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\textsuperscript{2} Every Child Succeeds

The Collaborative Science of Home Visiting Meeting
Washington, D.C. · May 6, 2015
Injury Risk

- Unintentional injury (UI) is the leading cause of death 1-19 years of age; 11-12% of children 0-5 years of age have at least one medically-attended UI.
- Home environment is the most common location of UI and children from disadvantaged families have the highest risk.

Home Visiting and Injury Prevention

• Engagement during a window of high risk for UI
• Engagement with high risk families
• Targeted education in the home environment
• Routine surveillance or assessment and mitigation of safety hazards in the home
• Impact? mixed findings in the home visiting research: no effect; effects indicating lower and higher risks for UI
Study Purpose and Context

- **Purpose**: evaluate the impact of a regional home visiting program on the prevention of UI during early childhood

- **Home Visiting Program**: Every Child Succeeds
  - 1999-current
  - Southwest Ohio and Northern Kentucky
  - 9 HFA sites and 1 NFP site
  - Average of 1,500 new families per year; >22,500 since inception

- **Funding**: grant from the Ohio Department of Public Safety (OPDS EMFTS Research Grant P3, July 2014-2015)
Methods

• Matched retrospective cohort study

• *Data linkages*: Home Visiting \( \cap \) Eligible Birth Records (2006-2013) \( \cap \) Hamilton County Injury Surveillance System

• *Study groups*: Birth comparison group matched to HV group by birth year and propensity score using the nearest neighbor algorithm

  \[ \rho(x) = \Pr(HV=1 \mid X), \text{ where } HV=1 \text{ is HV participation and } X=\text{vector of baseline characteristics to jointly handle confounders} \]

• *Outcomes*: injuries that caused an emergency department visit, hospitalization or death; primary ICD-9-CM: 800-995

• *Survival analyses*: time to injury (0-2 years, 0-3 years, 3-5 years) \& censoring at death
Study population

Service Eligibility (Target)
- Single or Young Mother
- Indicator of poverty
- Late prenatal care
- Hamilton County

Selection Criteria
- >25 weeks gestation at birth
- Available match from birth cohort

Eligible Birth Cohort (years: 2006-2013)  
\( N=17,992 \)

Received Home Visiting:  
\( N=3,473 \)

Refused Home Visiting:  
\( N=2,469 \)

No Home Visiting & Not referred:  
\( N=12,050 \)

Study Groups

Home Visiting:  
\( n=2,909 \)

Comparison:  
\( n=2,909 \)

1:1 Match
Balance Diagnostics

Absolute Standardized Difference

- Mother's Age
- Maternal Race
- Maternal Education
- Medicaid Insurance
- Rate of Community Violence
- Community Percent Food Stamp/SNA
- Community Percent Poverty
- Community Percent Unemployment
- Community Percent Uninsured
- Maternal Marital Status
- Birth weight
- Maternal Ethnicity
- Preterm Birth
- Gestational Age at Birth
- Prenatal Maternal Smoking
- Child's Sex

○ Before Matching
+ After Matching

Cincinnati Children's
Results

Injury rates and hazard ratios (HR) for home visiting group, stratified by encounter type, age of child, and home visiting exposure

<table>
<thead>
<tr>
<th></th>
<th>0-2 Years</th>
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<th>0-3 Years</th>
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<tbody>
<tr>
<td></td>
<td>Injury%</td>
<td>HR (95% CI)</td>
<td>p</td>
<td>Injury%</td>
</tr>
<tr>
<td>All Encounters</td>
<td>18.5</td>
<td><strong>1.17 (1.01, 1.35)</strong></td>
<td>0.03</td>
<td>27.2</td>
</tr>
<tr>
<td>ED Visits</td>
<td>18.0</td>
<td><strong>1.17 (1.01, 1.36)</strong></td>
<td>0.04</td>
<td>26.6</td>
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<tr>
<td>Hospitalizations</td>
<td>0.67</td>
<td>1.02 (0.50, 2.08)</td>
<td>0.95</td>
<td>0.95</td>
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</tbody>
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<td>Injury%</td>
<td>HR (95% CI)</td>
<td>p</td>
<td>Injury%</td>
</tr>
<tr>
<td>All Encounters</td>
<td>19.8</td>
<td><strong>1.30 (1.06, 1.59)</strong></td>
<td><strong>0.01</strong></td>
<td>29.3</td>
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<tr>
<td>ED Visits</td>
<td>19.4</td>
<td><strong>1.29 (1.05, 1.59)</strong></td>
<td><strong>0.01</strong></td>
<td>28.4</td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>0.60</td>
<td>1.87 (0.50, 6.95)</td>
<td>0.35</td>
<td>1.26</td>
</tr>
</tbody>
</table>
Results: Mechanism of Injury

- **Other Specified**
- **Unspecified**
- **Bite/Sting**
- **Suffocation**
- **Struck By/Against**
- **Poisoning**
- **Overexertion**
- **Environment**
- **Motor Vehicle Related**
- **Hot Object/Substance**
- **Fire**
- **Fall**
- **Drowning**
- **Cut/Pierce**

[Study Group: Home Visiting, Comparison]
Results: Nature of Injury

- System-Wide
- Unspecified
- Burns
- Crushing
- Superficial Contusion
- Amputations
- Open Wounds
- Internal Organ
- Sprains Strains
- Dislocation
- Fractures
Conclusions

- Participants in the home visiting program were significantly more likely to have a medically-attended injury (namely, emergency department visits).

- Excess injuries attributed largely to falls, struck-by against (contact injuries), open wounds, superficial trauma, fractures, and those with unspecified mechanisms or nature.

- Engagement in the home visiting program both prenatally & post-natally engagement strengthens effect.

- Injury prevention vs. health care promotion…surveillance bias and/or greater health care seeking behavior?
Strengths and Limitations

• Propensity score matching using maternal socio-demographic, clinical, and community-level characteristics (confounders)

• Availability and linkage of a large administrative HV dataset with population-based birth and pediatric trauma records.

• Although many steps taken to select an unbiased comparison group, a potential for selection bias remains.

• Non-hospital health care encounters were unavailable

• Hospital medical staff/registrars determine and code the intent of injury and possible misclassification bias
Acknowledgments

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Ohio Department of Public Safety (EMS)

Ohio Help Me Grow

Hamilton County Public Health

United Way of Greater Cincinnati