

## RESPONDENT BIAS IN THE COLLECTION OF ALCOHOL AND TOBACCO DATA IN AMERICAN INDIANS: THE STRONG HEART STUDY

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*Abstract: This study addresses the impact of assessment method (interviewer-administered questionnaire vs. self-administered questionnaire) and interviewers' demographic characteristics (gender, ethnicity, and residency) on responses to alcohol and tobacco questions. The study population included 1,522 men and women aged 45 to 74 from the Dakota Center of the Strong Heart Study (SHS), a multicenter study of cardiovascular disease in American Indians. Assessment method effects were greater for alcohol than tobacco but did not differ by interviewer characteristics.*

Smoking and alcohol use/abuse are important risk factors for many health problems, and they need to be assessed as accurately as possible in health research to determine their true associations with disease. Exposure to both of these risk factors is often under-reported, and 'gold standards' for exposure are non-existent for alcohol or, in the case of cotinine for smoking, are expensive. While participants may give more accurate answers on a self-administered questionnaire, trained interviewers may be able to obtain more accurate answers by probing research participants. Similarly the interviewer's ethnicity and community of residence may influence the accuracy of responses. On one hand, when the participant and the interviewer are from the same community or are of the same ethnic group, communication may be easier. On the other hand, the participant may provide more accurate information on sensitive topics such as alcohol and tobacco to strangers.

Relatively little scientific evidence is available on whether an interviewer's gender, ethnicity, and residency can influence a participant's response to survey questions in an epidemiological study. Webster (1996) analyzed "the simultaneous effects of Hispanic and Anglo interviewer and respondent ethnicity and gender on response quality" and found that men

misconstrue sensitive item answers when questioned by women, whereas female respondents are unaffected by interviewer gender (p. 62). Webster (1996) also discovered Hispanic and Anglo respondents to be unaffected by ethnicity of the interviewer when asked sensitive questions. However, Wardrip's (1979) study of race of interviewer effects found response bias among both African American and Caucasian respondents on racial questions. Caucasian respondents gave African American interviewers more socially acceptable answers on racial questions than African Americans gave Caucasians. Wardrip (1979) stated that, "Self-administered questionnaires appear capable of overcoming to a great extent race-of-interviewer biasing effects on racial questions among whites but not among blacks" (p. 6038-A). Hochstim's (1967) study data found mail self-administered questionnaires elicited a substantially higher frequency of alcohol consumption in women than face-to-face interviews (interviewer-administered questionnaires). Weeks' (1981) study found responses to non-sensitive questions in American Indian children not to be affected by ethnicity of the interviewer. Aquilino and LoSciuto (1990) stated that, "minorities in general appear more prone than Whites toward socially desirable responding in sensitive surveys, regardless of interview characteristics" (p. 387). To our knowledge, data related to respondent bias in studies of middle and older aged American Indians are nonexistent. As increasing emphasis is placed on racial and ethnic representation in population-based studies, researchers are confronted with how best to design studies and collect data in populations with whom they have had little experience.

This study examines respondent bias in American Indian participants, as it relates to assessment method and interviewer characteristics. Respondent bias was defined as the tendency of a respondent's behavior to be influenced by his/her perspectives, anticipations, and feelings toward the interviewer and assessment method (Warwick, 1975). The impact of assessment method (interviewer-administered questionnaire vs. self-administered questionnaire) on responses to alcohol and tobacco questions was examined in this study. In addition, the effect of interviewers' demographic characteristics (gender, ethnicity, and residency) on participants' responses to alcohol and tobacco questions is assessed. In the participant communities, inquiries about alcohol consumption may be more sensitive than those about cigarette smoking. Respondents feel intimidated by questions relating to heavy drinking when compared to social drinking, since heavy drinking is perceived by most respondents to be socially undesirable. Consequently, we would expect under-reporting of alcohol use, and therefore, the validity of alcohol surveys are threatened (Bradburn, Sudman, Blair, & Stocking, 1978).

This study is an ancillary project of the Strong Heart Study (SHS), sponsored by the National Heart, Lung, and Blood Institute of the National Institutes of Health. The Strong Heart Study is the first large multi-center

study to examine cardiovascular disease rates and risk factors in 13 American Indian tribal groups in South Dakota/North Dakota (SD/ND), southwestern Oklahoma, and Arizona (Lee et al., 1990; Welty et al., 1995). Data from the SD/ND SHS field center are the focus of this study, since only that center used both questionnaire methods.

## Methods

### Study Population

The study population included 1,522 American Indian participants (43% male and 57% female) aged 45 to 74 during the SHS Phase 1 exam between July 1, 1989 to January 31, 1991. Participants for this sub-study were limited to the SD/ND center of the SHS. Almost all study participants were enrolled members of the Oglala Sioux Tribe of Pine Ridge, South Dakota, the Cheyenne River Sioux Tribe of Eagle Butte, South Dakota, or the Spirit Lake Tribe of Fort Totten, North Dakota comprising 56%, 26%, and 14% of participants, respectively. The remaining 4% of study participants were enrolled in other tribes, but reside in one of the above mentioned communities.

### Measures

Ethnicity of interviewers was coded as American Indian vs. non-American Indian. Residency of interviewers was coded as those who live in the participant population communities vs. those who do not.

This study compared similar questions of alcohol and tobacco use on two separate methods of data collection; a self-administered American Indian-specific Health Risk Appraisal (HRA) questionnaire and an interviewer-administered questionnaire. Both methods of data collection were conducted in a clinical setting and administered within four hours of each other. The order in which the assessment methods were administered was not documented and provided some flexibility to accommodate clinic flow, although the HRA was usually administered first.

The interviewer-administered questions were part of the SHS personal interview form. This form was developed specifically for the SHS and was always administered by SHS interviewer staff as part of the SHS exam (see Appendix I). In addition to alcohol and tobacco questions, the SHS personal interview form included questions on gender, marital status, date of birth, years of education, American Indian blood quantum, tribal enrollment, family/health history, caffeine use, traditional values/culture, stress evaluation, and family income.

The self-administered questions were part of an American Indian-specific Health Risk Appraisal (HRA) (Han et al., 1994; Welty, 1988; Welty,

1989; Welty, Zephier, Schweigman, Blake, & Leonardson, 1993; see Appendix II). This instrument is primarily used as a health education tool to provide feedback to respondents through a calculated estimate of personal health risk with suggestions on how to reduce this risk.

Two similar questions on tobacco and four on alcohol were included in both questionnaires. The tobacco questions included smoking status (current smokers, ex-smokers, and never smokers) and the number of cigarettes smoked per day by current smokers. The alcohol questions addressed binge drinking, days per month having one or more drinks, number of drinks in a typical week, and, on the days when drinking, the number of drinks usually consumed (see Appendix I & II). All questions were analyzed as continuous variables (non-users coded as zero) except smoking status and binge drinking, which were analyzed categorically. Binge drinking was defined as having five or more drinks on an occasion.

Adjustments had to be made in reporting data for two alcohol questions to maintain comparability between the questionnaires. In the question asking, 'How many drinks of alcoholic beverages do you have in a typical week,' the self-administered questionnaire response allowed a maximum number of only 99, while the interviewer-administered questionnaire allowed a higher maximum number to be reported. Hence, 3 values of 112, 124, and 168 reported on the interviewer-administered questionnaire were changed to 99, to adjust to the limit of the self-administered questionnaire. In the question, 'On the days when you drank any liquor, beer, or wine, about how many drinks did you have on the average,' the self-administered questionnaire allowed a maximum of only 39, while the interviewer-administered questionnaire allowed a higher maximum number. Accordingly, the 4 values of 48 reported on the interviewer-administered questionnaire were changed to 39 to adjust to the limit of the self-administered questionnaire.

Participants were classified as non-drinkers based on the interviewer-administered questionnaire, if they reported having fewer than 12 drinks of alcoholic beverages in their entire life, or if they quit drinking more than one year prior to the time of interview. This classification was made in order to match the allowable responses on the self-administered questionnaire. All four alcohol questions were worded identically on both methods of assessment. However, in the interviewer-administered questionnaire method, the question on the number of drinks in a typical week was followed by 'Enter 1 for occasional drinkers.' Because the occasional drinker was coded as "1" on the interviewer-administered questionnaire, responses by assessment method were compared for participants only having two or more drinks per week. Also, a conversion key (i.e., 1 qt. of beer = 2.5 drinks, 0.5 gal. of wine = 16 drinks, etc.) was available to the interviewer to convert types of alcohol containers typically sold to the number of alcohol drinks they contain. The binge drinking question in the interviewer-administered questionnaire was coded as a

categorical variable, which matched the categorical responses of the self-administered questionnaire.

The interviewer-administered questionnaire method coded non-smokers as those reporting smoking fewer than 100 cigarettes in their entire life, ex-smokers as those smoking 100 or more cigarettes in their entire life but not a current smoker at time of interview, and current smokers as those reporting “yes” to the question, ‘Do you smoke cigarettes now.’ This category matched the response set on the self-administered questionnaire.

Of the 1,522 participants, 1,427 (94%) had sufficient information on both the self-administered questionnaire and the interviewer-administered questionnaire to be analyzed in this study. Reliability of participant interviews was subjectively judged by the interviewer immediately following the interviewer-administered questionnaire by selecting one of the five categories: very reliable, reliable, unreliable, very unreliable, or uncertain. Only the very reliable and reliable responses were used for this study, they comprised 1,385 (97%) of the 1,427 study participants completing both questionnaires. Interviews judged to be of lower reliability were generally the result of impaired cognitive ability (e.g., stroke, alcohol consumption) or language problem.

### Statistical Measures

Statistical analyses involved the use of SAS version 6.10 for Windows (SAS Institute Inc., 1989a; SAS Institute Inc., 1989b). Assessment methods were compared by *t*-tests of mean paired differences for continuous variables and kappa or weighted kappa statistics for categorized data. A kappa of .75 or greater was considered excellent agreement, .40 to .75 was intermediate to good agreement, and below .40 was considered poor agreement (Gordis, 1996). Spearman rank correlations were used to measure agreement between continuous variables that were not normally distributed. McNemar’s test for equality of discordant pairs and 95% confidence intervals were calculated to determine the significance of bias by assessment method for categorical variables. *P*-values less than 0.05 were considered to be statistically significant.

### Results

Table 1 presents the distribution by age and gender of the original sample of 1,522 as well as the number and percent who completed the self-administered questionnaire and were considered to be reliable or very reliable. Interviewer characteristics and number of interviews by interviewers for each category of interviewers are presented in Table 2; 59 interviewers conducted 1,385 interviews. Most of the interviews (72%)

Table 1  
 Total Number of Participants and Reliable Participants Taking the Self-Administered Questionnaire (SAQ) by Age and Gender. Strong Heart Study, Phase 1 (1989-1991), North/South Dakota Center.

Age	Men			Women			Total		
	Total	Men With SAQ	Percent-completing SAQ	Total	Women With SAQ	Percent-completing SAQ	Total	Total With SAQ	Percent-completing SAQ
45-54	325	286	(88)	413	386	(93)	738	672	(91)
55-64	225	200	(89)	288	261	(91)	513	461	(90)
65-74	108	100	(93)	163	152	(93)	271	252	(93)
Total	658	586	(89)	864	799	(92)	1522	1385	(91)

Numbers in parenthesis are percent of participants who were considered to have reliable interviews and who completed an SAQ.

Table 2  
 Distribution of Interviewers and Interviews Completed by Interviewer Characteristics. Strong Heart Study, Phase 1 (1989-1991), North/South Dakota Center.

Interviewer characteristics	Interviewers		Interviews completed	
	N	%	N	%
Gender				
Men	14	24	151	11
Women	45	76	1234	89
Ethnicity				
American Indian	36	61	1116	81
Non-Indian	23	39	269	19
Residency				
Community	30	51	1055	76
Non-community	29	49	330	24

were done by American Indian women residents of participant communities. There were no interviews done by non-American Indian men and only 15 interviews done by non-American Indian women from the participant communities. This reflects the fact that the study communities were on American Indian reservations.

Table 3 presents a comparison of the responses to alcohol and tobacco use questions by interviewer characteristics and method of assessment. Participants reported slightly higher percentages of alcohol use in the interviewer-administered questionnaire method, more so in the 'one or more drinks per day' question. However, the self-administered questionnaire method indicated a slightly higher percentage of tobacco use. The prevalence of alcohol use and smoking did not differ significantly by interviewer characteristics.

Comparison of mean paired differences for continuous variables are presented in Table 4 by assessment method and interviewer characteristics. The total for days in a typical month having at least one drink among current drinkers were significantly higher in the self-administered questionnaire. The same trend of higher reporting in the self-administered questionnaire was seen in each gender, ethnicity, and residency group, while significance was found among women, American Indian, and community interviewers. The average number of drinks per

Table 3  
Percent Alcohol and Tobacco Use by Interviewer Characteristics and Method of Assessment. Strong Heart Study, Phase 1 (1989-1991), North/South Dakota Center

Interviewer Characteristics	% One or more days per month drinking		% One or more drinks per day		% Two or more drinks per week		% Binge drinking		% Current smokers	
	SAQ	IAQ	SAQ	IAQ	SAQ	IAQ	SAQ	IAQ	SAQ	IAQ
	Total	33	37	35	44	22	27	25	26	51
Gender										
Men	38	38	41	48	27	29	27	29	59	57
Women	33	37	34	43	21	26	25	25	51	48
Ethnicity										
Indian	32	36	34	43	21	27	24	25	52	49
Non-Indian	37	42	41	47	24	25	26	27	48	46
Residency										
Community	32	36	33	43	21	26	25	25	51	48
Non-community	37	41	40	46	26	27	25	26	51	50

SAQ = Self-Administered Questionnaire

IAQ = Interviewer-Administered Questionnaire

Table 4  
 Mean Values, Mean Paired Differences and 95% Confidence Intervals of  
 Alcohol and Tobacco Use by Interviewer Characteristics and Method of  
 Assessment. Strong Heart Study, Phase 1 (1989-1991), North/South  
 Dakota Center.

Interviewer characteristics	Assessment method		Difference (SAQ-IAQ)	95% C.I.
	SAQ	IAQ		
Days per month drinking for current drinkers				
Total	6.52	5.80	0.72**	(+0.30,+1.14)
Gender				
Men	6.22	5.58	0.64	(-0.56,+1.84)
Women	6.56	5.83	0.74*	(+0.29,+1.19)
Ethnicity				
American Indian	6.59	5.72	0.86**	(+0.39,+1.33)
Non-Indian	6.29	6.04	0.25	(-0.68,+1.18)
Residency				
Community	6.70	5.77	0.93**	(+0.43,+1.43)
Non-community	6.06	5.88	0.18	(-0.58,+0.94)
Average drinks per day for current drinkers				
Total	7.98	9.00	-1.03**	(-1.51,-0.55)
Gender				
Men	10.60	11.60	-1.00	(-2.40,+0.40)
Women	7.58	8.61	-1.03**	(-1.54,-0.52)
Ethnicity				
American Indian	8.00	9.13	-1.14**	(-1.72,-0.56)
Non-Indian	7.90	8.56	-0.66	(-1.43,+0.11)
Residency				
Community	8.08	9.26	-1.18**	(-1.78,-0.58)
Non-community	7.72	8.34	-0.63	(-1.38,+0.12)
Total drinks per week for current drinkers				
Total	12.36	13.61	-1.25	(-2.96,+0.46)
Gender				
Men	11.29	17.03	-5.74*	(-9.69,-1.79)
Women	12.53	13.04	-0.51	(-2.38,+1.36)
Ethnicity				
American Indian	11.63	13.12	-1.49	(-3.14,+0.16)
Non-Indian	15.04	15.41	-0.37	(-5.64,+4.90)
Residency				
Community	12.05	13.52	-1.47	(-3.29,+0.35)
Non-community	13.12	13.83	-0.71	(-4.63,+3.21)

Table Continues

Table 4 (continued)  
 Mean Values, Mean Paired Differences and 95% Confidence Intervals of  
 Alcohol and Tobacco Use by Interviewer Characteristics and Method of  
 Assessment. Strong Heart Study, Phase 1 (1989-1991), North/South  
 Dakota Center

Interviewer characteristics	Assessment method		Difference (SAQ-IAQ)	95% C.I.
	SAQ	IAQ		
Cigarettes smoked per day by current smokers				
Total	13.27	13.24	0.03	(-0.38, +0.44)
Gender				
Men	14.14	13.70	0.45	(-0.82, +1.72)
Women	13.14	13.18	-0.04	(-0.47, +0.39)
Ethnicity				
American Indian	13.25	13.21	0.04	(-0.40, +0.48)
Non-Indian	13.37	13.39	-0.02	(-1.05, +1.01)
Residency				
Community	13.18	13.16	0.02	(-0.45, +0.49)
Non-community	13.54	13.51	0.03	(-0.78, +0.84)

Totals may not add exactly due to rounding.

SAQ = Self-Administered Questionnaire

IAQ = Interviewer-Administered Questionnaire

\*  $p < .01$

\*\*  $p < .001$

day for current drinkers when they drink was significantly higher in the interviewer-administered questionnaire. The same trend of higher reporting in the interviewer-administered questionnaire was seen in each gender, ethnicity, and residency groups, while significance was found among women, American Indian, and community interviewers. The total number of drinks in a typical week for current drinkers (defined as having two or more drinks per week) was significantly higher in the interviewer-administered questionnaire. The same trend of higher reporting in the interviewer-administered questionnaire was seen in each gender, ethnicity, and residency group, while significance was found only among men. The average number of cigarettes smoked per day for current smokers was only slightly higher in the self-administered questionnaire. Similar reporting of cigarette use in the self-administered questionnaire and interviewer-administered questionnaire was seen in each interviewer group.

Table 5 presents agreement of zero and one or more days in a typical month that participant drinks, categorized by assessment method. The total kappa agreement was excellent, and in each gender, ethnicity, and residency group the kappa statistic was greater than 0.79. Significantly more participants (81) reported drinking on one or more days per month only on the interviewer-administered questionnaire than those (33) who only reported drinking on one or more days per month on the self-administered questionnaire. Table 5 also presents categorized agreement of zero and one or more drinks per day by assessment method. The total kappa agreement was good, and in each gender, ethnicity, and residency group the kappa statistic were greater than 0.71. Significantly more participants (140) reported drinking one or more drinks per day only on the interviewer-administered questionnaire than those (25) who only reported drinking on the self-administered questionnaire. Table 5 also presents categorized agreement of zero and one or more times binge drinking in the past month by assessment method. The total kappa agreement was excellent, and in each gender, ethnicity, and residency group the kappa statistic was greater than 0.80. More participants (51) reported binge drinking only on the interviewer-administered questionnaire than those (40) who reported binge drinking only on the self-administered questionnaire but this difference was not statistically significant. Table 5 also presents categorized agreement of zero, one, and two or more drinks consumed in a typical week by assessment method. The total weighted kappa agreement was good, and in each gender, ethnicity, and residency groups the weighted kappa statistic was greater than 0.58. One-hundred-sixty respondents reported they drank one drink per week on the interviewer-administered questionnaire but reported zero drinks per week on the self-administered questionnaire, compared to only one respondent who reported drinking one drink per week on the self-administered questionnaire but reported zero drinks per week on the interviewer-administered questionnaire. This could be explained by the "Enter 1 for occasional drinkers" notation on the interviewer-administered questionnaire described in the methods section. Finally, Table 5 presents smoking status agreement of never smokers, ex-smokers, and current smokers by assessment method. The total weighted kappa agreement was excellent, and in each gender, ethnicity, and residency group the weighted kappa statistic was greater than 0.84. Only one person reported being a current smoker on the interviewer-administered questionnaire while responding "never smoked" on the self-administered questionnaire, compared to 25 never smokers on the interviewer-administered questionnaire and who reported they were current smokers on the self-administered questionnaire.

Spearman rank correlations were strong in all total comparisons by method of assessment for continuous variable questions: currently smoking one or more cigarettes per day, drinking alcohol one or more days per month, having two or more alcoholic beverages in a typical week, and

Table 5  
 Comparison of Assessment Methods for Alcohol Use and Smoking. The Strong Heart Study, Phase 1 (1989-1991), North/South Dakota Center.

Self-Administered Questionnaire	Interviewer-Administered Questionnaire						Statistical Tests*
Days/month drinking	0 days		1 or more days		total		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
0 days	804	60.6	81	6.1	885	66.7	Kappa=0.81
1 or more days	33	2.5	409	30.8	442	33.3	McNemar's=20.2 (1 df) p-value=.001
total	837	63.1	490	36.9	1327	100.0	
Drinks/day	0 drinks		1 or more drinks		total		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
0 drinks	721	54.3	140	10.6	861	64.9	Kappa=0.74
1 or more drinks	25	1.9	441	33.2	466	35.1	McNemar's=80.2 (1 df) p-value=.001
total	746	56.2	581	43.8	1327	100.0	
Binges/month	0 times		1 or more times		total		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
0 times	943	71.4	51	3.9	994	72.2	Kappa=0.82
1 or more times	40	3.0	287	21.7	327	24.8	McNemar's=1.3 (1 df) p-value=.249
total	983	74.4	338	25.6	1327	100.0	

Table Continues

Table 5 (continued)  
 Comparison of Assessment Methods for Alcohol Use and Smoking. The Strong Heart Study, Phase 1 (1989-1991), North/South Dakota Center.

Self-Administered Questionnaire	Interviewer-Administered Questionnaire								Statistical Tests*
	0 drinks		1 drink		2 or more drinks		total		
	n	%	n	%	n	%	n	%	
Drinks/week									Weighted Kappa=0.62
0 drinks	739	55.6	160	12.0	92	6.9	991	74.6	
1 drink	1	0.1	23	1.7	23	1.7	47	3.5	
2 or more drinks	9	0.7	42	3.2	239	18.0	290	21.8	
total	749	56.4	225	16.9	354	26.7	1327	100.0	
Smoking status	Never smoked		Ex-smoker		Current smoker		total		Weighted Kappa=0.87
	n	%	n	%	n	%	n	%	
Never smoked	225	16.5	40	2.9	1	0.1	266	19.5	
Ex-smoker	32	2.4	361	26.5	8	0.6	401	29.4	
Current smoker	25	1.8	17	1.2	655	48.0	697	51.1	
total	282	20.7	418	30.6	664	48.7	1364	100.0	

\*p-values based on McNemar's Test for equality of discordant pairs; chi-square, Kappa and Weighted Kappa.

Totals may not add exactly due to rounding.

average number of drinks on the days when drinking alcohol. The correlations of responses by method of assessment for the total sample ranged from 0.65 to 0.89. Similar results were found for each gender, ethnicity, and residency group of the interviewer; the correlations ranged from 0.61 to 0.91.

## Discussion

We found the differences in responses between assessment methods was much greater for alcohol questions than for tobacco questions. Interviewer-administered questionnaires elicited significantly higher amounts of alcohol usage for current drinkers than the self-administered questionnaire. In contrast, the self-administered questionnaire elicited higher average days per month drinking. One important difference in the methods was the interviewer-administered questionnaire had a key for the amount of alcohol per container (see Appendix I). Probing by interviewers using this more precise and objective device may have led to higher amounts of alcohol being reported on the interviewer-administered questionnaire. The only identical alcohol question on both interview forms was the days per month drinking alcohol for current drinkers which may have been more accurately reported on the self-administered questionnaire (Table 4), assuming higher levels were more accurate. The results presented here are similar to those reported in Aquilino's (1994) study, which found Hispanic respondents reporting significantly more recency of alcohol use and drunkenness on the self-administered questionnaire than to the same race interviewers.

Responses to tobacco questions were more consistent across methods, although 25 respondents reported being never-smokers to interviewers while they identified themselves as current smokers on the self-administered questionnaire. This may be the result of a bias in which a few current smokers may be reluctant to admit to interviewers they smoke.

Interviewers elicited a higher proportion of participants as current drinkers, more than were reported on the self-administered questionnaire. Respondents may have been more likely to report their drinking status accurately to interviewers who already were likely to know they drank.

The discrepancies in responses on the self-administered and interviewer-administered questionnaires may have been due to: (a) errors in completing the self-administered questionnaire, (b) misinterpretation of the questions on the self-administered questionnaire or misinterpretation of questions asked by the interviewer, or (c) under reporting of alcohol and tobacco use by participants. It is impossible in this study to determine which of these factors may have contributed to the discrepancies. Regardless of whether data are collected by the self-administered or the interviewer-administered questionnaires, researchers need to design their instruments to obtain the most accurate responses possible. In addition

screening for alcohol and tobacco use is especially important clinically, so that appropriate counseling and treatment can be provided to patients who smoke or abuse alcohol. The Indian Health Service has recently validated a self-administered questionnaire for screening prenatal patients for alcohol use (Bad Heart Bull, Kvigne, Leonardson, Lacina, & Welty, 1999). Screening for alcohol abuse is also important in elderly populations, including elderly American Indians so that persons with alcohol problems can be appropriately diagnosed and treated (Lowe, Long, Wallace, & Welty, 1997).

There were several limitations of this study, including the following: (a) most interviews [72%] were done by American Indian women who lived in the communities, thus fewer observations [28%] were done in the other characteristic groups, and no interviews were done by non-American Indian men who lived in the communities; (b) the self-administered questionnaire was only used in the SHS sites in North and South Dakota; (c) an alcohol conversion key was available on the interviewer-administered questionnaire form, but not on the self-administered questionnaire; (d) it was not documented which interview form was given first; (e) it was not documented how many respondents needed assistance in filling out the self-administered questionnaires; (f) two of the alcohol questions differed slightly on the self-administered and interviewer-administered questionnaires; (g) the self-administered questionnaire was limited to amounts of allowable responses on the form; (h) neither the SHS interviewer-administered questionnaire nor the self-administered American Indian specific HRA used in this study can be considered a gold standard in the collection of data; and (i) we are unable to measure the effect of assessment method [interviewer vs. self-administered] when they are not administered on the same day or in a particular sequence.

The study does not demonstrate a clear advantage in the use of a self-administered questionnaire or interviewer-administered questionnaire to obtain alcohol and tobacco data in a middle-aged to elderly American Indian population. Rather it documents inconsistency of responses between the two methods of obtaining alcohol data with higher responses provided by the self-administered questionnaire for days per month drinking, but higher responses to the interviewer-administered questionnaire for amounts drinking per occasion. The study demonstrated no overall significant differences in assessment method effects on alcohol or tobacco use either by self-administered questionnaire vs. interviewer-administered questionnaire, or by gender, ethnicity, or community of residence of interviewers. Thus, we suggest that interviewers for future studies among American Indians could be drawn from within or outside the community without regard to gender or American Indian status. Whether these results can be applied to questions other than those regarding alcohol and tobacco consumption remains unknown.

Further research is needed to assess differences in assessment methods and interviewer characteristics. Extension of data beyond alcohol

and tobacco consumption would also be useful. Another useful study for the future would involve the comparison of gender concordance and discordance between the interviewer and interviewee.

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### Authors' Note

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### Appendix I

#### Strong Heart Study Personal Interview Form – Interviewer-Administered Questionnaire. Tobacco and Alcohol Questions.

Have you smoked at least 100 cigarettes in your life?

1=yes

2=no (skip the following tobacco questions)

9=unknown

Do you smoke cigarettes now?

1=yes

2=no

On the average, How many cigarettes (did/do) you usually smoke a day?

In YOUR ENTIRE LIFE have you had at least 12 drinks of any kind of alcoholic beverage?

1=yes

2=no (skip the following alcohol questions)

How long ago did you last drink any kind of alcoholic beverage?

Indicate number of days, months, or years of their last drink.

Number of days.....

(if they drank today, fill in zero days)

OR

Number of months.....

(if they drank this month, fill in zero months)

OR

Number of years.....

(if they drank this year, fill in zero in years)

If more than one year, skip the following alcohol questions.

Appendix I Continues

## Appendix I (continued)

Strong Heart Study Personal Interview Form – Interviewer-Administered  
Questionnaire. Tobacco and Alcohol Questions.

How many drinks of alcoholic beverages do you have in a typical week?  
Enter 1 for occasional drinkers.

- 1 qt. of beer=2.5 drinks
- 1 pt. of beer=1.5 drinks
- 1pt. of wine=4 drinks
- 1qt. of wine=8 drinks
- 0.5 gal. of wine=16 drinks
- 1 pt. of hard liquor=12 drinks
- One-fifth of hard liquor=19 drinks
- 1 case of beer (12 oz. cans)=24 drinks
- 6 pack of beer (12 oz. cans)=6 drinks

Add up the total of drinks in a typical week and fill them in the box of this question. Round up to nearest whole number if fraction is greater than or equal to 0.5.

On how many days in a typical month do you have at least one drink?  
Indicate number of days per month.

On the days when you drank any liquor, beer, or wine, about how many drinks do you have on the average? Indicate number of drinks per day.

How many times during the past month did you have 5 or more drinks on an occasion? Indicate times per month. (Enter zero if subject quit drinking more than one month ago.)

Appendix II  
Indian Specific Health Risk Appraisal Form – Self-Administered  
Questionnaire. Tobacco and Alcohol Questions.

CIGARETTE SMOKING

How would you describe your cigarette smoking habits?

\_\_\_\_\_ Never Smoked    \_\_\_\_\_ I smoke now    \_\_\_\_\_ I have quit

IF YOU SMOKE CIGARETTES NOW:

How many cigarettes a day do you smoke?

IF YOU HAVE QUIT:

What was the average number of cigarettes you smoked per day?

*How many drinks* of alcoholic beverages do you have in a typical week?  
(1 drink = a can or bottle of beer, a small glass of wine or shot of hard liquor)

*On how many days* in a typical month do you have at least one drink?

On the days when you drank any liquor, beer or wine, about *how many drinks* did you have on the average?

How many times during the past month did you have 5 or more drinks on an occasion?