Among the 66 case-mothers:
- 27 (41%) received Tdap during pregnancy
- Of these 27, 22 (81%) were vaccinated during a routine prenatal visit
- 39 (59%) did not receive Tdap during pregnancy
- Reasons for not receiving Tdap were reported for 18 (46%) unvaccinated case-mothers:
  - 9 (50%) mothers were offered Tdap but refused
  - 6 (33%) were not vaccinated due to an invalid contraindication (Figure 1)
  - For 3 (17%), their providers did not follow up on offline referrals.

Deaths: Two infants died; one of their mothers was vaccinated at 39 weeks and the other refused vaccination.

**Methods**
- CDPH developed a supplemental case-interview form for enhanced infant pertussis surveillance.
- Local health departments conducted interviews of case-mothers and their prenatal care providers to assess Tdap vaccination practices and completed the supplemental form.
- Retrospective data collection began in April 2016 and continued prospectively through the beginning of 2017.

Definitions:
- **Recommended:** provider reported recommending prenatal Tdap
- **Strong referral** provider reported referral to a specific location and followed up with the mother on Tdap receipt.
- **Refusal:** mother reported being offered Tdap but refused.
- **Invalid contraindication:** reason that the case-mother provided for not being vaccinated was not consistent with ACIP recommendations.

**Results**
- Of the 114 pertussis cases <4 months of age reported to CDPH in 2016, 68 (58%) case-mothers and their prenatal care providers were interviewed by local health departments using the supplemental form.
- Case-mothers’ insurance: 36 (54%) Medicaid, 27 (41%) private, 3 (5%) unknown.

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**Summary**
- Not all providers recommended Tdap during pregnancy; 9 (14%) providers did not recommend Tdap; none of these case-mothers were vaccinated.
- Current referrals are not working: only 3 of 16 (19%) women who were referred offline received Tdap vaccine.
- Stocking Tdap onsite works: case-mothers whose prenatal clinics stocked Tdap were nearly 3 times more likely to receive prenatal Tdap than case-mothers whose clinics did not stock Tdap [RR=2.9; 95% CI: 1.7-5.0].
- Insurance type makes a difference: case-mothers with private insurance were 2 times more likely to receive prenatal Tdap than case-mothers with Medicaid coverage [RR=2.0; 95% CI: 1.1-3.3].
- Cost (44%) and reimbursement (41%) were most often cited by providers as reasons for not stocking Tdap.
- Infants of case-mothers vaccinated within the recommended timeframe were less likely to be admitted to a hospital or an intensive care unit than other infants (15.4% vs 84.6% and 0% vs. 100%, respectively).
- There are more opportunities for promoting prenatal Tdap for low-income women: 61% of the providers participate in an enhanced Medicaid program and 44% of mothers participated in WIC during their pregnancies.

**Limitations**
- This review included mothers of case-children only and is not representative of overall prenatal care providers’ immunization practices in California.
- Some interviews yielded incomplete data.
- Data from case-mothers and prenatal care providers were not validated by health department chart reviews.

**Recommendations**
- Ensure providers make a plan to routinely recommend Tdap to educate staff on benefits, routinizing the offer to all pregnant women, and emphasizing benefits to baby.
- Reduce financial barriers to stocking Tdap in prenatal provider offices.
- **Low-hanging fruit** for intervention may be providers who do not stock Tdap. Provide technical assistance to prenatal care providers to strengthen Tdap recommendation and referral practices.

**References**