



Protecting Infants from Pertussis: Strategies to Increase Maternal Immunization and Reduce Gaps in Health Systems

Sarah New, MPH

Rebeca Boyte, MAS

Immunization Branch

Division of Communicable Disease Control

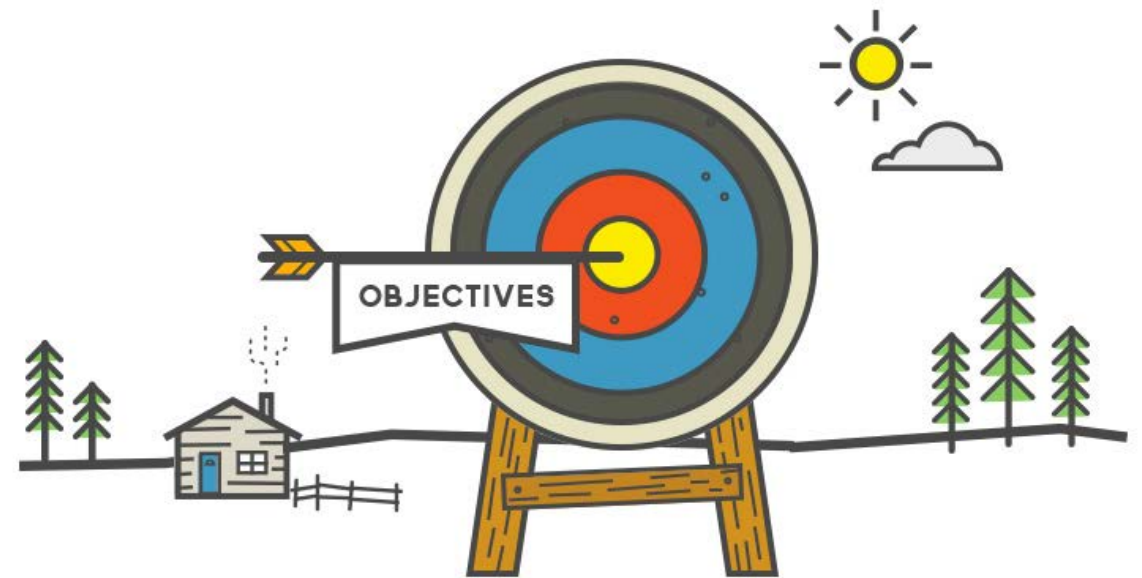
London's Story



<http://www.shotbyshot.org/stories/londons-story/>

Learning Objectives

- Describe the epidemiology of pertussis
- Demonstrate disparities among infant with pertussis and prenatal Tdap coverage
- Summarize the importance of prenatal Tdap and the barriers to Tdap uptake in California
- Describe CDPH and local public health prevention efforts
- Identify how health systems can implement strategies to reduce prenatal immunization gaps



Pertussis: Cause and Transmission

- A respiratory illness also known as **whooping cough**
- Caused by the bacteria *Bordetella pertussis*
- Releases a toxin, which damages the cilia and causes airways to swell
- Spreads through inhalation of **respiratory aerosols**



Pertussis: the 100 day cough

1-2 weeks

- Cold-like symptoms including runny nose, mild cough, fever, and fatigue.



1-6 weeks

- Distinguishable symptoms appear. In classic pertussis rapid and intense coughing fits occur, which are followed by a high pitched whoop and often vomiting. There is usually no fever.



2-6 weeks

- Cough becomes less intense and respiratory system begins to heal. However, coughing can persist for months.



People of all ages need WHOOPING COUGH VACCINES



DTaP

for young children

- ✓ 2, 4, and 6 months
- ✓ 15 through 18 months
- ✓ 4 through 6 years

Tdap

for preteens

- ✓ 11 through 12 years

Tdap

for pregnant women

- ✓ During the 27-36th week of each pregnancy

Tdap

for adults

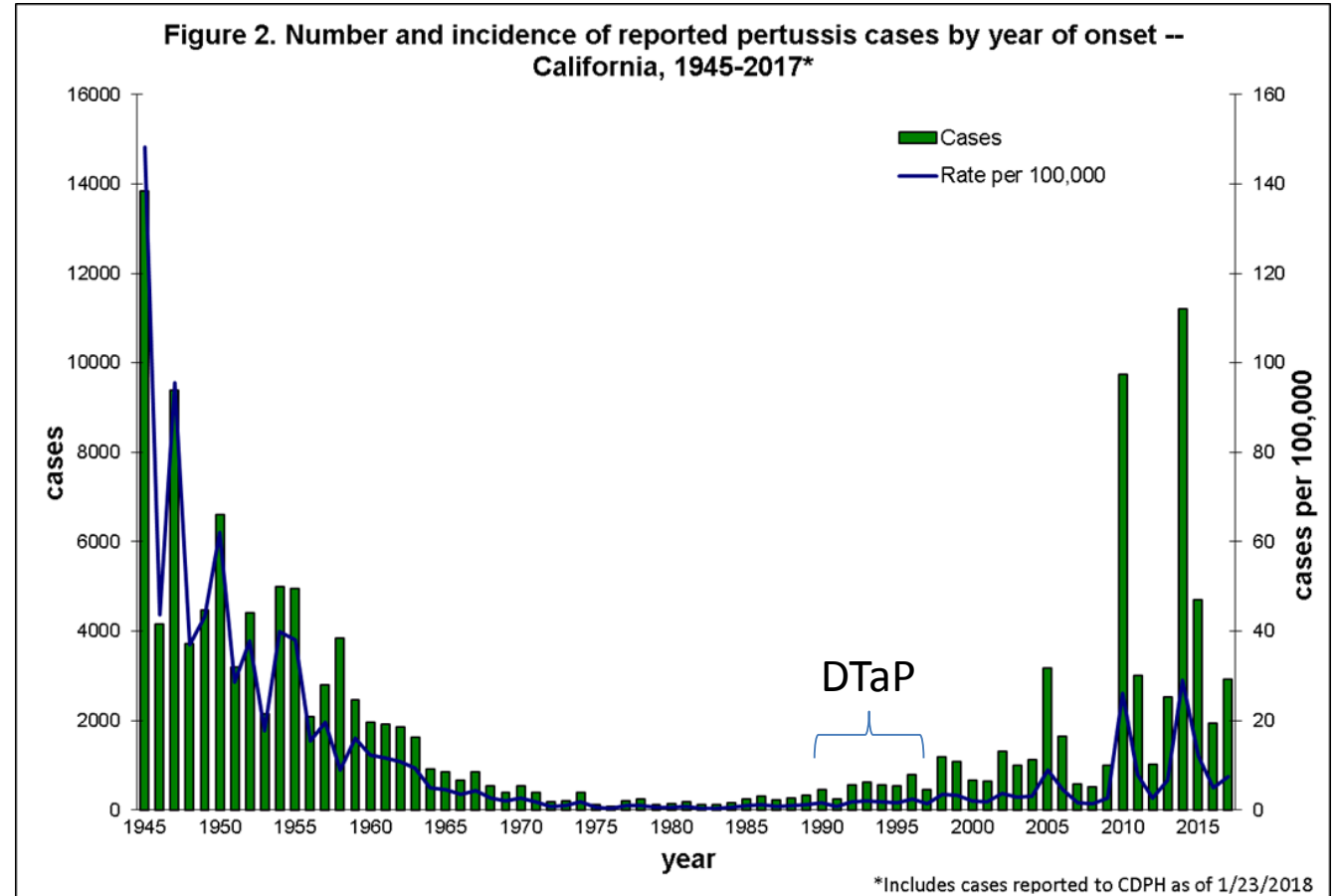
- ✓ Anytime for those who have never received it

www.cdc.gov/whoopingcough



Pertussis: The New Normal

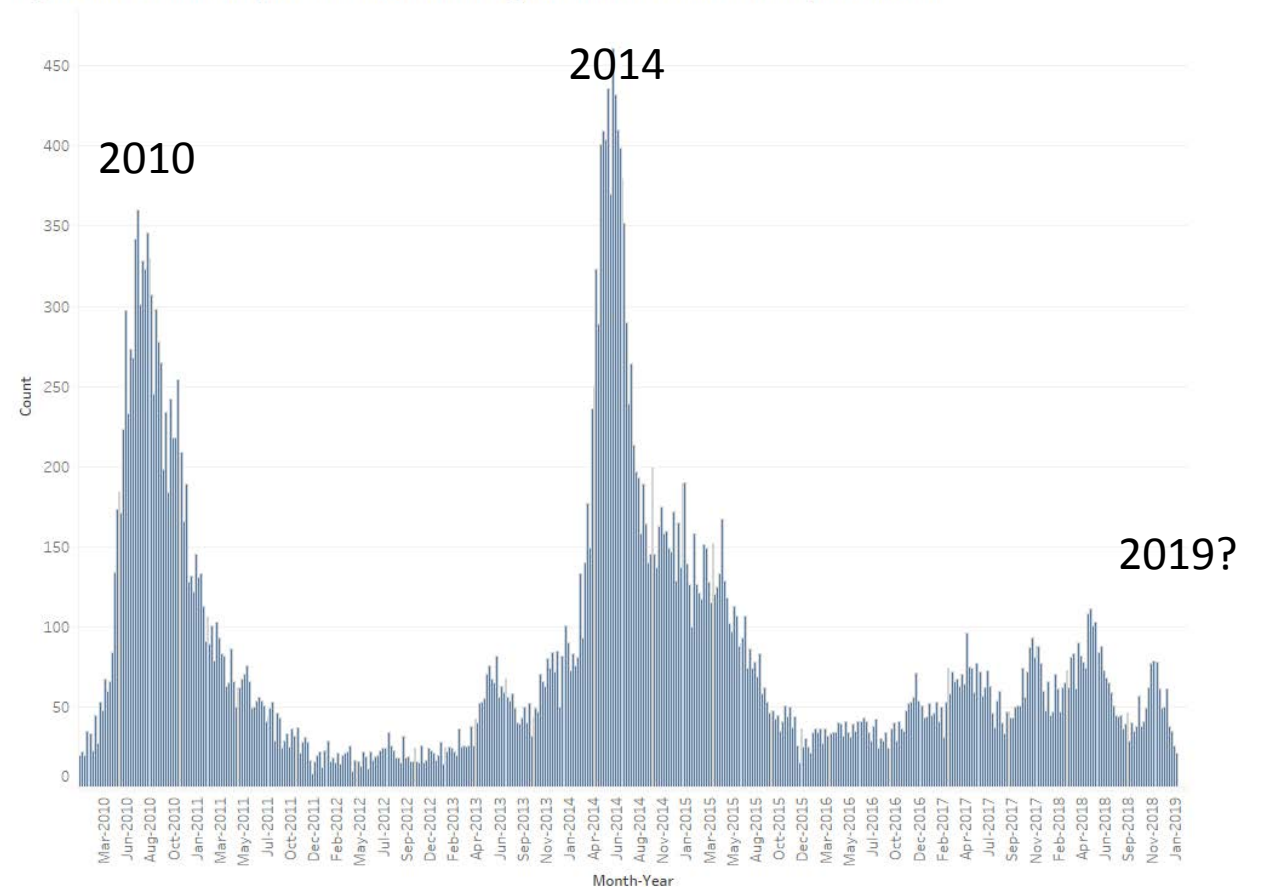
- Cyclical: epidemics occur every 3-5 years
- Immunity from both **natural disease and vaccination wanes over time**
- An increased number of cases is the “**new normal**”



Pertussis: The New Normal

- Peaks are getting larger
 - Over 9,000 in 2010
 - Over 11,000 in 2014
 - Over ??? in 2019??

Figure 1. Year to date* pertussis case counts by week of onset -- California, 2010-2018



*YTD: reported to CDPH as of 1/27/2019

Reported cases are the tip of the iceberg

A large iceberg floats in a deep blue ocean under a clear sky. The visible tip of the iceberg is jagged and white, while the much larger submerged portion is dark blue and textured, illustrating the concept of hidden or unreported cases.

**Under-reporting
Under-diagnosis**

Pertussis: The New Normal

- Pertussis can occur in **fully-vaccinated** persons
- The clinical presentation of pertussis may be **mild** in previously vaccinated people
- Persons with mild disease may still **transmit** the infection
- **Older persons** may be the source of infection for children

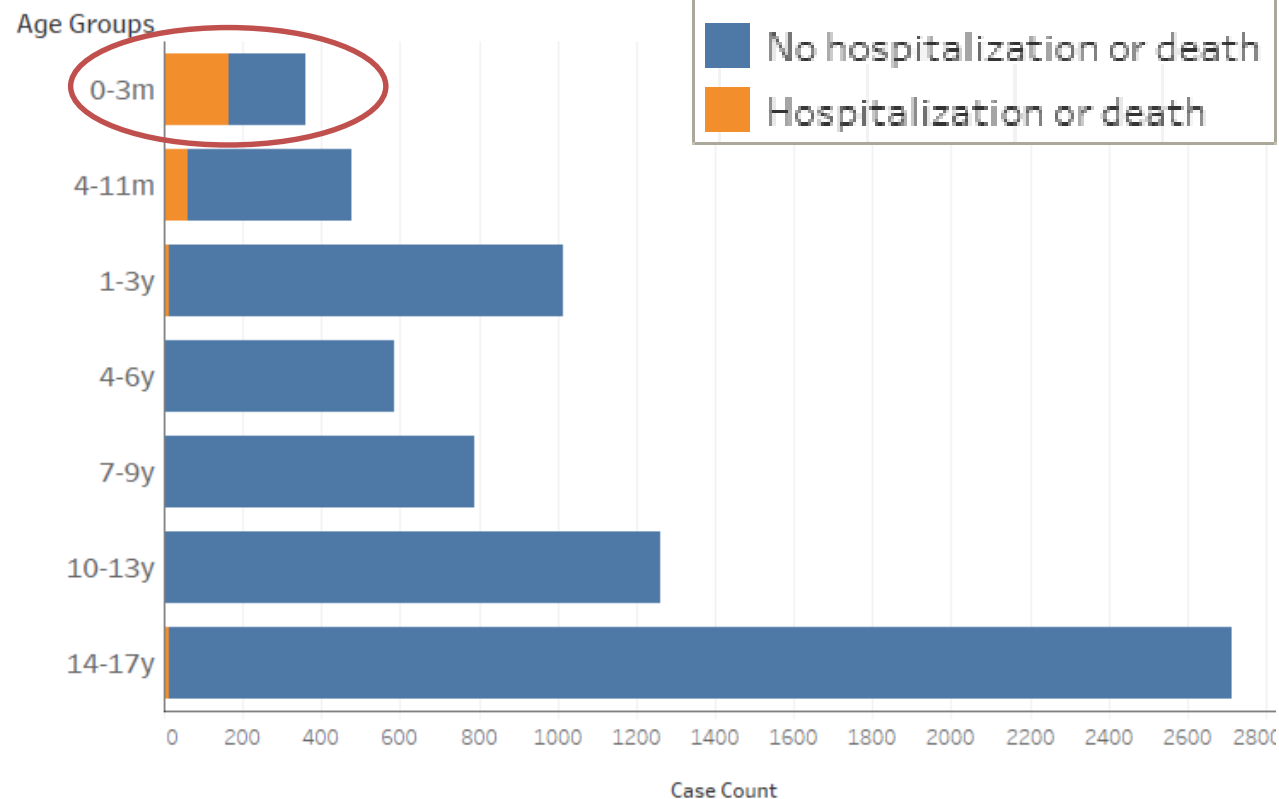


Pertussis in Infants

Infants are at the highest risk of severe or fatal disease outcomes

- Pertussis in infants <6 months of age can be **atypical**
 - Cough may be minimal or absent
- 1 out of 4 (23%) get **pneumonia**
- 3 out of 5 (61%) will have **apnea**
- 1 out of 300 (0.3%) will have **encephalopathy**
- 1 out of 100 (1%) will **die**

Severe outcomes (hospitalizations or deaths) among pediatric pertussis cases -- California, 2016-2018



Racial Disparities Among Infants

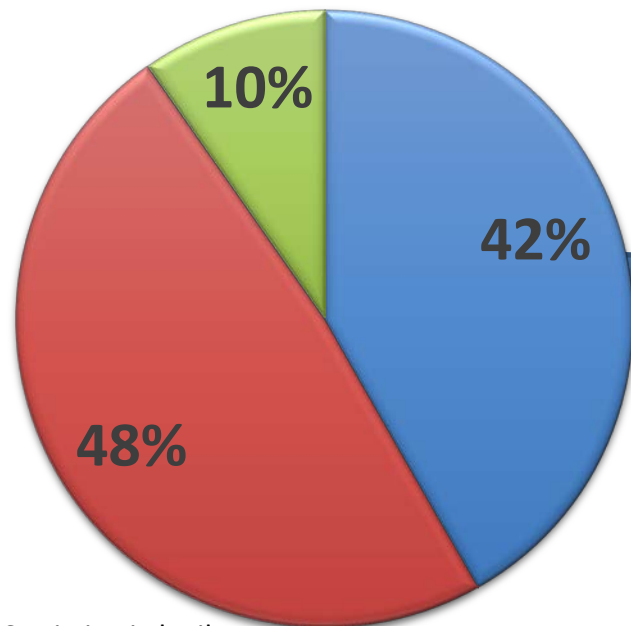
- Hispanic infants are at **higher risk** of pertussis infection
- Hispanic and black infants <4 months of age with pertussis were **>2 times more likely** to be hospitalized compared to white infants
- Hispanic infants <4 months of age with pertussis **more likely to die**
- Medi-Cal insurance is an independent **risk factor** for pertussis among Hispanic infants

Winter K, Harriman K. Risk markers for pertussis among infants <4 months of age: Understanding the Hispanic disparity. *Pediatric Infectious Disease Journal*. 2018. Feb;37(2):126-131.

Prenatal Care Payer Source, California – 2017*

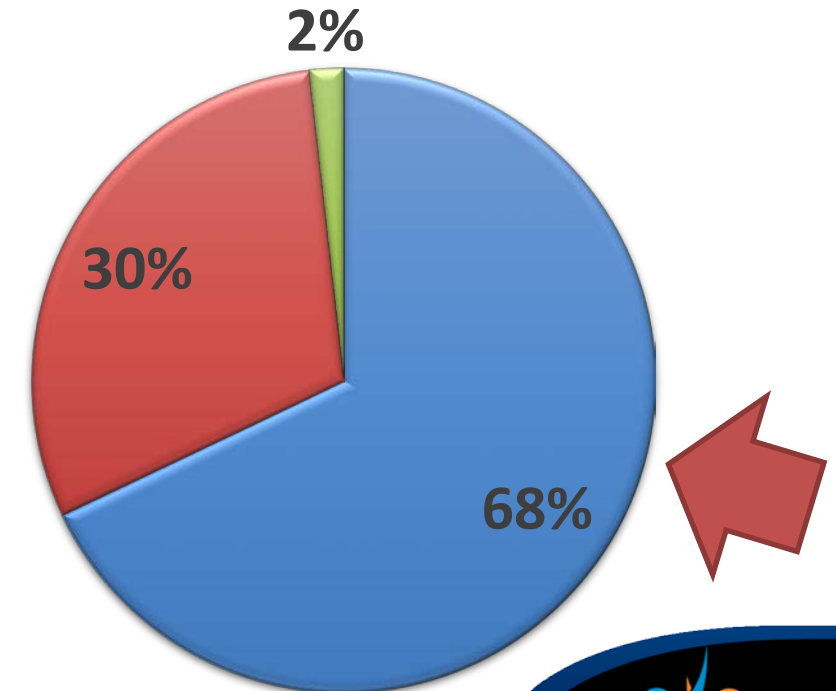
Prenatal care payer source, all pregnant women

■ Medi-Cal ■ Private ■ Other/Unknown



Ethnicity of pregnant women with Medi-Cal as prenatal payer source

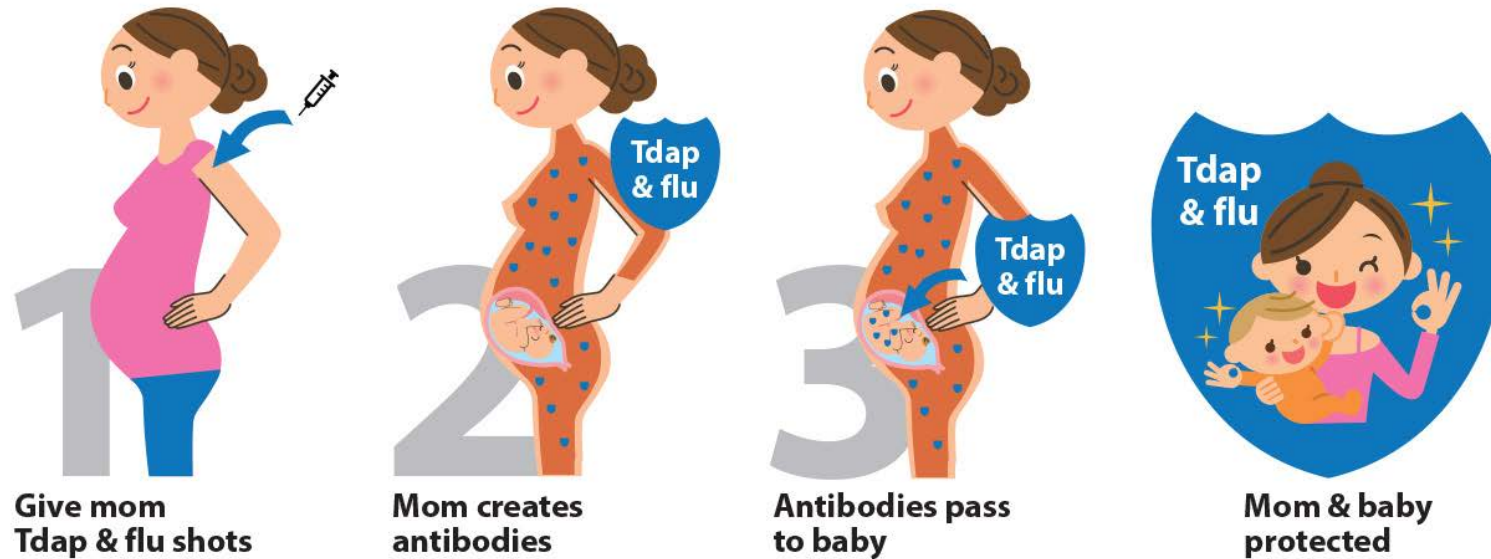
■ Hispanic ■ non-Hispanic ■ Unknown



*2017 California Vital Statistic Birth File

Best strategy to combat infant pertussis:

Tdap during pregnancy



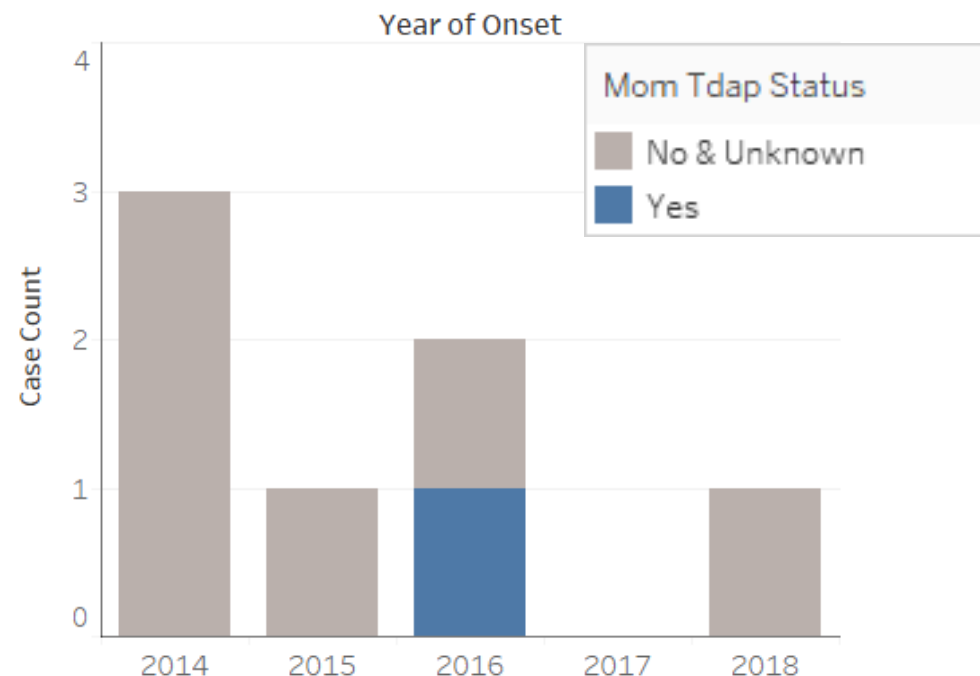
- Represents a shift in recommendations
 - No longer focusing on family/care givers and postpartum vaccinations
 - Shifts responsibility from primary care providers/pediatricians and hospitals to **obstetrics providers**

Prenatal Tdap coverage remains suboptimal.

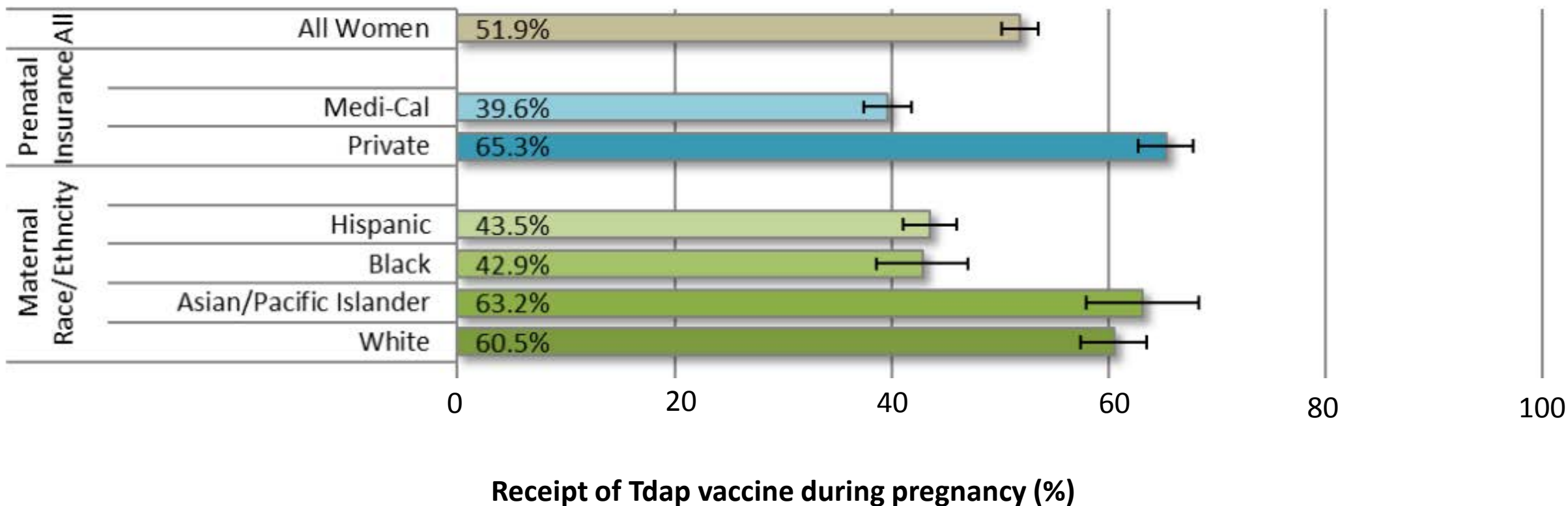
Pertussis in Infants

- **Seven** pertussis-related deaths among infants <4 months of age were reported to CDPH between 2014-2018
- **Six of the seven mothers** did not receive Tdap during pregnancy
- **One** of the mothers received Tdap during pregnancy, but outside the recommended timeframe and too late to provide protection for her newborn

Pertussis-related deaths among infants <4 months of age, California -- 2014-2018



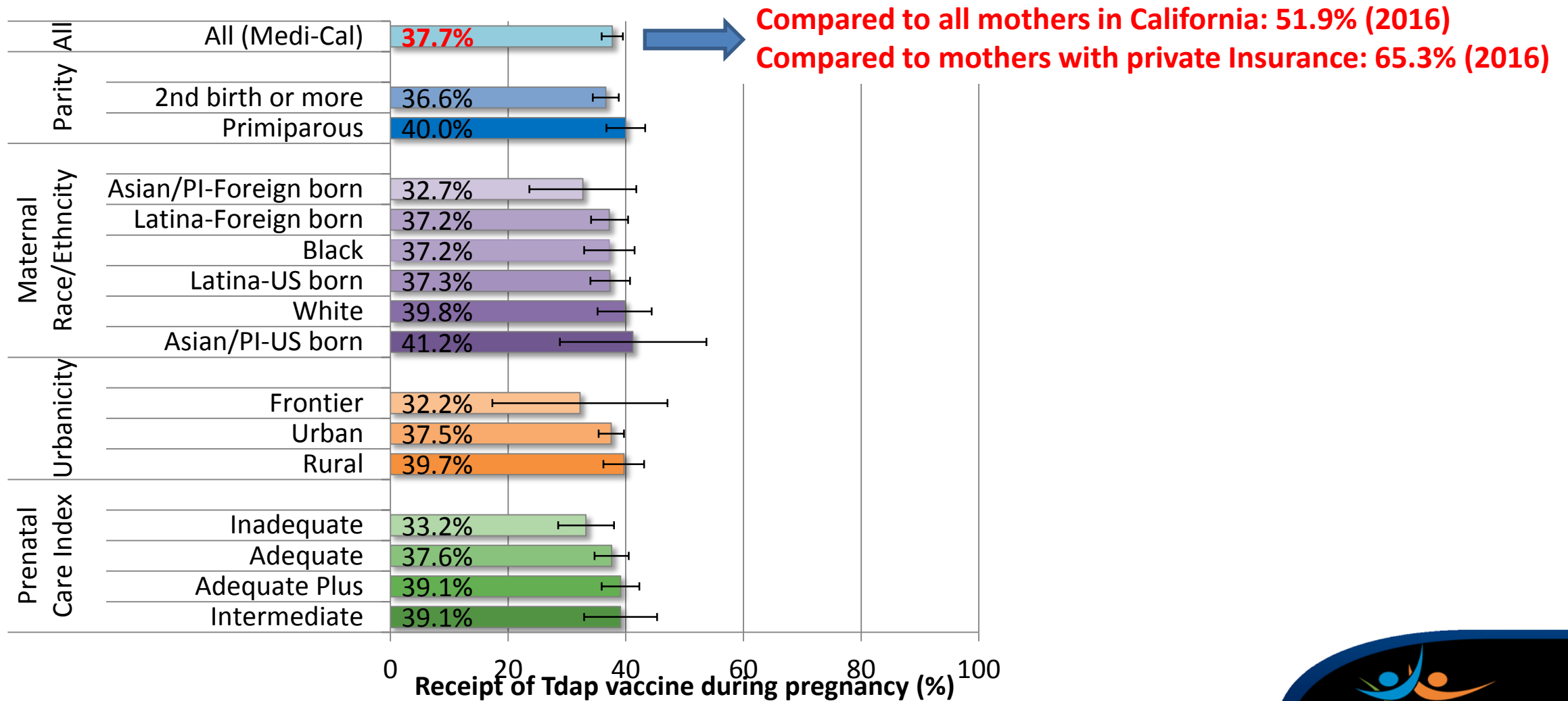
Tdap Coverage Estimates in California: Maternal and Infant Health Assessment, 2016



<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Immunization/MIHA-FactSheet2016.pdf>

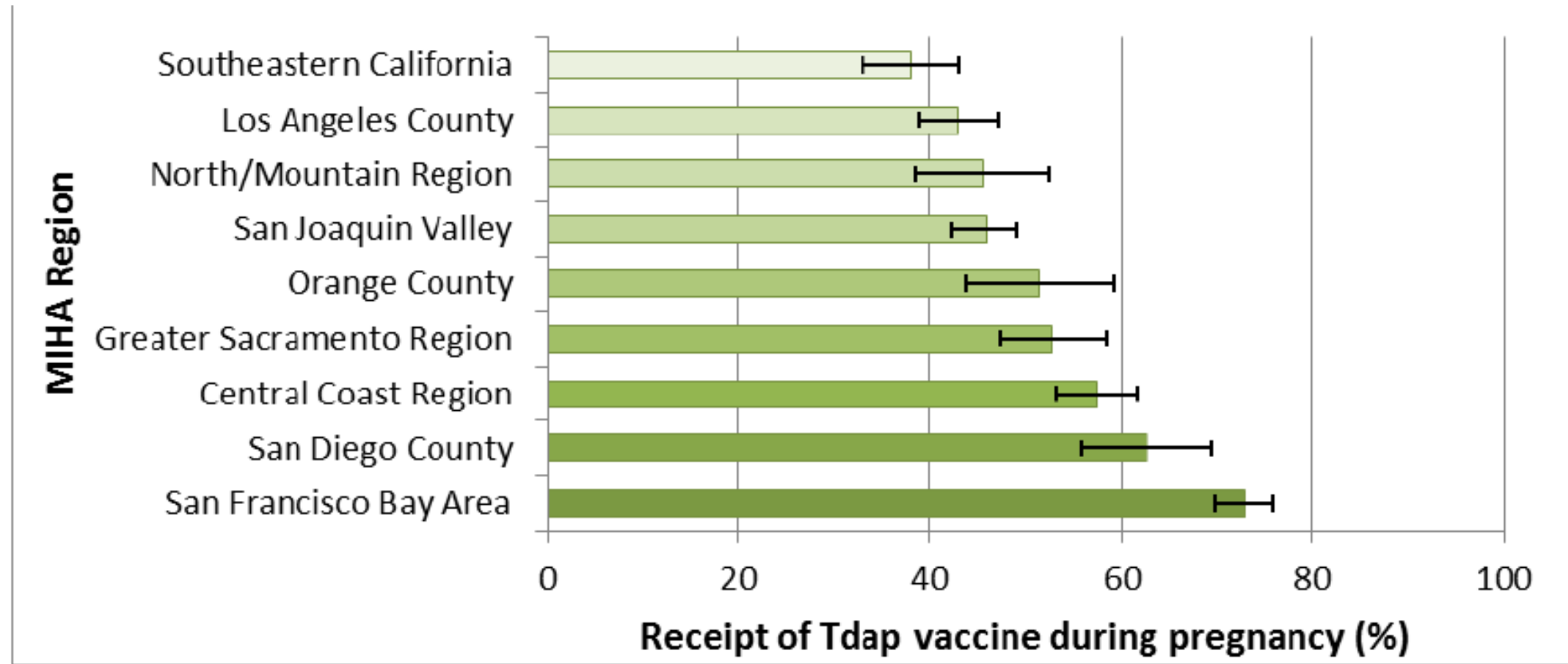
Tdap Coverage Estimates Among Mothers Insured by Medi-Cal

Maternal and Infant Health Assessment, 2015-2016



Tdap Coverage Estimates in California: All Mothers

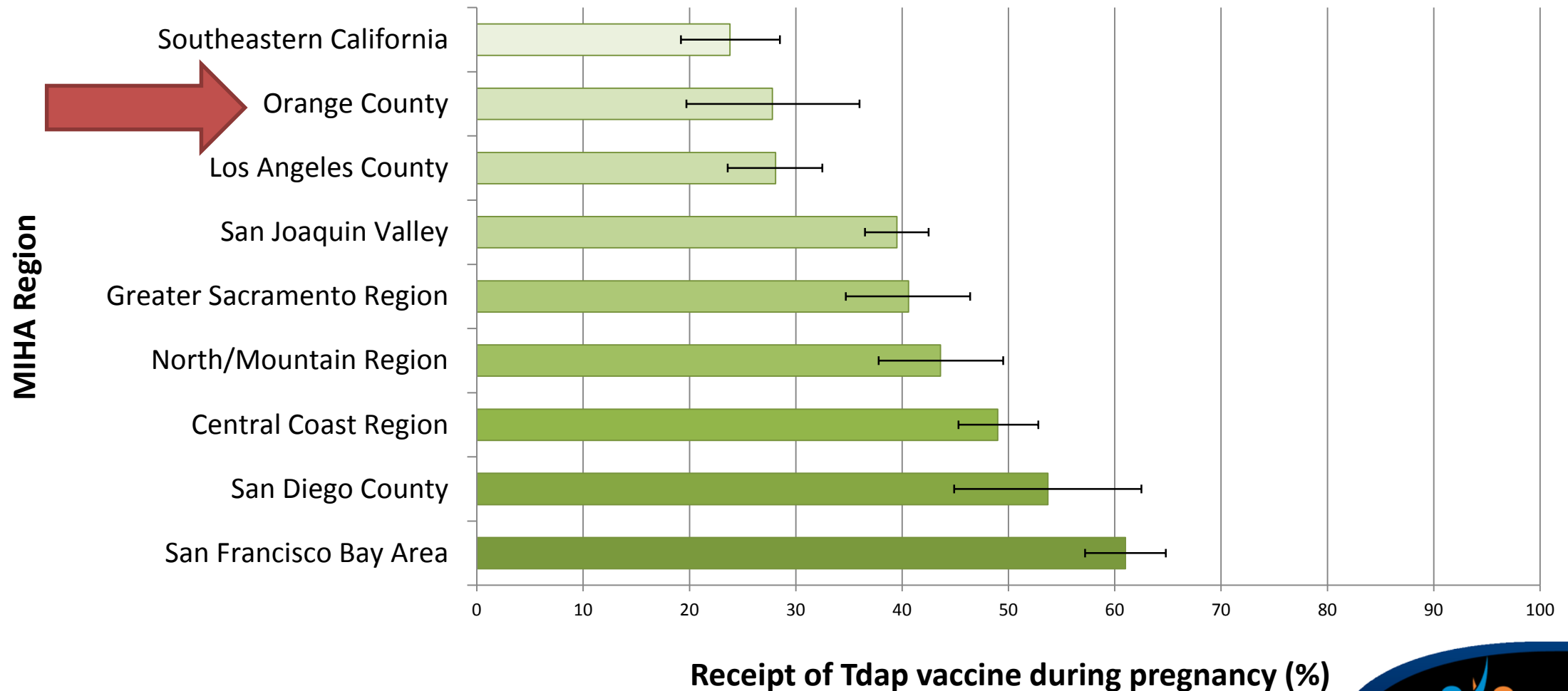
Maternal and Infant Health Assessment, 2016



<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Immunization/MIHA-FactSheet2016.pdf>

Tdap Coverage Estimates Among Mothers Insured by Medi-Cal

Maternal and Infant Health Assessment, 2015-2016



Supplemental information collected on infant pertussis cases <4 months

 **PERTUSSIS SUPPLEMENTAL FORM**
for cases <4 months of age

California Dept. of Public Health
Immunization Branch
850 Marina Bay Parkway
Building 9, 2nd Floor, W.S. 7513
Richmond, CA 94804-6403
Fax: (916) 440-6973

Contact Mother of Infant Pertussis Case to complete Sections A and B

Section A.

Infant's name (last, first, middle initial)	Infant DOB (mm/dd/yyyy)	CalREDIE ID	Local ID
Mother's name (last, first, middle initial)	Mother DOB (mm/dd/yyyy)	CalREDIE ID (if applicable)	Local ID (if applicable)

A1. Do you live with your baby? ☐ Yes ☐ No If no, in which county do you reside? ☐ Unknown

Prenatal Care Information

A2. Who provided your prenatal care during this pregnancy?
(If >1 practice, list others at bottom of page)

A3. Prenatal care practice name/location

A4. Prenatal care phone number

Mother's History

A5. Did you participate in WIC during this pregnancy?
☐ Yes - If yes, at what site? ☐ No ☐ Don't know

A6. Did you receive Tdap (the shot that protects against whooping cough, tetanus, and diphtheria) during this pregnancy?
☐ Yes - If yes, during which trimester did you receive it? ☐ First ☐ Second ☐ Third ☐ Don't know (Skip to Section B)
☐ No
☐ Don't know
☐ Received it after delivery

A7. Did your prenatal care provider recommend that you receive Tdap during this pregnancy?
☐ Yes - If yes, why didn't you get it?
☐ I didn't want to get it - If so, why?
☐ I didn't or couldn't go to alternate site recommended
What was alternate site?
☐ Insurance/payment issues (describe in detail):
☐ I delivered my baby before I could get it
☐ Other reason:
☐ No (Skip to section C)
☐ Don't know (Skip to section C)

A8. When your provider recommended the whooping cough shot, do you feel she/he gave you all of the information you needed?
☐ Yes
☐ No - If no, what was missing?

Section B. If mother received Tdap during this pregnancy, complete this section

B1. Where did you receive Tdap during this pregnancy?
☐ At a routine OB visit
☐ At a primary care physician visit
☐ At a pharmacy (specify name of pharmacy):
☐ At other site (specify name of site or clinician):
☐ Don't know

Name of person completing mother's form: Phone number and/or Email address: Date mother's interview completed:

Other prenatal care provider practice(s) where care received during this pregnancy and their contact information:

Goal:

- Identify and begin to address barriers to prenatal Tdap vaccination
- 114 pertussis cases <4 months of age with illness onset in 2016 were reported
- 66 of their mothers and prenatal providers were interviewed

MMWR available at: <https://www.cdc.gov/mmwr/volumes/67/wr/mm6738a6.htm#suggestedcitation>

Results

2016 Mother Interviews



Among the 39% of mothers who **received Tdap during pregnancy**

- Almost all were vaccinated during their routine OB visit
- Only 77% were vaccinated during the recommended 27-36 weeks gestation window



Among the 61% of mothers who did **NOT receive Tdap during pregnancy**

- 40% received Tdap postpartum (which is not preferred and does not result in antibody transfer to the fetus)

Two infants born in 2016 died; one mother was vaccinated at 39 weeks gestation – too late for effective maternal antibody transfer; the other mother refused Tdap.

Results

Why mothers did not receive Tdap during pregnancy (n=40)

Reason	No. (%)
No recommendation or referral	10 (25)
Referred off-site, did not follow up	9 (23)
Refused for personal reasons	8 (20)
Invalid contraindication	7 (18)
No prenatal care in third trimester	3 (8)
Valid contraindication	1 (3)
Unknown	2 (5)

*Had Tdap during
previous pregnancy*

*Told to wait because I
was sick*

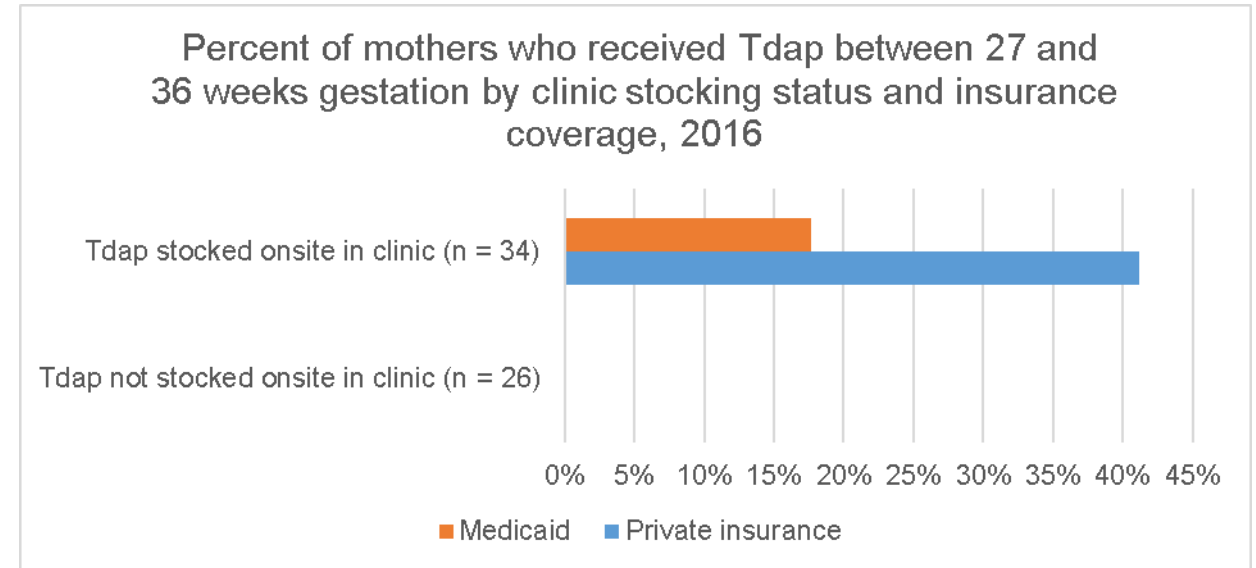
*I couldn't get there
[referred – no follow-up]*

Conclusions

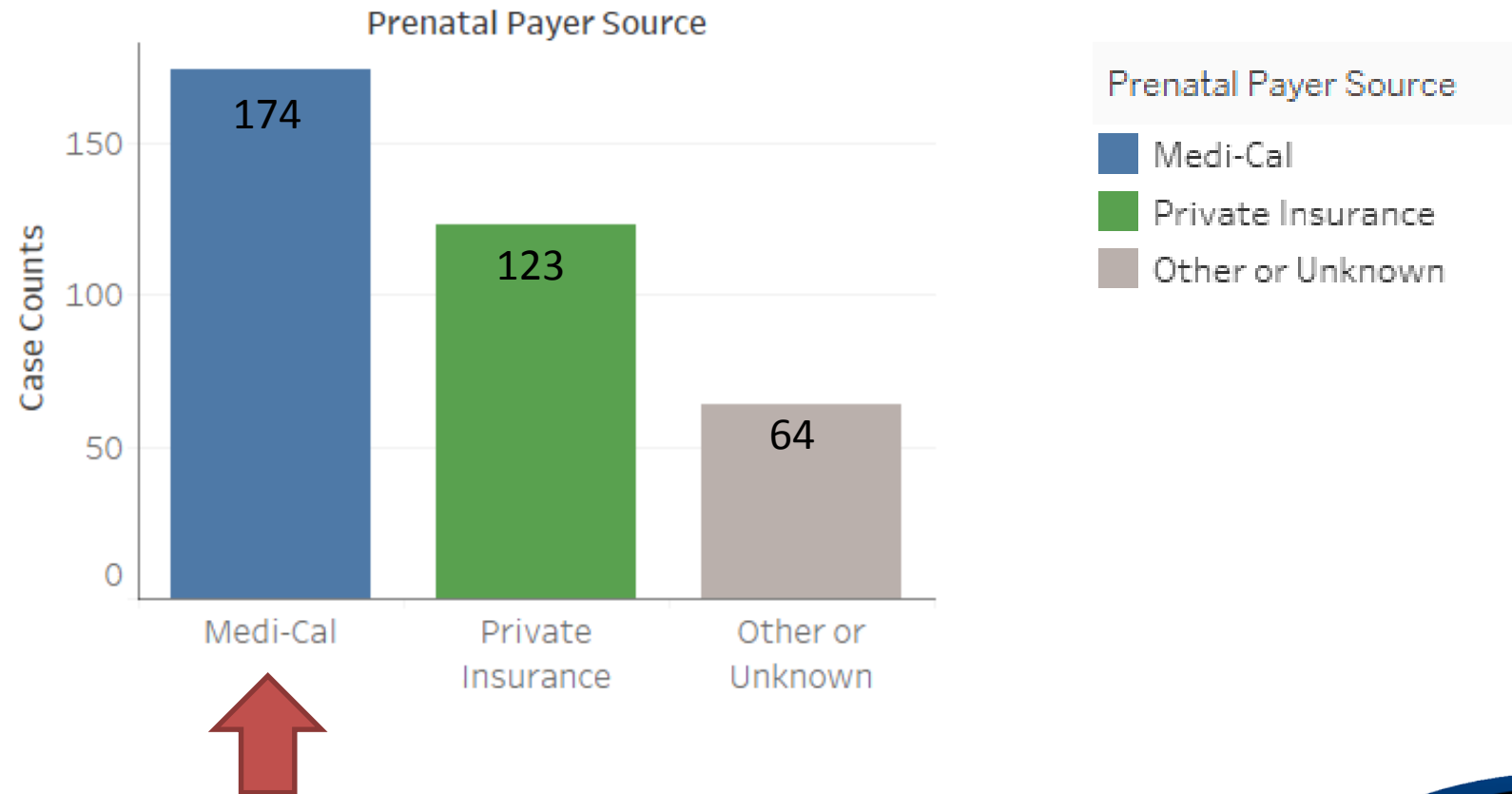
- **Referring pregnant women off site for Tdap is not effective:** only 2 (13%) of 16 women who were referred offsite received Tdap; one received Tdap at 38 weeks gestation.
- **Infants with pertussis whose mothers were vaccinated during pregnancy had less severe disease:**
 - Among mothers vaccinated within the recommended timeframe, only 4 infants with pertussis were hospitalized and none were admitted to the ICU.
 - Among unvaccinated mothers, 20 infants with pertussis were hospitalized, including 8 admitted to the ICU.
- **Cost and reimbursement rate** were the most common reasons cited by providers for not stocking Tdap onsite.
- **Provider education is needed:** 7 women were not vaccinated due to an incorrect assessment that they had a contraindication for Tdap at the time the vaccine was being offered.

Conclusions

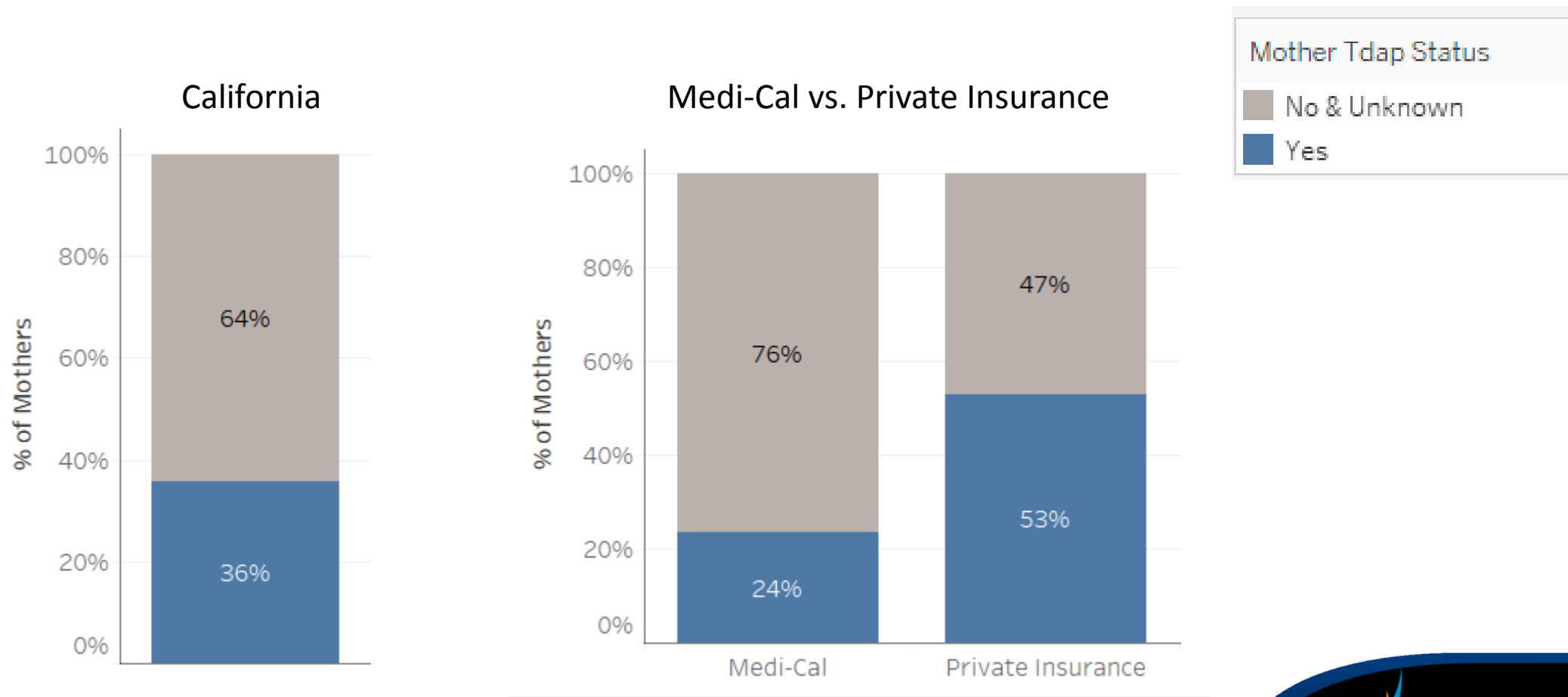
- **Stocking Tdap onsite is essential!**
 - Mothers whose prenatal clinics stocked Tdap were **3 times more likely** to receive Tdap during pregnancy than those whose clinics did not stock Tdap.
- **Insurance type makes a difference**
 - Mothers with Medi-Cal insurance were **significantly less likely** than those with private insurance to:
 - receive prenatal Tdap; or
 - receive prenatal Tdap during the appropriate timeframe, even when it was stocked in the clinic



Number of infant pertussis cases <4 months of age by prenatal payer source, 2016-2018



Proportion of mothers of infant pertussis cases <4 months of age who received Tdap during pregnancy, 2016-2018



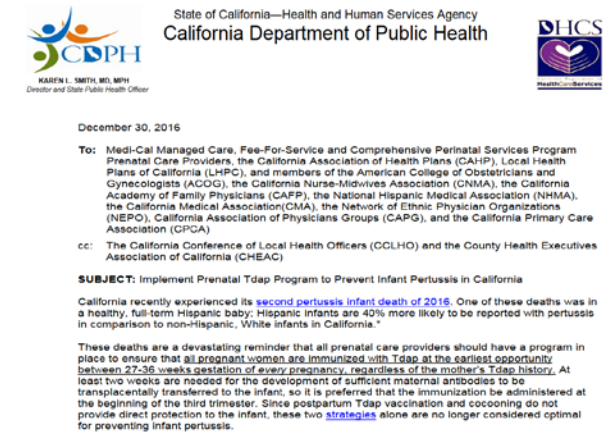
Future Analysis Projects

- Limitations of data
 - Case data only; expect lower rates of maternal Tdap
 - However, results are similar to other studies (e.g., MIHA data, MMWR findings)
- Future analysis using birth and California Immunization Registry data
 - Will look at the entire birth cohort across multiple years
 - Generalize results

DHCS/CDPH Tdap Immunization Program Collaboration

- National Governor's Association Grant and CHHS Agency Use Case Projects
- Medi-Cal Provider Bulletin: Tdap for Pregnant Women
 - <http://files.medi-cal.ca.gov/pubsdoco/bulletins/artfull/gm201501.asp#a8>
- CDPH/DHCS Tdap Program Letter
 - Routinize offer of prenatal Tdap
 - Ensure staff aware of role in helping vaccinate
 - Make a strong recommendation

*Source: <https://www.cdc.gov/pertussis/pregnant/hcp/strong-referral.html>



Medi-Cal Policy

- Medi-Cal Fee for Service (FFS) and Medi-Cal Managed Care Health Plans (MCPs) cover Tdap vaccine and are required to have the Advisory Committee of Immunization Practices (ACIP)-recommended adult immunizations (including Tdap) as part of their pharmacy formulary benefit.

California Regulations

(Title 16, Section 1746.4)

- Require pharmacists to:
 1. Report immunizations into the immunization registry and inform the patient about record-sharing preferences;
 2. **Maintain the vaccine record** at the pharmacy and provide a copy to the patient; and
 3. **Notify a patient's primary care provider (PCP)** of immunizations administered within 14 days. For pregnant women, the pharmacist should notify the prenatal care provider. Patients without a PCP should be advised to consult a health care provider.

CDPH's Actions to Increase Prenatal Tdap

- CDPH's Genetic Disease Screening Program now promoting Tdap and Flu messages in their tools
- Providers can [order](#) FREE gestational wheels!



CDPH's Actions to Increase Prenatal Tdap

- Modified Scope of Work for local health departments (LHD) to support investigation of infant pertussis cases
 - IZ Staff required to inform LHD Maternal, Child and Adolescent Health (MCAH) Program of each new infant case and work together to contact the mother's prenatal care provider to determine barriers to prenatal Tdap vaccination. Follow up and assist the provider to meet the standard of care including providing strong recommendations for Tdap and a strong referral (if Tdap is not offered on-site).
- Established an LHD prenatal Tdap working group
 - Developed [Prenatal Tdap Toolkit](#)

CDPH's Actions to Increase Prenatal Tdap

- Working closely with WIC and Maternal, Child & Adolescent Health (MCAH):
 - Updated provider and patient education materials
- Some local MCAH programs checking for prenatal Tdap on charts; State MCAH will be field-testing tool to make this routine practice
- Local health departments (LHD) are following up with prenatal care providers of case mothers if mom is not vaccinated*
- CDPH is following up with LHDs with infant pertussis cases
- Support work led by American College of Obstetricians (ACOG) in CA

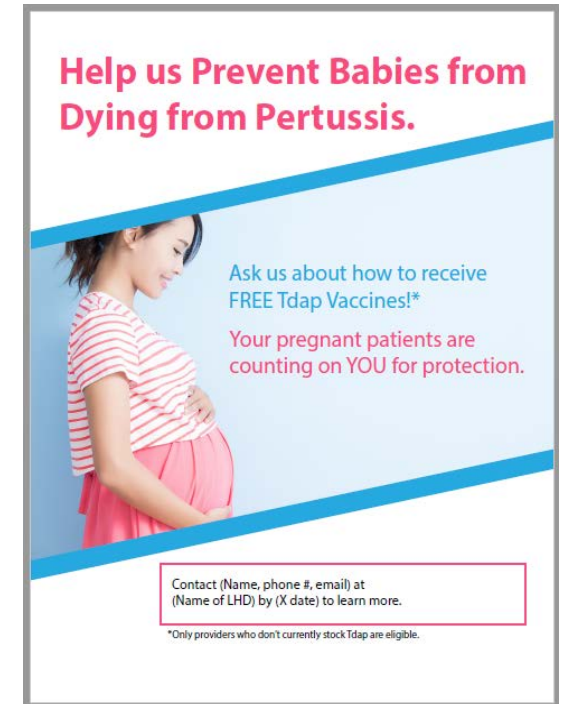


*CCLHO Template Letter which describes standards of care & provider tools: http://www.cdph.ca.gov/Programs/CCLHO/CDPH%20Document%20Library/TemplateLettertoPrenatalCareProviders_11_15-17.docx

Prenatal Tdap

“Starter doses” Kit

- **Goal:** To help prenatal provider offices start to stock Tdap, and sustain the practice of immunizing on site
 - 25,000 Tdap doses purchased with one-time state funds
 - Clinics with significant number of Medi-Cal prenatal patients prioritized



Patient Materials

PROTECT YOUR BABY

Get your whooping cough and flu shots here!



R_x

Prescriber Name, Address, Phone Number:

Patient Name: _____ Date: _____

Vaccines recommended during pregnancy:

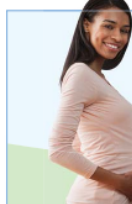
- ☐ **Tdap** (tetanus, diphtheria, pertussis [whooping cough]) during 3rd trimester 0.5 mL IM x 1
- ☐ **Inactivated Influenza** 0.5 mL IM x 1

Prescriber's Signature: _____ License #: _____

These vaccines may be available from your primary care physician, local health department, or pharmacy. To find a nearby location, please visit www.vaccine.healthmap.org.

Your baby is counting on you for protection. Get vaccinated.

IMM-1143 (7/14)



Expecting?

Protect yourself and your baby against flu and whooping cough!

You may not realize it, but changes to your body during pregnancy put you and your baby at risk for serious complications from flu or whooping cough.

Getting flu and whooping cough shots while you are pregnant can help protect you and your baby against these serious diseases. **The protection you get from the shots passes to your baby in the womb.** This will help protect your baby in early life when she is most vulnerable.

Is flu really dangerous?

Yes. If you get the flu, it is not the same as getting a common cold. You can still get the flu even if you are healthy and active.

Flu can lead to serious complications such as high fever, pneumonia, and even death for both you and your baby. Flu can lead to pre-term birth, low birth weight, and stillbirth of the baby.

How dangerous is whooping cough?

For babies, catching whooping cough can lead to trouble breathing (turning blue or gasping for air), pneumonia, hospitalization, and death.

For adults, coughing fits can last for months and lead to vomiting, trouble sleeping, and even broken ribs. Whooping cough is highly contagious and can easily spread to others, including babies.

How common are these diseases?

Each year, millions of Californians get flu, and hundreds of babies under 6 months of age are hospitalized due to flu. In 2014, over 11,000 people in California became ill with whooping cough, hundreds were hospitalized, and three infants died. In 2010, almost 10,000 Californians caught whooping cough, and 10 infants died. Tragically, more than 7 out of 10 babies hospitalized were younger than 6 months old.

How can I protect my baby and myself?

The American College of Obstetricians and Gynecologists (ACOG), the American Academy of Pediatrics (AAP), and the Centers for Disease Control and Prevention (CDC) recommend that all pregnant women get these life-saving shots:

- ☒ **Flu Shot**
By late October (if possible). If you missed it, get it now!
- ☒ **Whooping Cough Shot (Tdap)**
As early as possible during your third trimester—27 to 36 weeks of pregnancy—even if you got the shot before becoming pregnant. You will need to get the Tdap shot during **every** pregnancy.

Pass protection to your baby.
Get immunized during pregnancy.

California Department of Public Health, Immunization Branch - GetImmunizedCA.org



Your baby may be at risk for flu and whooping cough



Flu can be dangerous for you and your baby, causing:

- Low birth weight
- Premature birth
- Stillbirth
- Hospitalization
- Death

Whooping cough can also be dangerous for babies, causing:

- Coughing fits
- Gasping for air
- Serious lung infections
- Hospitalization
- Death

If you're pregnant:

- Get flu vaccine as soon as possible and
- Whooping cough (Tdap) vaccine in your third trimester of every pregnancy

The protection you get from these vaccines passes to your baby during pregnancy. Your baby counts on you for protection.

Talk to your doctor for more information



California Department of Public Health, Immunization Branch
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IMM-1146 (1-15)

IMMUNIZATIONS for a Healthy Pregnancy



Available at EZIZ.org

California Department of Public Health, Immunization Branch



NEW Prenatal Immunization HEDIS Measure

- The National Committee for Quality Assurance (NCQA) released new technical specifications for the Healthcare Effectiveness Data and Information Set (HEDIS) for 2019, including:
 - Prenatal influenza and Tdap vaccines

Adoption of Prenatal Immunization Measure

- **Increases awareness about importance of prenatal Tdap and influenza** and would improve provider practice.
- **Could help address the Medi-Cal disparity** (and increases our chances to meet Healthy people 2020 Goal of 80% for both prenatal Tdap and influenza)
- **Is feasible.** During NCQA testing, health plans found it feasible to collect data through Electronic Clinical data Systems (e.g., immunization registries [CAIR], claims and EHRs)
- **Is Practical.** The measure would yield robust data needed to identify gaps and focus quality improvement efforts.
- **Could help support DHCS contract requirements** . Current contracts with Medi-Cal Managed Care Plans requires Plans to adhere to ACOG guidelines.

Adoption of Prenatal Immunization Measure

- **May increase access to Tdap at Federally Qualified Health Centers**
 - Reinforces need to immunize prenatal patients onsite
- **May align with other measurement initiatives.**
 - May be included in NCQA health plan accreditation
 - Could be included in Centers for Medicare and Medicaid (CMS) Core Medicaid and Medicare programs

What you can do: Advocate & Inform!

- Promote best practices in health plans. **Encourage Health Plans to:**
 - Run rates and identify gaps for prenatal immunizations
 - Inform providers and members of the importance of prenatal immunizations
 - Make health education materials available to providers & members
 - Partner with local health departments to promote the State Prenatal Tdap Starter Kit
 - Work with pharmacies to promote prenatal immunizations



Thank you!

- Sarah New
 - Sarah.new@cdph.ca.gov
- Rebeca Boyte
 - Rebeca.Boyte@cdph.ca.gov

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