Model Performance in Fire Prevention

SYMPOSIUM 2016

Outcome Evaluation of Operation Installation: Reducing Deaths and Injuries from House Fires

Mary McCoy, MPH

Injury Prevention Center of Greater Dallas
Objectives

• Examine the impact of a community-based smoke alarm installation program
• Determine if injury rates differed between program and non-program houses
• Determine the functionality of smoke alarms installed through a community-based smoke alarm installation program
FORMATIVE EVALUATION
Formative Evaluation
Data Collection: Linked House Fire Database

Dallas Fire Rescue
- house fires
- smoke alarms
- year constructed

EMS runs (injured)

Hospital Admissions

Medical Examiner (deaths)

Census data (census tract, income, year of house construction)
Formative Evaluation
Death and Injuries from House Fires

- 7,190 house fires (-1027/year)
- 91 deaths
- 132 non-fatal injuries
- Rate: death – 2.1/100,000 year
  
  Total injury rate 5.2/100,000 year
Formative Evaluation

Injury Rate vs Prevalence of Functional Smoke Alarms
In Houses Which Burned* by Income of Census Tract

* Houses only
** Rate per 100,000 per year
Formative Evaluation
House Fire-Related Injury Rates by Census Tracts
Intervention: Smoke Alarm Installation Project

• Operation Installation
  – Joint venture with Dallas Fire-Rescue and the Injury Prevention Center
  – Installed lithium-powered smoke alarms
  – Census tracts identified as high risk for house fire deaths and injuries.
Results

- 36 census tracts
- 20,127 smoke alarms
- 8,134 houses
- 28,570 people
OUTCOME EVALUATION
Definitions

• Program House
  – Installed SA through OI

• Non-Program House
  – No SA through OI

• Outcome measure – death and injury rates

• Linked deaths and injuries to addresses in target census tracts

• Study period – April 2001 to April 2011
Program and Non-Program Houses after Operation Installation: Deaths and Injuries

Total: 26 deaths
16 injuries (non-fatal)

Program Houses
2 deaths + 2 injuries = 4 total
Rate: 3.1 per 100,000 population per year

Non-Program Houses
24 deaths + 14 injuries = 38 total
Rate: 9.6 per 100,000 population per year

Rate Ratio = .32 (95% CI 0.10 to 0.84)
Cumulative Incidence Rate
House Fire Related Deaths and Injuries
Rates of House Fire-Related Deaths and Injuries for Census Tracts, before and after Operation Installation, by Program Homes vs Non-Program Homes
Multivariate Analysis
Comparison of Death and Injury Rates for Program and Non-Program Population

<table>
<thead>
<tr>
<th></th>
<th>Rate* in Program Houses</th>
<th>Rate* in Non-Program Houses</th>
<th>Rate Difference</th>
<th>Rate Ratio</th>
<th>Prevention Fraction</th>
<th>P value</th>
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</thead>
<tbody>
<tr>
<td><strong>Unadjusted (95% C.I.)</strong></td>
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<td></td>
<td>3.1 (0.8-8.0)</td>
<td>9.6 (6.8-13.3)</td>
<td>6.5 (2.2-10.8)</td>
<td>0.32 (0.10-0.84)</td>
<td>68% (9.2-88.4%)</td>
<td>&lt;0.02</td>
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<td><strong>Adjusted</strong> (95% C.I.)</td>
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<td>3.5 (0-8.2)</td>
<td>9.5 (7.3-11.7)</td>
<td>6.0 (0.8-11.1)</td>
<td>0.37 (0.00-0.86)</td>
<td>63% (16-100%)</td>
<td>&lt;0.01</td>
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*per 100,000 person-years

** Multivariate regression analysis
Functionality of Smoke Alarms

Proportion of Homes that had at least one Working Smoke Alarm, by Study Year Stratum
N=815

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage of Homes with at least one working Smoke Alarm</th>
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<tbody>
<tr>
<td>Year 2</td>
<td>88.3%</td>
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<tr>
<td>Year 4</td>
<td>68.0%</td>
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<td>Year 6</td>
<td>35.8%</td>
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<tr>
<td>Year 8</td>
<td>27.3%</td>
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<tr>
<td>Year 10</td>
<td>19.9%</td>
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Vision 20/20
Cumulative Incidence Rate of House Fire-Related Cases, and Proportion of Houses with at least 1 Working OI Smoke Alarm, by Years Since Installation by Target Census Tracts

For rate calculations, cases were defined as a death or non-fatal injury related to a house fire. Program houses had received a smoke alarm through Operation Installation between 2001 and 2011. Non-Program houses were all other houses in the same census tracts that did not receive a smoke alarm through Operation Installation. Adapted from References 8 and 17.
RECOMMENDATIONS
• Main Findings: Operation Installation
  – Collaboration between DFRD and IPC to target high risk census tracts
  – The program was effective at preventing deaths and injuries from house fires
  – Smoke alarms did not last 10 years

• Modifications we have made
  – Use tampered-resistant smoke alarms
  – Working on how to better reach into high risk census tracts
Injury Prevention Center of Greater Dallas

- Website  www.injurypreventioncenter.org
- Articles
Questions