The 1992 survey information that was published in the 1994 report, Consumer Product Safety Commission Smoke Detector Operability Survey Report On Findings [1], was used for many years in developing codes and standards related to smoke alarms, subsequent changes in technology, installation codes, and state/local ordinances. However, the 30-year-old survey is rendering the information outdated and less effective.

Two organizations, the National Fire Protection Association (NFPA) and Vision 20/20, have expressed the need and benefits of repeating the CPSC 1992 survey. The NFPA publishes a periodical report, Smoke Alarms in U.S. Homes Fires [2], which provides the latest information about smoke alarms in home fires. The report recognizes the importance of the 1992 study. The report states, “This study is the gold standard for smoke alarm research. The most complete study of smoke alarm presence and operational status in the general population was done by the U.S. Consumer Product Safety Commission’s (CPSC’s) National Smoke Detector Project in 1992.” The report points out the key distinction between the CPSC study and other recent studies - “This [CPSC] project surveyed the general population, not just high-risk groups or people who had fires.” More recent studies by other groups have usually been combined with smoke alarm installation programs and typically targeted high-risk groups, rather than the general population. The NFPA still sees the importance of the 1992 survey even though the information may be outdated.

The Institution of Fire Engineers US Branch has established a steering committee, Vision 20/20 comprised of noted fire service and related agency leaders to guide a national strategic planning process for the fire loss prevention. In March 2015, Vision 20/20 hosted a one-day National Smoke Alarm Summit [3] at Johns Hopkins Bloomberg School of Public Health. Fifty-nine participants representing stakeholder groups such as the fire service, academia, government, non-profit and private sector organizations convened on the summit to develop consensus recommendations on:

1. Evidence-based and evidence-informed policy and practice interventions that will increase the installation and maintenance of smoke alarms in all homes in the United States.

2. High priority research gaps that need to be addressed.

3. Next steps to ensure that the findings from this meeting inform policy and practice.

The report findings based on input from experts who presented at the Summit and participants who provided feedback during and after the Summit concluded that the next step and number one priority for smoke alarms is to “Conduct a national census (or representative sample in-home survey) on the number of working alarms and types of alarms in people’s homes” and characteristics of smoke alarms in people’s homes.

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1The views expressed in this report are those of the CPSC staff and have not been reviewed or approved by, and may not necessarily reflect the views of, the Commission. This document was prepared in the authors’ official capacities and may be freely copied.
A NEW NATIONAL SURVEY

There was momentum in conducting a new national survey to reassess the current landscape of smoke alarms in the US. In addition to changes in smoke alarms and their implementation in the 30 years since the 1992 survey, residential use of CO alarms has increased considerably. CPSC recognized the value that the smoke alarm survey had in improving ANSI/UL 217 – Single and Multiple Station Smoke Alarms and the installation code, National Fire Protection Association (NFPA) 72 – Fire Alarm and Signaling Code, and proposed to conduct a similar national in-home survey to document CO alarm use in the US. The information would be used to help improve ANSI/UL 2034 – Standard of Safety for Single and Multiple Station Carbon Monoxide Alarms and guide state and local jurisdictions for the use, installation, and education of CO alarms. While the standards and installation codes for the two products, especially as required by states or local jurisdictions, are different, conducting both surveys at the same time would optimize resources.

To achieve the main goal of completing the smoke and CO alarm survey (SCOA) survey, the project was divided into two phases: Phase I and Phase II. Under Phase I, a stakeholder workshop was designed to collect input to assist in developing the survey. Phase II is the design and execution of the survey by the contractor.

Phase I – Stakeholder Workshop

The contract to conduct the workshop and document the proceedings was awarded to NFPA’s Fire Protection Research Foundation (FPRF) on September 6, 2016. The workshop was held at CPSC headquarters, Bethesda, MD on February 16, 2017 to gather feedback from stakeholder groups to help form the questions and collection methodology of the survey under Phase II. Workshop participants included representatives from fire services, code enforcement officials/authorities having jurisdiction (AHJs), media communication specialists, researchers, equipment manufacturers, and code/standards developers.

The workshop included a review of previous work; on-going relevant work; discussion on data gaps on this topic; consumer perception of risk and alarm use; and changes in smoke and CO alarm listing and installation standards. After the presentations, the workshop participants divided into breakout groups to discuss key areas and topics that they felt were needed as part of the survey. The groups focused on the information needs to inform prevention and education activities, codes and standards, and new technology. With the workshop information in hand, the design of the survey could begin.

Workshop for Survey on Usage and Functionality of Smoke Alarms and CO Alarms in Households

Amanda Kimball, P.E., Fire Protection Research Foundation (May 2017)

Phase II – Survey

CPSC awarded the contract on September 20, 2016 to EurekaFacts (EF) to design and conduct the survey, compile the results, and issue a report. Staff also gained the support of stakeholders (NFPA, National Institute of Standards and Technology, US Fire Administration, and National Electrical Manufacturers Association) who provided additional funding to implement the full survey sampling of homes. During FY 2017 and FY 2018, EF developed the questionnaire and logistics for the survey. Once the Office of Management and Budget (OMB) approved the survey plan, the contractor began administering the SCOA survey in January 2019. For the subsequent eight months, EF implemented the same methodology (mailings and phone calls) used previously in the 1992 survey, however, there was significant difficulty recruiting participants for the in-home portion of the SCOA survey. The current methodology for contacting homes was directly impacting the schedule and success of the survey.

Survey Recruitment Efforts and the Challenges Encountered

The current survey methodology for the initial round of sampling and recruitment yielded a response rate of less than 1/50 of 1% or 0.023%. EF and CPSC staff drafted a plan to improve the response rate, which included revisions to the screening instrument to raise the appeal; urgency and information on the public benefit of the study; and streamlining of language for greater efficiency.
in screening potential participants. After approval from OMB, the revisions to the recruitment efforts were implemented, but the response rate results were unchanged and were inadequate to reach the survey goal. The cooperation rate to schedule participants for the in-home survey was still about 3% for the first two combined primary sampling units (PSUs) in North Carolina.

To improve data collection efforts and complete the project within the timeframe of the contract, CPSC staff and EF brainstormed to develop an alternative approach that would work with today’s way of communicating to overcome the lack of responsiveness. A door-to-door methodology for recruitment was proposed and approved by OMB in November 2019. This effort included an initial program to evaluate its efficacy. The revisions also included increasing the incentive for participation from $25 to $50.

Door-to-Door Methodology
For the initial door-to-door campaign, the Washington D.C. metro area was selected as a possible replacement for one of the random metro areas of comparable size from the current random 24 primary sampling units (PSUs). The selection of the DC Metro area presented a higher advantage for success because the contractor could locally monitor the data collection teams and the participant response rate, thus making quick adjustments as needed. This allowed efficient use of resources and budgeting that were within the framework of the contract. All other PSUs remained the same and were on hold until completion of the DC survey.

Under this methodology, field teams first distributed door hangers as a pre-notification that researchers would be knocking on doors in the following days asking for participation in the survey. Field teams provided households with a distinctive piece of literature with vital information about the study and sources to seek out more information. A map of the tract where the door hangers were left provided field interviewers the path to recruit from those households a few days later.

To maintain consistency between sampling methods, all households within the census tract were part of the sampling frame. A process was designed to randomly select which homes that were visited during the door hanger-knocking campaign.

- Listed all households in a census tract in a spreadsheet
- Randomly assigned each a number value
- Sorted the households by randomly assigned number
- Calibrated the expected response rate to the quota needed within the tract to determine the number of homes that may need to be visited
- Mapped the selected homes to a predetermined walking route in the tract
- Randomly assigned one household as the starting point and walked clockwise in the route

The door-to-door pilot began in December 2019 in the Washington DC metro area and finished in March 2020 with completing the goal of 130 homes surveyed. The door-to-door method produced a much higher response rate, climbing from 0.023% (old method) to 3.5% (new method). The cooperation rate was 17.4% (new method, 1-in-6 chance of getting a complete in-home survey from the occupant) vs. 3% (old method).

This initial door-to-door program provided positive results and suggested that launching the same method for the other PSUs would make it feasible to gather the needed data to complete the survey and its objectives. A draft report of the door-to-door survey in the DC Metro area was completed by EF in August 2020.
Expanding the Door-to-Door Methodology to all PSUs in the Study

After the door-to-door methodology was proven to be successful, the implementation of the full survey began. The surveyed areas included metro and nonmetro PSUs. Random sampling of 24 metropolitan areas, PSUs, (of 389) fell within 20 states with a target of 1055 homes to be surveyed in the study.

Pandemic

In April 2020, most of the nation has been or was being shut-down due to a pandemic. The survey was paused in April 2020 and there was an uncertainty when or if the survey could be resumed.

Several contingency plans were designed during the 2020 shut-down. These included canceling the survey, reducing the number of homes, switching to a phone survey, or waiting to see how the pandemic plays out.

After the holidays and entering into 2021, the pandemic conditions appeared to be improving, thus it was decided to wait and see how conditions are in the spring of 2021.

The Wait was Over

The full launch of the survey was reinitiated in May 2021 with new safety protocols to protect the homeowners and the survey teams during the survey. During the first several months after the start of the survey, the field teams had its challenges with low cooperation because the pandemic was still on people’s minds. The survey began to take a faster pace as more businesses began reopening to the public and the environment was turning back to “normal”.

Temporary delays for some PSU locations were caused when fielding teams were unable to begin surveying because they had become infected with COVID. State and local restrictions were also unpredictable due to COVID infections, which impacted the effectiveness of the survey teams in the field. Each PSU had to be monitored and organized as when the optimum time to field the survey teams.

Since the contract awards for the survey began in 2016 and 2017, there was concern that the funds would expire before completion of the survey. A sense of urgency to complete the survey was a priority.

A SPRINT TO THE FINISH LINE!

A decision was made to not include the DC Metro pilot data with the national study since it was not one of the original randomly selected PSUs. The originally planned 24 PSUs were still in place.

Currently, there were 9 completed PSUs, 6 PSUs are in progress and 3 in the planning stage. Six PSUs have not started.

The goal is to survey 1055 homes using the door-to-door methodology for the project. By the end of 2022, it is projected that about 900 homes will be completed.

After the remaining homes are completed in 2023, the long awaited report is expected to be published in 2023/2024. The report will provide insights in the populations that do not have operable smoke alarms and/or CO alarms and understand the reasons why they do not have such alarms. The report will provide stakeholders with the information to target the messaging to improve consumer use and awareness regarding the operability of these alarms, improve the voluntary standards, and assist the state/local jurisdictions regarding their codes, standards, and/or regulations on smoke and CO alarms.

