

# **Testing of DOH Dental Health Questions Results of Interviews Conducted September 2009-March 2010**

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## **Introduction**

This report summarizes the findings from a research project designed to evaluate questions on dental health for the 2011-2012 home interview portion of the National Health and Nutrition Examination Survey (NHANES). This evaluation is based on two rounds of interviews that were conducted in the Questionnaire Design Research Laboratory (QDRL) at the National Center for Health Statistics (NCHS). The project was funded by the Division of Oral Health (DOH) at the National Center for Chronic Disease Prevention (NCCDPHP).<sup>1</sup>

Questions were evaluated using cognitive interviewing, a methodology used to uncover potential response problems that may not be readily apparent (Willis 2005). Cognitive interviewing can also be used to depict the meaning of the data that is captured in survey questionnaires (Miller 2009). The main goals of the project were to: 1) assess respondents' interpretation of the survey questions and gain a better understanding of the processes respondents engaged in when responding to the questions and 2) identify any potential question response problems that could lead to error in the survey data. If identified response problems were fix-able, questions were altered and re-examined.

The following section outlines the cognitive testing methodology and describes how analysis of the data was conducted. In the end, one round of interviews was conducted, and then questions were changed to improve their performance. Another round of interviews was then conducted to test the revised questions. The final section of the report provides a question-by-question summary of the findings from both rounds of testing as well as how the questions were revised.

## **Methodology**

### *Sample*

Two rounds of cognitive interviews were conducted. For both rounds, a purposive sample of respondents was recruited using newspaper advertisements, flyers, word-of-mouth, or by contacting participants from past QDRL projects. We attempted to recruit a diverse group of respondents in terms of race, gender, and socioeconomic statuses in both rounds of testing, however, the sample from Round 1 predominately consisted of low income, African American males, who were over the age of 35 (See Table 1). The sample from this round was, however,

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<sup>1</sup> Questions regarding smoking cessation were also tested during this project; however results are not presented here.

almost evenly split in terms of education, with 42% of the sample having a high school degree or less, and 58% having higher than high school education. As in Round 1, respondents from Round 2 were also predominately older and African American. However, this sample was predominately female and the majority of respondents had at least a high school education. Additionally, 46 percent of the respondents in Round 2 reported an income of \$20,000 or less and 54 percent reported an income of more than \$20,000.

**Table 1: Demographic summary of respondents in total and for each round of testing**

	Round 1	Round 2	Total(%)
	n=12	n=13	N=25
<b>Age</b>			
Under 35	2 (17%)	2 (15%)	4 (16%)
35 & Over	10 (83%)	11 (85%)	21 (84%)
<b>Gender</b>			
Female	3 (25%)	9 (69%)	12 (48%)
Male	9 (75%)	4 (31%)	13 (52%)
<b>Race/Ethnicity</b>			
Hispanic	0 (0%)	0 (0%)	0 (0%)
NH-White	1 (8%)	3 (23%)	4 (16%)
NH-Black	10 (83%)	9 (69%)	19 (76%)
Multi-racial	1 (8%)	0 (0%)	1 (4%)
DK	0 (0%)	1 (8%)	1 (4%)
<b>Education</b>			
High school or less	5 (42%)	2 (15%)	7 (28%)
More than high school	7 (58%)	11 (85%)	18 (72%)
<b>Income</b>			
Under 20,000	8 (67%)	6 (46%)	14 (56%)
20,000 and over	2 (17%)	7 (54%)	9 (36%)
DK	2 (17%)	0 (0%)	2 (8%)

### *Interviewing Procedures*

Questions were tested across two rounds of cognitive interviews. Cognitive interviewing is a qualitative question evaluation method used to uncover potential response errors that can occur during the question response process and that may not be readily apparent. These include problems with comprehension, recall, decision processes, and the mapping of response onto the survey question (Willis 2005; Tourangeau, Rips, and Rasinski 2000). Additionally the method can be used to determine the validity of survey questions; that is whether questions measure the constructs they were intended to capture (Miller, 2009). The questions were revised based on findings found in Round 1 and tested again in Round 2. Copies of the questionnaires used can be found in Appendices A and B.

All interviews were an hour long and respondents were paid \$40 for participating. During the interviews, retrospective, intensive verbal probing was used to collect response process data, that is, respondents were first administered the questionnaire in its entirety, and then interviewers returned to each question for retrospective probing. Probe questions included such things as: Why did you answer the way you did? Can you tell me more about that? What do you think this question is asking? All interviews were videotaped; the videos and interview summaries were used to conduct the analysis.

### *Data Analysis*

Data from the interviews were analyzed using qualitative techniques, specifically, the constant comparative method (Lincoln and Guba, 1985; Strauss and Corbin, 1990; Creswell, 1998). Analysts used Q-Notes, an analysis software tool developed by the National Center for Health Statistics. As data were entered into the Q-Notes software, patterns of question interpretation and cognitive processing problems were identified. The first step of data analysis, open coding, entailed reviewing the data and naming and defining the analytic categories found in the data. Next, we performed axial coding, which involved refining the themes/categories that emerged from open coding. In order to specify the dimensionality of the themes/categories we compared respondents, whose narratives were assigned similar themes/categories, resolving any discrepancies between the themes/categories and noting similarities. Additionally, we examined the relationship of the themes/categories to each other. Finally we performed selective coding, which involved specifying the core themes that emerged from the analysis. These core themes served as the unifying link between all the themes/categories, and denoted a working theory that depicts the phenomena captured by the survey questions.

### **Summary of Findings**

Questions were tested across two rounds. Based on findings in Round 1 of testing, questions were revised and tested again in Round 2. Overall the revised questions appeared to produce data that better matched what the sponsors were interested in capturing. The majority of respondents understood the questions and appeared to provide valid responses. Additionally, respondents appeared to adhere to the reference period specified in all questions and, respondents considered a wide variety of dental professionals when answering. However, some problematic patterns in the response process persisted across the two versions of these questions, which may lead to some response error in the survey data. We, however, believe that, for the most part, these problems can be easily addressed.

The first theme that emerged from the evaluation of these questions was that some respondents had difficulty adhering to the dental context when answering these questions, particularly when they had not had these types of discussion with dental health providers, but had in other medical settings. For example, some respondents reported during probing that their medical doctors had spoken with them about quitting smoking, having their blood sugar level checked as well as the links between smoking and using other tobacco products and oral cancer, but their dentists had not. Additionally, many respondents did not associate smoking cigarettes and having their blood sugar levels with their dental health. While for the majority of these respondents, the questions appeared odd but did not lead to response error, in some cases this lack of understanding led to false positive responses.

A more significant problem found with series of questions is that they assume that the respondent has seen a dentist in the past year. In fact, some respondents had not seen a dentist or any other dental professional for five years or more. Therefore, a response of “no” from this group of respondents to any of the three questions is a fundamentally different “no” response, than a response of “no” from respondents who had seen their dentist in the past year and whose dentist had not spoken to them about quitting smoking/using tobacco products, having their blood sugar checked, or checking their mouth for oral cancer.

Finally, the first question in the series also presumes that respondents smoke cigarettes or use other tobacco products. Asking this question of nonsmokers, who most likely have not had a discussion with their dentist about quitting smoking/using tobacco products, is likely to lead to missing data or response error.

We feel that most of these issues can be easily addressed by small changes in the questionnaire and in question administration. First, we recommend that the survey sponsor encourage field interviewers to read the full question every time. Questions that are formatted in this manner are often not administered consistently as it is not clear whether the question stem should be repeated in each administration of the question in the series. Even in our own interviews, interviewers did not consistently read the question stem every time. Repeating the question stem may encourage respondents to adhere not only to the reference period stated in the questions, but also the dental health context of the questions when answering. Doing so may not completely eliminate respondents’ perceptions of these questions as odd; however, it may encourage respondents to only consider their experiences within a dental context, rather than a medical context.

We also recommend considering the addition of two filter questions to the questionnaire. First, a filter question, which asks respondents if they have been to the dentist in the past 12 months, should precede all three of these questions. This should eliminate problems that may result because of the underlying assumption in these questions that respondents have been to the dentist in the past year. A second filter question is needed before the first question in the series, which asks respondents if they smoke or use other types of tobacco products. Skipping nonsmokers to the second question should eliminate the confusion they experience and lessen the chances of response error. However, if nonsmokers are intended to receive this question, revisions may be needed to improve comprehension. A more detailed description of the findings from the evaluation of these questions is presented below in the question-by-question review.

## Question by Question Review

### Round 1 Qa:

**In the past 12 months, has a dentist, dental hygienist or other dental professional spoken with you about...**

**...quitting cigarette smoking or stopping using tobacco to improve your dental health?**

- Yes**
- No**

Respondents appeared to adhere to the specified reference period when answering this question. Respondents also considered a variety of dental professionals including dentists, dental hygienists, orthodontists and/or oral surgeons. Most respondents only smoked cigarettes, however one respondent indicated that he smoked cigarettes and used chewing tobacco, and he considered both types of tobacco products when answering.

Three respondents, who answered “yes” to this question, were probed on the types of information they received from their dentists or other dental professionals regarding how quitting smoking or stopping using tobacco could improve their dental health. Respondents were told by their dentists and other dental professionals that if they did not stop smoking their teeth may yellow, and they could develop gum disease or oral cancer. Additionally, one respondent who considered a recent visit with an oral surgeon when answering, was told that smoking could increase the length of time it would take her gums to heal post surgery, and for that reason she should stop smoking.

Respondents who answered “no” were probed to see if they ever had any type of discussion with their dentist or other dental professional regarding quitting smoking or using tobacco. One respondent, who answered no, reported that her dentist had asked if she smoked but he did not have a discussion with her about quitting. However, upon further probing she revealed that her hygienist had also told her that she could tell she was a smoker and that she should stop smoking but her hygienist did not discuss with her *why* she should stop. A couple of respondents mentioned that their dentists or other dental health professionals had never had any kind of discussion with them regarding smoking, including asking if they smoke. In fact, several respondents in this round mentioned that they didn’t think their dentists even knew that they smoked.

A few minor problems did emerge in the testing of this question. First, this question seemed odd to one respondent who does not smoke. Upon initially hearing the question he stated, “No, but I don’t smoke.” This respondent later mentioned that his dentist has asked him if he smokes, however, because he doesn’t smoke, this was the end of the conversation.

There was also some concern of false positives occurring in the field, as this question prompted numerous respondents to report that their dentists had asked if they were smokers upon hearing the question, despite the fact that their dentists had not spoken with them about quitting to improve their dental health. One respondent also discussed during probing that his dentist has asked him if he is a smoker on the forms that he fills out prior to his appointments, however his dentist has never had a conversation with him about smoking.

Finally, interviewers found this question difficult to administer. Interviewers found the phrase “quitting cigarette smoking or stopping using tobacco” difficult to read aloud, and would often have to read the question a second time to respondents.

The question was revised in order to deal with these last two issues. First, by substituting “spoken with you” with “have a direct conversation with you” we hoped to place more emphasis on the discussion of quitting smoking, rather than simply being asked if one smokes. The sponsors indicated after the first round of interviewing that they were specifically interested in capturing incidents where patients have had an actual conversation with their dental health professional about quitting smoking; they did not wish to capture situations where patients were merely asked if they smoked. Second, by substituting “quitting cigarette smoking or stopping using tobacco” with “the benefits of giving up cigarettes and other types of tobacco” we hoped to eliminate the difficulty interviewers were experiencing when administering this question.

### **Round 2 Qa:**

**In the past 12 months, did a dentist, hygienist or other dental professional have a direct conversation with you about...**

**... the benefits of giving up cigarettes or other types of tobacco to improve your dental health?**

- Yes**
- No**

As we mentioned previously, sponsors indicated that they wanted this question to identify moments where patients have had actual, “direct” conversations with their dental health professionals about giving up cigarettes. They also indicated that they wanted these conversations to involve specifically discussing the benefit to one’s *dental* health by giving up cigarettes and other types of tobacco. In this respect, the revision of this question appeared to work well and more successfully captured the intent of the question, however some problems did remain and are discussed below. Interviewers also found this version easier to administer, and respondents also appeared to have fewer problems when answering this question. As in the previous round, respondents in this round also appeared to adhere to the specified reference period when answering and respondents considered both dentists and oral surgeons when answering this question. All respondents in this round of testing smoked cigarettes, however, none reported using other types of tobacco.

Respondents who answered “yes” to this question were probed on the types of information they received from their dentists or other dental professionals regarding the dental health benefits of quitting smoking or using tobacco. As in Round 1, these respondents’ dentists provided them with a range of reasons for why they should stop smoking. For example, one respondent only recalled being told by his dentist that smoking was bad for his teeth and that if he stopped he would not have as much tartar buildup. A number of other respondents reported that their dentists had told them that they should stop smoking, as it could lead to cancer, including oral cancer. Two respondents, who answered “yes” to this question, considered oral surgeons when answering. One of these respondents reported that her surgeon told her she should stop smoking prior to oral surgery to improve her breathing, and the other respondent

reported that she was told to stop smoking because smoking increases the time it takes to heal post surgery.

Respondents who answered “no” were probed on their response and these respondents gave a variety of reasons for why they answered no. As in the first round of testing, one respondent indicated that he did not think his dentist even knew that he smoked. Additionally, two respondents, (one who considered an oral surgeon and one who considered a dentist) reported that they answered no to this question because their dental health provider had encouraged them to quit smoking but hadn’t elaborated on how doing so could improve their dental health.

A few problems did emerge in the testing of this question. First, some respondents appeared to be initially confused when hearing this question for the first time, as their medical doctors had spoken with them about quitting smoking to improve their dental health, but not their dentists per se, nor other dental professionals. For example, when upon hearing this question for the first time one respondent initially replied, “My doctor did.” However, after hearing the question a second time this respondent answered “no” and reported that he was thinking about his dentist when answering. A couple of other respondents also indicated that their doctors, not their dentists, had spoken with them about giving up cigarette smoking, but not necessarily to improve their dental health. However, both of these respondents did appear to consider their dentists in their final response and that response appeared to be correct.

Finally, this question assumes that respondents have been to a dentist in the past 12 months. In fact, three respondents from this round of testing reported that they had not been to a dentist in the past year.

### **Round 1 Qb:**

**In the past 12 months, has a dentist, dental hygienist or other dental professional spoken with you about...**

**...having your blood sugar checked to improve your dental health?**

- Yes**
- No**

Once again, respondents considered a variety of dental professionals when answering this question, including dentists, dental hygienists, orthodontists and/or oral surgeons and respondents appeared to adhere to the specified reference period.

Only one respondent answered “yes” to this question, however, his response was not probed due to time constraints. Respondents who answered “no” verified during probing that their dentists or other dental professionals had never spoken to them about their blood sugar level and having it checked to improve their dental health. Only one respondent could recall ever having his blood sugar level checked during a dental visit and he stated that this was done prior to having a root canal.

Finally, one respondent thought this was an odd question to be asked during a dental survey, however, he was able to provide a valid response.

“I didn’t understand what having my blood sugar checked had to do with my dental health at all. I mean no dentists or my primary care physician has ever

asked me to check my blood sugar to equate it to my dental health. So I had absolutely no understanding about that question, why this is included in the survey... I understand the question perfectly. I just don't understand why you're asking it."

This question was changed in Round 2 in an attempt to eliminate any confusion, specifically by re-writing the question to emulate the previous question and by putting "dental health benefits" in the beginning. Because sponsors were interested in capturing moments where respondents had actual conversations with their dental health providers about having their blood sugar checked as well as the specific dental health benefits that result from doing so, the question was rewritten in Round 2 in an attempt to better capture this intent.

### **Round 2 Qb:**

**In the past 12 months, did a dentist, hygienist or other dental professional have a direct conversation with you about...**

**... the dental health benefits of checking your blood sugar?**

- Yes**
- No**

The revision of this question did appear to eliminate some of the confusion respondents were experiencing; however, other problems remained. First, there was some indication of false positive responses occurring among respondents who did not understand the association between their blood sugar levels and their dental health. Because the respondents' difficulty comprehending this question is related to respondents' experiences (or lack of) in dental settings the addition of the clause "have a direct conversation with you" did not completely resolve the issue. Second, the underlying assumption in the question that respondents had been to a dentist in the past year, made it difficult for one respondent to provide a response.

As in the previous questions respondents considered dentists and oral surgeons when answering. Only two respondents answered "yes" to this question. When probed on this question, one respondent, who answered yes, could recall having her blood sugar checked at the dentist and receiving information from her dentist regarding being diabetic and taking care of her mouth. However, she could not recall any specific information her dentist provided her regarding the dental health benefits of checking her blood sugar. The other respondent who answered "yes" to this question appeared to answer incorrectly. This respondent needed to have the question repeated, and then asked "my blood sugar? Glucose? See the dental is what- You said dental or hygienist." She then quickly answered "yes." When probed on her response she stated that a dental professional had never spoken with her about the dental benefit of having her blood sugar checked but her primary care doctor had. As in the previous round of testing this respondent and others thought this question was odd, as they didn't associate having their blood sugar checked with their dental health. However, because their medical doctors have spoken to them about this, they recall these incidents when answering, rather than considering their experiences in dental contexts.

The remaining respondents all answered "no" to this question. These respondents generally reported that a dental health professional had never spoken with them about having



their blood sugar checked, nor had they ever heard of a relationship between blood sugar and their dental health.

Finally, the assumption that respondents have seen a dentist or other dental professional in the past 12 months was problematic for one respondent. When he was first administered this question he stated, “I don’t have health insurance so...” The last time this respondent had been to the dentist was over 20 years ago, making it difficult for him to provide a response to this question. This respondent eventually answered no, however, his response of “no” has different meaning from those respondents who had seen a dentist in the past 12 months but whose dentists had not spoken with them about quitting smoking.

### **Round 1 Qc:**

**In the past 12 months, has a dentist, dental hygienist or other dental professional spoken with you about...**

**...looking inside your mouth to check for oral cancer?**

- Yes**
- No**

One respondent, who answered “yes” to this question discussed during probing how his dentist had warned him about the link between cigarette smoking and oral cancer, and that his dentist had checked his mouth for oral cancer. He said, “He looked in my mouth, took a swab, took small samples.” However, this respondent made no mention of his dentist or other dental professional instructing him to check his own mouth for oral cancer. Two respondents, who answered “no” to this question, were also probed on their response. Both of these respondents reported that they assumed that their dentists had checked their mouth for oral cancer during routine visits but neither of their dentists told them they were checking for oral cancer nor did they have any conversation with them regarding checking their own mouth for oral cancer.

Because many respondents reported on instances where their dentist had checked their mouth for oral cancer, but did not report having discussions with dentists regarding checking their own mouth for oral cancer, we were concerned that this could lead to false positive in the survey data. Therefore, we revised the question by replacing the term “spoken with you about looking inside your mouth” with “have a direct conversation with you about the importance of examining your mouth.”

### **Round 2 Qc:**

**In the past 12 months, did a dentist, hygienist or other dental professional have a direct conversation with you about...**

**... the importance of examining your mouth for oral cancer?**

- Yes**
- No**

As with parts (a) and (b) of this question, revising part (c) so that it asked respondents specifically about a “direct conversation” appeared to yield better results. However, some problems remained. It is still unclear if the question is asking the respondents whether they or their dental health professionals (or perhaps both) should be the ones examining their mouths for oral cancer. Sponsors should determine specifically what they wish to measure and then make this intent more explicit. Respondents considered both dentists and oral surgeons when answering, with the exception of one respondent, who did not consider any kind of dental professional when answering. For the most part respondents appeared to adhere to the stated reference period, however, one respondent did not report on an experience that occurred approximately 12 months prior to the interview and it was unclear if he should have. Finally, there was some evidence that respondents who had not seen a dentist in the past 12 months may shift the context of question when answering, leading to response error.

Only three respondents answered “yes” to this question. One respondent who answered “yes” indicated during probing that her dentist had encouraged her to check her own mouth for cancer and told her specific signs to look for:

“Well because I hadn’t quit smoking as she suggested, she suggested that I look for certain signs... she always look for them, but because I’m not going to her like every month that I also look for certain signs, also sores, extreme redness of my gums and tongue, any sores inside my cheeks she told me to look for.”

However, the two other respondents who also answered “yes” to this question appeared to answer incorrectly. When probed on her response, one respondent indicated that her dentist only discussed with her the importance of getting regular dental checkups, but had not discussed checking her mouth for cancer. Conversely, another respondent, who answered “yes” to this question, reported that he had conversations about checking his mouth for oral cancer and other dental health issues, but not with a dental health professional. Upon hearing this question for the first time this respondent stated, “I’ve had discussions with my daughter.” When pushed to choose from the response options provided he stated, “I mean I’ve discussed it so I really can say yes.” This respondent had not been to a dentist in over 20 years, and because of this, the question was not relevant to his own experiences. In order to answer this question, he shifted the subject of the question stem (i.e. dental health professional) to his daughter to make the question more relevant to his experiences.

The remaining respondents all answered “no” to this question. When probed on why they answered “no,” these respondents generally reported that a dentist or other dental professional had never spoken to them about checking their mouth for oral cancer, nor were they aware of dentists (or other dental professionals) checking their mouths for oral cancer during visits.

Finally, one respondent reported that he was confused by this question. Upon first hearing the question he stated, “just to get checkups every six months. I don’t know if that was for oral cancer or not. I don’t know how to answer that question. I’m sure they check for that. I guess they do.” When pushed to choose a response he stated, “I would say no, because I can’t remember having a conversation specifically about cancer of the mouth.” However, later during probing this respondent reported that he had seen a different dentist about 12 months ago who had in fact discussed with him the risks of oral cancer from smoking cigarettes and how to check his own mouth for cancer. He did not initially think of this dental appointment when answering

as it was not his most recent dental experience. However, this dental visit may have fallen within the specified reference period and in that case, the respondent should have answered “yes.”

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## Appendix A: Round 1 Questionnaire

In the past 12 months, has a dentist, dental hygienist or other dental professional spoken with you about...

- a. ...quitting cigarette smoking or stopping using tobacco to improve your dental health?
  - Yes
  - No
  
- b. ...having your blood sugar checked to improve your dental health?
  - Yes
  - No
  
- c. ...looking inside your mouth to check for oral cancer?
  - Yes
  - No

## Appendix B: Round 2 Questionnaire

In the past 12 months, did a dentist, hygienist or other dental professional have a direct conversation with you about...

a ... the benefits of giving up cigarettes or other types of tobacco to improve your dental health?

- Yes
- No

b... the dental health benefits of checking your blood sugar?

- Yes
- No

c... the importance of examining your mouth for oral cancer?

- Yes
- No