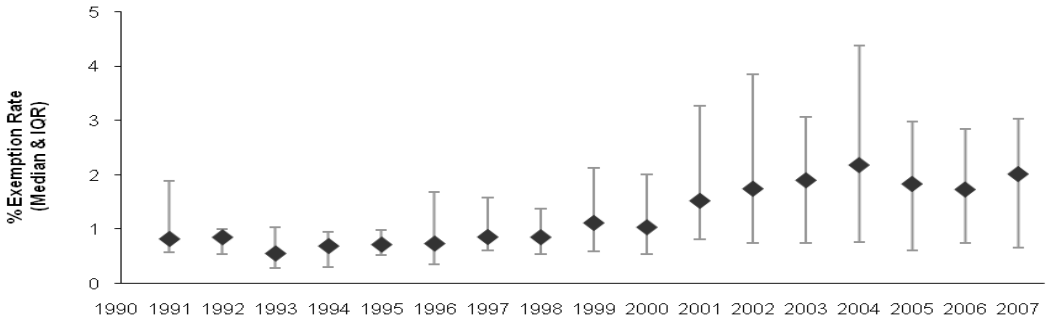


Omer et al., Journal of American Medical Association, 2006

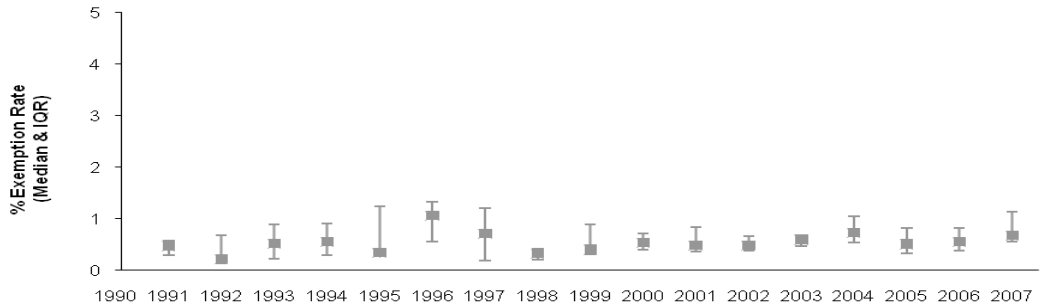
Data updated

Nonmedical Exemptions by Ease of Exemption 1991 - 2007

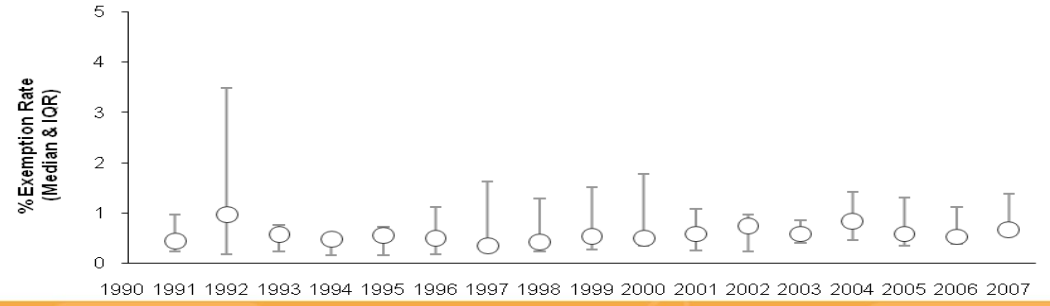
Easy Exemption Policy



Medium Exemption Policy



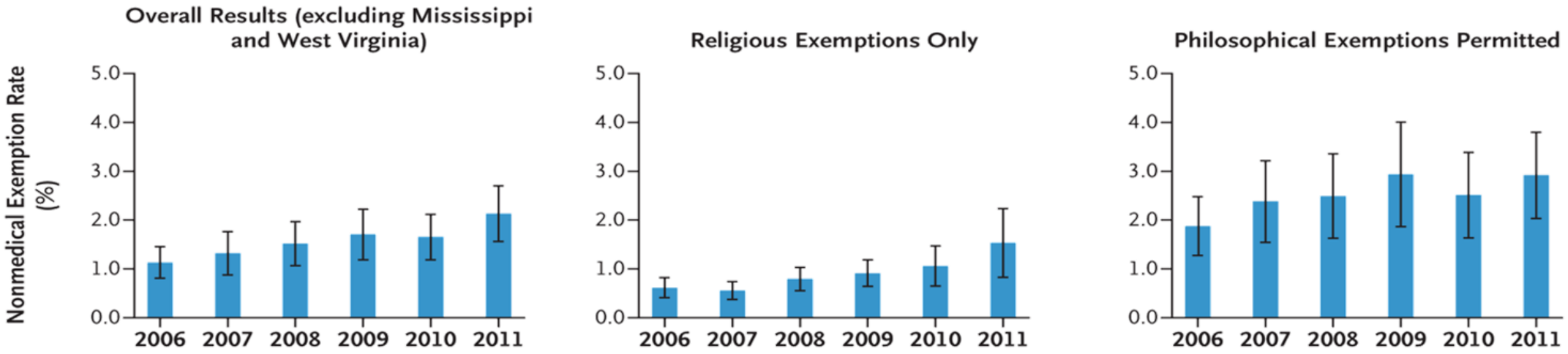
Difficult Exemption Policy



Omer et al., JAMA, 2006

Data updated

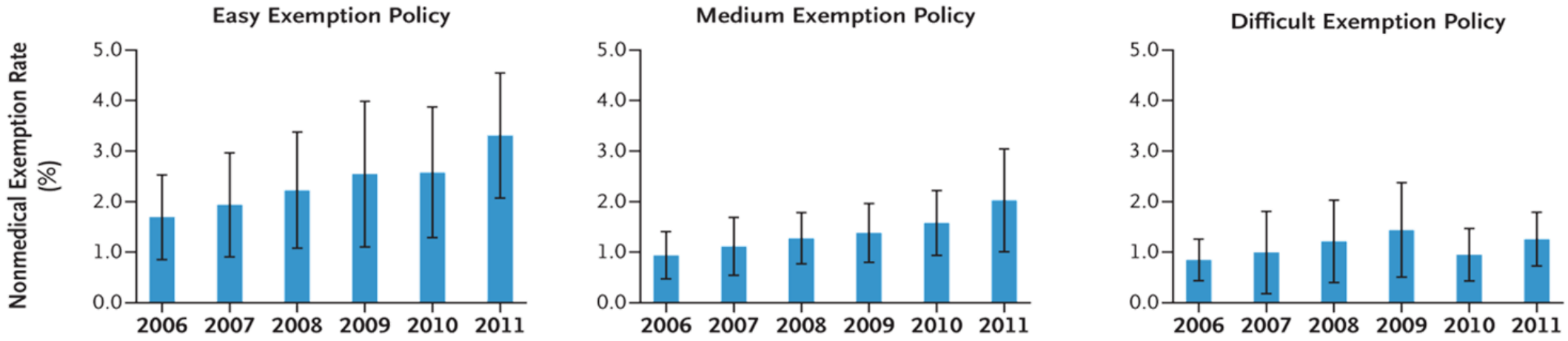
Mean (95% CI) Rates of Nonmedical Exemptions by Type of Exemption, 2006–2011



Omer et al., NEJM, 2012

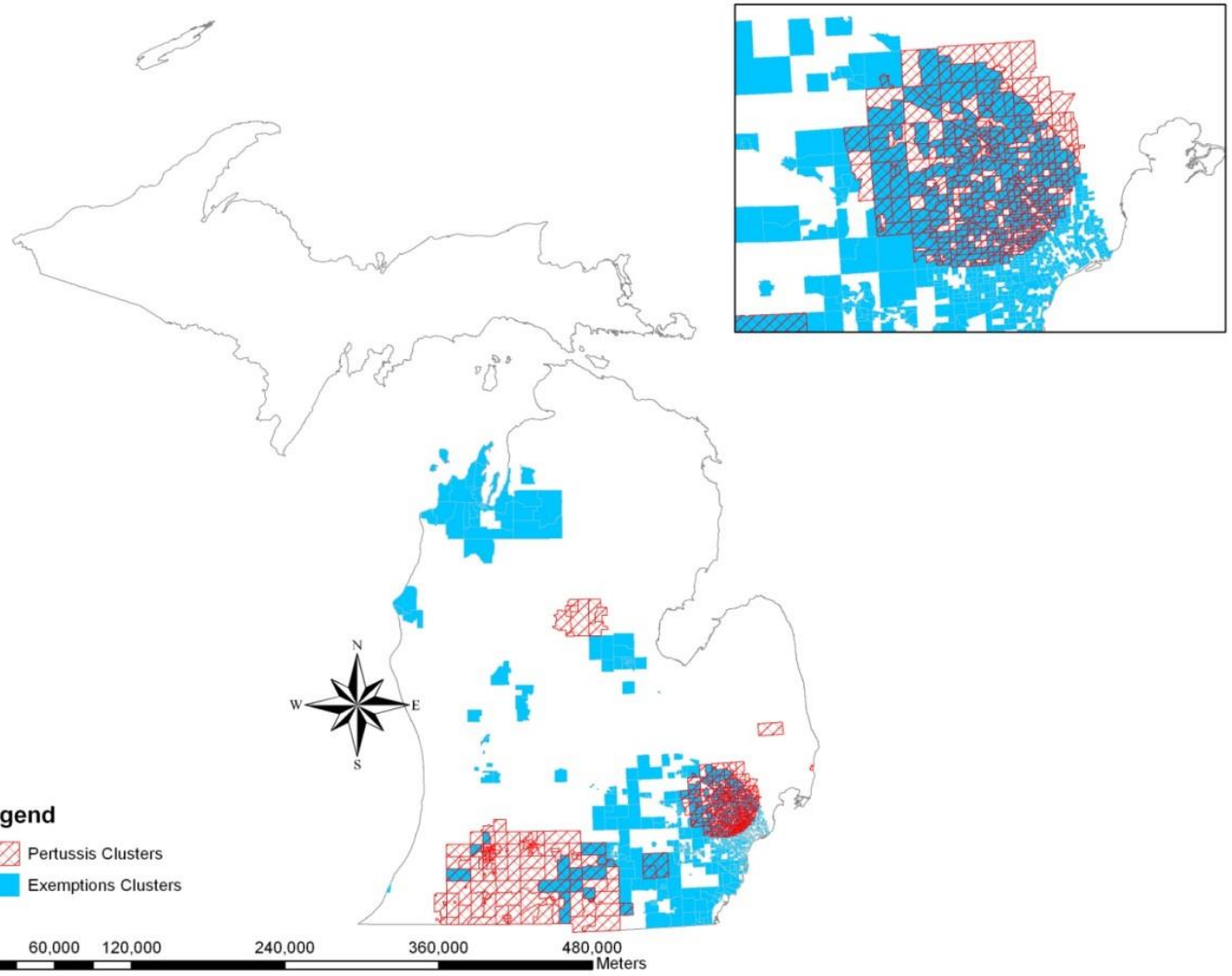
Mean (95% CI) Rates of Nonmedical Exemptions by Ease of Exemption,

2006–2011



Omer et al., New Eng Journal of Medicine, 2012

Relative Locations of Pertussis Space-time Clusters & Exemptions Spatial Clusters



Overlap of Exemptions Clusters with Pertussis Clusters

Unadjusted OR

3.0 (2.5 – 3.6)

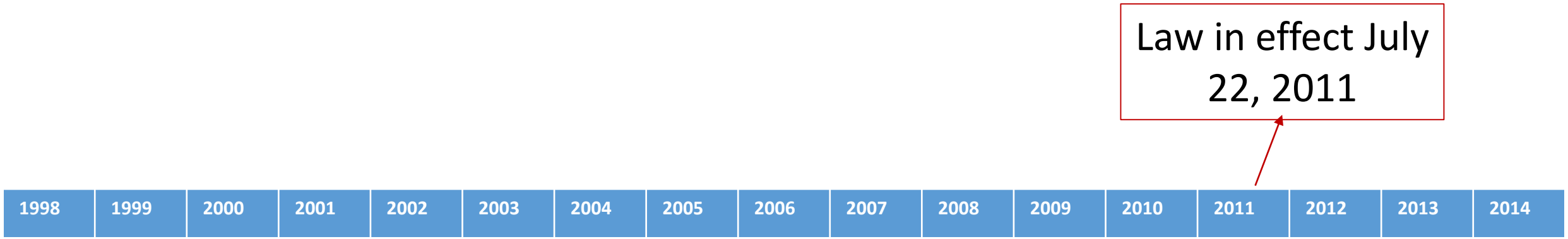
Adjusted OR

2.7 (2.2 – 3.3)

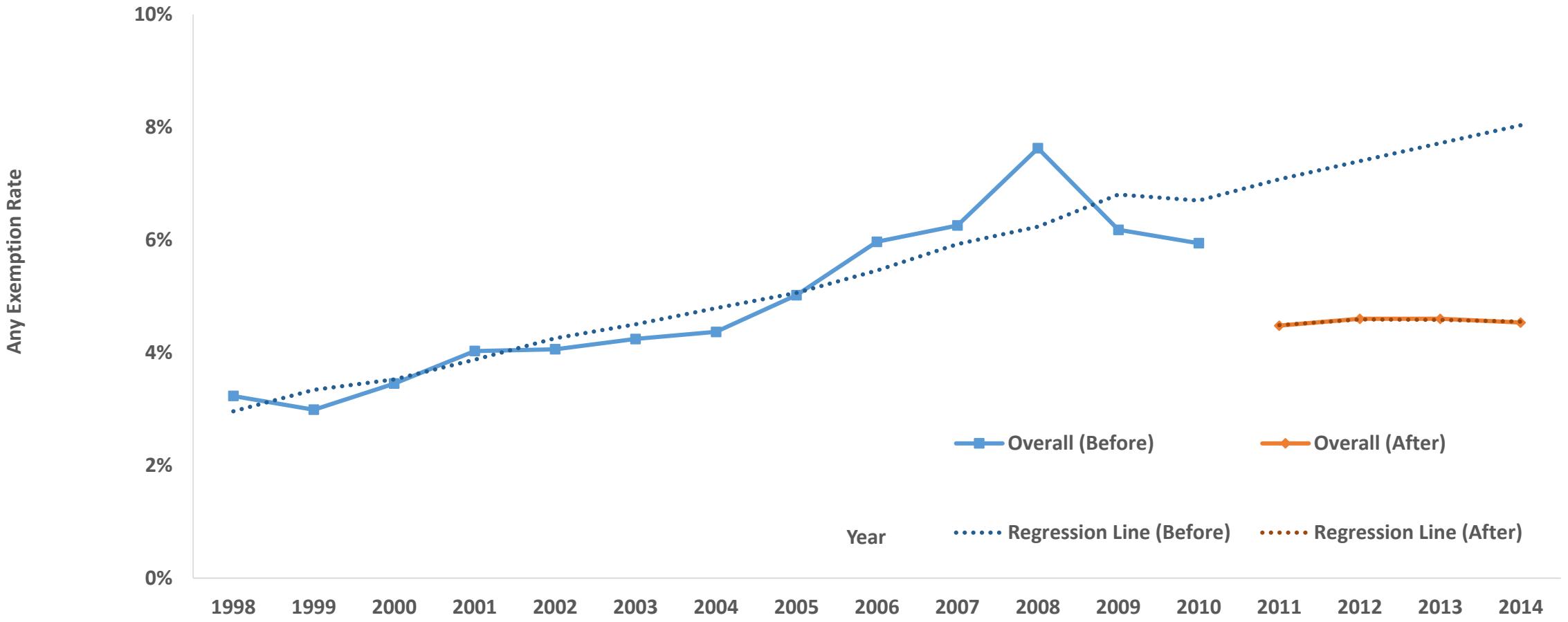
Omer et al., Am. J. Epi., 2008

Washington Exemption Law

- SB 5005
- Educational counseling and signed form from a licensed (in WA) health care provider in order to obtain a nonmedical exemption

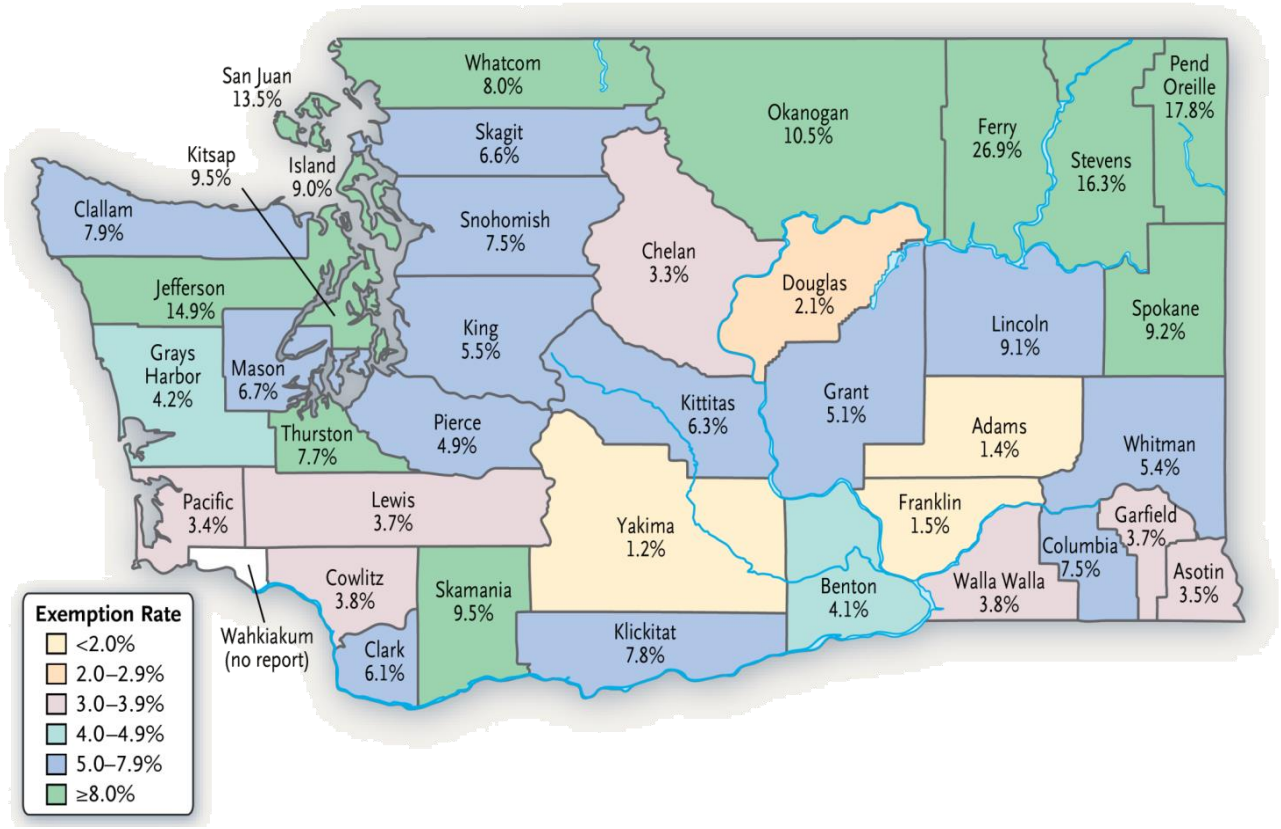


Impact of Change in Washington Exemption Law



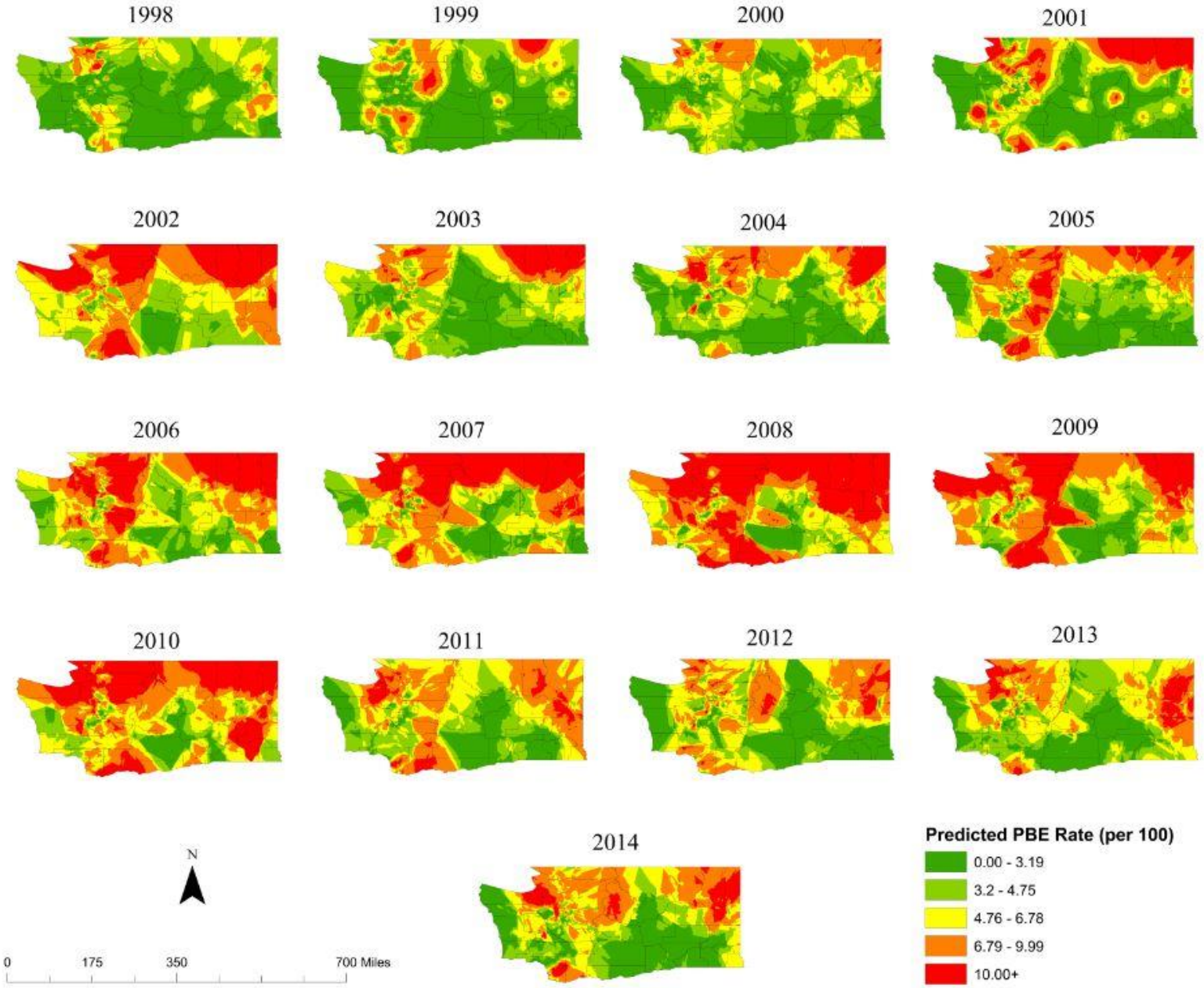
Omer et al., Pediatrics, 2017

WA State Counties' School Entry Exemption Rates -
2006-2007

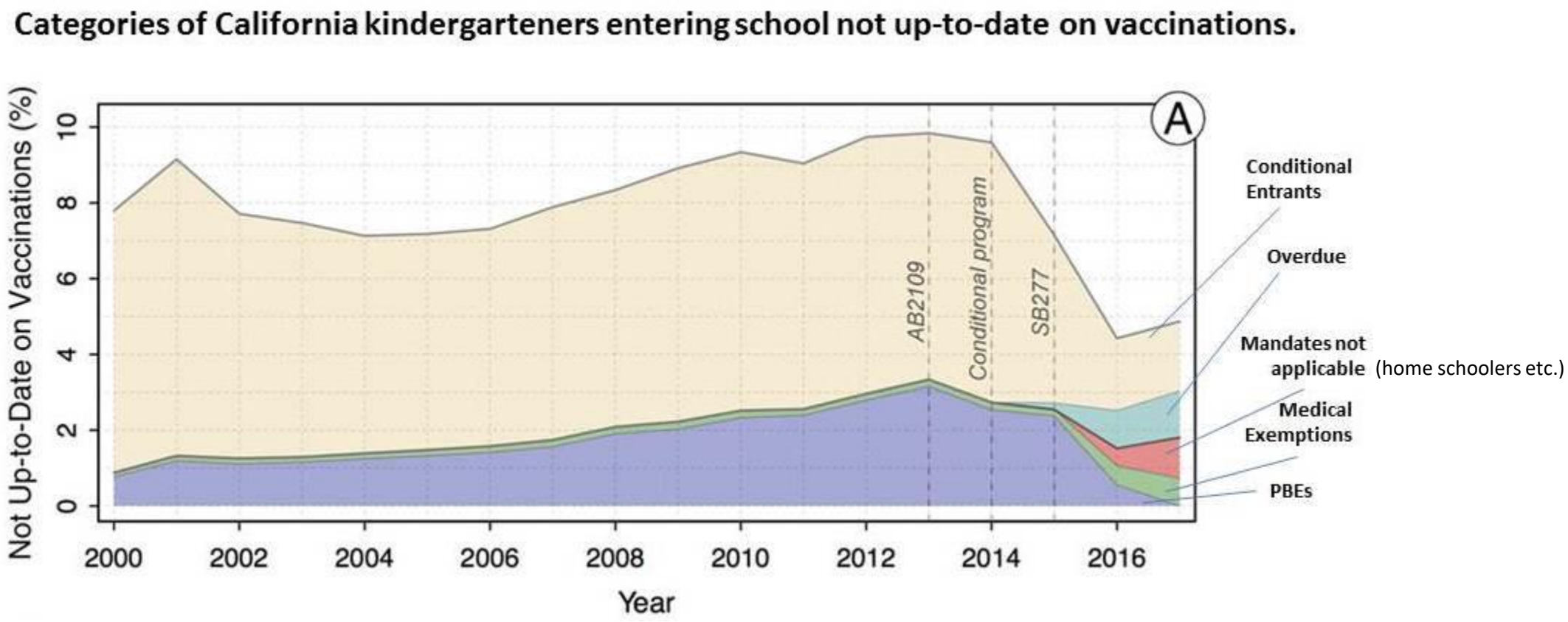


Omer et al., New Eng Journal of Medicine, 2009

Predicted PBE Rate (per 100), Washington 1998-2014

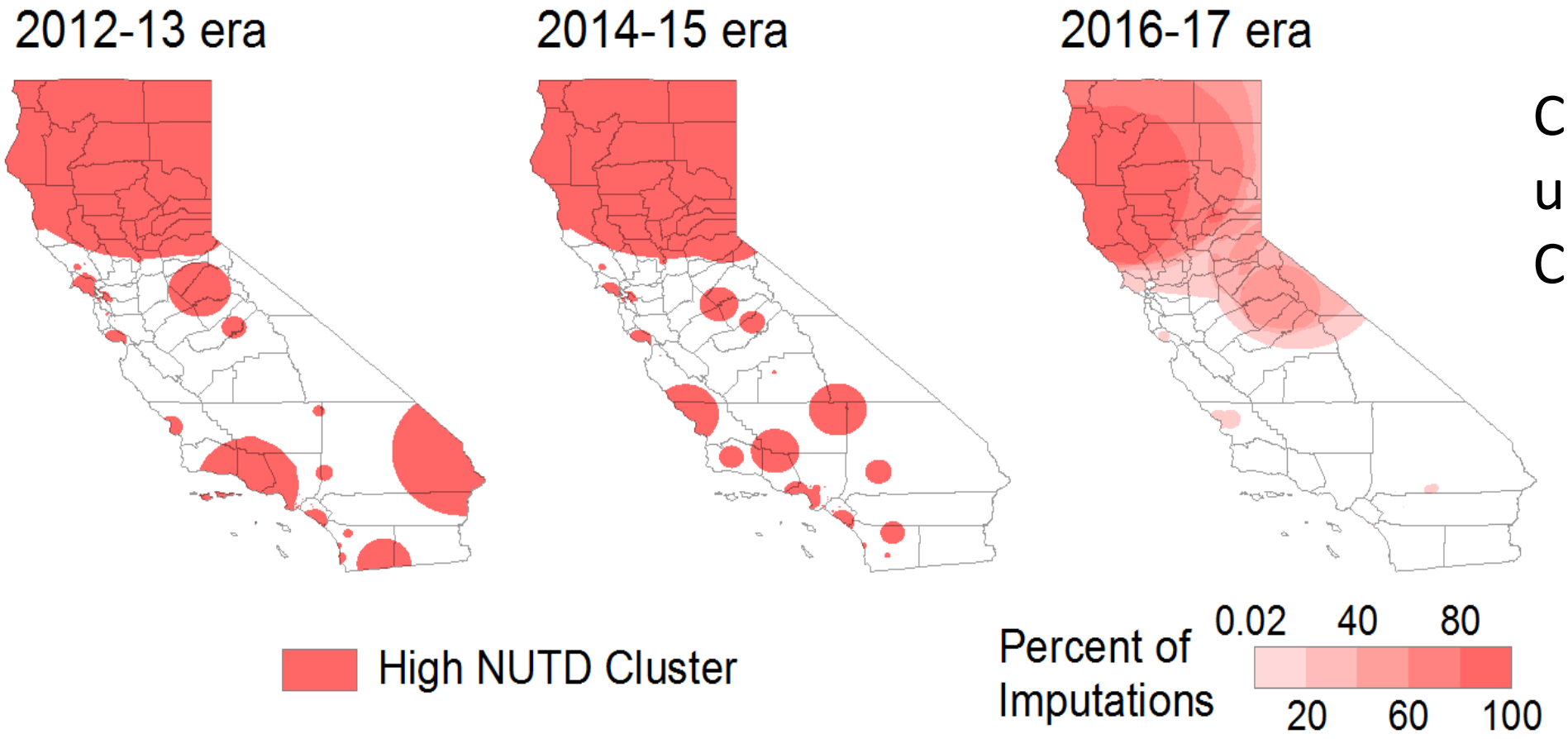


Elimination of Nonmedical Immunization Exemptions in California & School-Entry Vaccine Status



Delamater et al., 2019, Pediatrics

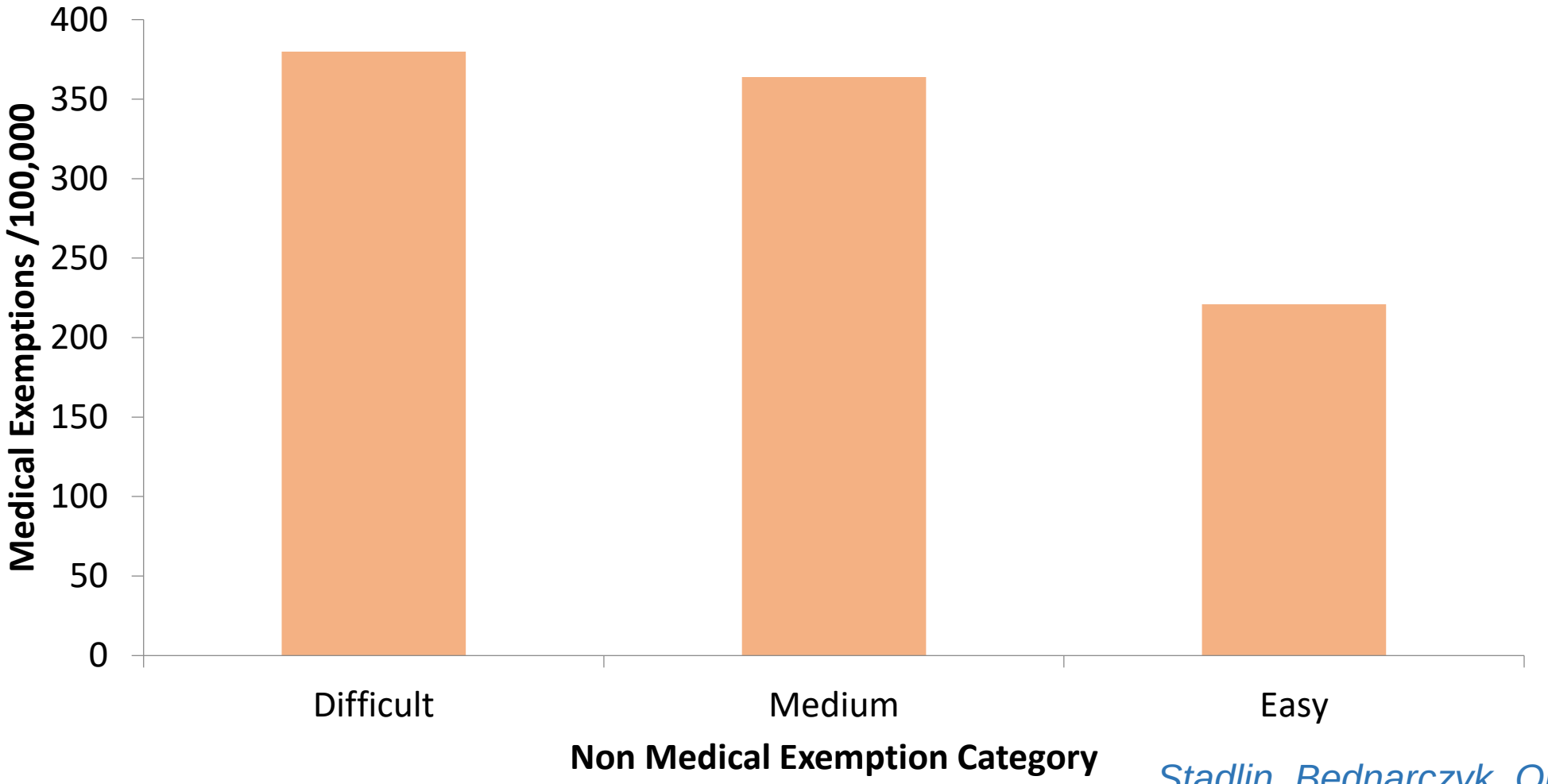
Not Up-To-Date Rates



Clusters of high not-up-to-date rates in California

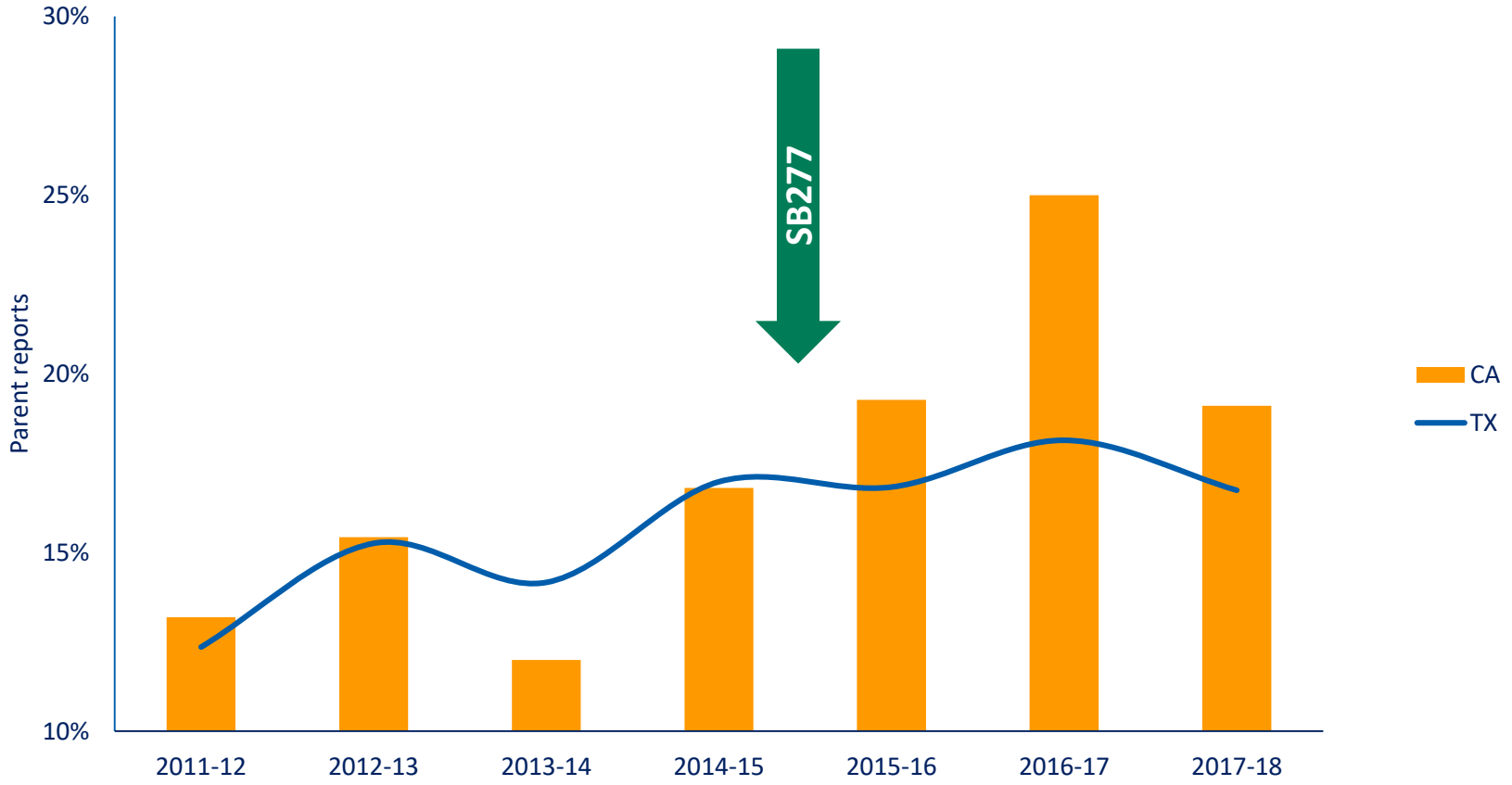
Pingali et al., 2019, JAMA

Association of State Non-medical Exemption Policies With Medical Exemption Rates



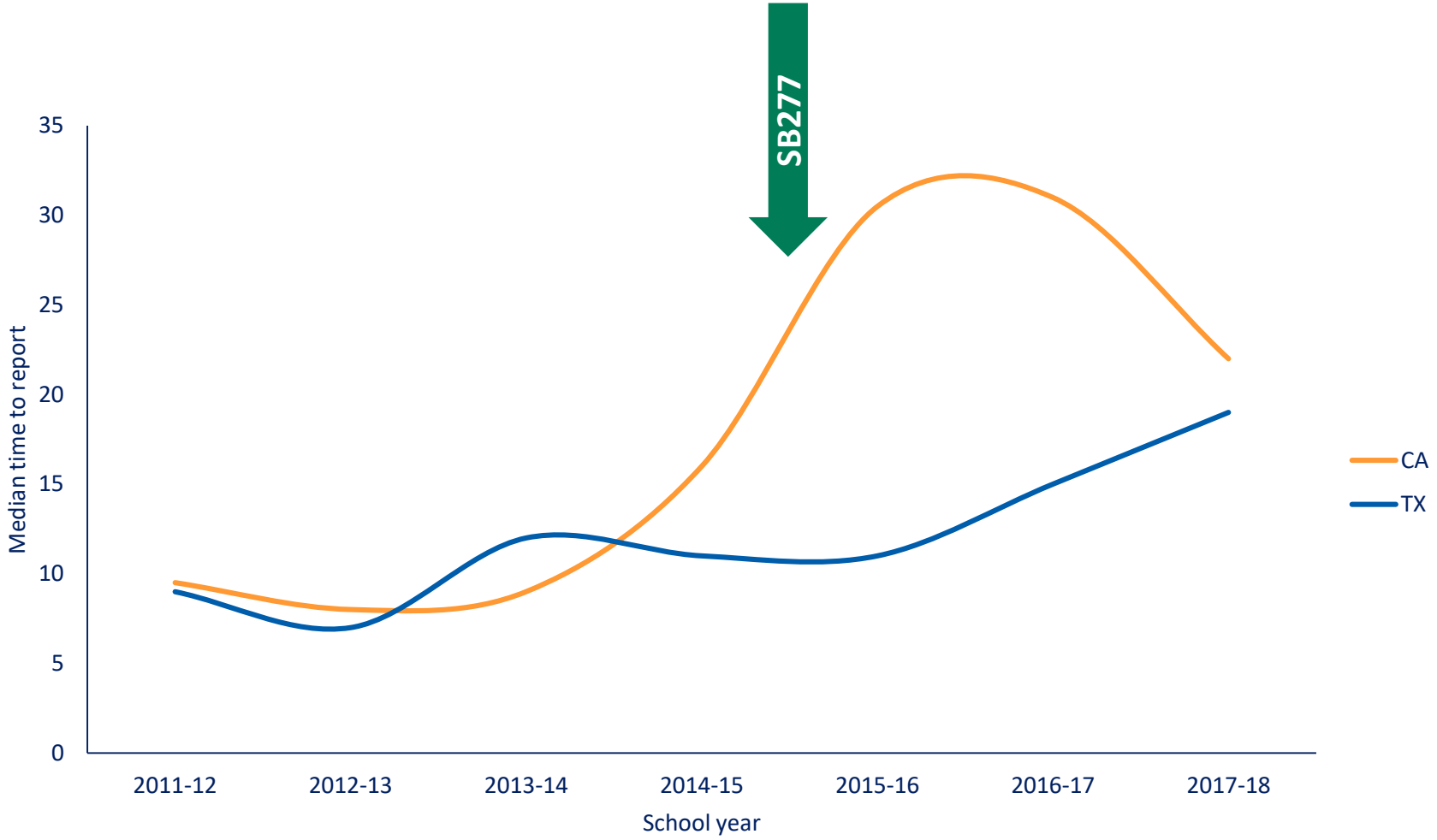
Stadlin, Bednarczyk, Omer JID 2012

Parent reports to VAERS increased after introduction of SB277 in California



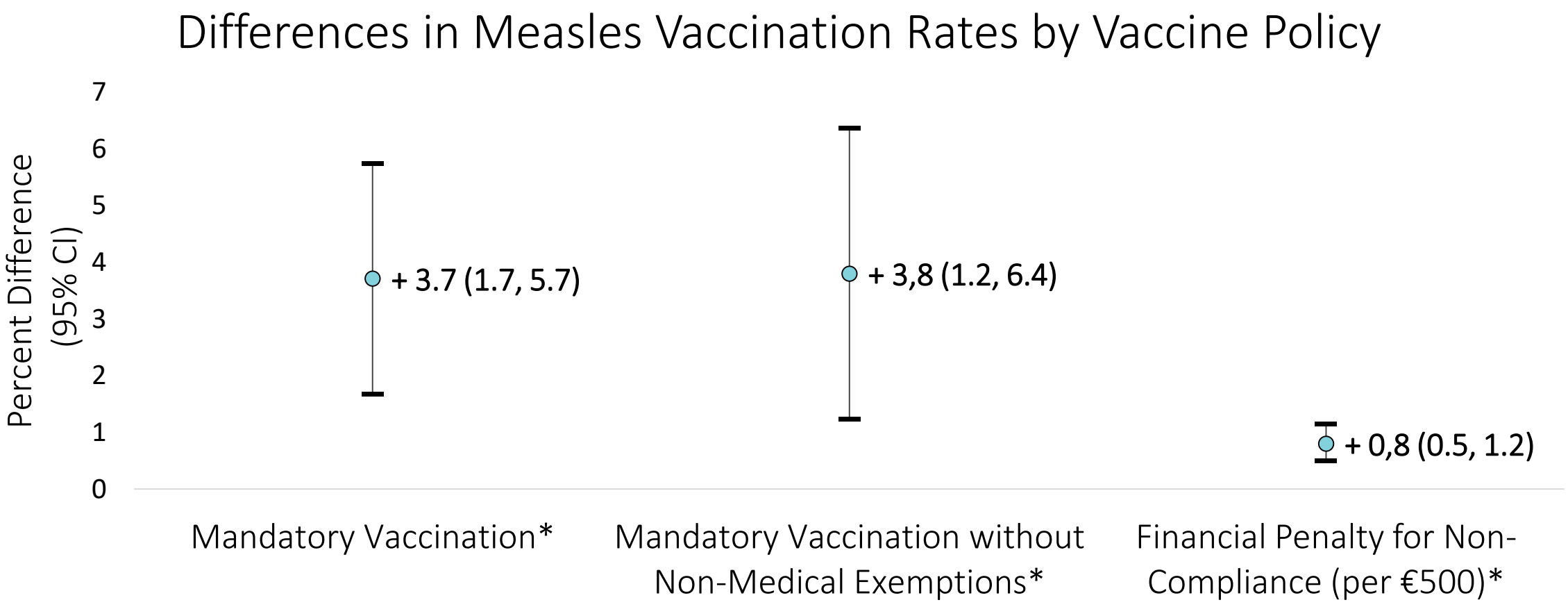
Hause at al., unpublished data

Reporting time increased after introduction of SB277 (parent reports)



Hause et al., unpublished data

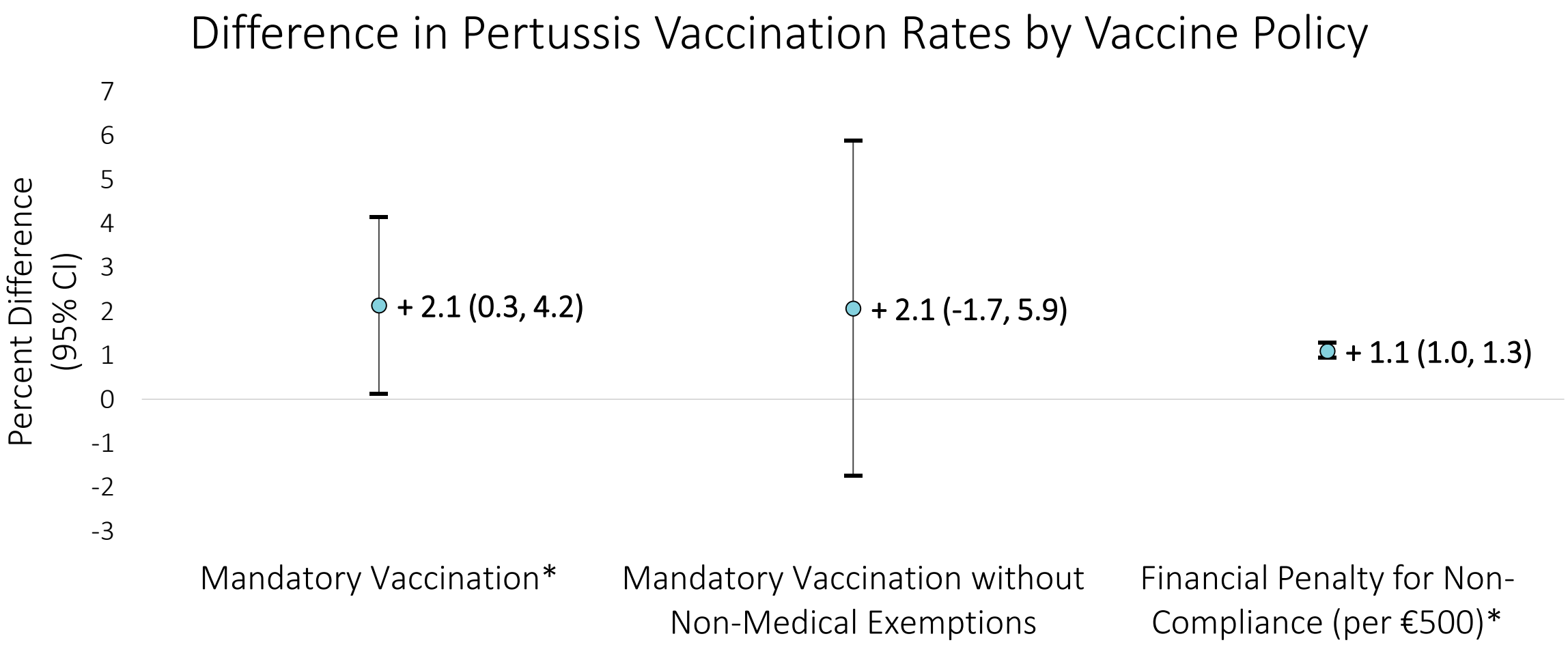
Association Between Mandatory Vaccination Policies and Measles Vaccination Rates



Vaz et al., Pediatrics, In press

*p-value < 0.01

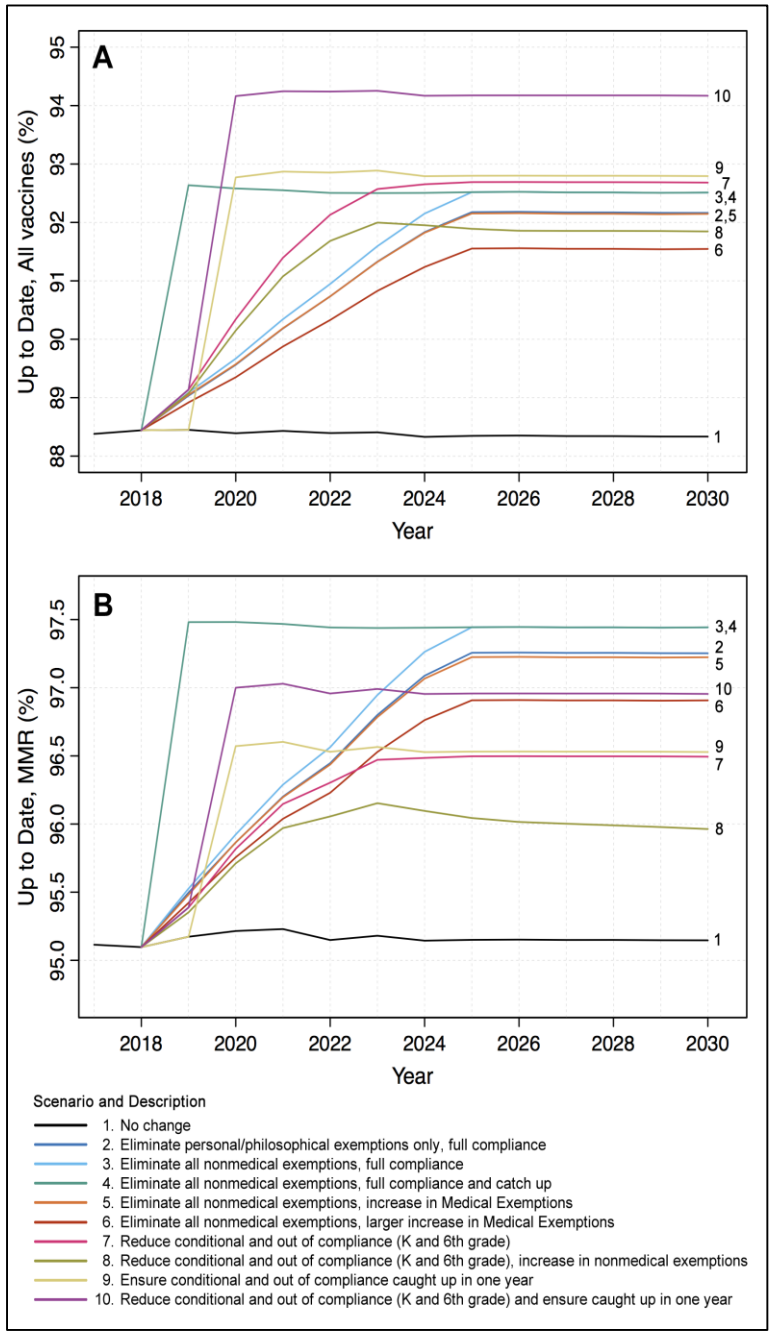
Association Between Mandatory Vaccination Policies and Pertussis Vaccination Rates



Vaz et al., Pediatrics, In press

*p-value < 0.05

Effects of potential legislative and administrative actions on vaccine up-to-date rates



Delamater et al., Unpublished

The New York Times

How to Handle the Vaccine Skeptics

- Sign a form that discusses the risks of non-vaccination
- In-person counseling
- Procedures to review each request for exemption

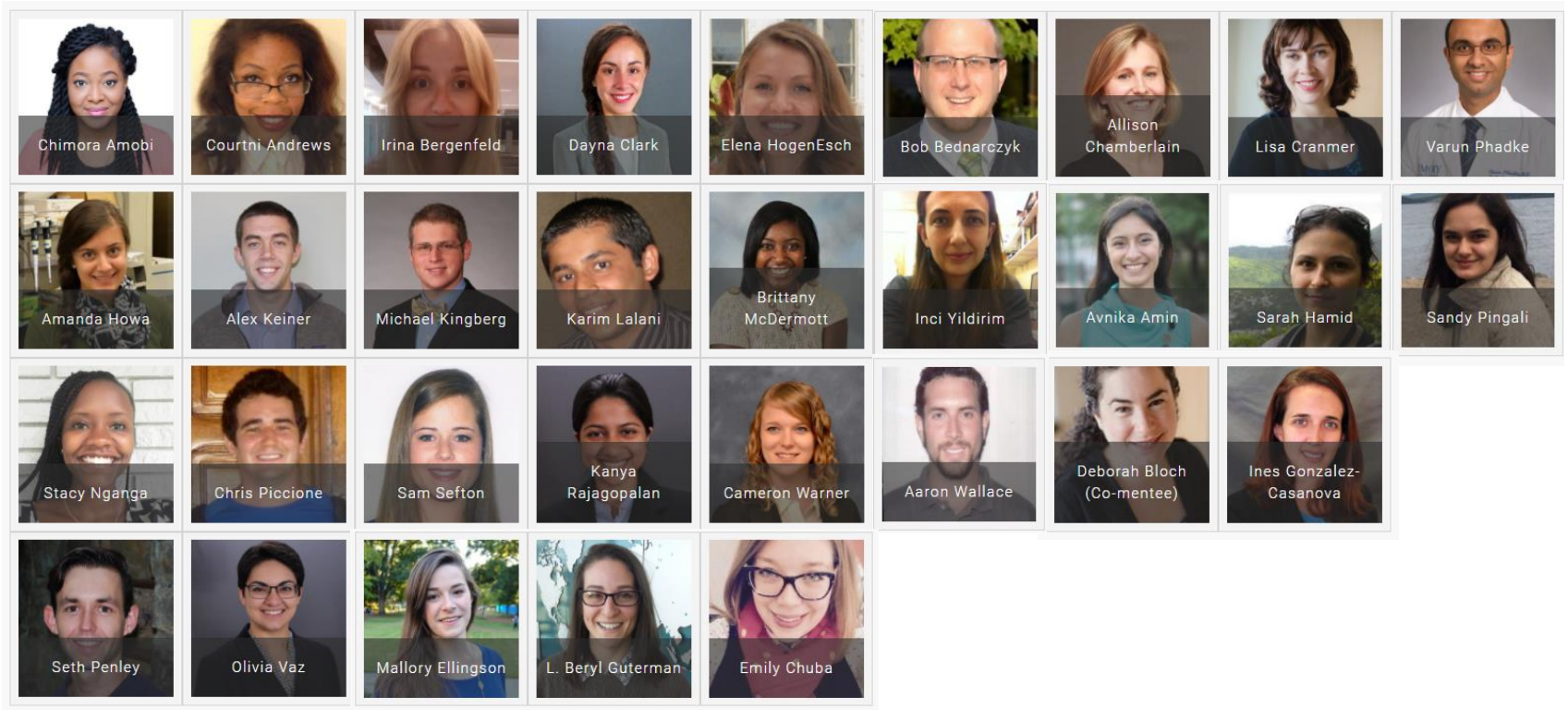
- Letter elaborating on the reason their child should be exempt
- Obtain the form by specifically requesting from the state or local health department, vs. downloading it online
- Annual renewal

Omer, New York Times (Op-Ed), Feb 2015

BEST PRACTICE

Omer, Betch, Leask; Nature; 2019

Acknowledgments



Thank You!

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