# Accessing Impact of Teen Pregnancy on Health and Wellness of Infants

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## Background

Teen Pregnancy has been linked to many negative economic and health outcomes including lower education attainment, worse health outcomes, higher abuse rates, higher poverty rates, etc. This paper will explore the impact of teen pregnancy on the health and wellness outcomes of the their infants.

## Objectives

We explore the impact of teen pregnancy on the health and wellness outcomes of the teen mothers' infants (TMIs), by achieving the following:

- Identify all infants born to Medicaid teen mothers (ages 10-19) and pair them with their appropriate mothers
- Match TMIs to infants born to adult mothers (ages 20-44) with similar demographics
- Determine if there is a difference between the health and wellness outcomes of these TMIs and adult mother infants (AMI):
  - **Addiction rates** (binary)
  - **Foster care** (binary)
  - **Health Status** (categorical)
  - **Infant mortality** (binary)
  - **Low birth weight rates** (binary)
  - **Number of ED visits** (count)
  - **Number of wellness visits** (count)

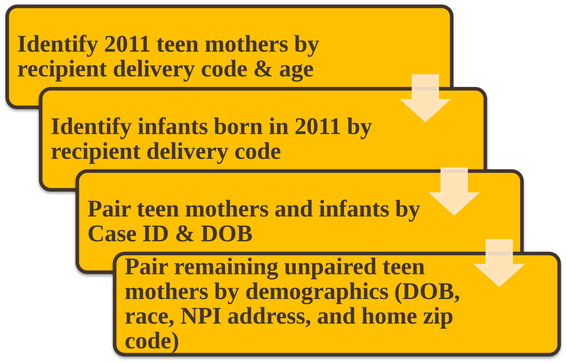
## Methods: Infant-Mother Pairing

**Data**

- Basis of analysis: Center for Medicaid and Medicare Services (CMS) 2011-2012 data
- 42 states included in analysis, over 70% of total Medicaid enrollment
- Identify infants and mothers using Delivery Recipient Code in Personal Summary Table

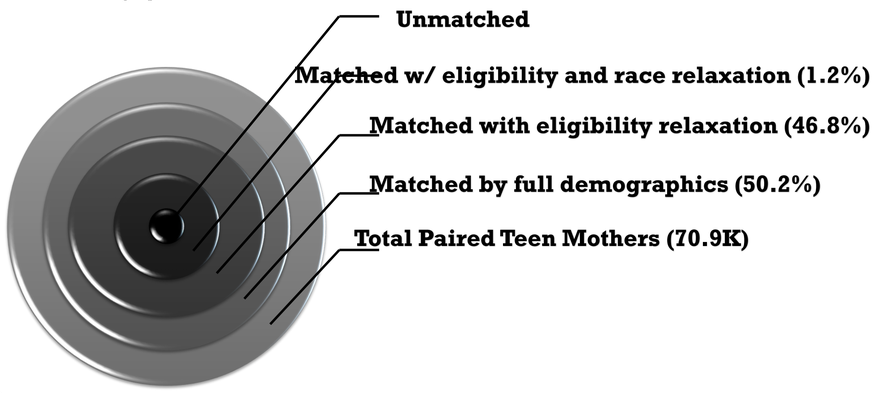
**Methods: Pairing Mothers & Infants**

The goal of the pairing process was to determine the mother-infant pair accurately




**Analysis: Pairing Mothers & Infants**

- 70,942 (paired teen moms) and 63,846 (unpaired teen moms)
- Significant variables in determining if paired
  - Race of mother (less likely to pair than reference level (white)
  - RUCC (less urban more likely to pair) are the most important in determining if paired




## Methods: Identifying Outcomes

**Addiction Rates**

- Identified by addiction related diagnosis codes
- Proportion Test used on contingency tables

**Foster care Rates**

- Identified by eligibility code and diagnosis code
- Proportion Test used on contingency tables

**Health Status**

- Identified using Critical Risk Grouping S/W based on 12 months of claims data
- Chi-Squared Test used on counts of each group

**Infant Mortality**

- Identified using date of death
- Proportion Test used on contingency tables

**Low Birth Weight**

- Identified using diagnosis codes
- Proportion Test used on contingency tables

**Number of ED Visits Data**

- Identified by type of service or place of service code
- Poisson Test used to test difference
- Normalized counts by enrollment months by state

**Number of Wellness Visits Data**

- Identified by diagnosis code
- Poisson Test used to test difference
- Normalized counts by enrollment months by state

**Normalized of count data**

$$\left(\frac{T_{i,j}}{E_{i,t}} - \frac{A_{i,j}}{E_{a,t}}\right) * Scale_j$$

## Methods: Teen-Adult Mother Matching

We define the matching step as joining each paired teen mother with an adult mother based on pre-determined important demographics. The purpose of this step is to isolate the causal effects of the age of the mother.

**Incremental Matching Process**

- All demographics included: state, mother's health status, urbanicity of home city, Medicaid eligibility and mother's race
- If multiple matches were found then the match was randomly assigned
- For the **68,586 matched** teens
  - 33.7 K full match and 34.9k are partial matches

## Results

**Outcomes for All Adult Mother Infants (AMI) and Teen Mother Infants (TMI)**

| | | | Proportion Test | | |
|---|---|---|---|---|---|
| Binary Outcome | AMI Count | TMI Count | AMI Estimate | TMI Estimate | p-value |
| Addiction | 571 | 465 | 0.008 | 0.011 | 0.570 |
| **CRG Low*** | 61,697 | 61,929 | 0.9 | 0.903 | 0.040 |
| **CRG Medium*** | 5,319 | 5,037 | 0.078 | 0.074 | 0.004 |
| CRG High | 1,546 | 1,596 | 0.023 | 0.023 | 0.370 |
| Foster care | 247 | 395 | 0.004 | 0.005 | 0.950 |
| **Infant Mortality*** | 173 | 213 | 0.003 | 0.009 | 0.050 |
| **Low Birth Weight*** | 4,205 | 4,585 | 0.06 | 0.084 | <0.005 |
| | | | Poisson Test | | |
| Count Outcome** | AMI Count | TMI Count | Rate Ratio | | p-value |
| **ED Visits*** | 77,130 | 101,118 | 1.311 | | <0.005 |
| Wellness Visits | 302,910 | 303,118 | 1.001 | | 0.790 |
| *Bolded outcomes are significant at the 95% confidence interval | | | | | |
| **Counts for count outcomes are normalized by enrollment months | | | | | |

Results show that low birth weight is higher among teens, as well as having moderate health with a CRG of medium. Emergency department visits are also higher among teens, even though the number of wellness visits is the same. Addiction rates and foster care rates seem to be the same among both groups, even after the Yates correction was used in the analysis.

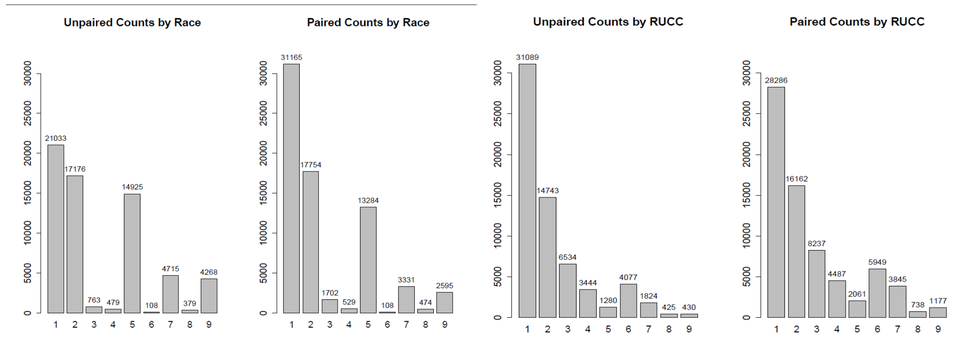
**Outcomes by Urbanicity for Adult Mother Infants (AMI) and Teen Mother Infants (TMI)**

| Binary Outcome | AMI Count | TMI Count | AMI Estimate | TMI Estimate | p-value |
|---|---|---|---|---|---|
| **Addiction** | | | | | |
| Urban* | 464 | 382 | 0.009 | 0.007 | 0.005 |
| Suburban | 66 | 61 | 0.006 | 0.005 | 0.722 |
| Rural | 41 | 22 | 0.007 | 0.004 | 0.023 |
| **FC** | | | | | |
| Urban* | 168 | 305 | 0.003 | 0.006 | <0.005 |
| Suburban | 57 | 65 | 0.005 | 0.005 | 0.525 |
| Rural | 23 | 25 | 0.004 | 0.004 | 0.885 |
| **Low Birth Weight** | | | | | |
| Urban* | 3,179 | 3,538 | 0.062 | 0.069 | <0.005 |
| Suburban | 729 | 724 | 0.061 | 0.061 | 0.914 |
| Rural | 294 | 322 | 0.053 | 0.058 | 0.263 |
| | | | Poisson Test | | |
| Count Outcome** | AMI Count | TMI Count | Rate Ratio | | p-value |
| **ED Visits** | | | | | |
| Urban* | 58,044 | 75,267 | 1.297 | | <0.005 |
| Suburban* | 13,153 | 18,232 | 1.379 | | <0.005 |
| Rural* | 5,932 | 7,719 | 1.301 | | <0.005 |
| *Outcome significant at the 95% confidence interval or Bonferroni adjusted p-value less than 0.017 | | | | | |
| **Counts for count outcomes are normalized by enrollment months | | | | | |

When assessing the results by urbanicity and race, we see some additional insights. The results above show urban AMIs are more likely to give birth to an infant with addiction issues, urban TMIs are more likely to have infants in foster care and with low birth weight. ED visits are shown to be higher with teens across all levels of urbanicity. The other outcomes showed no difference across all levels.

For race/ethnicity we that white AMIs have a higher rate of addiction, white and black teens are more likely to have children in foster care. Teena of all races have significant differences for ED visits and for whites and Hispanics for wellness visits.

## Methods: Bias Analysis




## Results

**Outcomes by Race/Ethnicity for Adult Mother Infants (AMI) and Teen Mother Infants (TMI)**

| Binary Outcome | AMI Count | TMI Count | AMI Estimate | TMI Estimate | p-value |
|---|---|---|---|---|---|
| **Addiction** | | | | | |
| White* | 232 | 172 | 0.009 | 0.006 | <0.005 |
| Black | 189 | 142 | 0.012 | 0.009 | 0.018 |
| Hispanic | 55 | 62 | 0.004 | 0.005 | 0.689 |
| Other | 95 | 89 | 0.007 | 0.007 | 0.916 |
| **FC** | | | | | |
| White* | 113 | 177 | 0.007 | 0.004 | <0.005 |
| Black* | 60 | 121 | 0.008 | 0.004 | <0.005 |
| Hispanic | 36 | 47 | 0.004 | 0.003 | 0.333 |
| Other | 39 | 50 | 0.004 | 0.003 | 0.213 |
| | | | Poisson Test | | |
| Count Outcome** | AMI Count | TMI Count | Rate Ratio | | p-value |
| **ED Visits** | | | | | |
| White* | 27,145 | 37,677 | 1.366 | | <0.005 |
| Black* | 21,313 | 26,205 | 1.255 | | <0.005 |
| Hispanic* | 13,732 | 18,305 | 1.295 | | <0.005 |
| Other* | 14,941 | 18,931 | 1.313 | | <0.005 |
| **Wellness Visits** | | | | | |
| White* | 108,470 | 112,857 | 1.024 | | <0.005 |
| Black | 60,782 | 59,431 | 0.998 | | 0.747 |
| Hispanic* | 68,168 | 68,572 | 0.977 | | <0.005 |
| Other* | 65,490 | 62,258 | 0.985 | | 0.006 |
| *Outcome significant at the 95% confidence interval or Bonferroni adjusted p-value less than 0.012 | | | | | |
| **Counts for count outcomes are normalized by enrollment months | | | | | |

## Conclusion

Despite the hypothesis that the wellness of infants would be better with adult moms we did not see clear evidence of that in our results. The number of wellness visits were chosen as an outcome to assess if the infant was getting proper care (i.e. vaccines and check-ups). Though there was not a difference between teen and adult mothers, the average of 4.4 visits was still well below the recommended 8 visits. Further investigation here could determine the impact of urbanicity on the number of wellness visits; we have already seen differences among the number of visits between urbanicity groups.

On the health side, our results were consistent with previous literature, and shows a higher risk of low birth weight for teen mothers. We also see that infants born to teen mothers have a slightly lower chance of being healthy (i.e. low CRG grouping). Informing us that teen mothers give birth to less healthy babies.

Health and wellness was also assessed through emergency department (ED) visits. The number of ED visits serve as an indicator of accidents, neglect, and/or abuse as well as the overall wellness of the infant. The number of ED visits was more than 30% higher for infants of teen mothers; demonstrating that a lower level of wellness for the infant. Further investigation into the rate of avoidable ED visits, as well as the causes of the visits would provide additional insight into the wellness of the infant.

## References

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