

Smoke Alarm Installation and Maintenance Behaviors: What do we know from Community Intervention Trials?

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Door-to-door canvassing programs can increase the number of homes with smoke alarms

- The Centers for Disease Control and Prevention Smoke Alarm Installation and Fire Safety Education (SAIFE) program has been found to increase smoke alarm coverage in high-risk communities.¹
- In our study in Baltimore, *residents that received notification of the fire department home visit before the visit were more likely to let fire fighters into their homes (75% vs 62%), and were more likely to be left with a working smoke alarm on every level of the home (84% vs 78%).*²

1. Ballesteros MF, Jackson ML, Martin MW. Working toward the elimination of residential fire deaths: the Centers for Disease Control and Prevention's Smoke Alarm Installation and Fire Safety Education (SAIFE) program. *J Burn Care Rehabil.* 26 (2005):434–9.

2. Gielen AC, Shields W, Frattaroli S, et al. Enhancing fire department home visiting programs: results of a community intervention trial. *J Burn Care Res* 34.4 (2013):e250–6.

Canvassing programs are cost-effective

- A cost-effectiveness analysis of our home visiting intervention trial in Baltimore showed that the program *increased the number of homes that went from having no working smoke alarms to having any working smoke alarms by 10%*.
- The fire department's home visiting program would result in an additional 0.24 lives saved per 10,000 homes over 10 years compared to a control area without the program.
- The incremental cost of each life saved by the program compared to the control area was *\$28,252 per death averted*.

Residents have various reasons for having nonworking smoke alarms

- Our survey of more than 600 households in Baltimore showed that *one in three households misreported its smoke alarm coverage*.
 - While 70% of respondents reported having a working smoke alarm on every level of their home, only 41% of the sample actually did.
- In follow-up interviews with 23 residents who over-reported their smoke alarm coverage:
 - 52% assumed that the smoke alarms were still working because they were still up or were not beeping
 - 22% thought their homes were safe despite not having a smoke alarm on every level of the home.

Knowledge and beliefs about smoke alarms related to their use

- Only 57% of residents correctly answered 9 questions about smoke alarms and home fire safety
- On average, residents thought it was not very likely they would experience a fire, but they believed that house fires were a serious problem with potentially severe consequences.
- Residents who reported *feeling confident that they could maintain smoke alarms were twice as likely to have working smoke alarms* observed in their homes.
- Other studies have found that low perceived risk and high perceived barriers explain why individuals do not have working smoke alarms in their homes.

Lithium battery smoke alarms are easier to maintain than 9V battery alarms

- An analysis of 601 lithium battery alarms installed as part of the SAIFE program showed that *8-10 years after installation 33% were still functional*, 37% were missing, and 30% were nonfunctional.¹
- Another evaluation showed that 62% of alarms were nonfunctional 6-10 years after installation.²
 - The majority of nonfunctional alarms were due to missing, disconnected, or nonfunctional batteries.
 - After 10 years, only 19.8% of the homes had at least one working program smoke alarm, in contrast to 91.8% of homes after 2 years and 67.9% of homes after 4 years.

1. Jackson M, Wilson J, Akoto J, Dixon S, Jacobs DE, Ballesteros MF. Evaluation of fire-safety programs that use 10-year smoke alarms. *J Community Health* 35.5(2010): 543-548.

2. McCoy MA, Roper C, Campa E, Stephens-Stidham S, Carlin DK, Istre GR. How long do smoke alarms function? A cross-sectional follow-up survey of a smoke alarm installation programme. *Inj Prev* 20.2(2014): 103-107.

Lithium battery smoke alarms are easier to maintain than 9V battery alarms

- 42 months after installation, *lithium battery alarms were significantly more likely to function than carbon than carbon-zinc battery alarms* (OR=1.89, 95%CI 1.38, 2.60)¹
 - Among alarms installed closest to the kitchen, alarms with reported nuisance alarms had 50–53% smaller odds of remaining functional than those with no reported nuisance alarms.²
- In Baltimore, 90% of 1,487 lithium battery alarms were still up and working 6 months following installation.
 - Of the 37 nonworking alarms, 51% of residents reported that they did not know why the alarm was not working. A minority of residents reported taking the alarm down because of cooking or chirping.

1. Peek-Asa C, Yang J, Hamann C, Jones MP, Young T, Zwerling C. Smoke alarm and battery function 42 months after installation: a randomized trial. *Am J Prev Med* 39.4(2010): 368-371.

2. Yang, Jingzhen et al. “Do Nuisance Alarms Decrease Functionality of Smoke Alarms near the Kitchen? Findings from a Randomised Controlled Trial.” *Injury prevention* 17.3 (2011): 160–5.