

# **Assessing the Risks to Children from Household Hazardous Materials: Using a Focus Group to Improve the Survey Questionnaire**

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## **Abstract**

### **Background**

To collect data about people's perception of household hazardous materials, and to identify any linkages between the storage and use of household hazardous materials which create health risks, particularly to children.

### **Methods**

A focus group was used to identify key topics and relationships within these data for improving a phone survey questionnaire and its analysis.

### **Results**

The focus group was successful in identifying the key issues with respect to all the data collection objectives, resulting in a significantly shorter and more topically focused survey questionnaire. Execution time of the phone survey decreased from 30 to 12 minutes, and useful relationships between the data were revealed, e.g., the linkage between reading food labels and reading labels on containers containing potentially harmful substances.

### **Conclusions**

Focus groups and their preparatory planning can help reveal data interrelationships before larger surveys are undertaken. Even where time and budget constraints prevent the ability to conduct a series of focus groups, one successful focus group session can improve survey performance and reduce costs.

## Background

In the United States today, the average household stores 3-10 gallons of hazardous materials.<sup>1</sup> These household hazardous materials (HHMs) are being used to the detriment of the physical environment—and even more unfortunately—some are making people sick. The most recent annual report of the American Association of Poison Control Centers identifies over 2.3 million exposures in 2003. Of these 2.3 million cases, over 50 percent were children under 6 years of age.<sup>2</sup> The Institute of Medicine reported that poisoning is a larger and more important public health hazard than previously realized. They describe 30,800 poisoning-related deaths in 2001, which makes poisoning the second leading cause of injury-related death in the United States. During that same year, there were 282,012 hospitalizations for treatment of poisoning. The estimated annual cost of poisoning was \$8.5 billion in 1989, which is equivalent to \$12.6 billion in 2003 dollars.<sup>3</sup> For all ages nationwide, the substances most commonly involved in human exposures are analgesics—common painkillers—followed by cleaning substances and cosmetic products. Nationally for children under 6, cosmetics are the most common toxic exposure, followed by cleaning substances and analgesics.<sup>2</sup> Although improvements have occurred in the prevention and treatment of poison emergencies,<sup>4-6</sup> the poisoning incidence rate for young children (< 6 yrs.) is still alarming, with the actual rate being close to 4 million annually, since the proportion of incidents reported to Poison Control Centers is estimated to be as low as 26 percent.<sup>6</sup>

In the public health arena, focus groups have been used to assist research in a wide variety of applications, such as nursing education,<sup>7</sup> contraception alternatives,<sup>8</sup> and injury prevention among adolescents.<sup>9</sup> Basche<sup>10</sup> defines focus groups as “a qualitative research technique used to obtain data about feelings and opinions of small groups of participants about a given problem, experience, service, or other phenomenon”, and they are characterized as an exploratory research method.<sup>11</sup> Exploratory studies typically serve three purposes: (1) to satisfy the researcher’s curiosity and desire for better understanding, (2) to test the feasibility of undertaking a more careful study, and (3) to develop the methods to be employed in a more careful study.<sup>11</sup>

In fall of 2004, the authors began an investigation to characterize the correlations between the storage of HHMs and the associated health risks, particularly to children. The study area selected was Genesee County, Michigan, near Flint, with data to be collected by a phone survey of residents and through the acquisition of county hospital records containing procedure codes indicating treatment for poison emergencies, and review of poison control center data. Analysis of the survey data would be used to help characterize the storage characteristics of toxic substances within households, and the regional hospital and poison control center call data would be used to help determine if these storage patterns were related to increased visits to hospital emergency rooms. Ultimately, this information would be used to develop intervention strategies for reducing the risks from HHMs to children in Genesee County. To help identify potential relationships within and between these data collection categories and project tasks, a focus group was used to help improve the phone survey questionnaire, thus relating this effort most closely to item #3 above. This paper presents the results from the focus group,

analyzes the changes made to the phone survey, and discusses the implications for the entire project.

## Methods

A critical requirement for achieving successful exploratory research is “representativeness”, which occurs when a sample has the distribution of characteristics as the population from which it was selected.<sup>11</sup> In this research, the target population consisted of households containing small children. Thus, when recruiting participants for the focus group, most of the effort was directed toward parents of small children and grandparents, since children frequently visit their residences. Flyers were placed at the daycare facility on the University of Michigan-Flint’s campus, and e-mail notices were sent to university faculty and staff. After the first attempt during the late summer of 2004 failed to produce enough participants, a second effort mounted in September 2004 yielded 13 participants. The gender/age/ethnic composition consisted of 11 women and 2 men; with 4 grandparents (3 women, 1 man) and 9 parents of young children (8 women, 1 man). Among the women there were 2 African-Americans, one Hispanic, and 8 whites, while both male participants were white. These characteristics provided a good representation of the ethnicity of the study area, along with a good distribution of young mothers and grandparents.

Another important factor contributing to a successful focus group is the need to conduct the discussion in a conducive environment.<sup>12</sup> To enable this environment, a central location and convenient time were needed; the location selected was a room at the university with a 4:00 P.M. start time. The university is centrally located in Genesee County, and the start time corresponded to the time many participants picked up their children from the daycare at the university. Pizza and a \$50 stipend were also provided to the participants. As a final measure to help produce a favorable environment, tape recorders and video cameras were not used so participants would not feel any sense of intrusiveness.

The research team had developed a phone survey instrument several weeks before the focus group was scheduled. This initial survey had 159 questions, which in the pre-trials took 30 minutes to complete. Given project budget constraints, and the strong likelihood respondents would not want to commit 30 minutes of their time to a survey, the research team saw the focus group as an opportunity to shorten--and if possible--improve the survey instrument.

On September 30, 2004 a focus group about reducing the risks to children from household hazardous materials was conducted at the University of Michigan-Flint. Demographic information was recorded from participants as they arrived at the session. The session formally opened with the moderator (co-author Kaufman) welcoming participants and thanking them for their participation. Notes were taken by personnel from the university’s Office of Research and the moderator. After the session, the notes of the Office of Research personnel and the moderator were compared for consistency and compiled.

## Results

During the preparations for the focus group, the research team identified 6 key issues which were to be probed during the session in order to help consolidate and improve the phone survey. These key issues included: (1) assessing the public's general knowledge of what events would constitute a poison emergency; (2) obtaining feedback about the specific products within the home which posed the most risks—especially to children; (3) how people received information about household hazardous materials; (4) respondents' perception and knowledge of the Poison Control Centers; (5) citizens' involvement with activities such as HHM recycling/pickup programs to reduce the presence of HHMs in their homes; and, (6) storage issues, including where people stored purses, their use and storage of weekly pill planners, and whether containers containing HHMs were changed.

### General Knowledge of Poison Emergencies

At the beginning of the session, participants were given a list of 6 questions which asked them to indicate on a scale of 1 to 5 whether exposure to certain substances were “not a poison emergency” (the low end of the scale) or a very serious poison emergency” (the high end of the scale). The responses indicated good awareness among the participants about the toxicity of swallowing bleach, paint, toadstools, and prescription medications. Swallowing mouthwash and spilling gasoline on someone's shoes were not deemed poison emergencies.

### Products Posing the Most Risks

A discussion of the products posing the most risk in the home followed. The unanimous opinion of the participants was that cleaning products were the most toxic and posed the most risk to children because of their perfume-like smell, corrosiveness, and variety. Participants also noted the ingredients list on cleaning products frequently contained warnings about their safety. Vitamins containing iron supplements were mentioned as a threat, but knowledge of these products' toxicity was not well known among the participants.

In response to the follow-up question: “Are there potentially dangerous products which might be confused with non-toxic products--either through their labeling or their taste/smell”, the answers were: TUMS<sup>®</sup> (look like candy); some high blood pressure medication (blue pills look like candy); bubble gum toothpaste; vitamins looking like gummy bears (these do not contain iron); and a newer product called Vitaballs<sup>®</sup> which looks like bubblegum.

At this juncture, one participant cited the issue of the “perception of parents to toxicity” as being particularly important. A discussion ensued about the levels of toxicity parents were willing to accommodate; e.g., some parents cannot stand cigarette smoke, and thus they are not willing to tolerate this exposure to themselves or their children. Other participants noted some parents were sensitive to food additives, and this sensitivity might translate into poison awareness as these people are more likely to read food labels

and other product labels more carefully. Participants agreed there might be a correlation between nutrition consciousness and sensitivity to household hazardous materials (HHMs).

### **Acquisition of HHM Information**

When participants were asked how they received information about HHMs, many responded “the Internet”, with certain magazines, such as “Mothering” also noted as a source. Some people learned about HHMs and toxic materials from workplace training (food service); others noted they learned from their parents. In the follow-up discussion, most participants said they clearly understood certain substances such as oil, gas, and bleach were toxic. However, participants identified perfume, nail polish, hair products, cosmetics, fabric fresheners, toothpaste, sunscreen, ant/insect sprays, baby oils, hand cleaners with alcohol, and insect repellants with DEET as less threatening substances, with these products often not receiving special precautions in terms of their storage. Participants noted high areas (top shelves) were used for their storage of oil, gas, and bleach.

Participants responded to the next question: “How can we help educate people about the less obvious products which still pose threats within the home?” with: “pediatricians could be more active in their dissemination of information about harmful substances”, and by “consistent labels” being placed on these products--a baby’s face with a line drawn through it was suggested.

Complacency was seen as an obstacle to parents’ education--since many products were used so often--it was difficult to protect children all the time. Participants suggested it might be beneficial to teach children “not to touch anything that is not food”. The participants also felt it was more important to educate the parents about HHMs rather than children, since the parents could then teach their children. However, children should also receive HHM education in the schools via videos and guest speakers, as they often do on fire safety.

### **Perception of the Poison Control Centers**

Discussion was then directed to the perception and knowledge of the Poison Control Centers (PCC). All respondents answered the PCC was not the first place they would call in a poison emergency. The response ranking was: pediatrician, emergency room, looking at the label, calling a friend, with the obstacles to calling the PCC being: the phone number was inaccessible; lack of confidence in the “round the clock” and “instantaneous” availability of the PCC services; and possible language barriers. For raising the awareness of PCCs, respondents unanimously supported a suggestion that PCC kits be given out at the time the mother and child are discharged from the birthing center. Midwives could also be given the PCC information packets.

## **HHM Recycling/Pickup Program Involvement**

Participants indicated they received information about HHM recycling from local newsletters (e.g., a local community's newsletter sent to all residents had information about paint recycling). Local TV stations also promoted the biannual hazardous recycling collections in Genesee County. In response to how expired medications were disposed of the participants replied: in the garbage disposal, flushed down the toilet, or thrown in the general garbage pail. No respondents considered taking expired medications back to the pharmacist, and participants were unaware of exchange programs to eliminate mercury thermometers.

## **Purse and Weekly Pill Planner Storage, Changing HHM containers**

During discussion of these final items, participants stated they stored purses “anywhere”—on tables, on the couch, and hung from the doorknob. The concept of “weekly pill planners” was considered vague by the participants, who suggested the term “weekly pill dispenser”. One respondent (not a senior) noted that childproofing is now available on weekly pill dispensers, but no other respondents (including the seniors) were aware of this capability.

Some participants noted they would change the containers for their pills when they went on vacation, or move liquids from their original spray bottles into old spray bottles (especially cleaning products). Sometimes concentrations of cleaning products were diluted, and this prompted their relocation to another container. Since some medications require refrigeration, one participant asked how these medications could be kept safe from probing children.

Participants were asked for any additional input, and when none was offered they were thanked for their efforts and again reminded of their capability to contact the project team for additional information about the research.

## **Discussion**

What did the researchers learn from this focus group, and how were these lessons applied to the phone survey?

Given project budget constraints, the investigators knew the phone survey constructed prior to the focus group was too long. Survey consolidation would have occurred without input from the focus group; however, it was the actual planning for the focus group and the analysis of its output which were the catalysts for its improvement and shortening. Specifically, the focus group helped the investigators to: identify and restructure redundant questions in the survey questionnaire; create a coding scheme for data analysis; remove questions which yielded little, or no valuable information; and recognize significantly more analysis opportunities with the raw data through the addition of only a few questions. Interrelationships between these items became apparent as investigators

revised the questionnaire. For example, the elimination of unnecessary questions would create room for more relevant questions and offer more analysis opportunities.

### **Identification and Restructuring of Redundant Questions**

Within the pre-focus group survey was a sequence of questions about 13 toxic substances: ibuprofen, acetaminophen, bleach, prescription medications, diaper rash products, alcoholic beverages, gasoline, live plants, rat poison, silica gel packets, mouthwash, acrylic nail products, and hair care products. The question sequence was: (1) “Do you have this product?”; (2) “How often it was used?”; (3) “Where it was kept?”; (4) “Was the product moved to a new container?”; (5) “Was that container a food container?”; (6) “Has anyone in the house swallowed this substance?”; (7) “How did you respond?”; then, if the respondent did not call the PCC: The interviewer would ask: (8) “Did you consider calling the Poison Control Center?”, and, (9) “Was there any particular reason you didn’t call the Center?” Although it was not likely questions 2-9 would get asked for every substance, there were potentially 117 (13 \* 9) questions possible from this sequence.

The remainder of the survey consisted of: 6 questions which asked respondents to rank certain actions as to whether they constituted a poison emergency (this was the same group of questions used to begin the focus group); 5 questions related to who would be called in the case of a poison emergency (which are redundant with questions 8 and 9 in the sequence listed above); 11 questions which asked how long ago some of the toxic substances listed above had been purchased; 4 questions about the presence and respondents’ use of local programs for recycling/collecting hazardous waste; and the 16 remaining questions were divided among ascertaining the respondents’ demographic characteristics, whether young children (< 6 yrs.) were present in the household, and the respondents’ use and storage of weekly pill planners.

The focus group provided the mechanism for consolidating the 9-question sequence used with the 13 toxic substances listed above, and for removing the associated redundant questions. There, participants provided a long list of substances which they noted were taken for granted as being safe, such as baby oils and sunscreens. Since child accessibility to any substance is the key determinant of exposure, the 9-question sequence was reconfigured to contain only 2 questions: “Do you have this substance?” and, “Is this storage location secured by a lock or other device?” In addition, the substances queried were reduced from 13 to 10, thus reducing the questions related to substance storage and access from 117 to 20. To facilitate this consolidation, the revised survey contained this interviewer instruction to respondents: Please indicate where you store the following items (if you don’t have an item, please say: “don’t have it”). Investigators decided not to ask the question, “Where in the room do you store “X?”, since this was considered to be leading. It was felt respondents might be averse to admitting toxic products were stored within reach of children, but given leeway within the question might specify locations such as “under the kitchen counter”, or “in the medicine cabinet in the bathroom”. This belief was confirmed by the pilot survey and actual surveys, as over one-half of the

respondents provided the specific rooms where the substances were, along with their storage elevations.

### **Coding Scheme**

This response pattern consisting of room location and elevation allowed investigators to create a spatial coding scheme for the characterization and analysis of toxic substances within the home. It was now possible to obtain a room-by-room accounting of toxic substance storage, and infer the risks to children associated with the substances' relative storage elevations. For example, items stored under the counter, on the floor, or in the drawer were coded as accessible to children; while items stored above the sink, in the medicine cabinet, or any storage location containing "high above" were coded as inaccessible to children. This coding scheme enables a practical implementation of the "Virtual House" concept used by the U.S. Environmental Protection Agency (EPA).<sup>12</sup> In the EPA's Virtual House, potentially toxic substances are depicted within each room of the home; this research provides actual substance locations and the associated risks to children. Moreover, the spatial characteristics of toxic substance storage can be compared to regional hospital data to help determine if these storage patterns are related to increased visits to hospital emergency rooms and non-hospitalized poisoning exposures. Ultimately, this information will be useful for developing intervention strategies for reducing the risks from HHMs to children in Genesee County.

### **Removal of Non-essential Questions**

After consolidation, other non-essential questions were removed from the pre-focus group questionnaire. The 11 questions relating to how long ago a substance had been purchased were removed for two reasons: (1) the presence of a toxic substance is the fundamental concern, as parents would likely seek assistance when a child was exposed regardless of the expiration date; and, (2) other questions within the survey could be used to obtain information related to the disposal of toxic products within the home. In addition, the 6 questions used at the beginning of the focus group were eliminated from the revised survey since the responses by focus group participants indicated a very clear distinction existed among parents and grandparents between events which were and were not poison emergencies.

### **Opening up New Avenues for Analysis**

The substantial reduction of the questionnaire allowed investigators to insert some new multiple purpose questions. These questions could be used to address issues that emerged from the focus group, and for creating measurement scales, thus opening up more capabilities for analysis. For example, since the focus group participants felt there might be a linkage between reading food labels and reading labels on containers containing potentially harmful substances, the question: "Do you read food labels?" was added to the revised survey. This question can also be used with other questions (e.g., participation in community hazardous collections) to construct a scale which measures other factors contributing to the general awareness of household hazardous materials.

Based on the focus group responses, other open-ended questions were added, including: “If a mercury thermometer was present, how would you dispose of it if broken?”, “In case of a poison emergency, who would you call first for help?”, and, “In the past, from what sources have you obtained information about potentially harmful materials in the home?” The existing questions concerning demographic information, the presence of children, and the respondents’ use and storage of weekly pill planners were retained, resulting in a final survey questionnaire containing 54 questions. This final questionnaire took 12 minutes to complete, compared to the 30 minutes needed for the pre-focus group questionnaire.

## **Conclusions**

Focus groups are informal, but structured discussions between interested citizens and researchers designed to help the researchers identify key issues within their investigations. This type of meeting format often helps to improve the quality of data collected. In this case, researchers from the University of Michigan-Flint and the Children’s Hospital of Michigan solicited input on the characteristics of the harmful materials kept in/around people’s homes which might pose risks to young children. The information obtained helped the researchers gain insight into several key issues related to household hazardous materials, consolidate a phone survey and improve the ability to analyze its results. Through follow-up work with citizens and local organizations, this information may also result in the design of more effective intervention strategies for reducing the risks posed to children by harmful substances in the home.

A systematic planning effort must accompany any focus group implementation. Effective planning can help provide not only improved results for specific data collection instruments such as a survey questionnaire, but create general improvement within other project tasks.

## **Competing interests**

The authors declare that they have no competing interests.

## **Authors’ contributions**

M.M. Kaufman conceived the study, supervised all aspects of its implementation, and led the writing of the manuscript. S. Smolinske assisted with the study and contributed to the design and analysis of all study components. Both authors helped to interpret findings and review drafts of the manuscript.

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