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Stroke and American Indians: Recent Information from the Strong Heart Study

Ms. Soonhee Han, MS, Biostatistician, University of Oklahoma Health Sciences Center College of Public Health, Center for American Indian Health Research, Oklahoma City, Oklahoma; Ying Zhang, PhD, Assistant Professor of Research, University of Oklahoma Health Sciences Center, College of Public Health, Center for American Indian Health Research, Oklahoma City; and Everett R. Rhoades, MD, Senior Consultant, The Strong Heart Study, and Professor Emeritus of Medicine, University of Oklahoma Health Sciences Center, College of Public Health, Center for American Indian Health Research, Oklahoma City

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Introduction

Despite its frequently devastating consequences, in comparison to the other leading causes of American Indian (AI) morbidity and mortality, stroke has received relatively little attention. This is likely the result of the higher prevalence of heart disease, cancer, and diabetes, especially the attention necessitated by the pandemic of diabetes. However, recent analysis of stroke data collected by the Strong Heart Study (SHS)[1] underscore the severity of stroke among AI and emphasizes the need for increased attention to its prevention. The SHS report in *Circulation* is the first to systematically analyze certain aspects of stroke among a sizeable population of AI. Because of the importance of these findings, it was thought useful to bring the following summary to the attention of *The Provider* readers.

The SHS is a population-based, prospective cohort study of prevalence and incidence rates of cardiovascular disease and its risk factors among 13 American Indian tribes/communities in southwestern Oklahoma, central Arizona, and North and South Dakota. The study population consists of 4549 individuals (1846 men; 2703 women) 45 to 74 years of age who underwent baseline examination during 1989 - 1992 with regular follow-up through 2004. Data obtained as part of SHS were analyzed in order to prospectively determine stroke prevalence and incidence rates among AI and to assess risk factors for incident stroke among this population.

Examinations included collection of demographic information, medical history, medication use, blood pressure, and personal health habits (physical activity, smoking, and alcohol consumption), collected by interviews conducted by trained field staff. A physical examination was conducted, and fasting blood samples were collected for laboratory tests, including lipids, lipoproteins, and a 75-g oral glucose tolerance test. The details of definitions of normal and abnormal findings are too extensive for the present report but can be found elsewhere.[2]

Incidence rates of stroke were calculated for participants in each of the three study centers (Table 1). The 1990 US population was used as the standard population in all age-adjustments.

In this Issue...

277 Stroke and American Indians: Recent Information from the Strong Heart Study
284 A Cooperative School- and Community-Based Intervention to Promote Diabetes Awareness and Prevention Behaviors Among Youths in an American Indian Community
294 IHS Child Health Notes
296 H1N1 Influenza: Pregnancy Multiplies the Risk of Severe Disease
299 A Reply to Keane, et al, Regarding the Article, *Intercepting the Safety Pitfalls of the Electronic Health Record*
302 Meetings of Interest
304 Position Vacancies

Prevalence and Incidence Rates of Stroke

At baseline, 42 of the 4549 participants had a history of previous stroke, and the age- and sex-adjusted prevalence proportion was 1132/100,000 population. Age-specific prevalence rates were as follows: 45 to 54 years, 450; 55 to 64 years, 1130; and 65 to 74 years, 1870/100,000. Age-adjusted prevalence rates for men and women were 1625 and 695/100 000, respectively. Age- and sex-adjusted prevalence rates among Arizona, Oklahoma, and South and North Dakota participants did not differ significantly: 741/100,000 (10 cases, 95% CI 0 to 1511.9); 1352 (18 cases, 95% CI 0 to 2754.6); and 1193 (14 cases, 95% CI 0 to 3091.9), respectively. The age-and-sex adjusted incidence of 679/100,000 (Table 1) exceeds that reported for white and black populations in the US.

Stroke Subtypes

Ischemic infarction was by far the most frequent type of stroke, comprising 85.7% of incident stroke cases. Intracerebral hemorrhage occurred in 11.6% of participants, and subarachnoid hemorrhage accounted for 2.7% of all strokes. The distribution of the types of stroke encountered in the SHS is very similar to that when data were pooled from the Atherosclerosis Risk in Communities Study (ARIC), the Cardiovascular Health Study (CHS), and the Framingham Heart Study.[3] Among the younger SHS participants, hemorrhagic strokes (primarily intraparenchymal) were, not surprisingly, more frequent.

Risk Factors Associated With Stroke

Cox proportional hazard models (Table 2) were used to assess association of stroke with its potential risk factors including age, gender, systolic and diastolic blood pressures, body mass index, waist circumference, low-density and high-density lipoprotein cholesterols, triglyceride, physical activity, smoking, alcohol use, microalbuminuria and macroalbuminuria. Hypertension and pre-hypertension were entered in alternative models as categorical variables instead of systolic and diastolic blood pressure. All other covariates remained the same.

Age was the strongest non-modifiable risk factor for stroke; the present findings (Table 2) are similar to those reported in several studies.[4-6] Although men have a higher risk of stroke than women in other populations, gender was not a significant risk factor for stroke in this population. For the SHS population and considering all strokes, systolic blood pressure was not a statistically significant risk factor, whereas diastolic blood pressure was, possibly related to 83 percent of SHS participants being <65 years old at enrollment. When treated as categorical variables, hypertension and pre-hypertension were both risk factors for stroke. Current and past histories of smoking increased risk of stroke in this population, similar to findings in several other studies.[7-9] Elevated fasting glucose and hemoglobin A1C levels were also significant risk factors for stroke. The associations between microalbuminuria and macroalbuminuria and stroke were very strong, probably reflecting widespread endothelial damage.

Table 1. Age-specific incidence rates of stroke per 100,000 person years (1989-2004)

Age	Arizona		Oklahoma		South/North Dakota		Rates for all Centers	Whites*	Blacks†	FHS Cohort‡
	Rate	No.	Rate	No.	Rate	No.	Rate	Rate	Rate	Rate
45-54	459	43	303	27	387	35	384	63	320	135
55-64	743	37	694	42	746	43	727	273	637	323
65-74	748	17	1072	34	1146	28	1002	669	972	879
Total	584	97	568	103	614	106	588			
ASAR	649		659		718		679			
ASAR CI	445 – 854		280 – 1038		337 – 1098		364 – 994			

ASAR indicates age-and sex-adjusted rate
ASAR CI indicates 95% Confidence Interval of ASAR
* In Rochester, Minnesota, 1985-1989
† The Greater Cincinnati/Northern Kentucky Stroke Study, 1993
‡ Framingham Heart Study 1980-2003

Case Fatality Following First Stroke

The 30-day and 1-year case fatality rates after first stroke are shown in Table 3, and no differences between men and women were found for either time period. In regard to 1-year case fatality after first stroke, pooled data from FHS, ARIC, and CHS showed a case fatality rate of 21% for men and 24% for women aged > 40 years,[3] and, in stark contrast, the 1-year mortality among SHS participants (Table 3) was almost 1.5 times higher. Data do not appear to be available for 30-day case fatality in other populations.

For *incident* stroke,[1] participants were older; had higher systolic and diastolic blood pressures, triglycerides, fasting glucose, HbA_1C, insulin, and 2-hour glucose levels; had lower HDL cholesterol levels, and were less physically active at baseline than participants who remained stroke-free. Hypertension, diabetes, microalbuminuria, and macroalbuminuria were significantly more prevalent at baseline among participants with subsequent stroke, and those with incident stroke were more likely at baseline to be past alcohol users but less likely to be current alcohol users than those who remained stroke-free.

Table 2. Cox proportional hazards model for all strokes

Variables	P	Hazard ratio*	95% confidence interval
Age	<0.001	1.07	(1.05, 1.09)
Gender	0.77	0.95	(0.71, 1.28)
Systolic blood pressure (per 20 mmHg)	0.2	1.10	(1.0, 1.22)
Diastolic blood pressure (per 10 mmHg)	0.02	1.21	(1.1, 1.48)
Body mass index (kg/m2)	0.43	0.98	(0.94, 1.03)
Waist circumference (cm)	0.95	1.00	(0.98, 1.02)
LDL-cholesterol (mmol/l)	0.8	0.98	(0.85, 1.14)
HDL-cholesterol (mmol/l)	0.08	0.67	(0.43, 1.05)
Triglyceride (mmol/l)	0.9	0.99	(0.84, 1.17)
Physical activity (hr/week)	0.68	1.00	(0.99, 1.01)
Fasting glucose (mmol/l)	<0.001	1.07	(1.04, 1.1)
Current smoking (vs. never smoking)	<0.001	2.38	(1.69, 3.36)
Past smoking (vs. never smoking)	0.006	1.6	(1.14, 2.25)
Current alcohol users (vs. never users)	0.23	0.78	(0.51, 1.17)
Past alcohol users (vs. never users)	0.87	1.03	(0.7, 1.48)
Microalbuminuria (vs. normal)	<0.001	1.73	(1.25, 2.38)
Macroalbuminuria (vs. normal)	<0.001	3.3	(2.29, 4.77)
Alternative models: Hypertension and pre-hypertension (instead of systolic and diastolic blood pressure) *			
Hypertension (vs. normotensive)*	<0.001	2.2	(1.5, 3.2)
Pre-hypertension (vs. normotensive)*	0.005	1.75	(1.18, 2.59)
HbA1c was put in the model instead of fasting glucose. All other covariates were the same.			
HbA1c (%)†	<0.001	1.15	(1.08, 1.21)
Diabetes and impaired glucose were put in the model instead of fasting glucose. All other covariates were the same.			
Diabetes (vs. normal glucose tolerance) ‡	<0.001	2.05	(1.41, 3.0)
Impaired glucose metabolism (vs. normal glucose tolerance)	0.49	1.17	(0.75, 1.8)

Table 3. Age-Adjusted 30-Day and 1-Year Mortality After First Stroke (1989-2004)

	Arizona		Oklahoma		South/North Dakota		SHS Overall
Time Point & Category	Mortality%	No.	Mortality%	No.	Mortality%	No.	Mortality%
30 Days							
Male	23.3 (15–30)*	8	16.1 (10–23)	7	16.2 (10–23)	7	18.0 (11–25)
Female	32.0 (25-38)	19	9.8 (5-14)	7	13.2 (8–18)	8	18.5 (13–24)
Male + Female	29.1 (24–34)	27	12.4 (9–16)	14	14.7 (10–18)	15	18.3 (14-23)
1 Year							
Male	39.3 (30–47)	13	31.6 (23–40)	14	23.4 (16–31)	10	31.0 (23–39)
Female	44.7 (37–52)	26	21.5 (16–28)	14	30.9 (24–38)	18	33.1 (26–40)
Male + Female	42.7 (37–48)	39	25.7 (21–31)	28	28.0 (23–33)	28	32.2 (27–38)

Incidence and case-fatality rates of stroke among AI are high compared to other segments of the US population. SHS findings confirm the strong associations between hypertension, diabetes, and cigarette smoking and risk of stroke. While it is not surprising that the stroke risk factors are virtually the same as those for atherosclerotic heart disease, the findings are of considerable value, nevertheless. Each of these risk factors provides important avenues for intervention to reduce risk. The basis of the higher case-fatality from stroke in this population deserves further study. To our knowledge, the SHS study is the first to examine incidence rates of stroke associated risk factors, including analysis of case fatality rates, among a well defined AI population. The findings confirm that stroke affects the AI population relatively more severely than it does the white population in the US, and that it is worthy of increased attention.

Stroke is the fifth leading cause of death among AI of all ages, exceeded only by diseases of the heart, malignant neoplasms, accidents, and diabetes. For those aged 65 years and older, it is the third leading cause of death, behind heart disease and cancer, and accounts for 7% of all deaths among that age group.[10-12] Thus, even based upon previous mortality studies, stroke among AI warrants increased study.

Comment

The first systematic compilation of AI information related to the epidemiology of stroke, including analysis of risk factors, was by Gillum[13] who compiled death information from the National Center for Health Statistics and prevalence of certain risk factor data from two National Health and Nutrition Examination Surveys (NHANES I & II). The NHANES data are limited to some extent by the relatively small sample size of AI included and some degree of uncertainty as to racial classification. In NHANES I, all but 17 self-identified Native Americans were classified White by interviewer observation, and in NHANES II, all but 26 persons were so classified by interviewer observation. Gillum called attention to the relative lack of data on stroke incidence and prevalence among AI.

Prior to the SHS, available data on incidence of nonfatal or fatal stroke among AI were derived from a hospital case study[14] and from national survey data that generally include a small number of AI.[13] Stroke mortality among AI has been described in several reports by use of regional or national death certificate data, in which race may have been misclassified.[15-18] We believe the SHS overcomes these weaknesses through study of a prospectively followed cohort of AI with special attention to accurate measurement of baseline parameters.

The SHS has proved to be important in a number of ways. It remains the longest-running, prospective, and comprehensive study of cardiovascular disease and its risk factors among a sizeable group of AI. Data collection has included a host of individual and group characteristics that have proved to be useful for a wide range of associated studies. As of April 2009, 185 publications of SHS data have appeared in the medical literature, and a substantial number are in preparation. While SHS understandably focused first upon the vasculature of the heart, its studies included the carotid and peripheral vasculature, renal dysfunction, and a number of other parameters. Analysis of data related to the cerebrovascular circulation was a natural extension of SHS investigations.

The SHS has been a model for working collaboratively with Indian communities. This has resulted, to considerable degree, from maintenance of a collegial attitude with the respective tribes and their participants. It is the result of diligent attention to the fact that the communities are true partners with the SHS and of professional field staffs who share these values and work in daily interface with the populations.

An important characteristic of the SHS is that it is based upon a defined cohort, thus obviating the always vexing problem of establishing both a definite numerator and a denominator for the calculation of various rates among AI populations. Its results may vary somewhat from those

reported in other AI studies, particularly those that have not been prospectively collected.

The SHS investigators, in conjunction with Dr. Dedra Buchwald of the University of Washington and her collaborators, have prepared a proposal for extending the SHS stroke studies. The proposal, designated the Strong Heart Stroke Study (SHSS) will focus on individuals from the original SHS cohort, all of whom are now age 65 or older. The aim is to further characterize stroke and certain of its sequelae among AI, with attention to cognitive and motor dysfunction resulting from circulatory disturbances in the brain.

A number of clinical guidelines for prevention[19] as well as for treatment[20] of stroke are available. In addition, recommendations are available for establishing systems of stroke care,[21] including use of telemedicine,[22] that are likely to be of interest to IHS and tribal clinicians. The recent Memorandum of Understanding between the IHS and the American Heart Association contains a number of achievements and plans, including possible establishment of regional stroke treatment centers located near Indian communities.[23] The latter approach would appear to be worthwhile and is in keeping with approaches to rural and relatively isolated community health pioneered by the IHS.

A major goal of the SHS is the seeking of additional information that may prove useful in refinement of recommendations for prevention and treatment of cardiovascular and cerebrovascular disease among AI. It is with this goal in mind that we provide this brief review of our recent *Circulation* paper[1] regarding stroke.

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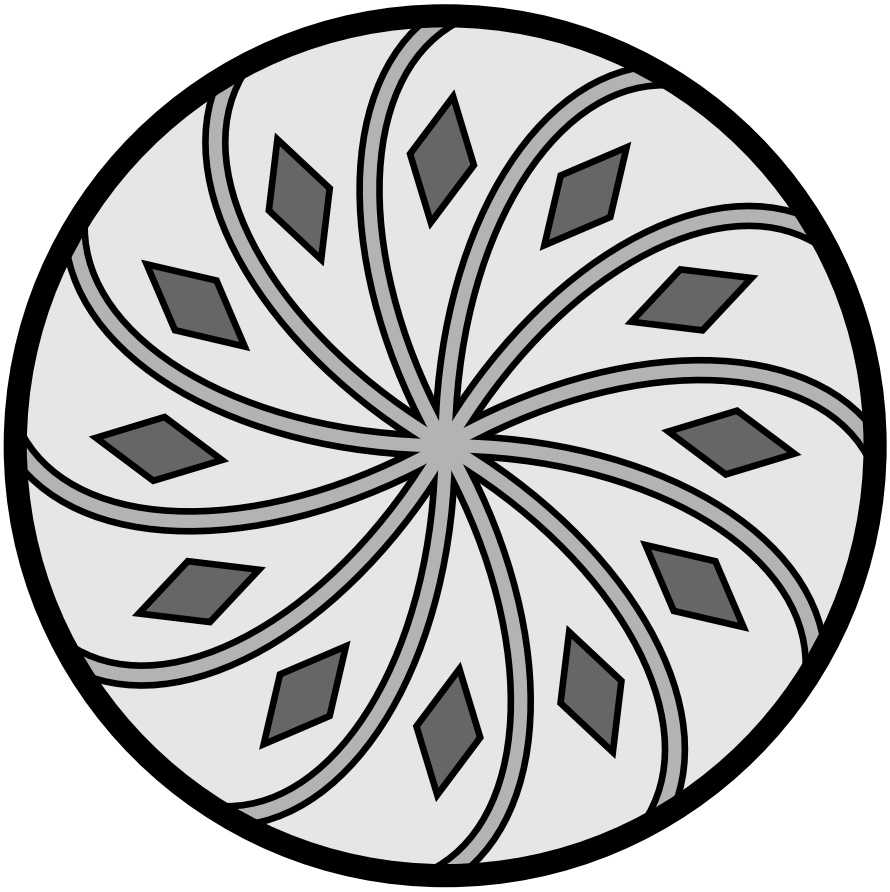

A Cooperative School- and Community-Based Intervention to Promote Diabetes Awareness and Prevention Behaviors Among Youths in an American Indian Community

Patrick S. Cross, DPT, Assistant Professor, The University of South Dakota Department of Physical Therapy, Vermillion, South Dakota, and Director of Rehabilitation, Carl T. Curtis Health Education Center, The Umo^n ho^n Tribe of Nebraska, Macy, Nebraska; Patti J. Berg, MPT, MA, Assistant Professor, The University of South Dakota Department of Physical Therapy; Marty Walsh, DPT, The University of South Dakota Department of Physical Therapy; Jennifer Kelly, DPT, The University of South Dakota Department of Physical Therapy; Debra Parker, MA, CDE, Coordinator, Umo^n ho^n Tribe Diabetes Program; Justin Beebe, PhD, Assistant Professor, The University of South Dakota Department of Physical Therapy; and Julie Jacobsen, EdD, Umo^n ho^n Tribe Prevention Grant/AmeriCorps Program Director

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Introduction

Diabetes mellitus is a major health concern in America, as demonstrated by the serious impairments it confers on individuals, the high treatment costs it creates for health care systems, and its rapidly increasing prevalence. In 2005, the percentage of Americans reporting a diagnosis of diabetes had more than doubled the 1980 rate, increasing from 2.5% to 5.5%.[1] Of those reported diabetes cases, between 90% and 95% were type 2 diabetes mellitus (T2DM),2 the form of diabetes most influenced by behavior and lifestyle choices.[2,3] Risk factors such as obesity,[4,5] unhealthy diet,[6] inactivity,[5,6] impaired glucose tolerance,[5] and hyperinsulinemia,[5,7,8] are closely associated with the development of T2DM. Ethnicity and genetics also play a significant role.[5] The US Department of Health and Human Services[9] estimates that 16.5 percent of the American Indian and Alaska Natives who received services through the Indian Health Service have been diagnosed with diabetes. This statistic is higher than any other major ethnic group in the US and can be as high as 29.3 percent in southern Arizona American Indian adults. The scope of the problem intensifies, as the incidence rate of newly diagnosed T2DM is greater among American Indian children younger than 20 years than in any other same-aged ethnic population.[9] The high incidence of the disease in this population makes the identification and prevention of T2DM risk factors a vital public health priority in American Indian communities.

Acanthosis nigricans (AN), an area of darkened skin that is thick and coarse[5] and characterized by "hyperpigmented, velvety cutaneous thickening"[10(p744)] as well as hyperkeratosis,[5] is strongly associated with T2DM,[4,5,11,12] as well as T2DM risk factors such as hyperinsulinemia,[5,7,8,11-14] increased body mass index (BMI),[11] insulin resistance,[4,5,8,13,14] and obesity.5,13 Although the mechanism is not fully understood, it appears that the genes that contribute to AN have pleiotropic effects[4,5,7,8,12-14] (meaning single genes may be responsible for multiple trait expressions). Individuals with darker skin pigmentation (including Native Americans, Aboriginals, Mexican Americans, and African Americans) are more likely to develop AN,[10,15] and although the genetic basis of the condition is unknown, it has a strong hereditary element.[5,10] Manifestations of AN most commonly affect the back of the neck,[5,8,10,11,16,17] but can also be found in other areas where the body has skin folds, such as the axilla, groin, and antecubital and popliteal surfaces.[10,11] For clinical purposes, a scale such as the 0 – 4 scale developed by Burke et al[11] is easy to use and has high interobserver reliability.

Literature Review: Interventions

Several studies in diverse populations have shown that lifestyle education programs can delay or prevent the onset of T2DM, particularly when the programs are coupled with physical activity and/or individualized counseling to develop an exercise program.[4,6,18-22] A recent meta-analysis of 21

studies showed that intervention programs based on diet and exercise are at least as effective as medications in preventing or delaying the onset of diabetes.[23] However, despite the many studies on diabetes prevention programs, few have targeted the effectiveness of intervention programs with American Indian youths, even though American Indians have higher risk for developing the disease.

Two studies[24,25] implemented ten, 45-minute education sessions in first through sixth grades in two indigenous communities in Canada. The studies focused on nutrition, healthy lifestyles, and diabetes prevention. The education was supplemented by a media campaign, and the program made extensive use of existing community groups to plan and enhance the education. The study implemented new programs and lobbied for improvements in school lunch and physical education programs. The goals of these studies were to detect physical and behavioral changes in the intervention groups to lower their risk factors of T2DM. Differences in measures of physical change (such as skinfold testing and body mass index) between groups were modest after two years; however, researchers determined that behavioral changes were influenced by a complex mixture of environmental, cultural, political, and societal factors. Many of these influences competed with or undermined the healthy messages in the educational program, making improvements difficult to attain and track. Nonetheless, the studies did identify successful strategies for implementing an intervention program. The studies drew two useful and important conclusions: 1) local tribal members were vital in planning and prioritizing program activities; and 2) it was important to educate students at an early age prior to establishing unhealthy lifestyles.

Saksvig et al[26] conducted a similar 9-month study among Ojibway-Cree third through fifth graders. Their program presented 16 education sessions, reduced access to sugary snacks at school, and implemented a free healthy breakfast program. Their program demonstrated significantly improved dietary knowledge and preferences ($p<0.001$); however, there were no improvements in BMI or body fat percentage.[26] The authors cited the short duration of the study (one year) and the lack of physical activity as limiting factors.

Ritenbaugh et al[27] published results of a three-year intervention in a Zuni community in New Mexico. The program consisted of a diabetes education curriculum targeting high school students, healthy school lunch menu changes, limited access to vending machine "junk food," and installation of a community fitness center in the high school. High school students were tracked, and voluntary participant blood-draws were taken. Blood glucose and insulin levels from these samples were compared to those from a group of Caucasian students in a neighboring community. In both communities, there were no significant changes in BMI throughout the study.[27] However, the blood plasma samples confirmed two important findings: 1) baseline insulin levels were significantly higher for the Zuni youths, and 2) insulin levels for the Zuni students dropped significantly ($p<0.06$) throughout the study, suggesting healthy physiological changes were taking place.[27]

Purpose/ Objectives

This intervention-based study was intended to decrease the risks for developing T2DM among middle school students in a midwestern American Indian tribe. Using a middle school based education program to supplement existing tribal diabetes prevention efforts, the goals of the study were to: 1) examine the correlation between AN grades and factors known to correspond with increased risk for T2DM; 2) increase student participation in pre-existing prevention and wellness programs; 3) evaluate changes in T2DM factors in subjects with greater youth center and wellness program exposure; and 4) through programming, decrease the risks for T2DM development for youths in the tribe. Although previous T2DM intervention studies have been conducted with American Indian youths, none have used intervention strategies to evaluate correlating changes between AN severity and T2DM risk factors for this group.

Hypothesis

This study sought to confirm that AN severity grades correlate with other T2DM risk factors in this population. It was hypothesized that: 1) students with AN will demonstrate other risk factors for T2DM, and there will be a positive relationship between the severity of these risk factors; 2) the intervention will reduce AN severity grades; and 3) there will be an inverse relationship between activity level and risk factors, such that increased levels of participation in youth prevention center activities will correlate with a decrease in T2DM risk factors.

Methods

Research design. This study was reviewed and approved by The University of South Dakota's Institutional Review Board and tribal health officials prior to implementation. The study was a non-randomized clinical trial of 37 fifth through eighth grade students at a school on an American Indian reservation, with an intervention period lasting eight months. The intervention consisted of six 1-hour education sessions, delivered to students once each month in the school setting. Sessions were tailored to the specific community of youth in an American Indian tribe, incorporating culture, traditions, values, and community ideas into the content and delivery. Each month, research members presented information pertaining to diabetes education, diet, and exercise based upon a specific theme.

Close collaboration with tribal members and groups was essential to project implementation. In the study's planning stages, the researchers met with the director and staff at the tribal diabetes education center to develop content and teaching strategies. Prior to instruction, materials for each month were shared with the diabetes education and youth

prevention center staff to ensure programming by those facilities reinforced the educational messages students were receiving. In addition, the researchers met monthly with members of the youth prevention center to discuss how the lessons could be improved and how monthly themes could best support activities at the center. Staff also attended the classroom education sessions to emphasize the tribe's commitment to the study.

Subject Selection. Subjects were recruited at the school through a sample of convenience. All children in grades 5 through 8 (n = 90) were invited to participate in the study. This group of students was targeted based on several assumptions: 1) young students are less likely to have developed T2DM, improving the probability that education can have a preventative effect; 2) pre-adolescent children are situated in a formative period during which they often establish lifestyle habits; 3) as students advance beyond elementary school, less physical activity is programmed into the school day and, unless students take deliberate steps, they tend to exercise less -- a trend supported by Macaulay et al.[24]

Student participation in the study involved four components: 1) signing an assent form and providing a signed consent form from a parent or guardian, 2) listening to six 1-hour, monthly diabetes education sessions delivered to all students in fifth through eighth grades, 3) participating in a second health screening at the end of the year to track anthropometric changes, and 4) allowing the anonymous data from health screenings to be recorded, analyzed, and published. Small incentives were provided to encourage participation.

Instruments. A calibrated electronic scale with a built-in measuring stick from the school nursing office was used for weight and height measurements. Weight was recorded to the nearest quarter pound, with the students clothed, and height was measured without shoes. Manual sphygmomanometers and automated blood pressure cuffs were used to assess blood pressure. Blood pressure (BP) measurements were taken by the researchers, all of whom were physical therapy students or instructors with clinical experience taking BP. Waist and hip measurements were made using tailors tape, and a waist-to-hip ratio (WH = waist divided by hip measurements) was calculated based upon these measurements. Material for the education sessions was presented to the students via Microsoft PowerPoint™ slides, using a personal computer and a video screen projector.

Procedures

Health screenings. Student interaction began with a health screening at the beginning of the school year. This screening was a standard part of the school's operations and had been in place for many years. Height, weight, BMI, BP, and WH ratio were measured/calculated and recorded for all students in grades K-12. To provide greater comfort for the students, measurements were not taken in the presence of peers, and tribal health care workers, who were familiar to the students, were present at all screenings. An experienced endocrinologist screened students for AN and noted the clinical severity of the condition based on the 0 - 4 AN rating scale.[11] Identical health screening measurements were repeated for all students who enrolled in the study at the end of the school year.

Educational sessions. All students, including those not participating in the study, received six 1-hour educational sessions during the 8-month intervention period that focused on diabetes prevention through diet and exercise. This instruction was incorporated into the normal health and science curriculum, and the material was developed and delivered by research members with the assistance of individuals from the diabetes education and youth prevention center. All educational materials were designed to be comprehensible at a fifth grade education level. The classes sought to educate students on the health consequences of T2DM, the behaviors associated with increased T2DM risk, and the benefit that diet and exercise changes can play in reducing the risk of T2DM. The education sessions also explained what AN was and how it was associated with T2DM risk factors.

After each educational session, students were encouraged to participate in healthy activities at the youth prevention center. The center, located across the street from the school, promotes health education and encourages exercise to tribal youth through free, culturally appropriate, activity-oriented, after-school programming. Student attendance at the center was tracked through a touch screen computerized system in which students voluntarily checked in and out using a personal identification code.

Incentives. Two of the goals of the study were to increase student participation in youth prevention center activities and to investigate whether higher participation rates correlated with reduced T2DM risk. To support these objectives, the study provided monthly incentives to encourage attendance at the center. If students checked in at the tribal youth prevention center ten or more times in a given month and were signed up to participate in the study, they were eligible for a monthly prize. Most months, the prizes were small (fruit or award certificates), but large rewards were given for achieving attendance goals for three consecutive months on two separate occasions – a fall trip to a university campus to attend a college football game and a spring trip to attend a college basketball game. Twelve and six students qualified and attended the fall and spring events, respectively. The smaller monthly prizes were discontinued after two sessions because there was concern from some tribal members that the rewards brought too much attention to the students individually and that they were redundant with other efforts to recognize students for health-promoting behavior. As a result, only the fall and spring trips were used as incentives during the latter intervention period.

Data Analysis. All screening data were entered into a pre-existing database that was the property of the tribe. Prior to

analysis, the student records were stripped of personally identifiable information and made anonymous to the researchers. Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 17.0 with an alpha level at $p<0.05$. Spearman's nonparametric correlations were used to evaluate relationships existing between T2DM risk factors, including AN, BMI, WH ratio, and systolic and diastolic BP, and correlations were classified by level.[27] Pre- and post-intervention data were analyzed using independent t-tests to assess differences in AN, BMI, systolic and diastolic BP over the intervention period. In addition, student participation data at the prevention center were compared with the same subject set's data from the previous school year.

Results

Of approximately 90 students in the fifth through eighth grades, 37 met all of the participation requirements (41.1%). Participants in this study initially included 20 males (54.1%) and 17 females (45.9%). Three of the male participants were not present at the time of the post-testing, thus creating a final pool of 34 participants (37.4%), including 17 males (50.0%) and 17 females (50.0%). All four grades were represented, but not proportionately: 10 fifth grade students (29.4%), 14 sixth graders (41.2%), 9 seventh graders (26.5%), and 1 eighth grader (2.9%). Of the participating students, 15 students (44.1%) had an AN neck marking and 9 (26.5%) had a BMI greater than 25 at the start of the intervention.

To determine the relationship between various risk factors, correlations were calculated pre- and post-intervention using Spearman's rho (Table 1). Overall, there was a moderate correlation, as defined by Munro,[27] between AN and BMI at both the pre- and post-intervention tests (r=0.69 and 0.61, respectively). Girls demonstrated a moderate correlation at both the pre-intervention test (r=0.58) and a high correlation at the post-intervention test between AN severity and WH ratio (r=0.63). Little to low correlations existed between both AN and systolic BP and AN and diastolic BP.

Pre- and post-intervention mean measurement data for the overall study population for girls and for boys are presented in Table 2, with difference calculations representing measurement changes. Overall, mean WH ratio and mean diastolic BP significantly decreased during the intervention period. The overall mean AN severity and BMI increased during the 8-month study, but only the BMI of boys, especially in the fifth grade, significantly increased. For students with an observable AN marking at the start of the study, the mean diastolic BP significantly decreased. In addition, boys with an observable AN marking at the start of the study significantly decreased their AN severity. Mean diastolic BP significantly decreased for those with a BMI greater than 25 prior to intervention. For those students who had higher participation rates at the youth prevention center (>27 visits to the prevention center in an 8-month time frame), significant changes were noted, including decreased WH ratio and decreased diastolic BP.

Table 1. Spearman's Correlations (r) between AN and Other T2DM Risk Factors (sorted by gender)

		BMI		WH		SBP		DBP	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Overall (n=34)									
AN	Pre	0.69 *	-	0.45*	-	0.33	-	0.11	-
	Post	-	0.61 *	-	0.61**	-	-0.06	-	-0.02
Boys (n=17)									
AN	Pre	0.71**	-	0.48*	-	0.20	-	0.17	-
	Post	-	0.53 *	-	0.49 *	-	-0.15	-	-0.09
Girls (n=17)									
AN	Pre	0.71**	-	0.58*	-	0.44	-	-0.01	-
	Post	-	0.71**	-	0.63**	-	-0.09	-	0.02
Data Set (n=313)									
AN	Pre	0.71**	-	n/a	-	0.34*	-	0.25*	-

AN = Acanthosis Nigricans; BMI = Body Mass Index; WH = Waist-to-Hip ratio; SBP = Systolic Blood Pressure; DBP = Diastolic Blood Pressure; Pre = beginning of the school year screen; Post = end of the school year screen; Data Set = 2002 – 2007 data; n/a = not available; n = number of students

.00 - .25 = little, if any correlation, .26 - .49 = low correlation, .50 - .69 = moderate correlation, *.70 - .89 = high correlation, .90 - 1.0 = very high correlation

*p < 0.05

Table 2. Mean Pre- and Post-Intervention Risk Factor Values by Subgroup

	AN Severity			BMI			WH			SBP			DBP			# visits			# min.		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Overall (n=34)	0.7	0.8	0.1	22.9	23.2	0.3	0.89	0.86	-0.03*	113	111	-2.3	68	62	-5.8*	18.5	15.8	-2.7	887	783	-1043
Boys (n=17)	0.7	0.8	0.1	21.9	23.4	1.5*	0.87	0.85	-0.02	113	112	-0.8	67	64	-2.9	13.3	13.2	-0.1	609	636	26
Girls (n=17)	0.6	0.8	0.2	24.0	23.0	-1.0	0.91	0.87	-0.04*	113	109	-3.9	69	60	-8.7*	24.8	18.4	-6.4	1164	931	-233
5th Grade (n=10)	0.4	0.9	0.5	19.9	21.7	1.8*	0.90	0.88	-0.02	115	110	-4.6	74	61	-13.0*	15.8	18.4	2.6	7320	864	132
Boys (n=5)	0.2	0.8	0.6	18.4	20.9	2.5*	0.89	0.86	-0.03	111	111	-0.4	74	61	-13.2*	10.8	19.2	8.4	466	886	420
Girls (n=5)	0.6	1.0	0.4	21.5	22.5	1.0	0.91	0.90	-0.01	118	110	-8.8*	74	61	-12.8*	20.8	17.6	-3.2	997	842	-155
6th Grade (n=14)	0.8	1.0	0.2	25.5	24.2	-1.3	0.91	0.87	-0.04	112	108	-4.4	66	61	-5.1	20.1	13.2	-6.9*	971	626	-345*
Boys (n=7)	0.9	1.0	0.1	24.6	25.7	1.1	0.90	0.88	-0.02	116	110	-5.7	66	63	-3.4	14.4	8.4	-6.0	776	403	-373
Girls (n=7)	0.7	1.0	0.3	26.3	22.8	-3.5	0.92	0.87	-0.05	108	105	-3.0	65	58	-6.9	25.7	18.0	-7.7	1165	848	-317
7th Grade (n=9)	0.4	0.1	-0.3	22.1	22.2	0.1	0.85	0.83	-0.02	111	115	3.2	64	65	0.8	20.7	18.1	-2.6	1000	990	-10
Boys (n=4)	0.5	0.0	-0.5	20.4	20.0	-0.4	0.79	0.80	0.01	108	116	7.5	58	69	10.8	12.3	16.0	3.8	589	807	219
Girls (n=5)	0.4	0.2	-0.2	23.4	24.0	0.6	0.90	0.85	-0.05*	114	114	-0.2	70	63	-7.2	27.4	19.8	-7.6	1330	1136	-194
8th Grade (n=1)	4.0	3.0	1.0	25.4	32.3	6.9	0.91	0.87	-0.04	120	119	-1.0	65	63	-2.0	5.0	6.0	1.0	240	320	80
Boys (n=1)	4.0	3.0	1.0	25.4	32.3	6.9	0.91	0.87	-0.04	120	119	-1.0	65	63	-2.0	5.0	6.0	1.0	240	320	80
Girls (n=0)	-	-	na	-	-	na	-	-	na	-	-	-	-	-	-	-	-	na	-	-	na
AN + (n=15)	1.5	1.3	-0.2	26.3	26.2	-0.1	0.92	0.92	0.00	116	111	-5.6	69	62	-7.3*	22.1	17.1	-5.0	1076	873	-203
Boys (n=7)	1.8	1.1	-0.7*	25.3	27.0	1.7	0.90	0.89	-0.01	114	112	-2.3	69	62	-6.4	14.9	15.7	0.9	720	754	34
Girls (n=8)	1.2	1.5	0.3	27.3	25.4	-1.9	0.94	0.94	0.00	118	110	-8.5	69	61	-8.0	28.5	18.4	-10.1	1387	976	-411
BM I > 25 (n=9)	1.7	1.8	0.1	30.1	28.5	-1.6	0.95	0.93	-0.02	120	112	-7.7	70	61	-9.2*	15.9	11.4	-4.6	752	607	-146
Boys (n=4)	2.3	2.3	0.0	28.8	31.5	2.7	0.97	0.95	-0.02	125	115	-9.3	73	62	-11.0	6.3	3.8	-2.5	323	162	-161
Girls (n=5)	1.2	1.4	0.2	31.2	26.0	-5.2*	0.93	0.92	-0.01	116	110	-6.4	68	60	-7.8	23.6	17.6	-6.0	1096	962	-134
Visits > 27 (n=8)	0.4	0.8	0.4	27.3	25.4	-1.9	0.89	0.86	-0.03*	114	112	-2.0	71	62	-9.0*	21.6	34.3	12.6*	946	1687	742*
Boys (n=3)	0.3	1.0	0.7	29.1	25.3	-3.8	0.84	0.82	-0.02	107	105	-2.3	69	55	-13.7	19.3	38.7	19.3	907	1856	949
Girls (n=5)	0.4	0.6	0.2	26.2	25.5	-0.7	0.92	0.87	-0.05*	118	116	-1.8	72	66	-6.2	23.0	31.6	8.6	968	1586	617
Data Set (n=313)	0.7	-	-	24.4	-	-	-	-	-	114	-	-	69	-	-	-	-	-	-	-	-

BMI = Body Mass Index; WH = Waist to Hip ratio; SBP = Systolic Blood Pressure; DBP = Diastolic Blood Pressure; # visits=number of times students visited prevention center during 8 month intervention; # min = number of minutes student visited prevention center during 8 month intervention; AN+ = students who had Acanthosis Nigricans marking at start of study; BMI>25 = students who had BMI > 25 at start of study; Visits > 27 = students who visited the prevention center more than 27 times during 8 month intervention; *$p < 0.05$

Data revealed that, for girls, both the mean number of visits and mean number of participation minutes decreased from the previous year; however these decreases were not statistically significant (Table 2). Significant decreases in the mean number of visits and mean number of minutes of participation were noted in the sixth grade participants. Of the subgroup of students who visited the center more than 27 times during the intervention period, there was a significant increase in their mean number of visits and mean number of participation minutes from the previous school year.

Discussion

Our study findings suggest a moderate to high relationship exists between the severity of AN neck markings and BMI for American Indian boys and girls in fifth through eighth grades. This relationship was also found when examining the 2002 – 2007 data from the same tribe, and is similar to that of Burke et al[11] which studied Mexican American adults. The consistency in these relationships may offer a screening advantage, since it is easier and quicker to observe the presence/absence of AN than it is to measure height and weight for purposes of calculating BMI.

Our study also noted moderate to high correlations between AN severity and WH ratios with females but low correlations between these variables in males, suggesting AN may have a differing T2DM risk predictive value than WH ratio for boys and girls. This may be explained by different female and male somatotypes as well as timing of pubescent changes. AN severity also did not correlate well with systolic or diastolic BP in either boys or girls. This suggests that neither systolic nor diastolic BP are good indicators of AN severity, and in turn, may not be as useful as BMI or WH ratio in determining relationships with T2DM.

Given that one intention of the study was to increase participation in wellness and prevention activities, it was unexpected to see a trend of decreased overall participation during the 8-month period. Overall participation at the prevention center averaged 27 minutes per week per student, and even among the most frequent users, participation was only 60 minutes per week per student. This low number of minutes is likely too little time to make positive physiological changes. Despite this, WH ratio and BP measurements improved within various subgroups from pre-test to post-test. That these changes occurred while participation decreased may reflect participation under-reporting with the voluntary check-in or external factors beyond the control of the research team. External factors, such as when the testing was performed (after meal, after a physical education course, prior to a test) or testing during a stressful time (start of school, death of a family member), may have accounted for the overall significant change in diastolic BP.

Although the greatest proportion of students who participated in the study was sixth graders, sixth grade students showed the most significant decrease in prevention center participation time. In addition, the overall girls' participation minutes decreased while the boys' slightly increased. External factors outweighing the strength of this intervention may have contributed to these results. One community member and one employee suggested that perhaps the youth prevention center programming needed updating, and the decline in participation could reflect a need to refresh student's activity programming. Interestingly, for those who participated in activities at the prevention center more frequently, overall participation significantly increased from the year prior, but again this increase was noted more in the boys than the girls. Thus, it may be worthwhile to investigate what factors contributed to the increase in participation for this subgroup and whether more programming needs to be tailored to attract more female students.

For the overall sample, there was a statistically significant decrease in WH ratio. This result was particularly notable for those subjects who attended the prevention center greater than 27 times during the intervention period. However, the intervention only significantly improved the overall BMI of boys, the AN severity of boys with AN prior to the intervention, the BMI of girls who had a BMI greater than 25 at the start of the intervention, and the BMI of fifth graders, especially the boys. A BMI of 25 was chosen as that number is usually considered a risk factor for obesity. In addition, although there was an overall increase in AN severity and BMI, the pre-test measures were smaller than the aggregate tribal data, which would have been collected at a similar time. These results suggest that current T2DM prevention efforts, whether via this study or other tribal efforts, may have positively influenced measures of student health when compared to a grade-matched sample from the same tribe taken five years ago.

The results of this study suggest that, to be most effective, diabetes interventions in this community should target students prior to the completion of fifth grade. Compared to the sixth and seventh graders, fifth graders demonstrated the largest increase in AN severity and BMI during the study. Very small differences were noted between grades with regard to the WH ratio. Although the tribal data set shows the greatest increase in AN severity occurring between the seventh and eighth grades and in BMI between the sixth and seventh grades, our study's results are similar to the observations made by Macaulay et al[24] and Paradis et al[25] that BMI and skinfold thickness among Kahnawake students increased markedly at ages 9 and 10 (typically third and fourth grade). Additionally, initiating interventions in early elementary programming may help students develop lifestyle habits that may reduce the mean BMI increases that are noted between sixth through eighth grade annual health screens.

Although it was not specifically outlined in the objectives, another important learning point emerged from the study: quality collaboration with members of the local community is essential to successfully implement an intervention program.

This study would not have been possible without the support of the tribal health care officials, prevention center staff, and school officials. Their input was essential to making the goals of the program relevant, and their participation was essential to make it a success. Any future interventions will also need a high level of engagement by the local community.

Limitations

There are several limitations to our study. First, the sample size was small. The small sample size limits the statistical power of these data. That said, our raw data are similar to the data collected from 2002 - 2007 on a larger representative group. Still, further investigation utilizing the same methodology with a larger sample size is needed to confirm these data. Second, the subjects reflected a group of ethnically similar subjects on one specific American Indian reservation. These results may or may not replicate well in other settings. Thus our results should be interpreted with caution with regard to more heterogeneous groups of individuals not on a reservation. Third, the tribe also had many resources previously committed to youth diabetes prevention, and the results of this study could reflect the effects of pre-existing programs, instead of this particular intervention. As noted in the studies by Macaulay et al[24] and Paradis et al,[25] behavioral changes are influenced by a complex mixture of factors, many of which were beyond the control of the researchers (e.g., environmental, societal, cultural, and economic issues). Fourth, the health related variables tracked in the study (AN, BMI, WH ratio) are often slow to change. Even with consistent behavioral change, longer follow up may be necessary to examine if changes are not only present but sustained. A similar limitation was acknowledged in a study by Saksvig et al.[26] Fifth and finally, our data showed positive changes associated with WH ratio and BP despite a decrease in participation in prevention center activities. Some possible explanations have been mentioned previously; however, a potential limitation could be decreased inter-rater reliability. Based on our experience with clinical testing and those involved with data collection, we do not expect our reliability to be significantly different. Nonetheless, these results should be interpreted with caution.

Conclusion

This study demonstrated positive moderate to high correlations between AN severity and BMI in both genders, as well as between AN severity and WH ratio in girls, re-enforcing the value of AN as a screening tool for T2DM risk factors. Additionally, the study highlighted differences in WH ratio between boys and girls, suggesting that WH ratio may have different predictive values for boys than girls. This study also provides insight that prevention initiated prior to the end of fifth grade may be beneficial.

Although this study was not successful in increasing the overall participation at the youth prevention center, many individuals who participated in this study had significantly reduced T2DM and various health risk factors. Even though the risk factors were not eliminated, the level of the risk factors in this study population was much less severe when compared to previously collected data from this same age group within this tribe. This suggests that T2DM prevention efforts of the tribal diabetes program may be having a positive effect.

There are many factors to consider when designing a culturally specific intervention for youth. In order to conduct a successful intervention, a trusting relationship between the researchers and the members of the community must be present prior to intervention implementation in order to increase the likelihood of success. The goals for the study must be mutually agreed upon, and it is imperative that the roles, responsibilities, and boundaries for all entities involved should be established at planning outset. Future studies should examine the level of exercise needed to precipitate positive changes in AN and BMI within this population. In addition, examining these changes longitudinally with a larger sample with sound data collection and testing techniques would provide a better picture of how effective the tribe's interventions are at reducing T2DM risk factors.

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Open Door Forum # 13

Increase Physical Activity across the Life span: Multi-level Approaches.

Quarterly Tele-conference/WebEx

Topic: Open Door Forum – Increase Physical Activity across the Life Span: Multi-level Approaches.
Host: Alberta Becenti
Date: Wednesday, October 28, 2009
Time: 12:00 pm, Eastern Standard Time
(GMT -05:00, New York)
Teleconference Number: 866-699-3239
Session Number: 710 086 004
Session Password: 102809

Open Door Forum on strategies to increase physical activity

On October 28, 2009 please join the Indian Health Service (IHS) for our **13th** quarterly Open Door Forum. This teleconference/WebEx Forum will focus on the Health Promotion/Disease Prevention program. The forum provides a unique American Indian Alaskan Native (AI/AN) tailored approach to increasing physical activity across the lifespan. Strategies include community, school, worksite, and clinical approaches. The financial impacts of childhood obesity will also be discussed.

PowerPoint presentations will be available on the agency Health Initiatives website approximately one week prior to this Forum – please download the presentations so you can follow along. There will be time for questions at the end of the presentations. Presentations will also be available during the WebEx and the WebEx will be recorded if you miss this Forum.

To sign into WebEx
1. Right click on the WebEx link and select "open hyperlink": https://ihs-hhs.webex.com
1. Click on Training Center
2. Click on Join the Directors Open Door Forum
3. Type in your name, email address and the password:

Continuing professional education credits are available for physicians, nurses, and dental professionals after completing a feedback survey (on Survey Monkey). To complete the survey, right click on this link, select "open hyperlink" or copy and paste the link into your browser:
https://www.surveymonkey.com/s.aspx?sm=fL0WLAvVElnGSEudG1QTIg_3d_3d

Registered dietitians and some other professionals can obtain credits from their professional organizations using the CME certificate.

The PowerPoint presentations from previous Open Door Forums are available under "What's New" of the agency Initiatives website.

Questions? Contact these Director's Three Initiatives Leads:
Health Promotion/Disease Prevention, Alberta Becenti at Alberta.Becenti@ihs.gov
Chronic Care, Dr. Ty Reidhead at Charles.Reidhead@ihs.gov
Behavioral Health, Peter Stuart at Peter.Stuart@ihs.gov

Open Door Forum # 13

The October 28, 2009 IHS Forum will focus on multi-level strategies to increase physical activity to reduce chronic conditions and diseases among AI/AN population. Physical inactivity is a major risk factor for heart disease, obesity, diabetes, and other risk factors including high blood pressure and triglycerides. Recommending appropriate regular physical activity is important in preventing the growing burden of chronic diseases and conditions.

Learning Objectives
The learner will be able to:

1. Discuss the importance of screening for and promoting physical activity in the clinic.
2. Describe at least three strategies to implement physical activity for all ages in various settings.
3. Discuss the financial cost of childhood overweight and obesity.

ACCREDITATION*:

The Indian Health Service (IHS) Clinical Support Center is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians.

The IHS Clinical Support Center designates this educational activity of *AMA PRA Category 1 Credit*™ for each hour of participation; each person will earn up to two hour for participating. Physicians should only claim credit commensurate with the extent of their participation in the activity.

This Category 1 credit is accepted by the American Academy of Physician Assistants and the American College of Nurse Midwives.

The Indian Health Service Clinical Support Center is accredited as a provider of continuing education in nursing by the American Nurses Credentialing Center Commission on Accreditation. This activity is designated 2.0 contact hours for nurses.

The Indian Health Service (IHS) Division of Oral Health is an ADA CERP Recognized Provider.

ADA C·E·R·P Continuing Education Recognition Program

The IHS Division of Oral Health designates this continuing dental education course for up to 2 hours. Each attendee should claim only those hours of credit actually spent in the educational activity.

Faculty Disclosure Statement:
As a provider accredited by ACCME, ANCC, and ACPE, the IHS Clinical Support Center must ensure balance, independence, objectivity, and scientific rigor in its educational activities. Course directors/coordinators, planning committee members, faculty, and all others who are in a position to control the content of this educational activity are required to disclose all relevant financial relationships with any commercial interest related to the subject matter of the educational activity. Safeguards against commercial bias have been put in place. Faculty will also disclose any off-label and/or investigational use of pharmaceuticals or instruments discussed in their presentation. The course directors/coordinators, planning committee members, and faculty for this activity have completed the disclosure process and have indicated that they do not have any significant financial relationships or affiliations with any manufacturers or commercial products to disclose.

* Registered dietitians and some other professionals can obtain credits from their professional organizations using the CME certificate.

This is a page for sharing "what works" as seen in the published literature, as well as what is being done at sites that care for American Indian/Alaskan Native children. If you have any suggestions, comments, or questions, please contact Steve Holve, MD, Chief Clinical Consultant in Pediatrics at sholve@tcimc.ihs.gov.

IHS Child Health Notes

Quote of the month

"Sickness is felt, but health not at all"

Thomas Fuller

Articles of Interest

Parental refusal of pertussis vaccination is associated with an increased risk of pertussis infection in children. *Pediatrics*. 2009 June;123(6):1446-51. *http://pediatrics.aappublications.org/cgi/content/abstract/123/6/1446*

This study from Kaiser Permanente of Colorado is the first to show that refusing a specific vaccine greatly increases a child's risk of infection from that disease. Previous studies have focused on regions in which nonspecific refusal of vaccinations has lead to increased rates of disease. Certain religious groups have declined vaccination and have had documented increases in outbreaks of vaccine preventable illnesses. Most parents vaccinate their children, and the CDC estimates that 85% of 30 month-old children have the full set of pertussis vaccines. However, there are regional pockets in which parents, for a variety of reasons, decline the pertussis vaccine. Only 65% of children in Wyoming are fully vaccinated against pertussis, and in certain parts of Washington up to 20% of children have exemptions from pertussis vaccines for non-medical reasons.

In this case control study, the authors looked at 156 laboratory confirmed cases of pertussis from 1996 through 2007. The authors reviewed all cases to see if parents had specifically refused the pertussis vaccine. There were 18 (12%) vaccine refuses among the cases but only 0.5% of the controls. As the lead author summarized, "Many of the parents who refuse have the common perception that their child is not at risk – that they are protected by proxy – but our study shows they are at risk and highlights the need to immunize."

Editorial Comment

Immunizations are victims of their own success. Many vaccine-preventable diseases are now so rare that most parents have never seen them. Many parents fear the potential adverse effects of vaccination more than the very real danger of an illness with which they are unfamiliar. Though the absolute rate of infection is low, this study shows that the risk of declining vaccination greatly increases a child's potential for disease.

Recent literature on American Indian/Alaska Native Health

Michael L. Bartholomew, MD

Crosby AE, Espitia-Hardeman V, Hill HA, Ortega L, Clavel-Arcas C. Alcohol consumption and suicide. MMWR.2009 Jun 19;58(23):637-41.

http://www.ncbi.nlm.nih.gov/pubmed/19543198?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum

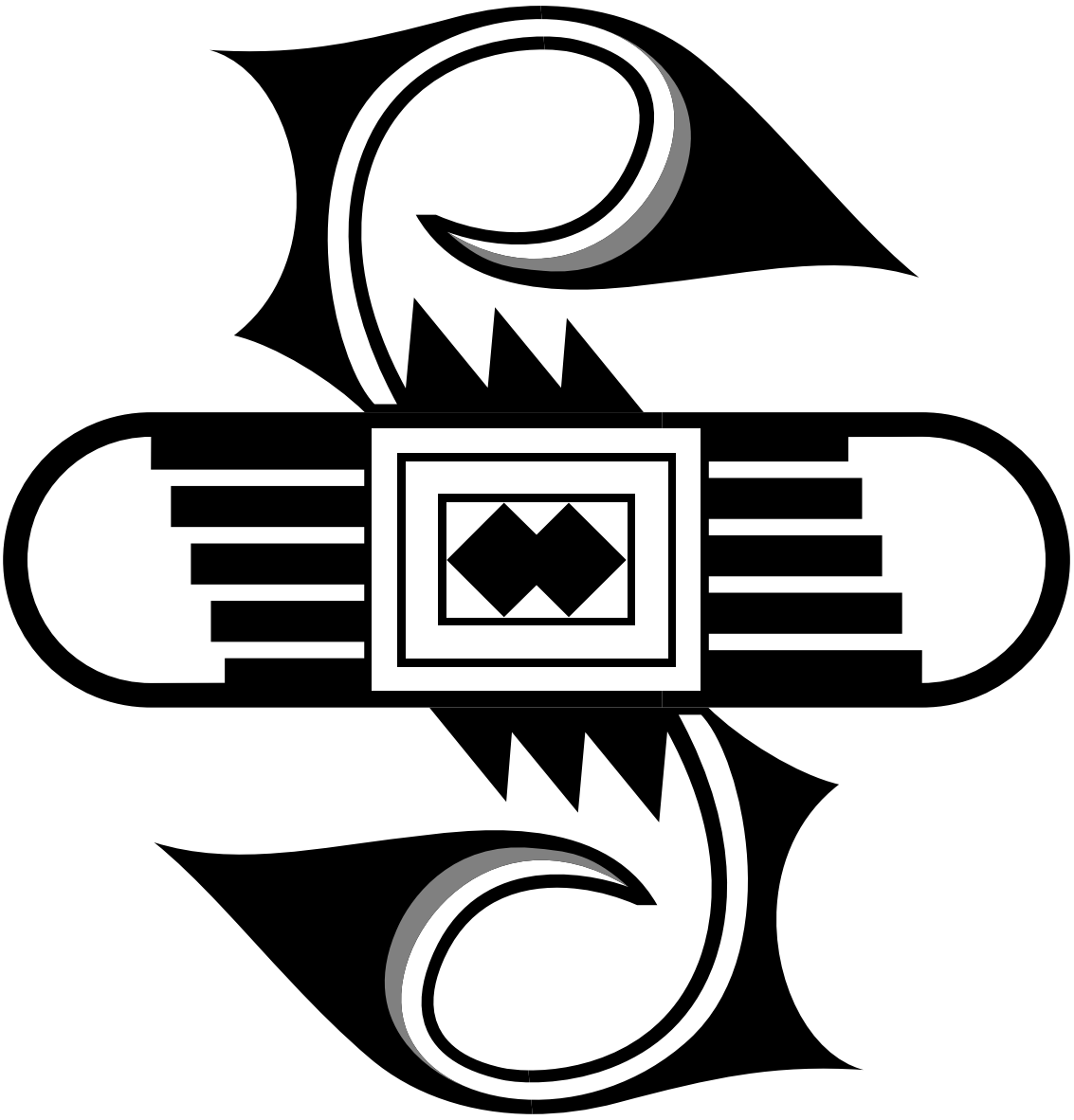
Excessive alcohol consumption is the leading cause of preventable death in the general US population and the AI/AN population. The role to which alcohol consumption impacts the incidence of suicide in ethnic and racial groups within the US is poorly defined. This study examines this relationship by analyzing data from the National Violent Death Reporting System (NVFRS) between 2005 - 2006 in 17 states (Alaska, California, Colorado, Georgia, Kentucky, Massachusetts, Maryland, North Carolina, New Jersey, New Mexico, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin).

During 2005 - 2006, a total of 19,255 suicides occurred in the 17 states contributing data to NVDRS. Among all suicide decedents tested for alcohol, approximately 24% had a blood alcohol concentration at or above the legal limit of 0.08 g/dL. Among the racial/ethnic groups (Hispanic, non-Hispanic white, non-Hispanic black, non-Hispanic American Indian/Alaska Native (AI/AN), and non-Hispanic Asian/Pacific Islander), AI/AN had the highest percentage of suicide decedents with alcohol intoxication (BAC ≥0.08 g/dL) at 37%, the highest percentage of suicide decedents characterized as dependent on alcohol at 21%, and the highest percentage of recent suspected alcohol use at nearly 46%. Non-Hispanic AI/AN had the highest percentage of alcohol detected in the blood of decedents tested at 45.5%. The highest percentage of decedents with BACs ≥0.08 g/dL was among AI/ANs aged 30 - 39 years (54.3%), followed by AI/AN aged 20 - 29 years at 50.0%.

The authors concluded "many populations can benefit from comprehensive and culturally appropriate suicide prevention strategies that include efforts to reduce alcohol consumption, especially programs that focus on persons age <50 years."

Locums Tenens and Job Opportunities

If you have a short or long term opportunity in an IHS, tribal or urban facility that you'd like for us to publicize (i.e., AAP website or complimentary ad on Ped Jobs, the official AAP on-line job board), please forward the information to *indianhealth@aap.org* or complete the on-line locum tenens form at *http://www.aap.org/nach/locumtenens.htm*.



H1N1 Influenza: Pregnancy Multiplies the Risk of Severe Disease

Jean E. Howe, MD, MPH, IHS Chief Clinical Consultant in Obstetrics and Gynecology; and obstetrician-Gynecologist and Health Promotion and Disease Prevention Coordinator, Northern Navajo Medical Center, Shiprock, New Mexico

"Swine Flu Spreading Widely; Worry Over Pregnant Women" "As of late August, 100 pregnant women had been hospitalized in intensive care and 28 have died" "As of Monday, October 5th, seven pregnant women were on respirators in Arkansas hospitals"

These are all quotes from recent *New York Times* articles about the ongoing global pandemic of H1N1 influenza. With school back in session and cooler weather prevailing, infection rates have soared dramatically since early September. Areas that had lower infection rates in the spring outbreak are particularly hard-hit now. Although Native American-specific mortality data are not currently available, many IHS, tribal, and urban sites are seeing dramatic increases in patients with suspected H1N1 disease. Several Native American patients have died, including at least one maternal death.

This novel H1N1 Influenza A virus, with combined genetic elements of human, avian, and swine influenza virus, was first recognized in spring 2009. Worldwide dissemination quickly ensued, and the World Health Organization declared a pandemic on June 11. Unlike seasonal influenza, which is often associated with high rates of severe disease in older people, 2009 H1N1 influenza can cause especially virulent disease in children and young adults. It is believed that past exposure to similar strains of influenza may confer a degree of protection to those over 60, although serious illness in the elderly can also occur. With H1N1, people with asthma, pregnant women, and those with chronic medical conditions have been most severely affected.

Pregnant women are known to have higher rates of hospitalization and death from influenza than their non-pregnant counterparts; with H1N1 infection this increased susceptibility is especially pronounced. Jamieson, et al reviewed hospitalization and mortality data for pregnant women in the first two months of the H1N1 outbreak. From mid-April to mid-May, 34 confirmed cases of H1N1 in pregnant women were reported to the CDC from 13 states, including one Native American woman. The estimated rate of hospitalization was four times higher than in non-pregnant women. Also, in the first two months of the outbreak (through mid-June), six of 45 deaths from H1N1 in the US were in otherwise healthy pregnant women. All six women died from respiratory collapse after developing pneumonia and Acute Respiratory Distress Syndrome (ARDS) requiring mechanical ventilation. It is of grave concern that, in this initial period of H1N1 surveillance, 13% of reported deaths were in pregnant women (pregnant women are approximately 1% of the overall US population). With additional reporting, this has decreased to an estimated 6% of H1N1 deaths occurring in pregnant women, still significantly higher than their percentage in the general population.

There are extensive resources on the CDC website for prevention and treatment of H1N1 influenza in pregnant women, and this information is being updated frequently. Some highlights include:

Limiting Exposure: Although the best prevention is vaccination, additional steps can also be taken to protect pregnant women and others from H1N1 influenza. H1N1, like seasonal flu, is spread by close contact with infected individuals. Coughing, sneezing, and residual respiratory secretions (which can remain infectious for several hours on a variety of surfaces) all transmit disease. Frequent hand washing and "cough etiquette" can help limit transmission. In the health care setting, screening should be undertaken at the initial point of contact, and patients with signs of current respiratory illness should be segregated. One model for this practice is the Winslow Indian Health Care Center in Arizona, where everyone presenting to the clinic is queried about fevers, cough, and sore throat at the clinic entrance. Those with possible influenza are given masks and instructed to "follow the blue line" to a flu clinic where they receive evaluation, education, and treatment in a separate area, from a dedicated team of nursing, provider, and pharmacy staff.

Vaccination: Despite strong recommendations for vaccination, recent national data show that pregnant women have the lowest rates of coverage among all adult populations recommended to receive influenza vaccine. In the face of the H1N1 pandemic, a joint statement has been issued by ACOG, ACNM, AWHONN, AAFP, The March of Dimes Foundation, and other organizations urging vaccination with both seasonal and H1N1 vaccine for all pregnant women. Vaccination in pregnancy also confers a degree of protection to the newborn as well; this is especially important as there is no licensed influenza vaccine for those under six months of age. In mid-September, the FDA approved H1N1 vaccine from four suppliers. Traditional injectable vaccine and live attenuated

influenza vaccine (LAIV) for nasal administration are both available. LAIV should not be used to vaccinate children less than two years old, adults more than 49 years old, pregnant women, people with underlying medical conditions, or children under five with episodes of wheezing in the past year.

Pregnant women can be vaccinated for influenza *during any trimester*. If not already vaccinated, the H1N1 vaccine can be given postpartum. Either IM or nasal (LAIV) vaccine can be administered prior to hospital discharge and both are safe in breastfeeding mothers. Partners and other household contacts of infants should also be vaccinated. Both seasonal and H1N1 vaccine can be given on the same day, one shot in each arm. If a nasal formulation for one vaccine is used, the other must be given IM, or a 4 week delay between immunizations is recommended. Q & As on H1N1 for pregnant women are available at *http://www.cdc.gov/h1n1flu/pregnancy*.

All health care workers are a priority for being vaccinated against H1N1, both for their own protection and to minimize disease transmission.

Treatment: Patients should be educated about influenza symptoms and encouraged to seek care promptly if they have been exposed to H1N1 or become ill. In the case series reviewed by Jamieson, et al, the following symptoms were reported: fever (97%), cough (94%) rhinorrhea (59%), sore throat (50%), headache (47%), shortness of breath (41%), myalgia (35%), vomiting (18%), diarrhea (12%) and conjunctivitis (9%). Individuals may be infected with influenza, including 2009 H1N1, and have respiratory symptoms without fever.

Early treatment (within 48 hours of the onset of symptoms, if possible) with influenza antiviral medications is recommended for pregnant women with suspected influenza illness. *Clinicians should not wait for test results to initiate treatment* since these medications work best if started as early as possible after illness onset. Moreover, rapid diagnostic tests for influenza have variable sensitivities for detecting the 2009 H1N1 influenza virus (10-70%). A negative rapid test does *no*t exclude the possibility of infection with 2009 H1N1 influenza.

At this time, most 2009 H1N1 influenza viruses are susceptible to oseltamivir and zanamivir. However, antiviral treatment regimens may change depending on new antiviral resistance or viral surveillance information. Pregnancy should not be considered a contraindication to the use of oseltamivir or zanamivir (both "Pregnancy Category C"). Oseltamivir is currently preferred because of its systemic absorption. Treat flu exposure in pregnant women with a prophylactic course of oseltamivir (75 mg. once daily for ten days). Treat those with flu-like symptoms with a therapeutic course of oseltamivir (75 mg twice daily for five days). Fever in pregnant women should be treated because of the risk that it appears to pose to the fetus. Acetaminophen appears to be the best option for treatment of fever during pregnancy.

Bacterial co-infections have also been implicated in cases of severe disease and death. Autopsy specimens from 77 patients were examined, and 22 (29%) had evidence of bacterial infection in addition to H1N1 disease. The bacteria causing these infections included *Streptococcus pneumoniae* (pneumococcus), group A, *Streptococcus*, and *Staphylococcus aureus*, several of the leading causes of community-acquired pneumonia and other severe bacterial infections. For the prevention of pneumococcal disease, two vaccines are currently available in the US. All children less than five years of age should receive pneumococcal conjugate vaccine according to current recommendations. In addition, the 23-valent pneumococcal polysaccharide vaccine (PPSV23) should be administered to all persons 2 - 64 years of age with high risk conditions and everyone 65 years and older. During this influenza season, it is especially important for adults with chronic medical problems to get PPSV23. In communities where 2009 H1N1 is circulating, empiric treatment of patients with community acquired pneumonia should include both influenza antiviral agents and appropriate antibiotic therapy.

Given the threat posed to the health of pregnant women and their newborns by H1N1 (and seasonal influenza), we have clear duties as health care providers:

- To educate our patients and their families so that they can reduce flu transmission and seek care promptly if they are exposed to flu or become ill.
- To provide accurate information about vaccine safety and the valuable protection that H1N1 and seasonal influenza vaccine confers to pregnant women and their newborns.
- To get vaccinated ourselves, so that we will not spread the disease further.
- To immediately develop and maintain screening systems, at the first point of contact, to separate those with respiratory illness from non-infected patients and visitors and thus minimize transmission in our waiting areas, exam rooms, and hospitals.
- To make oseltamivir available promptly to all pregnant women with recent flu exposure or symptoms of influenza. For women who become seriously ill, antibiotic coverage for possible concurrent bacterial infection should also be considered.

Wash your hands, cover your cough, get your shots; it could be a long winter . . ..

Resources

1. General information: *http://www.cdc.gov/flu*
2. Pregnancy specific information: *http://www.cdc.gov/h1n1flu/guidance/obstetric.htm*
3. Free educational materials from the CDC: *http://www.cdc.gov/h1n1flu/flyers.htm*

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A Reply to Keane, et al, Regarding the Article, *Intercepting the Safety Pitfalls of the Electronic Health Record (The IHS Primary Care Provider*. 2009; 34(9):249-255)

CDR Anthony Dunnigan, MD, Director of Medical Informatics, Phoenix Indian Medical Center, Phoenix, Arizona

I appreciate and applaud the authors' acknowledgement that as we look to design what Don Berwick, et al describe as an "ultrasafe" health care system, there are pitfalls in relying solely on automation without understanding and accounting for potential sources of risk and errors.

My hope is that this paper leads to a discussion on how we as IHS informaticians and providers can better quantify the tangible benefits (and risks) of converting a paper system to an electronic system. We currently lack readily available tools to accomplish this task, and, in fact, even the overall penetration of Electronic Health Record (EHR) in a facility can be difficult to quantify, with the one readily available measure being the percent of orders placed electronically by providers.

Compared to the Veterans Administration's implementation of VistA, we are still in the early stages of implementing our EHR, and it behooves us to look at the literature produced by the VA on this subject, especially given the great commonality of our two systems (indeed, this topic is a common area of research for VA Informatics Fellows, such as the study noted below).

My suspicion is that if we were able to better quantify both benefit and risk of our EHR, it would fuel further implementation among facilities yet to implement, and help drive completion of implementation at those facilities that have started the process. As an informatician at a facility roughly halfway through the conversion to electronic records, I can testify that our risk managers and others who assist with surveys from JCAHO and CMS are strongly lobbying for completion of our implementation throughout the facility, having assessed the "intangible" benefits of our EHR.

References:

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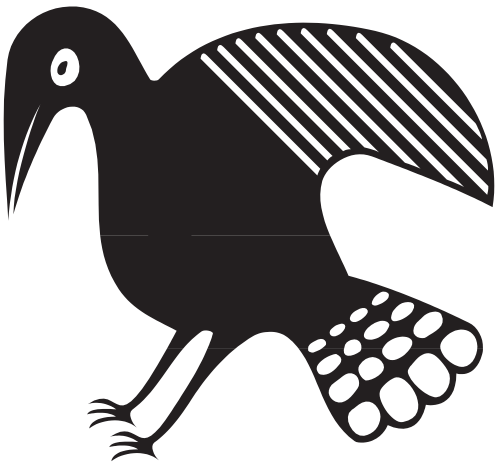
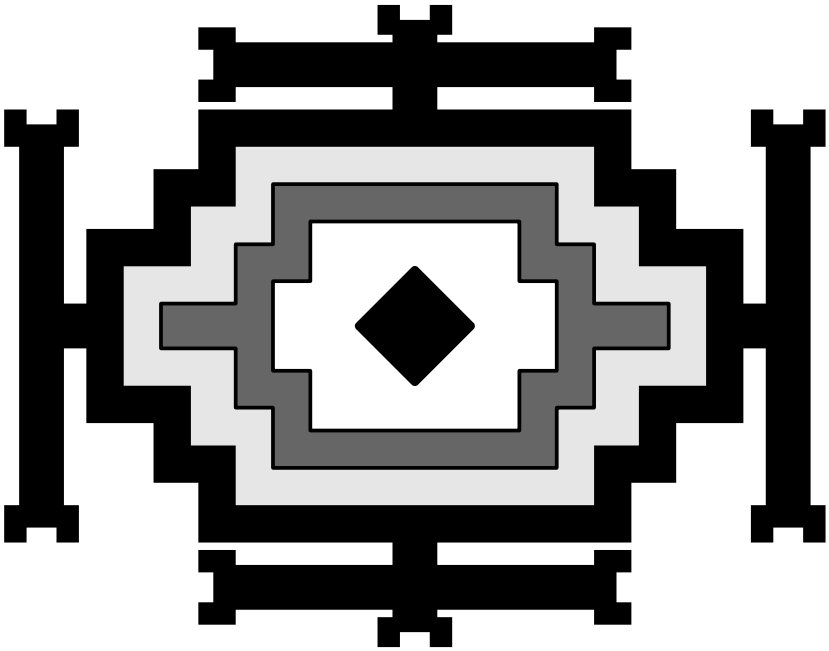


Sources of Needs Assessment Data That Can Be Used to Plan CE Activities

The new focus in planning continuing education activities is the identification of gaps in provider knowledge, competence, or performance that can be addressed with your activity. Ideally, these gaps should apply specifically to the American Indian and Alaska Native population and the providers who serve them. Where can you obtain data that help you identify these gaps? From time to time, we will publish items that either give you such data or show you where you can find them. When you are asked about the sources of your needs assessment data in your CE planning process, it will be easy enough to refer to these specific resources.

The two articles in this issue offer some detailed statistics describing the impact of two high frequency/high impact conditions in the population we serve. They both speak to risk factors and offer some insight about how to intervene. In addition, the references allow one to find more detail about these two conditions in the American Indian and Alaska Native population. These data would be a useful source to cite in the needs assessment process for your continuing education activities that focus on stroke or diabetes mellitus.



Continuing Medical Education Opportunity

1st Annual IHS Adolescent Health Conference

November 13-14, 2009

Navajo Nation Museum

Window Rock, AZ

Topics included:

- Suicide prevention
- Reproductive health
- STD prevention
- Obesity management
- Mental health
- School-based care
- Pregnancy Options
- Young Men's Health

Registration is free.

Contact: Andrew Terranella at andrew.terranella@ihs.gov

928-697-4203

MEETINGS OF INTEREST

Available EHR Courses

EHR is the Indian Health Service's Electronic Health Record software that is based on the Resource and Patient Management System (RPMS) clinical information system. For more information about any of these courses described below, please visit the EHR website at *http://www.ihs.gov/CIO/EHR/index.cfm?module=rpms_ehr_training*. To see registration information for any of these courses, go to *http://www.ihs.gov/Cio/RPMS/index.cfm?module=Training&option=index*.

Ninth Annual Tribal Clinical Cancer Update
October 28, 2009; Portland, Oregon

The Northwest Tribal Comprehensive Cancer Program will be presenting the Ninth Annual Northwest Tribal Clinicians' Update at the Northwest Portland Area Indian Health Board in Portland, Oregon from 8 am to 5:10 pm Wednesday, October 28, 2009. The topic this year is "Successful Cancer Patient Management." The conference will provide information on cancer data and surveillance; prostate, colorectal, liver, and lymphoma cancers; model tobacco prevention and cessation programs; and palliative care. There is no registration fee for Indian Health Service or tribal employees. The conference is suited for clinical staff with an interest in cancer. Program and registration materials are available at *http://www.npaihb.org/calendar/event/1170*. The conference is sponsored by the Indian Health Service Clinical Support Center which is accredited by the Accreditation Council for Continuing Medical Education (ACCME), the American Nurses Credentialing Center Commission on Accreditation (ANCC), and the American Council on Pharmacy Education (ACPE) to sponsor continuing medical education for physicians, nurses, and pharmacists. For more information, please contact Eric Vinson at (503) 416-3295 or *evinson@npaihb.org*.

Second Annual Cardiovascular Disease Update
October 29 – 30, 2009; Scottsdale, Arizona

The Native American Cardiology Program will be presenting the Second Annual Cardiovascular Disease Update at the Chaparral Suites in Scottsdale, Arizona beginning midday on Thursday, October 29 running through Friday afternoon, October 30, 2009. The topic this year is "Successful Management of The Cardiovascular Patient." The conference will provide practical approaches to the evaluation and management of common cardiac conditions encountered by primary providers, including atrial fibrillation, chronic angina, heart failure, arrhythmias, acute coronary syndromes, peripheral vascular disease, and stroke. There will be no registration fee for Indian Health Service or tribal employees. The conference is directed at clinical staff with an interest in cardiovascular disease. Program and registration material will be available by August. The Indian Health Service Clinical Support Center is the accredited sponsor. For more information, please feel free to contact *lkoepke@umcaz.edu* or *bmalasky@umcaz.edu*.

Diabetes Management System
November 3 - 5, 2009; Portland, Oregon

The Northwest Portland Area Indian Health Board (NPAIHB) periodically conducts trainings in using the Diabetes Management System package of the Resource and Patient Management System (RPMS). Participants receive hands-on instruction in the DMS package for RPMS in both the "roll and scroll" interface and the Visual DMS graphical user interface (GUI). Topics include building and maintaining diabetes and pre-diabetes registers, editing patient information, and running register and quality assurance reports. Additional topics include using QMAN for custom searches to meet needs that commonly arise for diabetes programs, creating panels of patients in *i*Care, and performing the annual IHS Diabetes Audit with WebAudit. Instruction is hands-on using a training server with mock patient data. For more information or to register, email *wtdp@npaihb.org*, or call Don Head or Katrina Ramsey at 1-800-862-5497. You can also visit the NPAIHB website at *http://www.npaihb.org/training/npaihb_training*.

The First Annual IHS Adolescent Health Conference
November 13 - 14, 2009; Window Rock, Arizona

The Navajo Area, Kayenta Service Unit, and the Adolescent Reproductive Health Project will host the first Annual Adolescent Health Conference in Window Rock, Arizona, November 13 - 14, 2009. Hear nationally recognized speakers on topics, including suicidality and mental health, obesity management, reproductive health and STDs, young men's health, caring for gay and lesbian youth, and pregnancy counseling. This conference is aimed at general pediatricians, family practitioners, physician assistants, and nurse practitioners who care for adolescents in their practices. The speakers will focus on current research and practices to help improve adolescent services to Native American youth. Registration is free; details will be found here next month. In the meantime, for more information, please contact the conference director, Andrew Terranella, MD, at *andrew.terranella@ihs.gov*; telephone (928) 697-4203.

Advances in Indian Health
April 27 - 30, 2010; Albuquerque, New Mexico

The Advances in Indian Health Conference, April 27 - 30, 2010 will be held at the Sheraton Uptown in Albuquerque,

New Mexico. "Advances" is IHS's primary care clinical conference and attracts over 350 clinicians from across the Indian health system. The conference covers many primary care topics with special emphasis on diabetes, mental health, substance abuse, women's health, geriatrics, pediatrics, and the EHR. With low tuition and a government rate available for the conference hotel, Advances is a low cost way for clinicians to receive up to 28 hours of CME/CE on issues of particular importance to Indian health patients and practices. The conference brochure will be available in early 2010 on the UNM Office of CME website: *http://hsc.unm.edu/som/cme/2010_Conferences.shtml*. For more information, contact the course director, Ann Bullock, MD, at *ann.bullock@ihs.gov*.

POSITION VACANCIES

Editor's note: As a service to our readers, THE IHS PROVIDER will publish notices of clinical positions available. Indian health program employers should send brief announcements as attachments by e-mail to john.saari@ihs.gov. Please include an e-mail address in the item so that there is a contact for the announcement. If there is more than one position, please combine them into one announcement per location. Submissions will be run for four months and then will be dropped, without notification,, but may be renewed as many times as necessary. Tribal organizations that have taken their tribal "shares" of the CSC budget will need to reimburse CSC for the expense of this service ($100 for four months). The Indian Health Service assumes no responsibility for the accuracy of the information in such announcements.

Family Practice Physician/Medical Director
Carl T. Curtis Health Education Center
Omaha Tribe of Nebraska, Macy, Nebraska

The Omaha Tribe of Nebraska is seeking a full-time, permanent physician medical director for the Carl T. Curtis Health Education Center. The CTCHEC is a comprehensive, tribal community-based ambulatory family medicine facility. Services include primary care, dental, behavioral health, substance abuse treatment, and diabetes. The physician medical director functions as the supervisor of the outpatient clinic, ambulance service, and a 25-bed long term care facility. A 12-chair hemodialysis unit operates within the facility with a contracted nephrologist as medical director. Specialty consultants with regular clinics operating include podiatry, optometry, psychiatry, audiology, endocrinology, physical therapy, and occupational therapy.

The people of the Omaha Tribe are the descendents of the original first Nebraskans. Their ancestral home is their current home and lies among beautiful timber filled rolling hills following the Missouri River. Abundant wildlife with hunting and fishing available is a bonus benefit for the outdoors person. Driving times to nearby cities are 40 minutes to Sioux City, Iowa and 70 minutes to Omaha, Nebraska.

The physician that we are looking for in this position will appreciate a comprehensive, patient and family-first philosophy of practice. Our physician medical director will be interested in the broad, rural, “frontier” medical experiences. He/she will have daily access to behavioral health professionals, certified diabetes educators, and an energetic, multi-disciplinary team of colleagues anxiously awaiting his or her arrival. Hopefully, you are looking for us if you are a compassionate highly skilled physician. You practice medicine according to adopted evidence-based standards and are an exceptional listener and diagnostician. The Carl T. Curtis Health Education Center and the staff members are seeking a physician leader who is interested in excellence with experience in managing resources. If you are our physician medical director, a competitive salary; a full health, vision, and dental benefits package; student loan repayment; four weeks of paid vacation plus 20 paid holidays per year; and a retirement plan await you. Please help us find you by contacting Jessica Valentino, Administration by e-mail at *Jessica.valentino@ihs.gov* or Kelly Bean, Medical Staff, at *Kelly.bean@ihs.gov*. (10/09)

Family Practice Physician
Warm Springs Health and Wellness Center; Warm Springs, Oregon

The Warm Springs Health and Wellness Center will have an opening for a board certified/eligible family physician starting April 1, 2010. Located in the high desert of central Oregon, we have a clinic that we are very proud of and a local community that has much to offer in recreational opportunities and livability. Our facility has been known for innovation and providing high quality care and has received numerous awards over the past ten years. We have positions for five family physicians, of which one is retiring after 27 years of service. Our remaining four doctors have a combined 62 years of experience in Warm Springs. This makes us one of the most stable physician staffs in IHS. Our clinic primarily serves the Confederate Tribes of Warm Springs. We have a moderately busy outpatient practice with our doctors seeing about 15 - 18 patients per day under an open access appointment system. We were a pilot site for the IHS Innovations in Planned Care (IPC) project and continue to make advances in how we provide care to our patients. We fully utilize the IHS Electronic Health Record, having been an alpha test site for the program when it was created. We provide hospital care, including obstetrics and a small nursing home practice, at Mountain View Hospital, a community hospital in Madras, Oregon. Our call averages 1 in 5 when fully staffed. For more information, please call our Clinical Director, Miles Rudd, MD, at (541) 553-1196, ext 4626. (10/09)

Family/Pediatric Nurse Practitioner for School Health Program
Nurse Practitioner for San Simon Health Center
Sells Service Unit; Sells, Arizona

The Sells Service Unit (SSU) in southern Arizona is recruiting for a family/pediatric nurse practitioner for our school health program. The SSU is the primary source of health care for approximately 24,000 people of the Tohono O'odham Nation. The service unit consists of a Joint Commission accredited 34-bed hospital in Sells, Arizona and three health centers: San Xavier Health Center, located in

Tucson, the Santa Rosa Health Center, located in Santa Rosa, and the San Simon Health Center located in San Simon, Arizona, with a combined caseload of approximately 100,000 outpatient visits annually. Clinical services include family medicine, pediatrics, internal medicine, prenatal and women's health care, dental, optometry, ophthalmology, podiatry, physical therapy, nutrition and dietetics, social work services, and diabetes self management education.

Sixty miles east of the Sells Hospital by paved highway lies Tucson, Arizona's second largest metropolitan area, and home to nearly 750,000. Tucson, or "The Old Pueblo," is one of the oldest continuously inhabited sites in North America, steeped in a rich heritage of Indian and Spanish influence. It affords all of southern Arizona's limitless entertainment, recreation, shopping, and cultural opportunities. The area is a favored tourist and retirement center, boasting sunbelt attributes and low humidity, with effortless access to Old Mexico, pine forests, snow sports, and endless sightseeing opportunities . . . all within a setting of natural splendor.

We offer competitive salary, relocation/recruitment/retention allowance, federal employment benefits package, CME leave and allowance, and loan repayment. Commuter van pool from Tucson is available for a monthly fee. For more information, please contact Peter Ziegler, MD, SSU Clinical Director at (520) 383-7211 or by e-mail at *Peter.Ziegler@ihs.gov*. (9/09)

Family Practice Physician
SouthEast Alaska Regional Health Consortium; Juneau, Alaska

The SEARHC (SouthEast Alaska Regional Health Consortium) Clinic in Juneau, Alaska has an excellent opportunity for a family physician with obstetrics skills to join a medical staff in a unique clinic and hospital setting. Have the best of both worlds in a practice where we share hospitalist duties and staff an outpatient clinic with excellent quality of life. We have the opportunity to practice full spectrum family medicine. Southeast Alaska has amazing winter and summer recreational activities. Enjoy Alaska's capital with access to theater, concerts, and annual musical festivals. Join a well rounded, collegial medical staff with generous benefits. For information contact Dr. Cate Buley, (907) 364-4485; *cbuley@searhc.org* or *www.searhc.org*. (9/09)

Family Medicine, Internal Medicine, Emergency Medicine Physicians
Sells Service Unit; Sells, Arizona

The Sells Service Unit (SSU) in southern Arizona is recruiting for board certified/board eligible family medicine, internal medicine, and emergency medicine physicians to join our experienced medical staff. The Sells Service Unit is the primary source of health care for approximately 24,000 people of the Tohono O'odham Nation. The service unit consists of a Joint Commission accredited 34-bed hospital in Sells, Arizona and three health centers: San Xavier Health Center, located in Tucson, the Santa Rosa Health Center, located in Santa Rosa, and the San Simon Health Center located in San Simon, with a combined caseload of approximately 100,000 outpatient visits annually. Clinical services include family medicine, pediatrics, internal medicine, prenatal and women's health care, dental, optometry, ophthalmology, podiatry, physical therapy, nutrition and dietetics, social work services, and diabetes self-management education.

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Internal Medicine Hospitalists
Physicians Assistants/Nurse Practitioners
Pine Ridge Service Unit; Pine Ridge, South Dakota

The Pine Ridge Service Unit is seeking enthusiastic health care practitioners to come work with their current staff on the Pine Ridge Indian Reservation. The Pine Ridge Service Unit consists of a hospital located in Pine Ridge and two independently-staffed satellite clinics in Kyle and Wanblee, South Dakota.

The hospital is a multidisciplinary facility that includes inpatient, outpatient, urgent care, emergency, dental, behavioral health, pharmacy, ob/gyn, surgery, optometry, podiatry, pharmacy, and physical therapy services. The facility is currently seeking to strengthen the services and staff to ensure quality care for our population of 45,000 beneficiaries.

Pine Ridge is located just south of both the Black Hills and Badlands of South Dakota so the outdoor activity possibilities are unlimited. There are two colleges within fifty miles, and Rapid City, with its variety of cultural opportunities, is within ninety miles.

If you are interested in a challenging position with the opportunity to have a positive effect on developing and building health care services, please contact Jan C. Colton, DMD, PhD, Acting Clinical Director, Pine Ridge PHS Hospital, 1201 E. Highway 18, Pine Ridge, South Dakota, 57770; telephone (605) 867-3019. (9/09)

Physician
Puyallup Tribal Health Authority; Tacoma, Washington

The Puyallup Tribal Health Authority is currently recruiting a full time physician to join a team of nine other physicians. PTHA is a tribally operated, ambulatory clinic located in Tacoma, Washington and is accredited by AAAHC, CARF, and COLA. This position will evaluate, diagnose, and treat medical, obstetric, psychiatric, and surgical diseases and emergencies as credentialed and privileged; oversee the medical evaluation, diagnosis, and treatment of patients by other medical professionals, including precepting midlevel providers as needed; perform histories, physicals, and direct the evaluation, diagnosis, and treatment of PTHA patients in local hospitals including participation in rounding schedule; make referrals to specialists as per PTHA protocol and follow-up to assure quality care; provide on-site health education and counseling to patients and staff; participate in after-hours on-call duty as scheduled; provide back-up consultation to other on-call PTHA providers as scheduled; participate in utilization review studies and quality improvement committee as assigned.

Minimum requirements include a Doctorate of Medicine or Osteopathy from an accredited institution; board certified (or eligible to sit for exam) in family practice or appropriate field; licensed to practice medicine in the state of Washington; and current certification in ACLS. PTHA offers a competitive salary, benefits, and generous time off schedule.

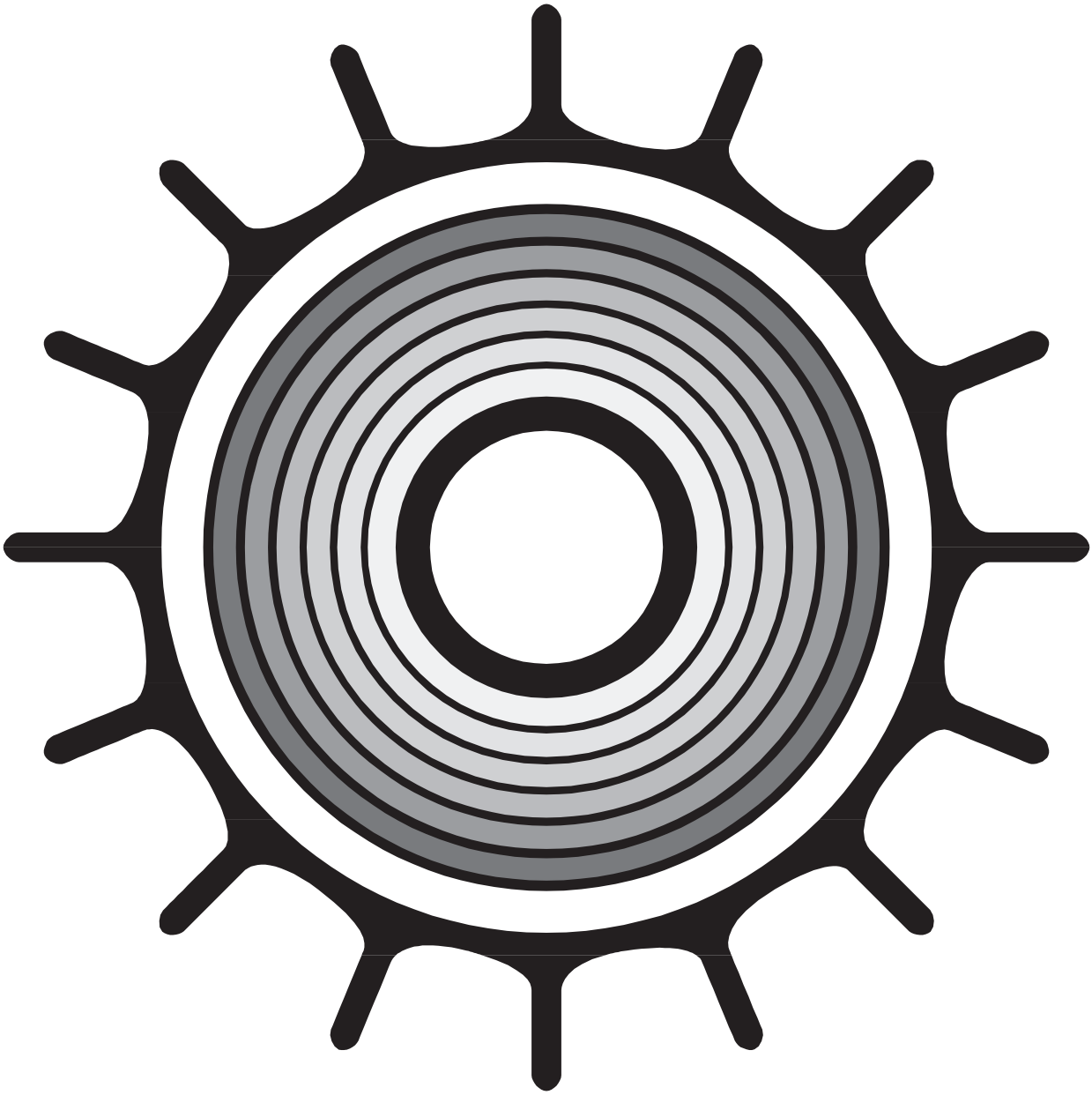
To apply, a PTHA employment application is required (resume optional). Please submit completed applications to the Human Resource Department prior to the closing date. Indian hiring preference by law. Telephone (253) 593-0232, ext 516; fax (253) 593-3479; e-mail *hr@eptha.com*; website *www.eptha.com*. The address is PTHA Human Resource Department, KCC bldg #4, 1st Floor, 2209 E. 32nd St. Tacoma, WA 98404. (8/09)

Family Practice Physician
Pharmacist
PHS Clinics; Wind River Service Unit, Wyoming

This is the primo IHS opportunity. Two family physicians will be retiring in January to split a position between them, leaving a hiring opportunity for this progressive and stable seven-physician group (six FP and one pediatrician). We admit patients to the Lander Regional Hospital on a 1/7 on-call basis and staff two clinics on the reservation, along with four nurse practitioners. The Wind River Reservation is home to the Northern Arapaho and Eastern Shoshone Tribes. Local cultural opportunities abound, and the medical practice is fascinating and challenging.

The physicians tend to live in Lander, which is located adjacent to the Wind River Indian Reservation. Lander was featured in Sunset Magazine as one of "The West's Twenty Best Small Towns" and has been featured in the book "Best Small Towns in America." It is located next to the Wind River Mountains, which offer a spectacular chance for world class climbing, hiking, outfitting, fishing, and hunting. Lander is progressive and is the world headquarters for the National Outdoor Leadership School. Next fall, Lander High School graduates will attend MIT, Duke, and Princeton. The IHS physicians enjoy a great relationship with the private physicians in town, and the hospital sports the latest generation MRI, CT, and nuclear medicine capabilities. This is the kind of IHS medical staff that physicians join and end up staying for ten to twenty years. Board eligible/certified applicants only, please. E-mail CV to Paul Ebbert, MD at *paul.ebbert@ihs.gov* or call him at work at (307) 856-9281 or at home at (307) 332-2721.

The Wind River Service Unit also has an opening for a pharmacist. Pharmacists at Wind River enjoy a close professional relationship with the medical staff. There is interest and opportunity for pharmacists to expand their skills into enhanced patient education and management. Interested candidates should contact Marilyn Scott at *marilyn.scott@ihs.gov* or call (307) 332-5948. (6/09)



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THE IHS PRIMARY CARE PROVIDER
A journal for health professionals working with American Indians and Alaska Natives

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