Diabetes and Impaired Glucose Tolerance in Three Alaskan Eskimo Populations

The Alaska-Siberia Project

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OBJECTIVE — The objectives of this study were to determine the prevalence of diabetes and impaired glucose tolerance (IGT) in three Alaskan Eskimo populations, using standardized diagnostic criteria, and to evaluate family history and obesity as risk factors.

RESEARCH DESIGN AND METHODS — This cross-sectional study involved men and women ≥25 years of age from three Eskimo ethnic groups (Siberian Yupik, Central Yupik, and Inupiat) residing in northwestern Alaska. Glucose tolerance status was defined by World Health Organization criteria and was based on a 75-g oral glucose tolerance test. Data on age, family history of diabetes, and degree of Eskimo ancestry were obtained from a personal interview. Obesity was assessed using BMI.

RESULTS — A total of 454 of 899 (50.5%) eligible participants were examined for diabetic status (239 Siberian Yupik, 106 Central Yupik, and 109 Inupiat participants). The prevalence of diabetes was more than twice as high among the Siberian Yupik (9.6%) as among the Central Yupik (2.8%) and Inupiat participants (3.7%). Diabetes was more prevalent in women than men (8.8 vs. 4.2%). IGT was found in an additional 11.7% of the women and 4.7% of the men. The combined prevalence of diabetes and IGT in the population ≥55 years of age was 30.4% (diabetes 12.0%, IGT 18.4%). Of the people identified with diabetes, 47% had not been previously diagnosed. Age-specific prevalences were similar to those found in U.S. whites in the National Health and Nutrition Examination Survey II. After adjustment for age, family history of diabetes was associated with diabetes in study participants with an odds ratio of 4.4, while obesity was associated with diabetes with an odds ratio of 2.6.

CONCLUSIONS — These prevalences of diabetes are the highest yet reported among Eskimo populations. Obesity and family history of diabetes are associated with increased odds of developing diabetes. These data underscore the need to further examine risk factors and to design effective interventions.

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Abbreviations: IGT, impaired glucose tolerance; NHANES II, National Health and Nutrition Examination Survey II; OGTT, oral glucose tolerance test; OR, odds ratio.

Diabetes has been a relatively uncommon condition among Eskimo populations in the past (1–8). However, data over the past 10 years have indicated that diabetes is increasingly common among Alaskan Eskimo populations (9–12). The prevalence of diagnosed diabetes among the Central Yupiks of southwestern Alaska has risen from an estimated 1.7% among those ≥40 years old in 1962 to 4.7% in 1987 (2,9). Data from the Alaska Native Diabetes Registry indicate that the overall prevalence among Alaskan Eskimos has increased from 8.8/1,000 to 12.1/1,000 people (age-adjusted to the U.S. 1980 population) from 1985 to 1993 (11). However, these data have been based on diagnosed cases or on surveys in which not all participants received oral glucose tolerance tests (OGTTs).

While terminology varies, ethnographers agree that the Alaskan Eskimo population can be subdivided broadly into two groups, commonly referred to as Inupiat and Yupik (13). Genetic, linguistic, and dental data indicate that all Eskimo groups are closely related to each other and to indigenous populations of the Russian Chukotka Peninsula, just across the Bering Strait from our study villages, and that they have diverged relatively recently (14–16). Eskimo linguistic groupings reflect distinct ethnic and anthropometric differences and may predict different predispositions to disease (13,17). The Inupiat speak Inupiaq, or Eastern Eskimo, which is a relatively homogeneous language spoken by Eskimo people in Alaska's Norton Sound region, across Canada, and in Greenland. Western Eskimo, on the other hand, is subdivided into five separate languages, two of which are spoken in villages in this study. One is Central Yupik, spoken in southwestern Alaska and some Norton Sound villages, and the other is Siberian Yupik, which is spoken in villages on Russia's Chukotka Peninsula and on Alaska's St. Lawrence Island (13).

Diabetes prevalence based on clinical data appears to vary widely among Eskimo

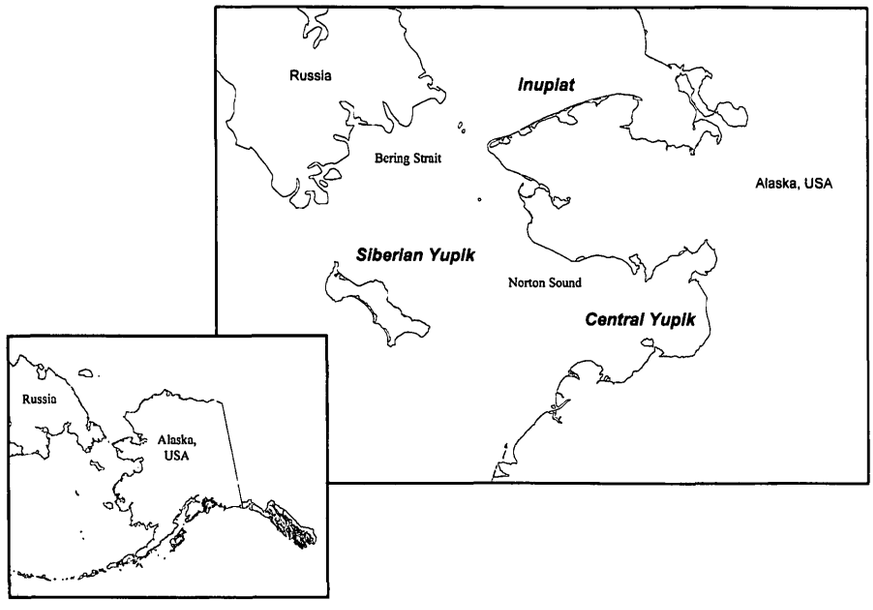

Figure 1—*Bering Strait region of Alaska and Russia.*

populations (10–12). A pilot test of our methodology in a small sample of Siberian Yupik people in 1992 indicated that 9% of those ≥40 years of age had diabetes (18), while anecdotal evidence suggested a much lower prevalence among Chukotkan Eskimos. Hence, we sought to characterize the occurrence of diabetes more precisely in three related but distinct Alaskan Eskimo populations.

RESEARCH DESIGN AND METHODS

This study, which took place in April and May of 1994, involved two Siberian Yupik villages on St. Lawrence Island, a Central Yupik village, and an Inupiat village, all in the Bering Strait region of Alaska (Fig. 1). Every village resident ≥25 years of age was invited to participate. The screening consisted of several components, including a personal interview, physical examination, blood sampling, and nutritional interviews, using 24-h recall and food frequency instruments, which were conducted the day before the blood sampling.

For purposes of comparability to ongoing studies among American Indians, the protocol of the Strong Heart Study was generally followed, with some abbreviations and adaptations. The Strong Heart Study is a standardized 3-center study funded by the National Heart, Lung, and Blood Institute to study the rates of cardiovascular disease, diabetes, and associated risk factors in American Indians (19). We abbreviated several parts of the interview, most notably sections related to acculturation that were not pertinent to Eskimo lifestyles. We used a different set of physical activity questions based on prior knowledge of activities performed in Eskimo villages. However, the methodology for determination of BMI and glucose tolerance status reported here were the same, with the exception of the exclusion criteria for administration of the glucose load.

Participants with a documented history of diabetes and for whom a primary care provider felt a glucose load was inadvisable had only a fasting glucose determination in our study (11 subjects, all had fasting glucose levels of ≥7.8 mmol/l). All others received a standard 75-g OGTT. Glucose analysis was performed by the Penn Medical Laboratory at the Medlantic Research Institute in Washington, DC, where the samples from the Strong Heart Study are analyzed according to methods described previously (19). All subjects were classified based on OGTT results in this study, which were interpreted according to the 1985 World Health Organization criteria for classification of glucose tolerance (20).

Village was equated with ethnicity because 97% of the participants were of at least one-half blood quantum of the specific Eskimo ethnicity of their village of residence. Individuals included in the analysis were at least one-quarter Eskimo, as determined by ethnicity of grandparents reported by each individual. A positive family history for diabetes was considered present if a parent, aunt or uncle, sibling, or child had diabetes.

Weight was measured on a standard balance beam scale, with participants wearing undergarments. Obesity was defined by BMI, which was calculated as weight in kilograms divided by height in meters squared. A BMI of ≥27.8 for men and ≥27.3 for women was defined as obesity for this study, a definition that includes the National Center for Health Statistics categories of "overweight" and "severely overweight" (21).

Statistical analysis

All statistics were calculated using the SAS system (SAS Institute, Cary, NC). The associations of both age-group and sex with participation were examined by χ^2. To evaluate associations with glucose tolerance status, two categorical variables were produced to reflect glucose tolerance status as follows: *1*) glucose intolerance (diabetes + impaired glucose tolerance [IGT]) versus normal glucose tolerance and 2) diabetes versus non-diabetes (IGT + normal). To evaluate the association of glucose tolerance status with sex and ethnicity, logistic regression models were constructed for each of these dependent variables. To evaluate differences in the prevalence of glucose intolerance and diabetes among ethnic groups overall, models were constructed with age (as a continuous variable) and ethnicity entered as independent variables in order. Ethnicity was represented by one variable with three categories (Central Yupik, Siberian Yupik, Inupiat). If significant differences were found overall, we then looked for differences between each individual ethnic group and the other two combined. To do this, separate models were constructed that included a variable that represented membership or nonmembership in each ethnic group. In these models, independent variables were entered as age and one ethnicity variable. Significance of each difference associated with ethnicity was assessed via χ^2. If the probability was <0.05, the odds ratio (OR) and CI (α = 0.05) for the OR were also calculated.

The associations of family history of diabetes and obesity status with glucose intolerance and diabetes status were determined. Logistic regression equations were constructed with either diabetes or glucose intolerance as the dependent variable and with age and family history, obesity, or both family history and obesity as independent variables. Three variables were produced to

Table 1—*Participation in screening clinic and prevalence of diabetes and IGT by ethnicity and age*

Ethicity/age-group (years)	Men				Women			
	Eligible	Screened*	Diabetes†	IGT†	Eligible	Screened*	Diabetes†	IGT†
Central Yupik								
25–34	28	13 (46.4)	1 (7.7)	0 (0.0)	20	13 (65.0)	0 (0.0)	2 (15.4)
35–44	31	21 (67.7)	0 (0.0)	1 (4.8)	17	12 (70.6)	0 (0.0)	1 (8.3)
45–54	10	7 (70.0)	0 (0.0)	0 (0.0)	11	9 (81.8)	0 (0.0)	2 (22.2)
55–64	6	4 (66.7)	0 (0.0)	2 (50.0)	6	5 (83.3)	0 (0.0)	1 (20.0)
65–74	6	5 (83.3)	1 (20.0)	0 (0.0)	7	7 (100.0)	1 (14.3)	2 (28.6)
75+	3	2 (66.7)	0 (0.0)	0 (0.0)	8	8 (100.0)	0 (0.0)	4 (50.0)
Total	84	52 (61.9)	2 (3.8)	3 (5.8)	69	54 (78.3)	1 (1.9)	12 (22.2)
Inupiat								
25–34	39	12 (30.8)	0 (0.0)	0 (0.0)	34	14 (41.2)	0 (0.0)	0 (0.0)
35–44	23	11 (47.8)	0 (0.0)	0 (0.0)	27	15 (55.6)	0 (0.0)	1 (6.7)
45–54	15	9 (60.0)	0 (0.0)	1 (11.1)	11	8 (72.7)	0 (0.0)	0 (0.0)
55–64	12	10 (83.3)	0 (0.0)	2 (20.0)	15	12 (80.0)	3 (25.0)	1 (8.3)
65–74	9	5 (55.6)	0 (0.0)	0 (0.0)	9	8 (88.9)	0 (0.0)	1 (12.5)
75+	3	3 (100.0)	0 (0.0)	1 (33.3)	3	2 (66.7)	1 (50.0)	0 (0.0)
Total	101	50 (49.5)	0 (0.0)	4 (8.0)	99	59 (59.6)	4 (6.8)	3 (5.1)
Siberian Yupik								
25–34	109	27 (24.8)	1 (3.7)	0 (0.0)	77	29 (37.7)	0 (0.0)	0 (0.0)
35–44	88	29 (33.0)	0 (0.0)	0 (0.0)	58	28 (48.3)	3 (10.7)	0 (0.0)
45- 54	47	17 (36.2)	2 (11.8)	0 (0.0)	36	22 (61.1)	4 (18.2)	1 (4.5)
55–64	43	22 (51.2)	1 (4.5)	1 (4.5)	31	22 (71.0)	2 (9.1)	6 (27.3)
65–74	15	11 (73.3)	3 (27.3)	2 (18.2)	17	16 (94.1)	4 (25.0)	2 (12.5)
75+	10	6 (60.0)	0 (0.0)	0 (0.0)	15	10 (66.7)	3 (30.0)	4 (40.0)
Total	312	112 (35.9)	7 (6.3)	3 (2.7)	234	127 (54.3)	16 (12.6)	13 (10.2)
All ethnicities								
25–34	176	52 (29.5)	2 (3.8)	0 (0.0)	131	56 (42.7)	0 (0.0)	2 (3.6)
35–44	142	61 (43.0)	0 (0.0)	1 (1.6)	102	55 (53.9)	3 (5.5)	2 (3.6)
45–54	72	33 (45.8)	2 (6.1)	1 (3.0)	58	39 (67.2)	4 (10.3)	3 (7.7)
55–64	61	36 (59.0)	1 (2.8)	5 (13.9)	52	39 (75.0)	5 (12.8)	8 (20.5)
65–74	30	21 (70.0)	4 (19.0)	2 (9.5)	33	31 (93.9)	5 (16.1)	5 (16.1)
75+	16	11 (68.8)	0 (0.0)	1 (9.1)	26	20 (76.9)	4 (20.0)	8 (40.0)
Total	497	214 (43.1)	9 (4.2)	10 (4.7)	402	240 (59.7)	21 (8.8)	28 (11.7)

Data are *n* or *n* (%). *Number and percentage of eligible subjects who were screened. Two eligible unscreened subjects are not included because of unknown birthdates. †Number and percentage of screened subjects who met the criteria for diabetes or IGT.

reflect the presence of both family history and obesity or either condition individually. Logistic regression models were constructed with age and all three of these variables. Family history of diabetes was reported as unknown by 63 subjects, who were excluded from the models that included the history variable. BMI was not defined for 4 subjects who declined to participate in that part of the study; they were excluded from analyses that included obesity. Significance was assessed and ORs were calculated in the same manner as with sex and village equations.

RESULTS — There were a total of 899 eligible individuals (Eskimo residents ≥25 years of age) in the study villages. Of the 497 eligible men and 402 eligible women, 214 men (43%) and 240 women (60%) participated in the screening clinic. The participation rate was significantly different between sexes (χ^2 = 25.73, df = 1, P = 0.001). Participation also differed significantly by age-group, with 72% participation among residents ≥55 years, but only 43% participation among those <55 (χ^2 = 75.7, df = 5, P = 0.001) (Table 1). Village variability in participation was also significant (χ^2 = 32.8, df = 2, P = 0.001), with 69% participation among Central Yupik, 55% among Inupiat, and 44% among Siberian Yupik residents (Table 1).

Of the 454 subjects examined, 68 (15.0%) were classified as glucose intolerant, which included 30 with diabetes (6.6%, 21 women and 9 men) (Table 1). Of those with diabetes, 14 were not previously aware of their diabetic status. The glucose-intolerant group also included 38 subjects with IGT (8.4%, 28 women and 10 men) (Table 1).

The prevalence of diabetes was 9.6% among the Siberian Yupik, 3.7% among the Inupiat, and 2.8% among the Central Yupik participants. Among those ≥55 years of age, the Siberian Yupiks had a total prevalence of glucose intolerance of 32.1% (diabetes, 14.9%; IGT 17.2%), the Central Yupiks 35.5% (diabetes, 6.5%; IGT, 29.0%), and the Inupiat 22.5% (diabetes, 10.0%; IGT, 12.5%). Significant differences by ethnicity were not found for the prevalence of glucose intolerance, whereas diabetes prevalence did differ by ethnicity overall (OR = 2.1, CI = 1.2–3.8, P = 0.0151). Diabetes prevalence was signifi-

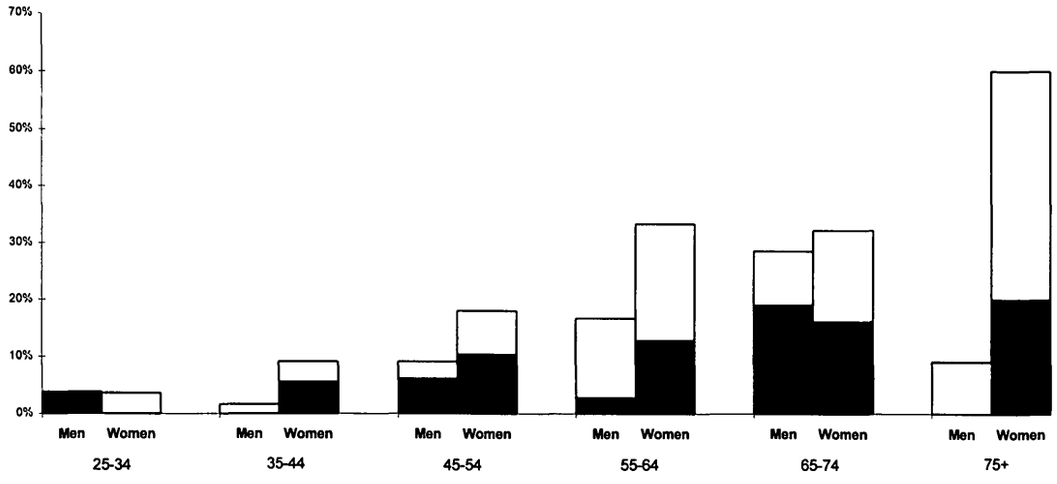

Figure 2—*Prevalence of abnormal glucose tolerance by age and sex for three Alaskan Eskimo populations, 1994.* □, *IGT;* ■, *diabetes.*

cantly greater for Siberian Yupik subjects compared with subjects of the other villages combined (OR = 3.1, CI = 1.3–7.6, *P* = 0.1018). This was the only significant individual ethnic difference found.

Glucose intolerance (OR = 1.8, CI = 1.5–2.2, *P* = 0.0001) and diabetes (OR = 1.6, CI = 1.2–2.0, *P* = 0.0002) increased with each 10-year increase in age (Fig. 2). The combined prevalence of diabetes and IGT in the population ≥55 years of age was 30.4% (diabetes, 12.0%; IGT, 18.4%). The prevalence of abnormal glucose tolerance in those <55 years of age was 6.7% (diabetes, 3.7%; IGT, 3.0%).

Prevalence of glucose intolerance was significantly lower for men than for women after adjustment for age (*P* = 0.0300) with an OR of 0.40 (CI 0.22–0.74) for men compared with women. Prevalences of diabetes for women ranged from 1.9 to 12.6% in the three ethnic groups and from 0 to 6.3% for men (Table 1). Sex differences in diabetes prevalence did not reach statistical significance (OR = 0.5, CI 0.22–1.1, *P* = 0.1037).

Table 2 shows the characteristics of the population with respect to age, prevalence of diabetes, mean BMI, and obesity by family history status. Over 86% of the participants knew their family history with respect to diabetes. Among women, the prevalence of obesity ranged from 38.5 to 49.7% and among men from 25.5 to 29.7%. After adjustment for age, obesity was significantly associated with glucose intolerance (OR = 2.0, CI = 1.2–3.5, *P* = 0.0128) and with diabetes (OR = 2.6, CI = 1.2–5.8, *P* = 0.0148). After adjustment for age, a positive family history of diabetes was also significantly associated with glucose intolerance (OR = 3.2, CI = 1.6–6.4, *P* = 0.0010) and with diabetes (OR = 4.2, CI = 1.7–10.1, *P* = 0.0014).

In models containing age, family history status, and obesity status, all three variables were significantly associated with glucose intolerance and with diabetes. Obesity was associated with glucose intolerance (OR = 1.9, CI = 1.1–3.5, *P* = 0.0321) and with diabetes (OR = 2.6, CI = 1.1–6.0, *P* = 0.0275). Similarly, family history of diabetes, after adjustment for age and obesity, was significantly associated with glucose intolerance (OR = 3.3, CI = 1.6–6.7, *P* = 0.0009) and with diabetes (OR = 4.4, CI = 1.8–10.7, *P* = 0.0013). Hence, these ORs also did not appreciably change for obesity due to the presence of history, or for history due to the presence of obesity in the model. Very similar results were found in separate models in which BMI was used as a continuous variable in place of obesity.

Among those participants with neither obesity nor a family history of diabetes, the prevalence of diabetes was 3.2%. In the presence of either obesity or a positive family history, the prevalence of diabetes was 8.5 (OR = 2.1, CI = 1.1–4.1, *P* = 0.0249) and 7.8% (OR = 3.7, CI = 1.5–9.1, *P* = 0.0038), respectively. In the presence of both factors, the prevalence of diabetes was 23.3% (OR = 5.7, CI = 2.2–15.2, *P* = 0.0005) (Table 3).

CONCLUSIONS — The Alaska-Siberia Project, the first large study among Alaskan Eskimos in which all subjects received a

Table 2—*Characteristics of participants by sex and family history of diabetes*

	Family history											
	Women				Men				Both			
	Yes	No	Unknown	All	Yes	No	Unknown	All	Yes	No	Unknown	All
Age (mean)	45.7	49.3	53.3	49	43.5	47.6	46.7	46.8	44.8	48.5	49.4	48
Number of subjects screened (*n*)	48	166	26	240	33	144	37	214	81	310	63	454
Number with diabetes (*n*)	8	11	2	21	3	5	1	9	11	16	3	30
Prevalence of diabetes (%)	16.6	6.6	7.7	8.8	9.1	3.5	2.7	4.2	13.8	5.2	4.8	6.6
BMI (mean)	27.2	27.8	26	27.5	26.2	26.2	26.3	26.2	26.8	27.1	26.1	26.9
Obese (%)	43.8	49.7	38.5	47.3	27.3	25.5	29.7	25 5	37	38.6	33.3	37.6

One woman and three men did not have height and/or weight measurements and are not included in the BMI and obesity calculations.

Table 3—*Glucose tolerance by obesity category and family history of diabetes*

	Family history				
	Not obese		Obese		
	Negative	Positive	Negative	Positive	Total
Glucose tolerance status					
Normal	171 (91.0)	41 (80.4)	93 (78.8)	21 (70.0)	326
IGT	11 (5.9)	6 (11.8)	15 (12.7)	2 (6.7)	34
Diabetes	6 (3.2)	4 (7.8)	10 (8.5)	7 (23.3)	27
Total	188	51	118	30	387

Data are *n* (%) or *n* and exclude all subjects who did not know their family history or did not have BMI documented.

glucose tolerance test, found the highest prevalence of diabetes yet reported for any Eskimo population of which we are aware (Fig. 3). We found a considerably lower prevalence in the Central Yupik (2.8%) and Inupiat (3.7%) than in the Siberian Yupik (9.6%). Previous data are not available for the Siberian Yupik, but data from the Alaska Native Diabetes Registry have demonstrated that the prevalence of clinically recognized diabetes has generally been lower among the Central Yupik than the Inupiat (10,11). Because only one village each of the Inupiat and Central Yupik participated in this study, it is essential to include other villages in the future to confirm possible ethnic and geographic differences.

There are some limitations inherent in our data. The first is that from among the previously diagnosed diabetic people in our study population, 80% (13 of 16 women and 3 of 4 men) participated, while the overall participation was 50.5%, indicating that our prevalence may be somewhat increased by overrepresentation of those with known diabetes. However, other screening studies of diabetes prevalence, because screening is always voluntary, may also have the potential to include an overrepresentation of those who already have been told that they have abnormal glucose tolerance. In addition, those out hunting may have been less likely to have diabetes. Finally, we had higher participation in the older higher-risk age-groups.

However, even with these limitations, some comparisons are worthy of mention. Our age-specific prevalences of diabetes are, in general, very similar to those reported for U.S. whites in the National Health and Nutrition Examination Survey (NHANES) II, while our IGT prevalences are generally lower (Table 4) (22). Our diabetes prevalences are considerably lower than those reported in the Strong Heart Study for American Indians 45–74 years of age, which range from 32 to 71% depending on sex and ethnicity (23). As in NHANES II and the Strong Heart Study and except for the Central Yupik, Eskimo women had a higher prevalence of diabetes than men. It is noteworthy that the prevalence of obesity was considerably higher among women than men in our study.

Our data suggest that, as in other populations, genetic factors may be an important determinant of glucose intolerance among Eskimo people, as demonstrated by the finding of increased ORs in those with positive family histories. One Siberian Yupik family had seven known diabetic members, including three generations of women. Among those who knew their family history, both obesity and family history appeared to be associated with diabetes to about the same degree, while a combination of the two increased prevalence more than sevenfold (Table 3). Similarly, the Strong Heart Study found that parental diabetes and obesity were strong risk factors among American Indians, although the relative contribution of each factor varied by ethnic group (23).

Insight into the evolving impact of environmental and lifestyle factors among genetically similar people may be gained by comparing our data with that from a 1991 survey among Siberian Yupik Eskimo residents of the Chukotka peninsula, just across the Bering Strait from our study villages. The Siberian Yupik Eskimos live mainly in villages on the coast in Siberia and on St. Lawrence Island in Alaska. Among people ages 25–64, the prevalence of diabetes was 1.5% among the Chukotka residents (E.V.S., unpublished observations), while among the Alaskan Siberian Yupik people, the prevalence in the same age-group is much higher at 6.6%. Before the Cold War, travel between the American and Russian Siberian Yupik communities (~40 U.S. miles) was frequent. During the Cold War, travel between the two countries ceased, in

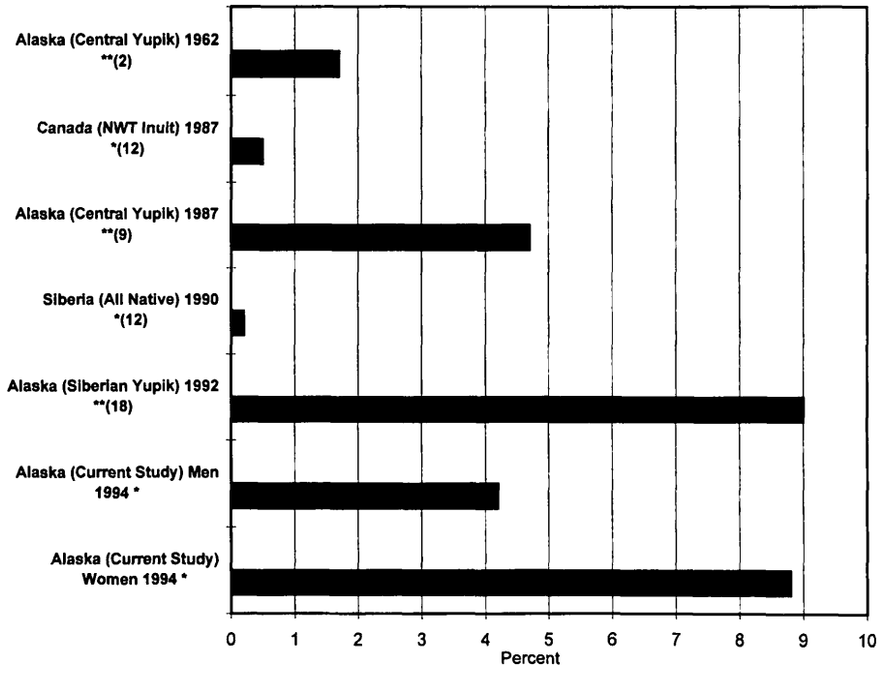

Figure 3—*Diabetes prevalence in Eskimo populations. *Age ≥25 years; **age ≥40 years.*

Table 4—*Prevalence of diabetes and IGT by World Health Organization criteria: U.S. whites, 1976–1980, and Alaskan Eskimos, 1994, by age and sex*

	Men		Women	
	White	Eskimo	White	Eskimo
Diabetes (years)				
20–44*	1	1.8	2.2	2.7
45–54	7.7	6.1	8.5	10.3
55–64	9	2.8	14.6	12.8
65–74	18.1	19	16.1	16.1
IGT (years)				
20–44*	4.6	0.9	6.5	3.6
45–54	12.6	3	14.5	7.7
55–64	17.2	13.9	13.7	20.5
65–74	22.8	9.5	23	16.1

Data are %. Values for U.S. whites are from Ref. 22. *Ages 25–44 years for the Eskimo population.

many cases separating close relatives. Comparison of dietary data from native people of the Siberian Chukotka Peninsula with that of Alaska Native people indicates that, overall, the Chukotka residents consume more protein, while the Alaskans consume more carbohydrates (24). The same type of difference in dietary consumption, i.e., decreased protein and increased carbohydrate, has been noted over time among Alaskan and Canadian Native populations and may bear on the question of the role of dietary composition in the development of diabetes in populations (25–27).

We did not assess the risk of glucose intolerance in relation to Eskimo blood quantum because so few participants had any non-Eskimo ancestry. Overall, 89% were full-blooded Eskimo (village range 87%–90%), and all but one participant were of at least one-half Eskimo ancestry.

The data suggesting an increase in diabetes among Alaskan Eskimos are of concern. Our low prevalence relative to American Indians is not necessarily reassuring when one considers the history of the Pima Indians of Arizona. The prevalence of diabetes among Pimas increased from 3.2% (all ages) in the early 1950s to 19% (≥5 years) in the 1960s (28). Between 1967 and 1977, this tribe experienced a 42% increase in diabetes prevalence and by 1972, 50% of people ≥35 years had diabetes (29,30). Recently, the Strong Heart Study has found that the Pima/Maricopa/Papago Indians of Arizona have a prevalence of 65% among men 45–74 years of age and 71% among women of the same age range (23).

There is evidence to suggest that a high ratio of IGT to total glucose intolerance may predict the rising prevalence of NIDDM seen in developing countries and in minority groups in developed countries (31,32). The Central Yupik and the Inupiat had higher ratios, with prevalences of IGT approximately fourfold and twofold those of diabetes, respectively, while the Siberian Yupik, who have the highest prevalence of diabetes, show a prevalence of IGT slightly less than that of diabetes. The relationship of IGT to diabetes prevalence appears to be complex, however, and speculation must be guarded in the absence of longitudinal data (32).

In summary, our data suggest that among Alaskan Eskimos, diabetes is now as common as among U.S. whites, and that as in other populations, both genetic and lifestyle factors play a role. Further comparisons with data from the Russian Chukotka populations may elucidate specific dietary or other lifestyle factors that could be modified to prevent a further increase in the occurrence of diabetes among Eskimo people. It is our hope that through an increased awareness of this apparently emerging problem, the ravages of diabetes that are being experienced by other Native Americans can be avoided.

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