

# INTERVENTIONS FOR REDUCING PARENTAL VACCINE REFUSAL AND VACCINE HESITANCY

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# Outline

- Review of interventions
- Policy-level intervention
  - Vaccine laws as nudges
- Ongoing studies & future directions





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## Review

# A systematic review of interventions for reducing parental vaccine refusal and vaccine hesitancy



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## ABSTRACT

Unvaccinated individuals pose a public health threat to communities. Research has identified many factors associated with parental vaccine refusal and hesitancy toward childhood and adolescent immunizations. However, data on the effectiveness of interventions to address parental refusal are limited. We conducted a systematic review of four online databases to identify interventional studies.

We used criteria recommended by the WHO's Strategic Advisory Group of Experts on immunization (SAGE) for the quality assessment of studies. Intervention categories and outcomes were evaluated for each body of evidence and confidence in overall estimates of effect was determined. There is limited evidence to guide implementation of effective strategies to deal with the emerging threat of parental vaccine refusal. There is a need for appropriately designed, executed and evaluated intervention studies to address this gap in knowledge.

# Search Strategy

- **Systematic literature search :**
  - PubMed, CENTRAL, EMBASE and PsychInfo.
  - Publications from 1990 – 2012
- **Only primary reports of intervention studies with quantitative outcome measures**
  - Interventional studies (natural or scientific experiment)
  - with outcomes that measured parental vaccine refusal behavior, attitudes toward immunization, and/or intent to vaccinate

# Quality Assessment Using GRADE

- Criteria for downgrading quality
  1. Risk of bias
  2. Indirectness of evidence
  3. Imprecision
  4. Inconsistency across studies.
  5. Publication bias

# Quality Assessment Using GRADE

- Criteria for upgrading quality
  1. Strength of association or large magnitude of effect
  2. Dose–response relationship
  3. Antagonistic bias and confounding

**Identification**

Records identified through search in PubMed, EMBASE, PsychInfo and CENTRAL, n = 15,139

Duplicates removed, n = 207

**Screening**

Records screened for eligibility, n = 14,932

Records excluded based on title and/or abstract, n = 14,340  
Reviews/Historical Articles = 428  
Letters/Commentaries = 1337  
Guidelines/Recommendations = 336  
Laws/Ethics/News = 94  
Books = 6  
Observational Studies = 500  
Virology/Bacteriology studies = 49  
Epidemiology of disease/outbreak = 1095  
Vaccine development/Adverse events = 2713  
Immunization Coverage = 1857  
Other Irrelevant Topic = 5925

**Eligibility**

Full reports screened for inclusion, n = 592

Records excluded based on full text, n = 562  
25/30 studies from the U.S.

**Included**

Studies included in this review, n = 30



# Conclusions I

1. Most studies scored low on GRADE criteria
  - Score range 1-2 (out of 4)
2. Vaccine mandates work may but might not be applicable in all situations

## Conclusions II

3. Most studies evaluating the impact of parent-centered information/education reported improvement in parents' intentions to vaccinate.
  - However, data for parents' attitude changes very inconsistent
  
4. Improvement in parents' intentions in some studies without a change in attitudes

# Caveats

- Only quantitative studies
- Most studies from the U.S.
- No packages evaluated
- A few important studies have come out since the review

# VACCINE MANDATES AS NUDGES

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# Vaccine Mandates & Choice Architecture

- In the U.S., vaccines are mandatory at school entry
- Laws permit certain exemptions from mandatory immunization.
- Mandates work by changing the balance of convenience in favor of vaccination.

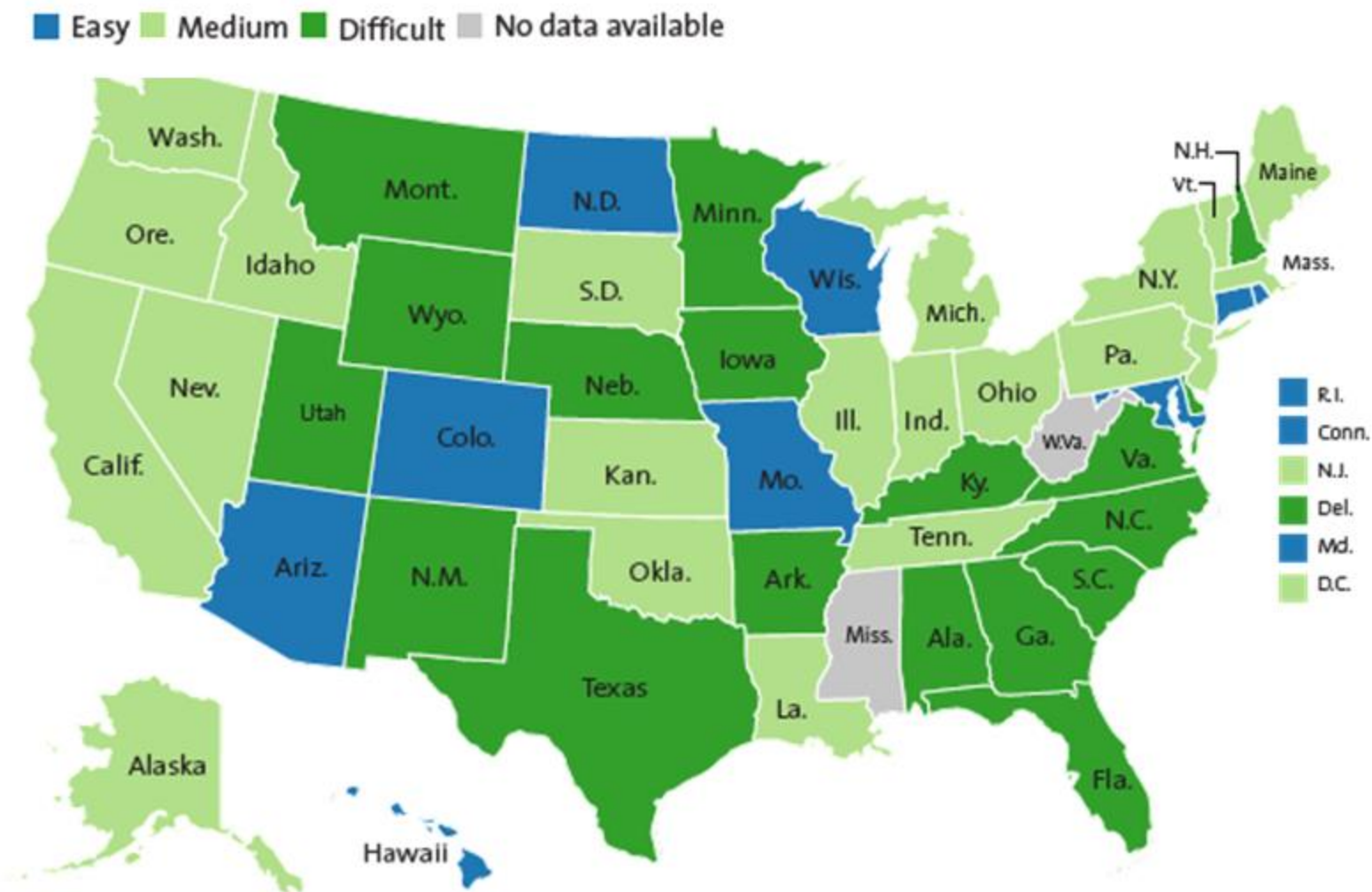
# School Immunization Requirements

- State laws (not federal)
- Major role in low rates of vaccine preventable diseases
- Exemptions
  - Medical
  - Religious
  - Personal belief (philosophical) exemptions

# Ease of Exemption Criteria

1. Standardized form was permissible versus a letter written by a parent
2. Where the parent obtained the form (i.e., school versus the health department)
3. Form needed to be notarized
4. If a letter from the parent was required, whether or not the parent needed to expend extra effort to determine how the statements in the letter needed to be worded

# Ease of Obtaining Vaccine Exemptions –by State

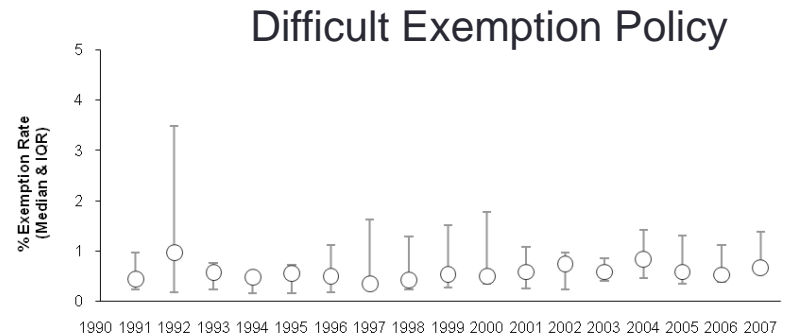
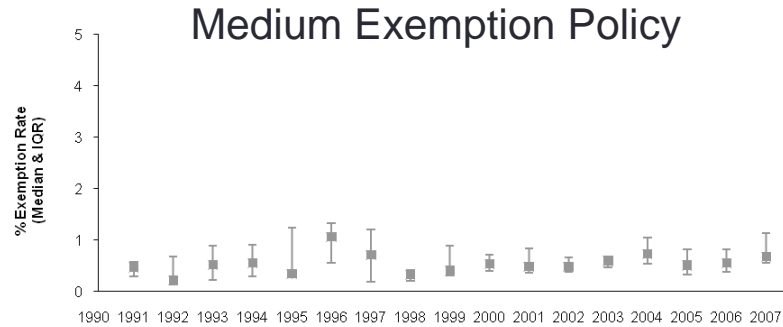
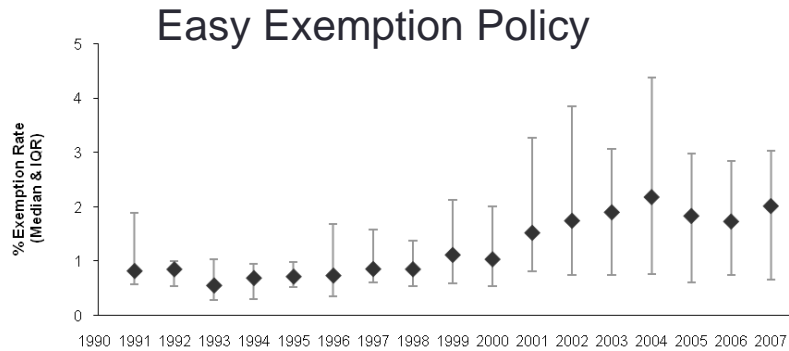


*Omer et al., New England Journal of Medicine . 2012*

Figure (with updated 2013 data) created by Mother Jones



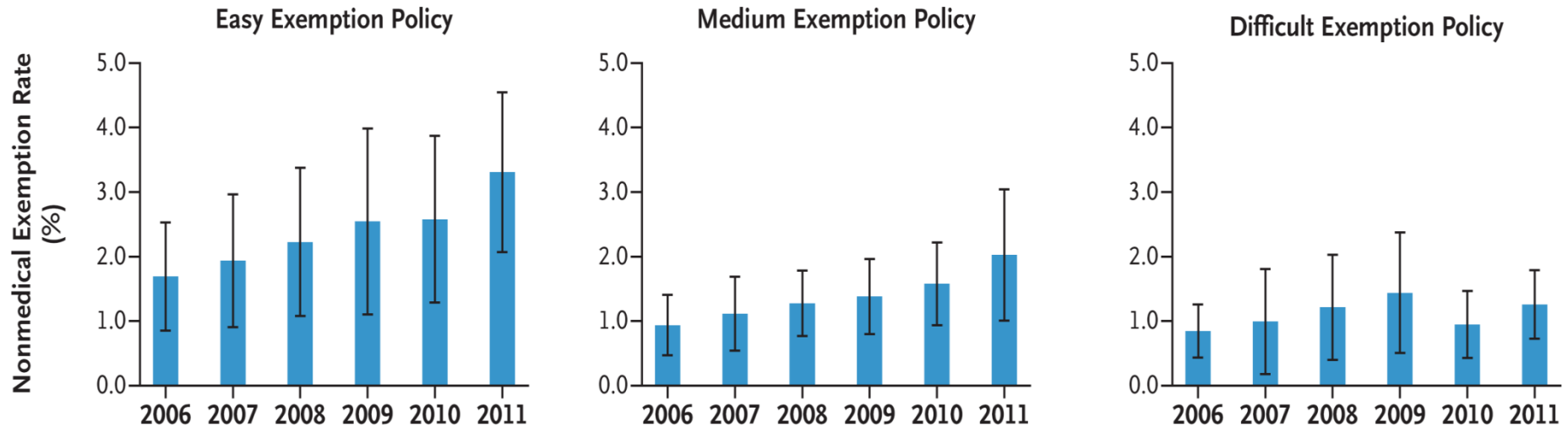
# Nonmedical Exemptions by Ease of Exemption 1991 - 2007



*Omer et al., JAMA, 2006*

*Data updated*

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



# Associations between State Exemption Policies and Pertussis Incidence, 1986-2004

|                       | Unadjusted IRR<br>(95% CI) | Adjusted IRR<br>(95% CI) |
|-----------------------|----------------------------|--------------------------|
| <b>Exemption ease</b> |                            |                          |
| Difficult             | Reference                  | Reference                |
| Medium                | 1.27 (1.06-1.51)           | 1.35 (0.96-1.91)         |
| Easy                  | 1.90 (1.60-2.28)           | 1.53 (1.10-2.14)         |

Adjusting for allowing parental signature for school immunization forms, proportion inside urbanized area, income (11 categories), and education (7 categories)

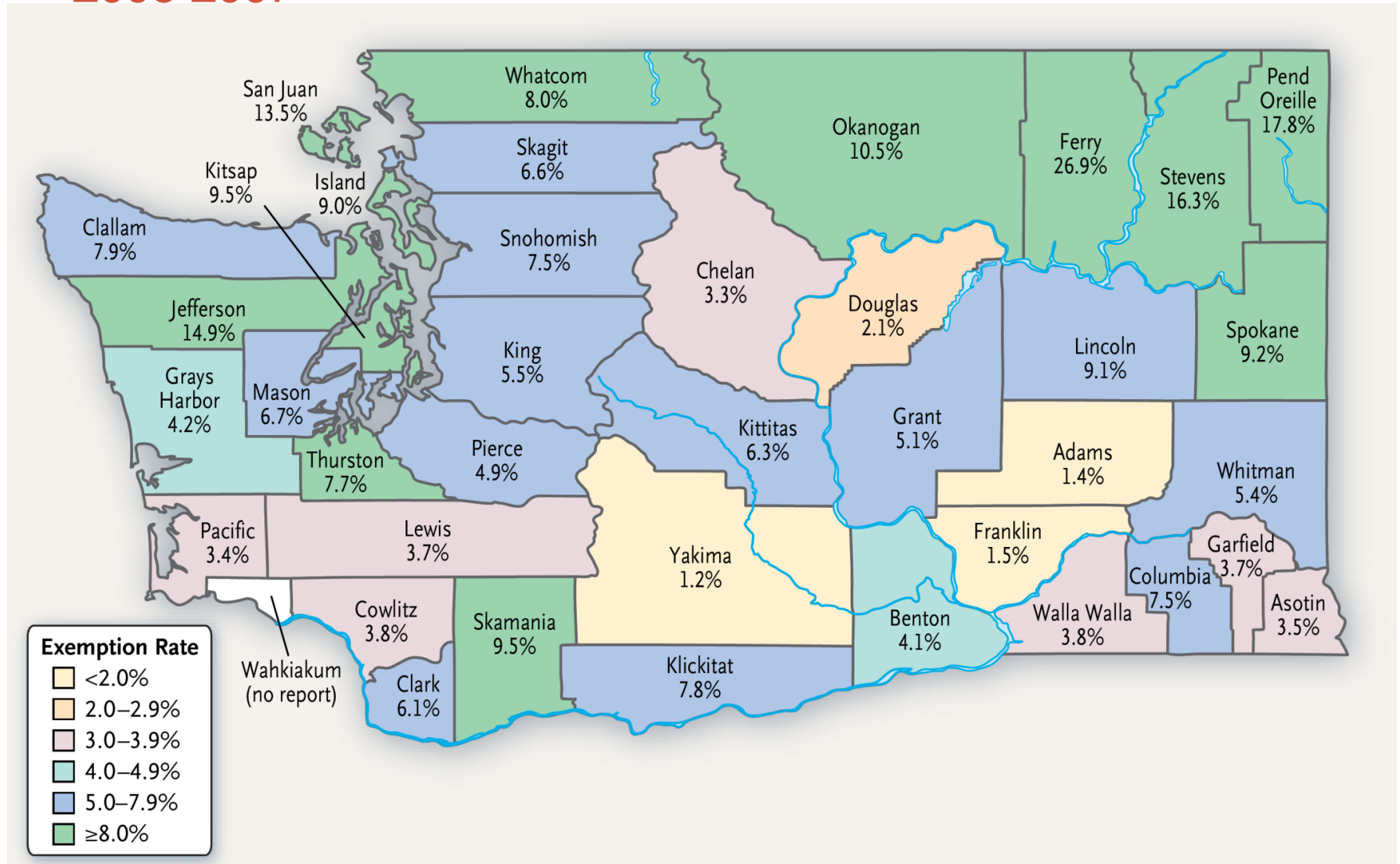
*Omer et al., JAMA, 2006*

# Relative Risk of Measles and Pertussis in Exemptors from School Laws

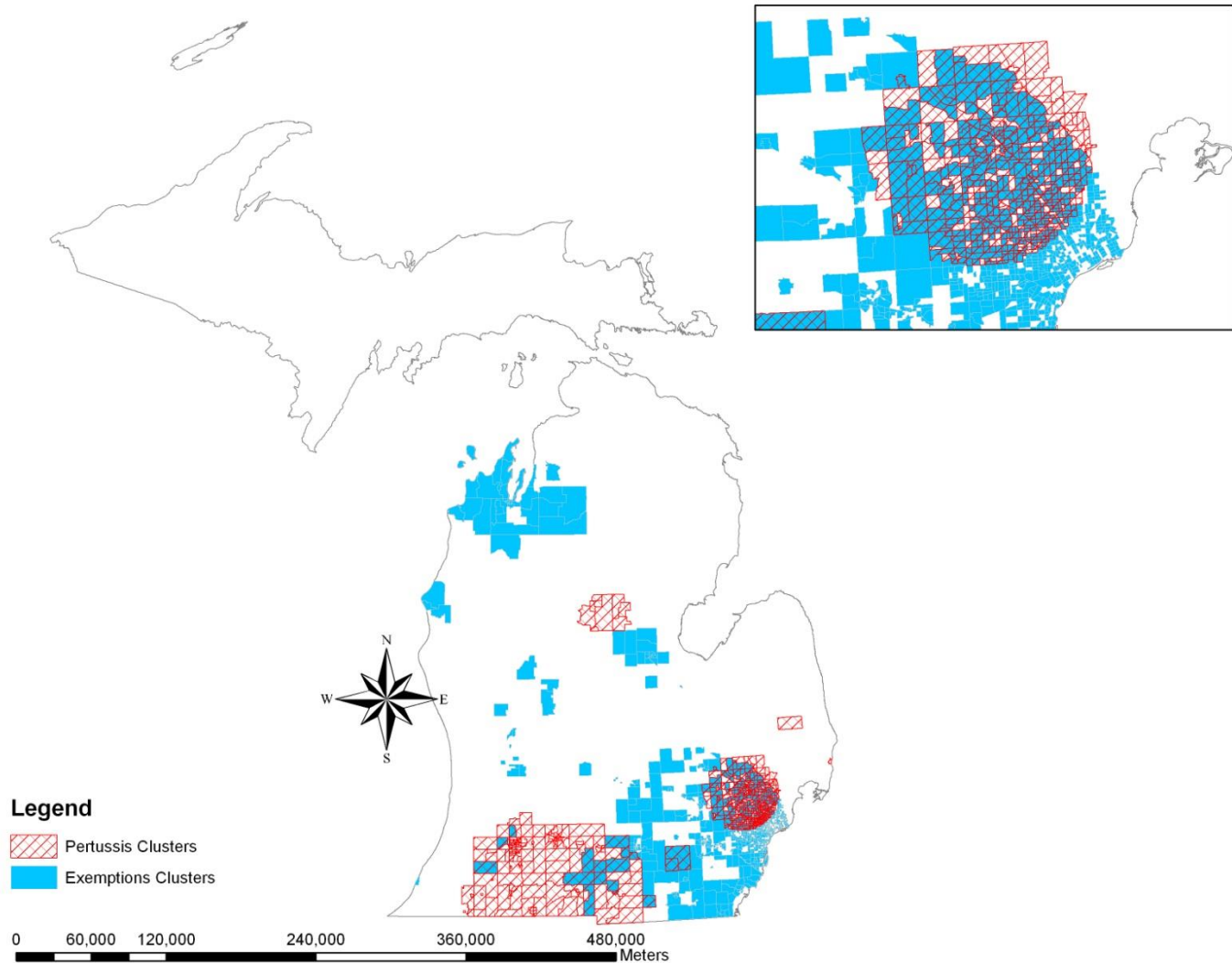
|                  | Measles | Pertussis |
|------------------|---------|-----------|
| CO (1987-98)     | 22      | 5.9       |
| U.S. (1985-1992) | 35      |           |

Feikin et al. JAMA. 2000;  
Salmon et al, JAMA. 1999.

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



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



**Overlap of Exemptions Clusters with Pertussis Clusters**

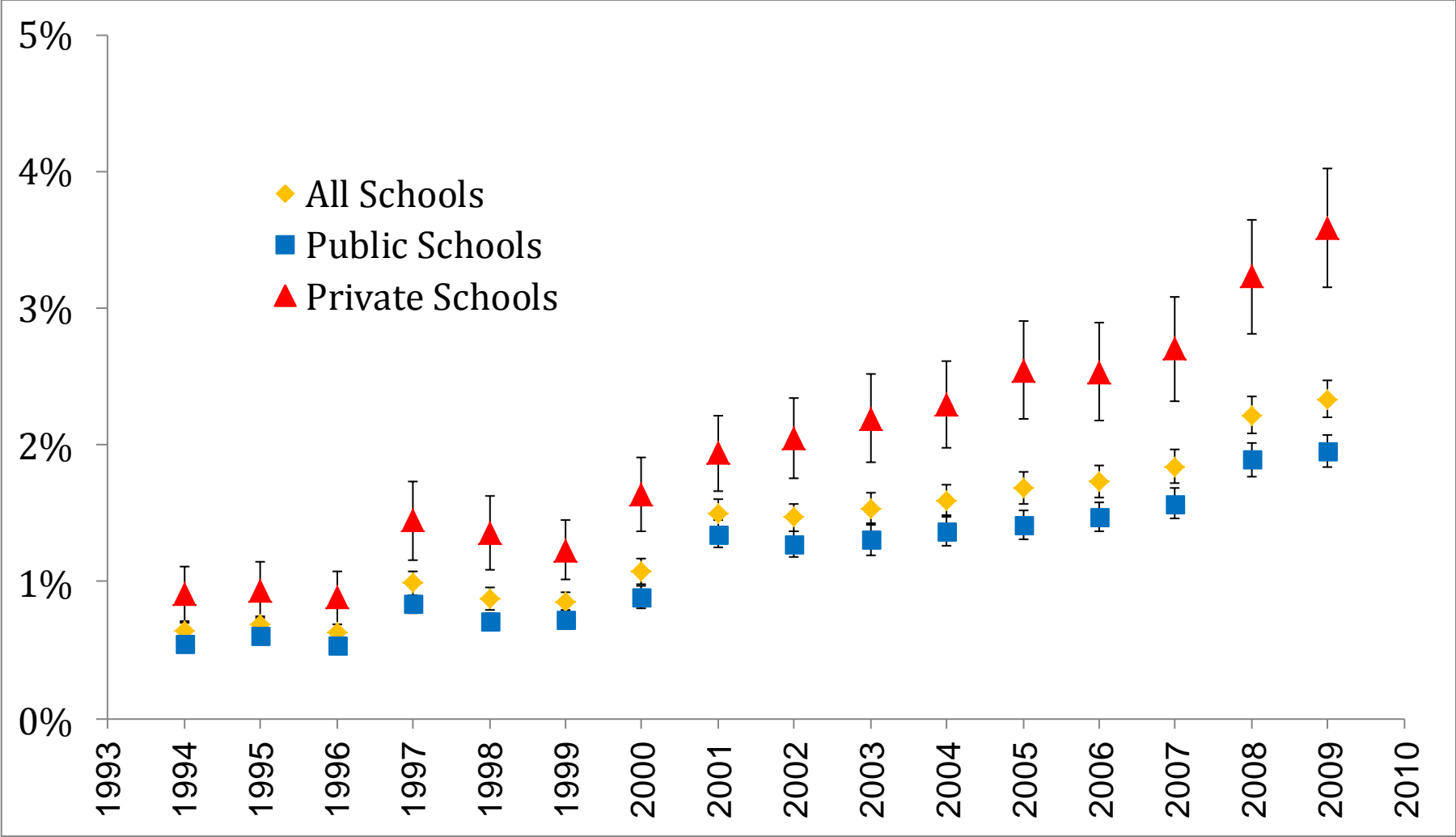
Unadjusted OR

3.0 (2.5 – 3.6)

Adjusted OR

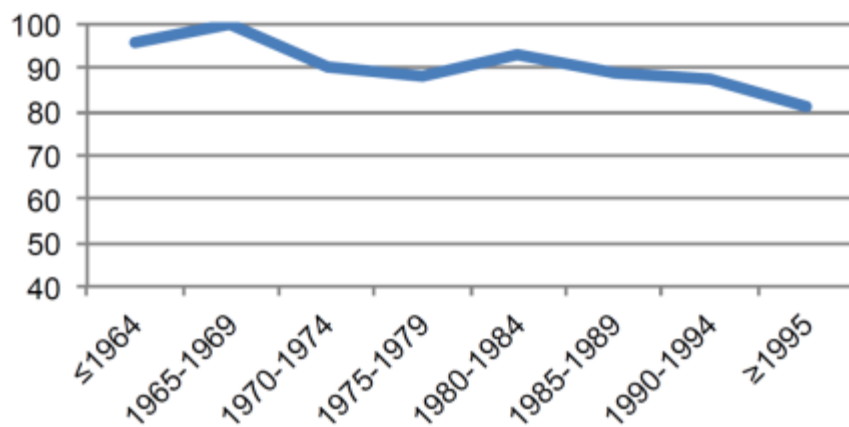
2.7 (2.2 – 3.3)

# School-level Personal Belief Exemption Rates Overall & by School Type

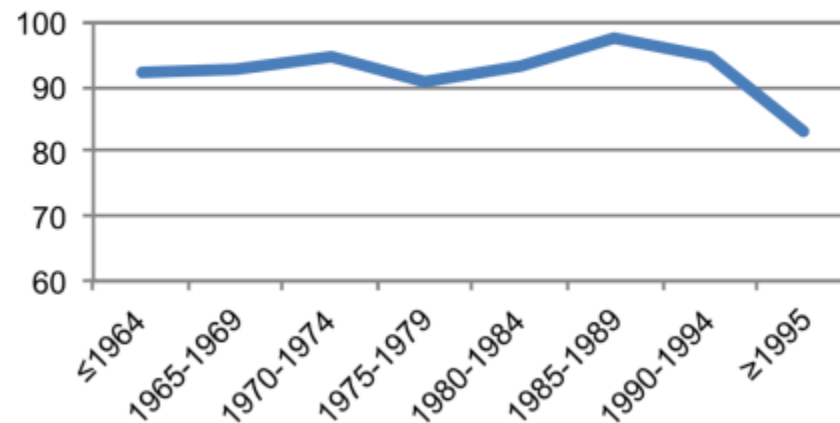


# Are Recent Medical Graduates More Skeptical of Vaccines?

**VACCINE EFFICACY CONSTRUCT  
(OVERALL)**



**VACCINE SAFETY CONSTRUCT  
(OVERALL)**





| Organization  | Document Type                               | Document Title/Description   |
|---|---|--|
| American Bar Association                                    | Amicus Brief for the U.S. Supreme court     | Brief of <i>Amicus Curiae</i> in the Supreme Court of the United States - <i>Bruesewitz vs. Wyeth Inc.</i> |
| Council of State Governments                                | Policy Brief                                | Exemptions from School Immunization Requirements   |
| Council of State Governments                                | Policy Overview and Toolkit for Legislators | Policy Overview -immunization  |
| Infectious Disease Society of America                       | Policy Statement                            | Infectious Diseases Society of America's Policy on State Immunization Mandates                             |
| American Public Health Association                          | Policy Statement                            | Annual Influenza Vaccination Requirements for Health Workers   |
| Pediatric Infectious Diseases Society                       | Position Statement                          | A Statement Regarding Personal Belief Exemption from Immunization Mandates                                 |
| Association of State & Territorial Health Officials (ASTHO) | Issues Brief                                | Permissive State Exemption Laws Contribute to Increased Spread of Disease                                  |
| Society for Healthcare Epidemiology of America.             | Position Paper                              | Influenza Vaccination of Healthcare Personnel  |
| Society for Adolescent Medicine                             | Position Statement                          | Human Papillomavirus (HPV) Vaccine   |
| Association of nurses in AIDS care                          | Position Statement                          | Support for Requiring Annual Immunization of Health Workers Against Influenza                              |

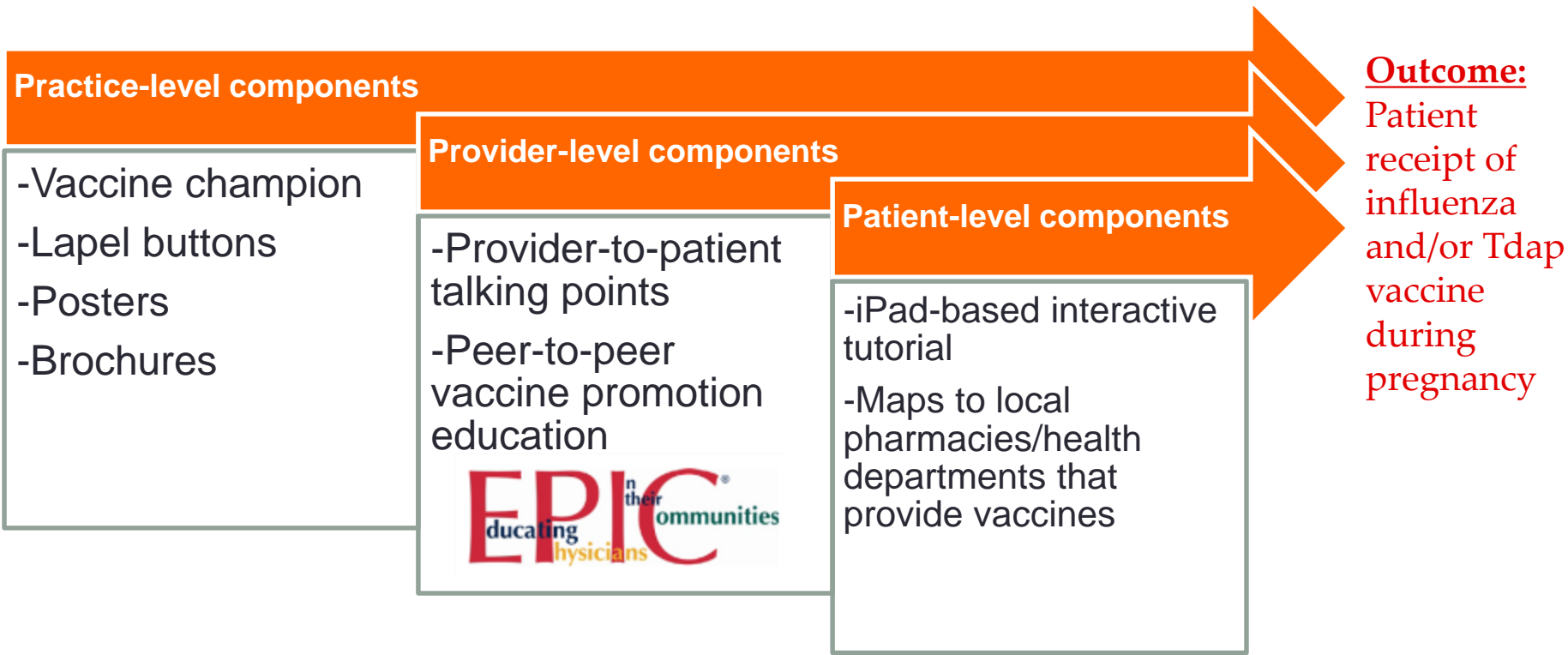
# Legislation Related to School Immunization Mandates, 2009-2012

- 36 immunization bills introduced
  - Restricting exemptions: 5
    - 3 passed
  - Expanding exemptions: 31
    - 0 passed

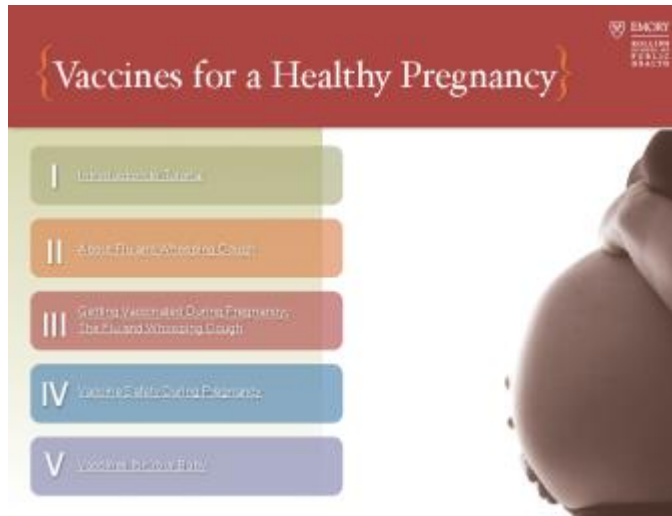
# ONGOING STUDIES & FUTURE DIRECTIONS

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# Practice, Provider and Patient components = “P3” package



# P3 package components

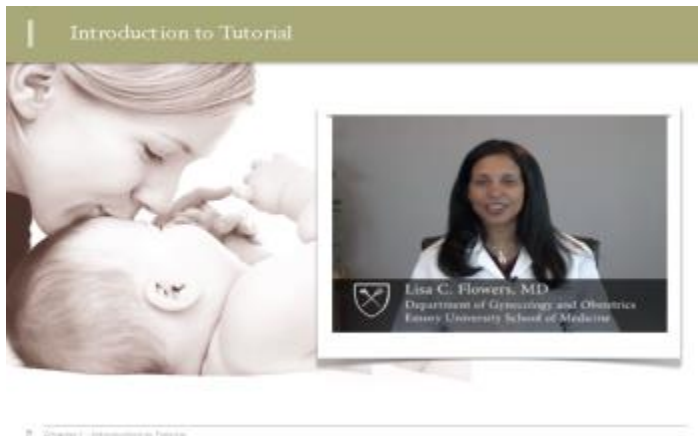


Protect you.  
Protect your baby.

You probably know about the flu shot.  
Do you know about the whooping cough vaccine (Tdap)?

Protect you and your baby from both **influenza** (flu) and **pertussis** (whooping cough) by getting vaccinated during pregnancy.

Ask your doctor today about getting vaccinated against both flu and whooping cough.



# Gain vs. Loss Frame Messages



Give her a healthy dose of love.

Getting a flu shot during pregnancy will protect your baby from getting the flu, and will continue to protect your baby for up to 6 months after she is born.

**DON'T RISK THE LIFE OF YOUR UNBORN CHILD BY SKIPPING A FLU SHOT.**



*Did you know...*  
Flu-related illness could jeopardize the lives of both mother and baby?

# Vaccine Promotion Activities to Increase Coverage in Areas Participating in Pneumococcal Vaccine Introduction Impact Assessment and Lessons Learnt

With Aga Khan University in Pakistan

## 1. Common package of interventions

- Baseline GIS mapping of coverage at and feedback to health officials on areas of very low coverage
- District officials and EPI staff training and sensitization on value of vaccines
- Assistance with developing vaccine management tools for district health team
- Mass local radio messaging on Sindhi stations
- Ensuring availability of EPI cards and plastic envelopes for disbursement to vaccinees

## 2. Monitoring and Improvement Initiative Intervention in targeted areas



# Monitoring and Improvement Intervention

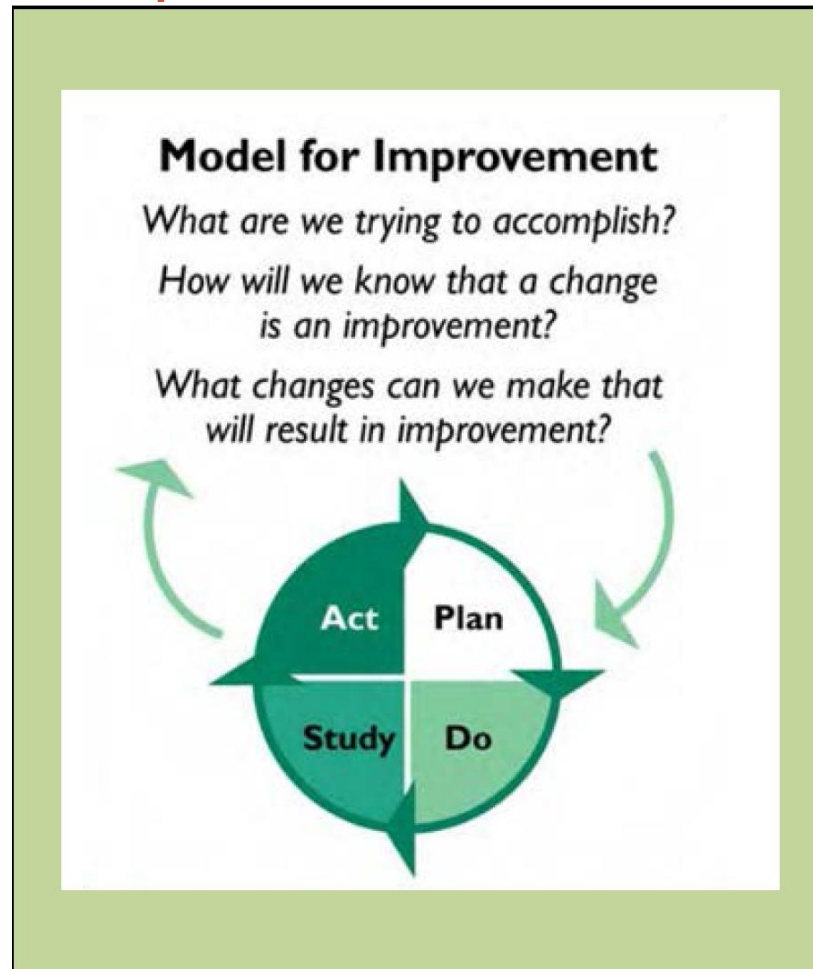


Figure 1: Model for improvement adapted from the Institute for Healthcare Improvement (USAID, 2008).



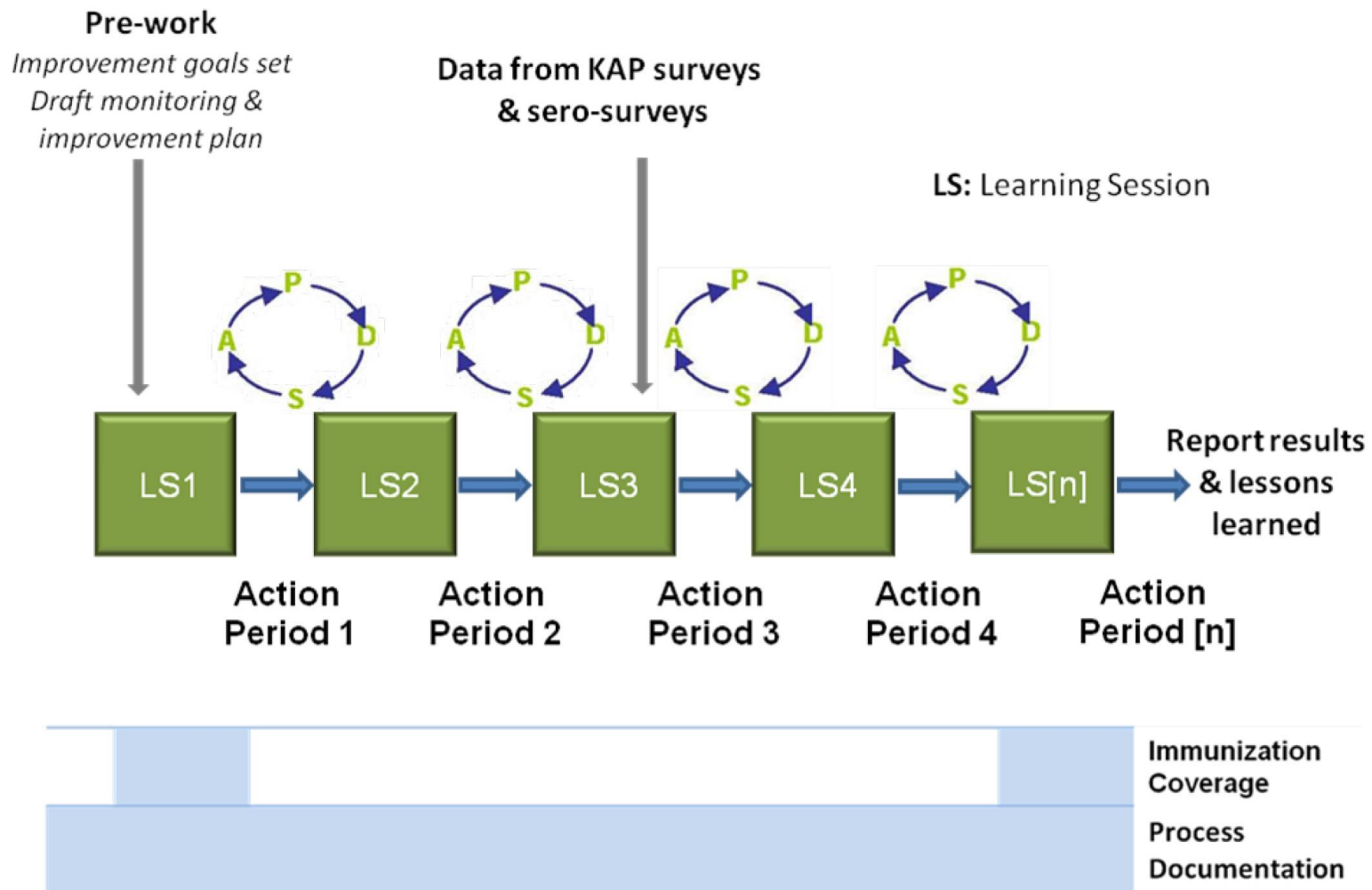


Figure 2: Implementation of the monitoring and improvement initiative. Note: The number of Learning Sessions indicated is only for illustrative purposes. The actual number will be determined by the improvement teams and will depend on the system changes implemented.

Thank You!



## Under-vaccination & Pertussis Risk in 8 VSD HMOs

**Table 3. Estimates of the Risk of Laboratory-Confirmed Pertussis for Those Undervaccinated vs Those Age-Appropriately Vaccinated<sup>a</sup>**

| Comparison of DTaP Vaccine Doses Undervaccinated by | OR (95% CI)         | P Value |
|---|---------------------|---------|
| 1 vs 0  | 2.25 (0.97-5.24)    | .06     |
| 2 vs 0  | 3.41 (0.89-13.05)   | .07     |
| 3 vs 0  | 18.56 (4.92-69.95)  | <.001   |
| 4 vs 0  | 28.38 (3.19-252.63) | .002    |
| 1, 2, 3, or 4 vs 0                                  | 4.36 (2.23-8.55)    | <.001   |