

# Results of Cognitive Testing of Questions on Exposure to Second-Hand E-Cigarettes

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## I. Introduction

This report summarizes the findings of a cognitive interview study to test questions for use in the National Health and Nutrition Examination Survey (NHANES). NHANES is a program of studies designed to assess the health and nutritional status of adults and children in the United States. The purpose of this testing project was to evaluate questions on second-hand exposure to e-cigarettes.

This evaluation is based on 65 cognitive interviews that were conducted by a team of researchers from the Center for Questionnaire Design and Evaluation Research (CCQDER) at the National Center for Health Statistics in November 2015 and January 2016.

The following report is organized into four sections. Following this initial introduction, Section Two discusses the methods used in this question evaluation study, including the sample selection, sample characteristics, and interviewing procedure. Section Two also summarizes cognitive interviewing methodology and describes how data analysis was conducted. Section Three provides a summary overview of the findings and addresses patterns that are relevant to instrument as a whole. Section Four presents a detailed question-by-question review of the findings. The initial instrument and revisions for the second round of testing are presented in Appendices A and B.

## Methods

*Cognitive Interviewing:* Cognitive interviewing is designed to evaluate items on survey questionnaires through qualitative methods. In particular, cognitive interviewing studies seek to uncover how respondents interpret and respond to questionnaire items based on their particular social and cultural contexts. Further, it can be determined whether these interpretations align with question intent. Findings of a cognitive interviewing project often lead to recommendations for question improvement, provide evidence of question validity and can be used in post-survey quantitative analysis to assist in data interpretation.

Cognitive interviewing studies typically involve in-depth, semi-structured interviews with a small sample of approximately twenty to forty respondents. In these interviews, respondents are first

administered the survey items under evaluation and then answer a series of follow-up probe questions that reveal how respondents arrived at their particular response choices. These probes can be either concurrent (asked with each survey item) or retrospective (asked after all survey items). Through this semi-structured design, various types of question-response problems, such as interpretive errors or recall accuracy, are uncovered.

Sample selection for a cognitive interviewing project is purposive with respondents selected for specific characteristics -- such as race, health status or occupation-- that are relevant to the intended purpose of survey instrument. Because of the small sample size, not all social and demographic groups are represented although an effort is made to maintain a varied sample.

Analysis of cognitive interview data involves a five step process of data synthesis and reduction. Through these steps- conducting the interview, summarizing interview data, comparing across respondents, comparing respondent subgroups and making conclusions- the complexities of the question-response process are understood (Miller, Willson, Chepp, & Padilla, 2014). In this way, it is possible to understand how individual questions perform as well as how questions perform across different subgroups of respondents. This information can be used to improve questions and to validate user end conclusions based on survey data.

*Sample:* A team of researchers from the CCQDER interviewed a total of 65 respondents for two rounds of interviews. The research team recruited a purposive sample of adults over age 18 through newspaper advertisements, email list contacts and flyers. Inclusion criteria included living with someone who uses an e-cigarette or knowing someone who uses an e-cigarette. Because these questions were tested in conjunction with other sets of questions for NHANES, there were additional inclusion criteria related to flexible consumer spending and alcohol use. A screening process was employed over the telephone to determine eligibility for participation. In the first round of testing (November 2015), 31 English and 10 Spanish interviews were conducted. In the second round of testing (January 2016), 19 English and 5 Spanish interviews were conducted. Almost half of all respondents reported having less than a high school diploma. Almost 70% of respondents were Black while 58% were male. Demographics for the full sample are shown in Table 1.

	Round One	Round Two	Total %
<b>Race/Ethnicity</b>			
Asian/American	2	1	4.6
Indian or Alaskan Native			
Black	29	14	66.2
White	8	9	26.2
Multiple	2	0	3.1

<b>Ethnicity</b>			
Hispanic	12	7	29.2
Non/Hispanic	29	17	70.7
<b>Gender</b>			
Male	26	12	58.5
Female	15	12	41.5
<b>Education</b>			
Less than HS	23	7	46.2
HS or GED	8	10	27.7
Some College or more	10	8	27.7
<b>Age</b>			
18-29	5	4	13.8
30-49	14	4	27.7
50-64	20	14	52.3
65+	2	1	4.6

*Interviewing Procedures:* During the interviews intensive retrospective and concurrent verbal probing was used to collect response process data. Video/Audio recordings and written notes of interview summaries were collected and used as the basis of data analysis. Most interviews were conducted face-to-face in the Questionnaire Design Research Laboratory within the CCQDER while some were conducted off-site. Interviews lasted up to 60 minutes and respondents were given \$40 once the interviews were complete.

*Rounds of testing:* Two rounds of testing were conducted. The instrument was evaluated and revised between rounds. During the first round of testing, three questions on second-hand exposure to e-cigarettes were tested. For the second round of testing, one of the questions (on exposure while riding in a car) was deleted. The remaining two questions were revised slightly. Additionally, in Round Two, respondents were asked questions on smoking were asked to provide context. These smoking questions were not included in the analysis but are presented as part of the instrument in Appendix B.

*Data Analysis:* Post-interview analysis was done using Q-Notes, a qualitative software packages designed to facilitate cognitive interview analysis. After each interview was conducted, summary notes for each question were entered into Q-Notes. Summary notes included the way in which a respondent interpreted and processed individual questions, what experiences or perceptions the respondent included as they formulated their answer, and any response difficulties experienced by the respondent. After all interviews and summaries were completed, interviews were compared to identify common patterns of interpretation and response difficulties for each question. Sub-group analysis looked at patterns of interpretation and responses as they varied across different groups

within the sample. Use of Q-Notes for this analytic process ensures systematic and transparent analysis across all cognitive interviews as well as provides an audit trail depicting the way in which findings are generated from the raw interview data.

### **III. Overall Findings**

#### **Preamble**

In the first round of testing the questions were introduced with the preamble:

*Electronic nicotine delivery systems, or ENDS, are battery-operated systems that heat a solution containing nicotine and produce a vapor or aerosol instead of smoke. People use them in a manner that simulates smoking. Examples of ENDS are e-cigarettes, e-hookahs and vape pens.*

There was no evidence that respondents paid attention to this preamble. No respondent indicated familiarity with “ENDS,” but all were familiar with “e-cigarettes” and most with “vape pens.”

In the second round of testing, the questions were simply introduced with the statement, “The next questions are about electronic cigarettes and similar products.” Again, all respondents indicated familiarity with electronic cigarettes. Moreover, in the second round of testing, to provide context, the electronic cigarette questions were asked after a series of questions on regular cigarettes. The shortened preamble was sufficient to shift respondents’ focus from regular cigarettes to e-cigarettes.

#### **Knowledge of E-cigarettes:**

All respondents were familiar with the idea of “e-cigarettes.” Although a couple of respondents had only seen them on television or in stores, most had either tried them or knew someone who smoked them. One respondent described e-cigarettes saying, “It can be like a regular cigarette or a big box. The e-cig has a disposable cartridge and the box ones use the liquid refillable.” Some respondents described them as looking “like a pen” while one said they were like “little sticks you put flavored oils on.” Several respondents noted that e-cigarettes could also be used for smoking marijuana. One said, “The last time I saw it was last week on H Street. I saw a guy with an electronic machine for marijuana.”

Respondents did not agree on whether e-cigarettes were “healthier” than regular cigarettes. Many respondents knew people who used e-cigarettes in place of regular cigarettes either as a healthier alternative or because they were trying to quit smoking regular cigarettes. One respondent said, “They’re supposed to be better because it has no nicotine...although I read somewhere that it does have it [nicotine], so I don’t know.” Other respondents agreed with the respondent who asserted, “E-cigarettes cause more damage than regular ones because they produce more smoke.”

#### IV. Question-by-Question Review

##### **NEW SMQ.1 DURING THE LAST 7 DAYS, WERE YOU IN A PLACE WHERE SOMEONE WAS USING AN E-CIGARETTE, E-HOOKAH, VAPE-PEN OR OTHER SIMILAR ELECTRONIC PRODUCT INDOORS?**

As seen in Figure 1, respondents had to consider several elements of this question when formulating their responses: timeframe, smoking device, location and person. Although most respondents understood these elements as intended, some did not which lead to some response error.

Timeframe	smoking device	location	Person
<ul style="list-style-type: none"><li>• within 7 days</li><li>• longer than 7 days</li></ul>	<ul style="list-style-type: none"><li>• regular cigarette</li><li>• e-cigarette or vape pen</li><li>• hookah</li></ul>	<ul style="list-style-type: none"><li>• indoors</li><li>• out of doors</li></ul>	<ul style="list-style-type: none"><li>• self</li><li>• someone else</li></ul>

Figure 1. Elements of SMQ.1

*Timeframe:* Most respondents, but not all, answered within the timeframe of the last 7 days as specified by the question. Several clarified upon hearing the question, “Last seven days?” Some respondents who attended to the 7 day timeframe answered ‘no’ but noted that they had seen people smoking e-cigarettes longer than 7 days ago. One respondent who answered ‘no’ said, “My friend smokes one of those things, but I haven’t seen him in the last 7 days....it was 3 or 4 months ago.”

A few respondents did not attend to the timeframe specified in the question. These respondents answered ‘yes’ but mentioned seeing people smoking e-cigarettes longer than 7 days prior. One said, “Yeah. My brother used to smoke those, but it got too expensive... He switched back to the regular ones a few months ago.”

*Smoking device:* Although most respondents understood that the question was asking about e-cigarettes, a few answered based on regular cigarettes or hookahs.

Almost all respondents indicated that they knew what an e-cigarette was and could recognize one when they saw it. “It’s like a pen” and “It’s a small box that you put some liquid in” were common ways that respondents described e-cigarettes.

A few respondents answered 'yes' based on seeing people smoking regular cigarettes. One respondent said, "My mom, my sister and I, we all smoke cigarettes. In the house. All the time." When asked if they smoked e-cigarettes, the respondent said, "Nah. We don't smoke that kind. Just the regular ones."

Three respondents were thrown off by the term *e-hookah*. They answered 'yes' because they had been in hookah bars within the last 7 days. All three later clarified that there were regular hookahs, not e-hookahs, in the hookah bars.

*Location:* Although a few respondents answered about smoking outdoors, most respondents understood that the question specified "indoors." These respondents answered 'no' if they had seen someone smoking an e-cigarette outside. One respondent said, "No. Not indoors..." This respondent described "a gentleman smoking an e-cigarette" outside his apartment building. Respondents thought about people smoking e-cigarettes in their houses, in their friends' houses, at work, in cars and in restaurants.

A few respondents did not pay attention to the location specified in the question and answered 'yes' even if the person they saw smoking was outside. One respondent described seeing someone smoke an e-cigarette in a state park. Another said, "People always using it while waiting for the bus."

*Person:* The question asks if the respondent has been in a place where SOMEONE was smoking an e-cigarette. Almost all respondents understood this to mean someone ELSE. However, a couple of respondents thought about themselves and answered 'yes' because they had smoked an e-cigarette indoors within the past 7 days.

**Spanish:** Spanish-speaking respondents answered similarly to English-speaking respondents. A single respondent was not familiar with a "Pluma estilo de fumar electrónica" but was able to guess what it was. Although there were some comments on the Spanish translation, all were able to understand the question well enough to formulate an appropriate response. Among comments on the translation, were a preference for "Que calientan una solucion que contiendo nicotina" rather than "Que calientan una solucion que contiene nicotina," "Una solucion que contiene" rather than "Una solucion conteniendo" and "Para hacer de cuenta que fuman" rather than "En manera de similar fumar" (pretending to smoke).

**New SMQ. X During the last 7 days, were you riding in a car or motor vehicle where someone was using an e-cigarette, e-hookah, vape-pen or other similar electronic products?**

This question was only asked in Round One of testing. Respondents answered based on whether they had ridden with someone who was using an e-cigarette. Almost all respondents attended to the 7 day timeframe and almost all were thinking of others rather than themselves. However, one respondent answered 'yes' because she had ridden in a car with her uncle two months ago when he was smoking an e-cigarette and a single respondent answered 'yes' because he had smoked an e-cigarette while driving within the last 7 days.

**Spanish:** Spanish-speaking respondents answered similarly to English-speaking respondents.

**NEW SMQ.2** During the last 7 days, did you breathe the vapor from someone else who was using an e-cigarette, e-hookah, vape-pen or other similar electronic product in a public or private place?

As with the previous two questions, most, but not all, respondents attended to the 7 day timeframe.

In the first round of testing, the question referred to e-cigarettes in a “public or private” place. This wording resulted in respondents thinking about both indoor and outdoor places including houses, businesses, cars, parks, bus stops and sidewalks. One respondent asked, ““So public? That’s outdoors?” Another answered ‘no’ although she had breathed e-cigarette vapor at home. She explained her response saying, “You said ‘public’ like Starbucks or a restaurant.” The question was revised for Round Two to refer only to e-cigarettes “indoors.” With this revised wording, almost all respondents limited their answers to inhaling e-cigarette vapor indoors.

Some relied on the smell to know whether they had inhaled the vapor saying that the vapor smells “fruity” or “with a really strong tobacco smell.” One respondent explained how she knew that she had inhaled the vapor from her boyfriend’s e-cigarette, “When I walk in and he be cooking [vaping], I smells it.” However, other respondents claimed that e-cigarettes have no smell. One respondent said, “I can smell food, so I think I have a good sense of smell but I can’t notice the e-cigarette even in the other room.” A few respondents indicated that they did not breathe the vapor (answered ‘no’) even though they had smelled it.

In the absence of smell, some respondents relied on the sight of the vapor saying that they could see a “a big cloud of puff” or “a lot of that smoke stuff.” One respondent answered ‘yes’ describing how his friend comes over and smokes an e-cigarette, “A lot of smoke comes out. It’s like a chimney. I see all that, so I know I must breathe it in.”

Still others based their responses on their proximity to e-cigarettes. One respondent said, “I may have. Say yes. I wasn’t too far away from the person.” Another said, “I had to because I was in the same room while they were smoking.” Similarly a third respondent said, “I don’t think so. I wasn’t that close to it.”

A few respondents indicated uncertainty. One said, “I don’t know...I don’t know how fast it precipitates in the air, but if it’s like cigarettes, I breathed it.” This respondent, answered ‘yes,’ but other respondents who weren’t sure answered ‘no’ assuming that they hadn’t since they didn’t notice anything. For example, one said, “Well, sitting in the car, I probably did, but there was no effect.”

**Spanish:** Spanish-speaking respondents answered similarly to English-speaking respondents.

## Works Cited

Miller, K., Willson, S., Chepp, V., & Padilla, J.-L. (2014). *Cognitive Interviewing Methodology: A Sociological Approach for Survey Question Evaluation*. Hoboken, NJ: Wiley.



**Appendix A. Instrument Round One**

**ENGLISH VERSION**

Electronic nicotine delivery systems, or ENDS, are battery-operated systems that heat a solution containing nicotine and produce a vapor or aerosol instead of smoke. People use them in a manner that simulates smoking. Examples of ENDS are e-cigarettes, e-hookahs and vape pens.

NEWSMQ.1 During the last 7 days, were you in a place where someone was using an e-cigarette, e-hookah, vape-pen or other similar electronic product indoors?

- YES..... 1
- NO..... 2
- REFUSED..... 7
- DON'T KNOW..... 9

NEWSMQ.X During the last 7 days, were you riding in a car or motor vehicle where someone was using an e-cigarette, e-hookah, vape-pen or other similar electronic products?

- YES..... 1
- NO..... 2
- REFUSED..... 7
- DON'T KNOW..... 9

NEWSMQ.2 During the last 7 days, did you breathe the vapor from **someone else** who was using an e-cigarette, e-hookah, vape-pen or other similar electronic product in a public or private place?

- YES..... 1
- NO..... 2
- REFUSED..... 7
- DON'T KNOW..... 9

## SPANISH VERSION

Los sistemas electrónicos de administración de nicotina (SEAN, por su sigla en español) son sistemas que funcionan con pilas que calientan una solución que contiene nicotina. Producen un vapor o aerosol en lugar de humo. La gente los usa de un modo que simula la acción de fumar. Los cigarrillos electrónicos, las hookahs electrónicas y las plumas electrónicas son ejemplos de sistemas electrónicos de administración de nicotina.

NEWSMQ.1 En los últimos 7 días, ¿estuvo {usted/SP} en un lugar o recinto cerrado donde alguien estaba fumando un cigarrillo electrónico, una hookah electrónica, una pluma electrónica u otro producto electrónico similar?

YES.....	1
NO.....	2
REFUSED.....	7
DON'T KNOW.....	9

NEWSMQ.X En los últimos 7 días, ¿viajó {usted/SP} en un automóvil u otro vehículo dentro del cual alguien estaba fumando un cigarrillo electrónico, una hookah electrónica, una pluma electrónica u otro producto electrónico similar?

YES.....	1
NO.....	2
REFUSED.....	7
DON'T KNOW.....	9

NEWSMQ.2 En los últimos 7 días, ¿respiró el aerosol o vapor de **otra persona** que estaba fumando un cigarrillo electrónico, una hookah electrónica, una pluma electrónica u otro producto electrónico similar en un lugar público o privado?

YES.....	1
NO.....	2
REFUSED.....	7
DON'T KNOW.....	9

**Appendix B. Instrument Round Two**

**ENGLISH VERSION**

Gray questions are only for context..

These next questions are about cigarette smoking. Then I will ask about other tobacco products.

SMQ.022 {Have you/Has SP} smoked at least 100 **cigarettes** in {your/his/her} entire life? This hand card shows you the products we would like you to include and not include when answering this question.

- YES ..... 1
- NO..... 2
- REFUSED..... 7
- DON'T KNOW ..... 9

SMQ.040 {Do you/Does SP} **now** smoke cigarettes . . .

- every day, ..... 1
- some days, or ..... 2
- not at all?..... 3
- REFUSED..... 7 (SMQ.890)
- DON'T KNOW ..... 9 (SMQ.890)

SMQ.890 {Have you/Has SP} **ever** smoked a regular cigar, cigarillo or little filtered cigar **even one time**? This hand card shows examples of some cigars; however there are others not included here.

- YES ..... 1
- NO..... 2 (SMQ.900)
- REFUSED..... 7 (SMQ.900)
- DON'T KNOW ..... 9 (SMQ.900)

SMQ.900 The next question is about e-cigarettes. These are battery-powered devices that usually contain liquid nicotine, and don't produce smoke

{Have you/Has SP} **ever** used an e-cigarette **even one time**? This hand card shows examples of some e-cigarettes and other devices used to inhale liquid nicotine; however there are others not included here.

- YES ..... 1
- NO..... 2
- REFUSED..... 7
- DON'T KNOW ..... 9

SMQ.856 I will now ask you about tobacco smoke in other places.

During the last 7 days, {were you/was SP} working at a **job or business outside of the home**?

YES .....	1
NO.....	2 (SMQ.860)
REFUSED.....	7 (SMQ.860)
DON'T KNOW .....	9 (SMQ.860)

SMQ.858 While {you were/SP was} **working at a job or business outside of the home**, did someone else smoke cigarettes or other tobacco products indoors?

YES .....	1
NO.....	2
REFUSED.....	7
DON'T KNOW .....	9

SMQ.860 {I will now ask you about smoking in other places.} During the last 7 days, did {you/SP} spend time in a **restaurant**?

YES .....	1
NO.....	2
REFUSED.....	7
DON'T KNOW .....	9

SMQ.862 While {you were/SP was} in a **restaurant**, did someone else smoke cigarettes or other tobacco products indoors?

YES .....	1
NO.....	2
REFUSED.....	7
DON'T KNOW .....	9

SMQ.866 During the last 7 days, {did you/SP} spend time in a **bar**?

YES .....	1
NO.....	2 (SMQ.870)
REFUSED.....	7 (SMQ.870)
DON'T KNOW .....	9 (SMQ.870)

SMQ.868 While {you were/SP was} in a bar, did someone else smoke cigarettes or other tobacco products indoors?

YES ..... 1  
NO..... 2  
REFUSED..... 7  
DON'T KNOW ..... 9

NEW SMQ.1 The next questions are about electronic cigarettes and similar products.

During the last 7 days, were you in a place where someone was using an e-cigarette, e-hookah, vape-pen or other similar electronic product indoors?

YES ..... 1  
NO..... 2  
REFUSED..... 7  
DON'T KNOW ..... 9

NEW SMQ.2 . During the last 7 days, did you breathe the vapor from someone else who was using an e-cigarette, e-hookah, vape-pen or other similar electronic product indoors?

YES ..... 1  
NO..... 2  
REFUSED..... 7  
DON'T KNOW ..... 9

INTERVIEWER: “indoors” refers to any public or private space. Questions refer to being around OTHERS using e-cigarettes not use of e-cigarettes by the respondent.

**SPANISH VERSION**

NEW SMQ. 1 Durante los últimos 7 días, ¿{estuvo usted/estuvo SP} en un lugar donde alguien estaba usando un cigarrillo electrónico, hookah electrónica, pluma estilo de fumar electrónica, u otro producto electrónico parecido?

YES..... 1  
NO..... 2  
REFUSED..... 7  
DON'T KNOW..... 9

NEW SMQ.2 Durante los últimos 7 días, ¿{estuvo usted/estuvo SP} en un automóvil o vehículo de motor donde alguien estaba usando un cigarrillo electrónico, hookah electrónica, pluma estilo de fumar electrónica, u otro producto electrónico parecido?

YES..... 1  
NO..... 2  
REFUSED..... 7  
DON'T KNOW..... 9