

deformity, paralysis, and ultimately amputation.

Approximately 60,000 diagnosed diabetics in the United States undergo lower extremity amputation each year, at a cost of about \$25,000 each. It is estimated up to 90 percent of these amputations could be prevented by use of the Lower Extremity Amputation Prevention (LEAP) Program developed at Carville.

The LEAP Program utilizes a multidisciplinary team consisting of a physician, podiatrist, physical therapist, nurse, and orthotist. An initial foot screen is conducted to evaluate the condition of the foot, determine the patient's risk category, and develop a treatment plan. Patients with active infection receive appropriate antibiotics and are confined to bed with the leg splinted. Ulcers are treated with a total contact walking cast. Once the ulcer is closed, protective footwear is provided and walking is carefully monitored. In some cases, custom made shoes are necessary.

Patient education is an essential part of the "Carville approach." Throughout all stages of the treatment, members of the team work closely with the patients who are taught to inspect their feet daily.

The LEAP Program is being adapted at the Jackson-Hinds Community Health Center, a federally-funded community health center in Jackson, MS. Members of the Carville team have worked with the Jackson-Hinds Diabetic Foot Clinic to establish a community-based diabetic foot program. The program

is focused on prevention and trains low income adults from the community to serve as Diabetes Educator Assistants. They provide outreach services to other low income, medically underserved, elderly persons in senior residences and public housing facilities in Jackson.

The partnership between Carville and Jackson-Hinds has led to the establishment of a regional training center in Jackson to certify registered nurses and other health care providers as Diabetic Foot Care Specialists. The training program consists of at least 400 hours of instruction as well as training and practical experience, including assessment of risk factors, proper foot care (skin, nail, callous), and footwear selection. They will be taught techniques to reduce risk factors and improve foot care. The training program has been approved by the Mississippi State Nursing Association.

HRSA's Bureau of Primary Health Care funds programs to increase access to primary and preventive health care for low income, underserved, and vulnerable populations. Hansen's disease has been one of the most stigmatized conditions in history, and the advances made at Carville have enabled people with HD to lead healthy and productive lives. The application of research and treatment developed for HD patients to other vulnerable populations such as those with TB and diabetes is an exciting, new opportunity that is a model for public health practice.

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## **Behavioral Risk Factors of Chippewa Indians Living on Wisconsin Reservations**

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Degree Candidate at the time of the study, and Dr. Anderson is State Environment Health Epidemiologist. Ms. Kuykendall is with the Lac Courte Oreille Tribal Office, Hayward, WI. Dr. Kanarek is an Associate Professor in the Department of Preventive Medicine and Institute for Environmental Studies, University of Wisconsin, Madison.

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## Synopsis .....

*Behavioral risk factors and chronic disease death rates vary markedly among the numerous American Indian tribes. Local data on prevalence of risk factors are important in determining effective community-based interventions. The authors conducted an in-person survey to ascertain the prevalence of behavioral risk factors among members of the Chippewa tribe living on reservations in Wisconsin.*

*A total of 465 Chippewa adults were randomly selected from tribal registries and invited to participate in the study. Of these, 175 (38 percent) participated. To characterize nonrespondents, 75 nonrespondents were randomly selected and aggressively followed up. The authors compared their*

*results with data from the 1989 Wisconsin Behavioral Risk Factor Surveillance System.*

*Chippewa respondents reported high levels of obesity and tobacco use. No significant differences existed between the original survey and followback of nonrespondents. Compared with respondents who had telephones, those without telephones were significantly more likely to be unemployed, to be a current smoker or drinker, and to report nonuse of seatbelts.*

*Compared with the general Wisconsin population, Chippewa adults appear to have higher prevalences of several chronic disease and injury risk factors. The original survey methodology, despite the low response rate, appeared to give a more accurate (less biased) estimate of risk factor prevalences than would have been achieved by a telephone survey.*

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Behavioral risk factors are major contributors to chronic diseases and injuries in the United States. A principal function of public health is the assessment of the burden of diseases and risk factors in populations. Given the marked variation in disease risks between American Indians and the surrounding communities, this assessment is especially important for tribal communities. For example, Chippewa Indians have been documented as having higher rates of both cardiovascular disease and diabetes than persons in the surrounding white communities (1,2).

To ascertain the prevalence of behavioral risk factors among Chippewas in Wisconsin and to compare such prevalence estimates with estimates obtained via telephone surveys (3), we undertook a population-based survey of Chippewa Indians living on reservations in Wisconsin. This information can be used to design and evaluate interventions (4) to improve Indian health in Wisconsin.

## Methods

Using the registries of five Wisconsin Chippewa tribes—Lac du Flambeau, Lac Courte Oreilles, St. Croix, Red Cliff, and Bad River (Mole Lake, the sixth and smallest tribe, chose not to participate), we randomly selected adults ages 18 or older who were reported to be living on a reservation. The study was conducted as part of a larger study of fish consumption and blood mercury levels in the same Chippewa population (5).

Two weeks before the survey, which was con-

ducted the last week of May 1990, those selected were sent a letter that explained the nature of the study and invited them to participate. They were notified that they would receive \$10 for their participation, which would consist of completing a self-administered questionnaire and having a blood specimen drawn at a central site on their reservation. During the week before the survey, a representative of each tribe made efforts to contact those selected, by telephone or home visit, to answer any questions and to encourage their participation in the study.

Of 465 adults invited, 175 (38 percent) participated in the survey. Because of our concern that these original survey respondents may not be representative of the adult population, we randomly selected 75 of the nonrespondents for intensive followback (multiple attempts by telephone or home visits) with a shorter questionnaire. In the followback, we were able to reach 61 (81 percent) of the 75 selected nonrespondents. Of the 61, 10 reported that they had been living off-reservation at the time of the survey (and therefore had not been eligible for participation according to the study criteria), and responses were not available for five (two had since died, one was incarcerated, and two refused). Thus, we report results for 46 followback respondents.

To facilitate comparisons of the two groups, data for original survey and followback respondents are presented separately in table 1. Because no significant differences were found between the two groups, the two groups of respondents were combined.

Questions for both demographic factors and be-

Table 1. Demographic characteristics and behavioral risk factors among Chippewa Indians and Wisconsin adults, by percentages

Characteristics and risk factors	Chippewa respondents		Wisconsin adults
	Initial survey (n=175)	Followback (n=46)	BRFSS
<b>Demographics:</b>			
Age (mean years) . . . . .	41	44	44
Male . . . . .	43	57	46
Less than high school education . . . . .	29	35	16
Unemployed . . . . .	19	15	4
Married . . . . .	39	39	54
Telephone in home . . . . .	74	72	100
<b>Risk factors:</b>			
Obesity <sup>1</sup> . . . . .	54	52	23
Current smoker . . . . .	69	57	27
Drank alcohol during preceding month . . . . .	63	52	70
Always, almost always use seat belts . . . . .	42	39	73

<sup>1</sup>Body mass index (weight in kilograms divided by height in meters squared) of > 27.3 for men, > 27.8 for women.  
NOTE: BRFSS = Behavioral Risk Factor Surveillance System.

Table 2. Tobacco and alcohol risk factors among Chippewa Indians and Wisconsin men and women

Risk factor	Men		Women	
	Chippewa	Wisconsin	Chippewa	Wisconsin
<b>Tobacco:</b>				
Ever smoked (percent) . . . . .	88	58	78	48
Current smoker (percent) . . . . .	69	29	63	25
Cigarettes per day (mean) . . . . .	16	23	15	18
<b>Alcohol:</b>				
Drank during preceding month <sup>1</sup> (percent) . . . . .	67	79	55	63
Days per week drank <sup>2</sup> (mean) . . . . .	2	2	2	2
Drinks per day <sup>3,4</sup> (mean) . . . . .	11	4	7	2
Heavy drinking <sup>3,5</sup> (percent) . . . . .	59	43	40	15
Drink and drive <sup>3,6</sup> (percent) . . . . .	19	12	10	3

<sup>1</sup>Reported drinking alcohol during the month preceding the survey.  
<sup>2</sup>Usual number of days a week drinks alcohol (among drinkers).  
<sup>3</sup>Asked only of the original survey respondents.  
<sup>4</sup>Average number drinks consumed on a day one drinks (among drinkers).  
<sup>5</sup>Drank 5 or more drinks on 1 or more days during the month preceding the survey month (among all respondents).  
<sup>6</sup>Reported driving after having had "perhaps too much to drink" at least once in the last month (among all respondents).

havioral risk factors were taken directly from the 1989 Wisconsin Behavioral Risk Factor Surveillance System (BRFSS) survey. This is a random-digit-dialed telephone survey conducted throughout the year to study health-related behaviors among the State's noninstitutionalized population ages 18 years or older. Details on the BRFSS have been reported elsewhere (6). For comparison with the Chippewa population, we present data from the 1989 Wisconsin BRFSS in tables 1 and 2.

## Results

Basic demographic and risk factor prevalences of original survey and followback respondents are shown in table 1. None of the differences between the original survey and the followback respondents is statistically significant ( $P > 0.05$ , chi-square). More detailed responses regarding tobacco and alcohol use by sex are presented in table 2. Twenty-seven percent of the respondents reported not having telephones, and table 3 shows the basic demographic and risk factor prevalences depending on whether the respondents reported having a telephone in their household. Compared with respondents who had telephones, respondents without telephones were significantly more likely ( $P < 0.05$ , chi-square) to be unemployed, to be a current smoker or drinker, and to report nonuse of seatbelts.

## Discussion

In comparison with BRFSS survey results for the entire Wisconsin adult population, the Chippewa adults surveyed had higher prevalences of obesity and cigarette smoking. Although a lower percentage of the Chippewa adults reported drinking alcohol during the month before the survey than was reported in the Wisconsin BRFSS, and in both groups drinkers reported drinking alcohol an average of twice a week, the Chippewa adults reported usually drinking a markedly higher number of drinks on days when they drink. These findings were similar for both men and women. Overall, compared with the Wisconsin BRFSS survey, fewer of the Chippewa adults reported high school or more education, fewer were married, and more were unemployed.

The differences between the initial survey respondents and those contacted during the followback phase were not significant for any of the demographic or behavioral risk factors measured. Thus, it appears that the original survey, with its low participation rate, was not substantially biased by this fact. (Because the number of persons sought in the follow-

back effort was relatively small, and we did not reach all of those we sought to reach, we cannot rule out that some bias occurred.) In contrast, several significant differences in responses were evident between persons who had telephones and those who did not (that is, persons without telephones had higher prevalences of several behavioral risk factors). These findings indicate that persons interested in risk factor prevalence estimates for Native American populations should consider methods other than telephone surveys if telephone ownership is low, weighing the potential improvement in precision of the results against the extra cost or effort necessary for another approach.

The results of our study suggest that Chippewa adults living in Wisconsin are at increased risk for tobacco- and alcohol-related diseases. This is supported by a recent analysis of the health of minority peoples in Wisconsin. Compared with all residents of the State, American Indians had substantially higher death rates from coronary heart disease (295 versus 227 per 100,000), diabetes (69 versus 19 per 100,000), and injuries (93 versus 51 per 100,000) (7). Similar analyses suggest that, compared with other areas of the United States, American Indians living in the Midwest are at increased risk for chronic diseases. For example, the age-adjusted death rate in the Bemidji Area (which includes Wisconsin's Chippewa Indians) is higher than the average for all Indian Health Service Areas for diabetes, heart disease, cerebrovascular disease, and cancer (8). Moreover, the death rates for these diseases were three to six times greater in comparison with the areas with the lowest rates.

These data will be used in Wisconsin to support the development of community-based programs to increase physical activity and reduce the prevalence of cigarette and alcohol abuse. Surveys conducted in the future will be able to determine the impact of such programs on the health-related behaviors of Chippewa Indians who live in Wisconsin.

## References.....

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Table 3. Demographic characteristics and behavioral risk factors among Chippewa Indian adults by telephone in household, by percentages

Characteristics	Telephone		Relative risk, 95 percent confidence interval
	No (n=59)	Yes (n=162)	
<b>Demographics:</b>			
Age (mean).....	38	44	1
Male.....	54	43	1.3 0.9, 1.7
Less than high school education.....	36	28	1.3 0.8, 2.0
Unemployed.....	34	13	2.6 1.5, 4.5
Married.....	25	44	0.6 0.4, 0.9
<b>Risk factors:</b>			
Obesity <sup>2</sup> .....	47	56	0.8 0.6, 1.1
Current smoker.....	81	60	1.3 1.1, 1.6
Drank alcohol during pre- ceding month.....	75	56	1.3 1.1, 1.6
Always, almost always uses seat belts.....	25	47	0.5 0.3, 0.9

<sup>1</sup>Means different at  $P < 0.05$  by ANOVA

<sup>2</sup>Body Mass Index (weight in kilograms divided by height in meters squared) of 27.3 for men and 27.8 for women.

- programs in the Aberdeen Area Indian Health Service. *American Indian Culture Res J* 16: 117-138 (1992).
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