An Evaluation of Smoke Alarm Installation and Community Risk Reduction Programs in Five U.S. Fire Departments

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CDC/NCIPC/DUIP
Presentation Outline

• Formative Research
  – Global Research
  – CDC SAIFE Program
• Demonstration Projects
• Evaluation Objectives
• Evaluation Findings
FORMATIVE RESEARCH
Select Global Comparisons

Figure 1. 2007 International Fire Death Rates per Million Population

Note: Where 2007 data were unavailable, the death rate for the most recent year available is shown.
Trends in Civilian Fire Death Rates

Figure 3. Fire Death Rates per Million Population by Selected Countries

Sources: World Fire Statistics Centre fire death data and the U.N. Demographic Yearbook population estimate data.
Trends in Civilian Fire Death Rates

Figure 3. Fire Death Rates per Million Population by Selected Countries

Sources: World Fire Statistics Centre fire death data and the U.N. Demographic Yearbook population estimate data.
Global Research

- Conducted by TriData
- Prior work in 1982-1983
- Recent research in 2006-2009
  - 2006/7: Europe
    - England, Scotland, Sweden, Norway
  - 2007/8: Pacific Rim
    - Australia, New Zealand, Japan
  - 2008/9: North America
    - Canada, Mexico, Puerto Rico, Dominican Republic
Global Research Findings

- Increase emphasis on prevention, especially for residential fire safety
- Drop mandatory standards of cover
- Adopt an integrated risk management (community risk reduction) approach
  - Business and prevention plans made and tracked by fire station
  - Target prevention to high-risk groups
    - Identified by GIS analysis and socioeconomic data
Home Safety Visits: The Best “New Practice”

- Visit high risk homes (50%-100%)
  - Use firefighters and community volunteers or staff
  - Visit by appointment or cold calls after local publicity
  - Offer to install free smoke alarms.
  - Educate, test/install alarms, inspect/mitigate hazards
US Fire Death Rate Declines as Smoke Alarm Ownership Increases

% Homes with Smoke Alarms vs. Fire Death Rate/Million Population


NFPA, Fire Loss in the United States During 2009, by Michael J. Karter, Jr., NFPA, Quincy, MA, 02169

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CDC SAIFE Program

[Map of the United States showing states in red, yellow, and gray with annotations]

- Red states: Indicates a city/FD grantee
- Yellow states: Indicates a Children’s Hospital grantee

MODELS IN FIRE PREVENTION
SYMPOSIUM 2012
# CDC SAIFE Program

As of September 2011

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Homes Canvassed</td>
<td>611,047</td>
</tr>
<tr>
<td>Homes Enrolled</td>
<td>278,872</td>
</tr>
<tr>
<td>Smoke Alarms Installed</td>
<td>553,167</td>
</tr>
<tr>
<td>Lives Potentially Saved</td>
<td>3,755</td>
</tr>
</tbody>
</table>
“The future is here.
It is just not widely distributed yet.”

William Gibson - Novelist
DEMONSTRATION PROJECTS
Demonstration Projects

• FEMA-funded 2009-2011
• Administered by Washington State Association of Fire Marshals
• Evaluated by University of Washington PRC

• Five implementation sites
  – Dallas
  – Portland
  – Tucson
  – Wilmington
  – Vancouver
Approach

• Phase I – Smoke Alarm Installation
  – Targeted approach to high risk neighborhoods
  – Installation and Education
  – Follow up and Evaluation

• Phase II – Community Risk Reduction
  – Identify and prioritize community risks
  – Develop appropriate strategies and tactics
  – Prepare and Implement plan
  – Monitor and Evaluate program
Community Risk Reduction (CRR)

1. Identify Risks
2. Prioritize Risks
3. Develop Strategies/Tactics to Mitigate
4. Prepare CRR Plan
5. Implement CRR Plan
6. Monitor & Evaluate
Evaluation Framework

- Process evaluation conducted with each site
- Data collected in homes to establish baseline and measure improvement
- Fire incidence and census data used to begin tracking impact on reported home fires & deaths
- Results intended to demonstrate value of prevention programs
Evaluation Objectives

Purpose of evaluation:

- Describe the programs (Program Descriptions), their implementation (Process Evaluation), and associated costs (Program Costs)

- Describe the short- and long-term outcomes (Impact & Outcome Evaluations)

- Summarize the Lessons Learned

- Identify the Key Program Components
<table>
<thead>
<tr>
<th>City</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tucson</td>
<td>Medium-sized, career fire department; installations completed by community partner (SERI)</td>
</tr>
<tr>
<td>Vancouver</td>
<td>Small-sized, mixed fire department; union; experience with CRR; installations completed in pairs of volunteer firefighters and community volunteers</td>
</tr>
<tr>
<td>Dallas</td>
<td>Large-sized, career fire department; 20+ year history of smoke alarm installation efforts; installations completed in pairs of firefighters and volunteers</td>
</tr>
<tr>
<td>Portland</td>
<td>Medium-sized, career fire department; installations completed by firefighters</td>
</tr>
<tr>
<td>Wilmington</td>
<td>Small-sized, career fire department; installations completed by firefighters</td>
</tr>
</tbody>
</table>
## Site Specifics

<table>
<thead>
<tr>
<th>Location</th>
<th>Phase I</th>
<th>Phase II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tucson</td>
<td>Smoke Alarm Installation</td>
<td>Community partnership, CRR computer training for FD’s</td>
</tr>
<tr>
<td>Vancouver</td>
<td>Smoke Alarm Installation</td>
<td>All stations included, School based approach</td>
</tr>
<tr>
<td>Dallas</td>
<td>Smoke Alarm Installation</td>
<td>Station based approach, Produced educational DVD’s</td>
</tr>
<tr>
<td>Portland</td>
<td>Smoke Alarm Installation</td>
<td>Crew based approach, Community radio campaign</td>
</tr>
<tr>
<td>Wilmington</td>
<td>Smoke Alarm Installation</td>
<td>Community partnerships, College student PSA’s</td>
</tr>
</tbody>
</table>
## Process Evaluation

### Home Visits

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Fire Departments</td>
<td>5</td>
</tr>
<tr>
<td>Duration of Program</td>
<td>2 years*</td>
</tr>
<tr>
<td># homes visited</td>
<td>5,249</td>
</tr>
<tr>
<td>No Alarm Present</td>
<td>40%</td>
</tr>
<tr>
<td>No Functioning Alarm Present</td>
<td>55%</td>
</tr>
<tr>
<td>No Home Escape Plan</td>
<td>74%</td>
</tr>
<tr>
<td>No Practice of Escape Plan</td>
<td>88%</td>
</tr>
</tbody>
</table>

*2 years in the field*
Homes With No Functioning Alarm

<table>
<thead>
<tr>
<th>City</th>
<th>No Alarm Present</th>
<th>Alarm Present - but NOT Working</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dallas</td>
<td>39%</td>
<td>22%</td>
</tr>
<tr>
<td>Portland</td>
<td>20%</td>
<td>45%</td>
</tr>
<tr>
<td>Tucson</td>
<td>20%</td>
<td>78%</td>
</tr>
<tr>
<td>Vancouver</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>Wilmington</td>
<td>10%</td>
<td>44%</td>
</tr>
<tr>
<td>ALL</td>
<td>40%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Legend:
- No Alarm Present
- Alarm Present - but NOT Working
Escape Plan and Practice

13% 13% 1% 18% 19% 12%

Dallas Portland* Tucson Vancouver Wilmington ALL SITES

14% 40% 22% 42%

0% 5% 10% 15% 20% 25% 30% 35% 40% 45%

Have & Practiced Have - NOT Practiced

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SYMPOSIUM 2012
Impact Evaluation

- 15,983 smoke alarms installed

Home Fires per 100,000: Change between Pre & Post Intervention

- PORTLAND: -14.1
- VANCOUVER: -15.6
- WILMINGTON: -59.7

Targeted Non-Targeted

- Targeted: 6.1 18.9 21.8 1.0
- Non-Targeted: -14.1 -15.6 -29.8

Avg All Sites: -59.7
Outcome Evaluation
Deaths per 1,000 Home Fires
Change between Pre & Post Periods

Portland
Vancouver
Wilmington
Avg. All Sites

-9.8
0.0
21.8
-17.7

-4.0
21.2
45.8

Targeted
Non-Targeted
## Program Costs

<table>
<thead>
<tr>
<th></th>
<th>Present Study</th>
<th>Other Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg. Cost</td>
<td>Range</td>
</tr>
<tr>
<td>Per Installed Alarm:</td>
<td>$34</td>
<td>$20-$78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$53-126</td>
</tr>
<tr>
<td>Per Home Visit:</td>
<td>$107</td>
<td>$85-$269</td>
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<tr>
<td></td>
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<td>$135-$242</td>
</tr>
</tbody>
</table>

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MODELS IN FIRE PREVENTION

SYMPOSIUM 2012
Lessons Learned

• Phase I – Smoke Alarm Installation
  – Emphasize need and department’s commitment
  – Develop accountability systems for alarms & forms
  – Plan in advance for follow-up w. residents not home
  – Choose times when people are likely home & receptive
  – Not all volunteer groups are equal
  – Address common firefighter concerns

• Phase II – Community Risk Reduction
  – Involve entire station(s)
  – Developing community partnerships take time
Key Program Components
Phase I and Phase II

- Clear Vision
- Reasonable expectations
- Buy-in Senior Management
- Knowledge of FMAs
- Point Person
- Adequate Resources/Tools
- Knowledge of Community Resources
- Training for staff/volunteers
Conclusions

• Potential to:
  – Increase the presence of working smoke alarms
  – Change culture towards prevention
  – Substantially reduce fires deaths and injuries

• Further Research:
  – Implement larger scale programs
  – Assess CRR impact on perceptions
  – Enhance alarm technology
  – Address human behavior
    • Escape planning, alarm maintenance
Thank You

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