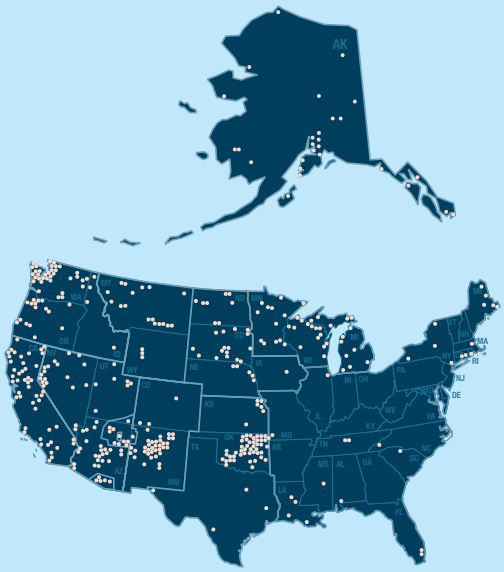
Changing the Course of Diabetes: Turning Hope into Reality

In response to the burgeoning diabetes epidemic among American Indian and Alaska Native (AI/AN) people, Congress established the Special Diabetes Program for Indians (SDPI) through the Balanced Budget Act of 1997. The SDPI is a $150 million per year program that provides grants for diabetes treatment and prevention services to 404 Indian Health Service (IHS), tribal, and urban (I/T/U) Indian health programs across the United States (Figure 1). The SDPI has two major components: the Diabetes Prevention and Healthy Heart Initiatives and the Community-Directed Diabetes Programs.

Figure 1. SDPI Grant Program Map



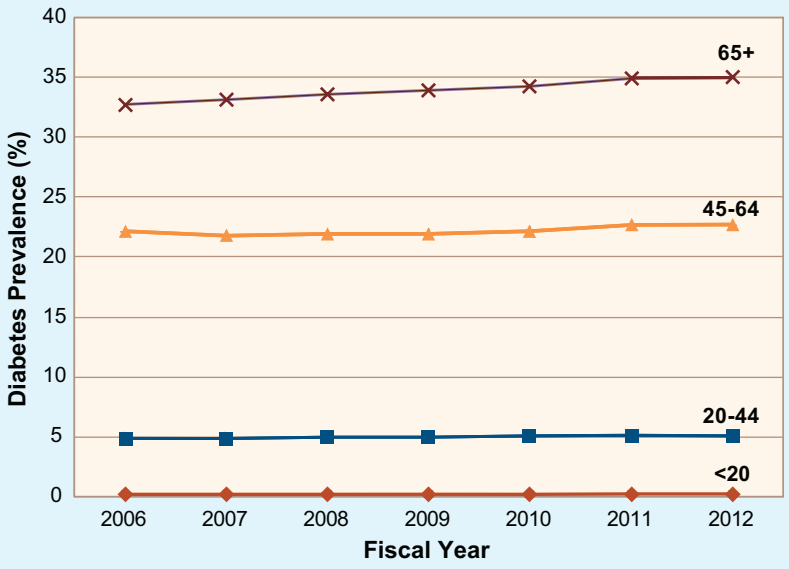
Diabetes is a complex and costly chronic disease that requires tremendous long-term efforts to prevent and treat. Although diabetes is a nationwide public health problem, AI/AN people are disproportionately affected. In 1997, it appeared that the diabetes epidemic in AI/AN communities would continue to escalate at an alarming rate. The SDPI provided funding to build programs that fueled hope for changing the course of the epidemic. During the 17 years of the SDPI, the grant programs have successfully implemented evidence-based and community-driven strategies to prevent and treat diabetes. **AI/AN people no longer have to rely on hope alone, because now there is strong evidence that the SDPI is helping to change the trajectory of the diabetes epidemic.**

This fifth interim report to Congress highlights the SDPI's ongoing and outstanding accomplishments in improving the quality of diabetes care and health outcomes for AI/AN people.

Stemming the Diabetes Epidemic in American Indian and Alaska Native People

Recent data show that the rate of increase in diabetes prevalence is slowing in AI/AN adults (aged 20 and older), climbing only from 15.2 percent to 15.9 percent from 2006 through 2012. This trend, plus the continued rise in the U.S. prevalence rate during those years, narrowed the gap in prevalence rates between AI/AN adults (15.9 percent) and U.S. adults (11.7 percent) in 2012.

Figure 2. Diabetes Prevalence in American Indians and Alaska Natives by Age Group: 2006-2012



Data Source: IHS National Data Warehouse General Data Mart

Figure 2 shows another important trend in diabetes prevalence in AI/AN people. From 2006 through 2012, prevalence in those under 65 years of age increased only slightly. The small overall increase in prevalence during this period was driven by those aged 65 years and older.

Two factors account for the increased prevalence in those aged 65 years and older: (1) incidence (new cases) of diabetes, and (2) longevity of those diagnosed at younger ages. Being diagnosed with diabetes at an older age means that a person is less likely to experience complications of diabetes that develop after many years of living with the disease. In addition, living longer with diabetes is a result of improvements in self-care and clinical care.

Another positive trend is that obesity rates in AI/AN children and youth aged 2-19 years remained nearly constant from 2006 through 2012. Obesity in youth is an indicator of future risk for developing diabetes.

These trends show that the course of diabetes is changing in a positive direction for AI/AN people.

The SDPI Diabetes Prevention and Healthy Heart Initiatives: Ongoing Success in Translating Diabetes Science

In 2004, Congress established the SDPI Demonstration Projects to translate research-based interventions for diabetes prevention and cardiovascular disease (CVD) risk reduction into AI/AN community-based programs and health care settings. In total, 66 grants were funded that served 110 tribal communities from 2004 to 2010. The SDPI Demonstration Projects successfully translated diabetes science and reduced the risk of diabetes in people at high risk and reduced CVD risk factors in people with diabetes. In 2010, the SDPI Demonstration Projects transitioned into the SDPI Initiatives to continue their prevention work and begin disseminating the strategies and lessons learned to other I/T/U health programs.

The SDPI Diabetes Prevention Initiative (SDPI DP)

The National Institutes of Health led the landmark Diabetes Prevention Program clinical trial (NIH DPP), which was the first study in the United States to show that lifestyle intervention could reduce the incidence (new cases) of type 2 diabetes in a diverse population of people at high risk. This randomized controlled trial achieved a 58 percent reduction in diabetes incidence in the lifestyle intervention group compared to the placebo group, which did not receive the intervention (*N Engl J Med* 2002;346:393-403).

The SDPI DP adapted the lifestyle intervention from the NIH DPP and implemented this program in diverse AI/AN communities. As of May 2014, a total of 4,549 participants have completed the follow-up assessment conducted within one month after finishing their last lifestyle class.

Following the lifestyle intervention, SDPI DP participants achieved significant improvements in key diabetes risk factors, including weight loss (Table 1).

Table 1. SDPI DP Changes in Diabetes Risk Factors

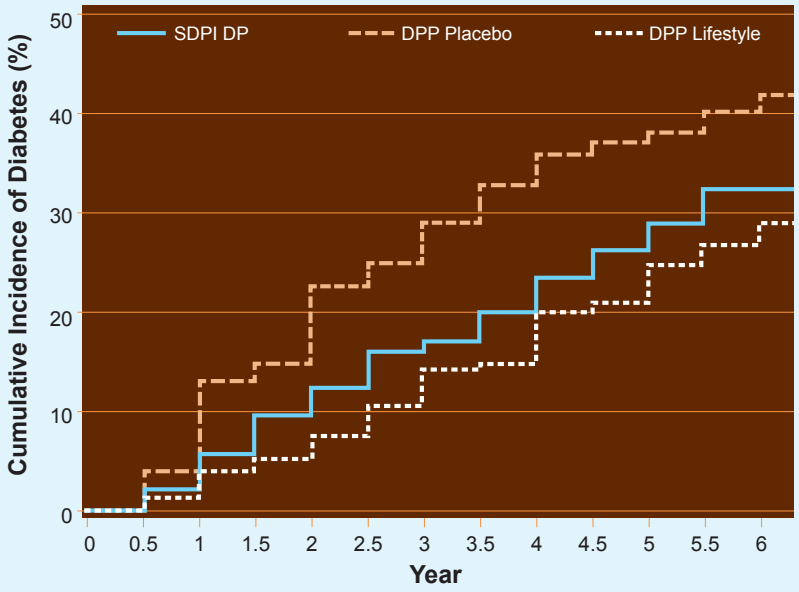
MEASURE	RESULTS	
	Baseline[1] (n=7,097)	Follow-up[2,a] (n=4,549)
Weight Loss		
Mean Weight (lbs)	218	208
Mean BMI (kg/m^2)	35.9	34.4
Lifestyle Behaviors		
Ate healthy foods once or more per week	77%	87%
Ate unhealthy foods less than once per week	53%	81%
Regular physical activity[3]	30%	53%

[1] Baseline = before starting the lifestyle intervention classes
[2] Follow-up = within one month after finishing the lifestyle intervention classes (approximately 5-7 months after baseline)
[a] All changes from baseline to follow-up were statistically significant ($P < 0.0001$) for participants who completed the follow-up assessment.
[3] Regular physical activity = 30 minutes or more per day of moderate physical activities, 5 or more days per week **or** 20 minutes or more per day of vigorous physical activities, 3 or more days per week

Source: Evaluation of the SDPI Diabetes Prevention Demonstration Project and Initiative, May 2014

The key outcome of the NIH DPP was reduction in the incidence of diabetes in the lifestyle intervention group as compared with the placebo group. To compare SDPI DP results with the NIH DPP for diabetes incidence, a subgroup (n=688) was analyzed of SDPI DP participants that met all of the NIH DPP eligibility criteria: ≥ 25 years old; body mass index (BMI) ≥ 24; fasting blood glucose of 95 to 125 mg/dL; and oral glucose tolerance test 2-hour result of 140-199 mg/dL. Since the SDPI DP did not have a placebo group, the NIH DPP placebo group provides an estimate of what the diabetes incidence rates might have been if SDPI DP participants had not received the lifestyle intervention (Figure 3).

Figure 3. Cumulative Incidence of Diabetes in SDPI DP and NIH DPP



Results
The diabetes incidence rates per year were:

- 11.0 percent for the NIH DPP placebo group
- 6.5 percent for the SDPI DP subgroup
- 4.8 percent for the NIH DPP lifestyle intervention group

Note: Results of NIH DPP and SDPI DP are superimposed in the graph for comparison, but participant characteristics and study design were not identical.

Source: 1) Evaluation of the SDPI Diabetes Prevention Program
2) Diabetes Prevention Research Group, *Lancet* 2009;374:1677-1686 (Figure 3A)

The SDPI DP subgroup achieved markedly lower rates of diabetes incidence compared with the NIH DPP placebo group and somewhat higher rates compared with the NIH DPP lifestyle intervention group. **Achieving results that come close to those of the NIH DPP lifestyle intervention group indicates that the SDPI DP successfully implemented the program in diverse AI/AN communities and reduced progression to diabetes. Reductions in diabetes incidence have significant implications for preserving health and reducing health care costs.**

The SDPI Healthy Heart Initiative (SDPI HH)

A leading cause of death in people with diabetes is CVD. Research has shown that controlling CVD risk factors, particularly blood pressure, LDL cholesterol, and smoking, can substantially reduce the occurrence of heart attacks and strokes (CDC, 2014). To improve both behavioral and clinical CVD risk factors in AI/AN people with diabetes, the SDPI HH intensive case management intervention included medical care and patient education. As of May 2014, a total of 2,174 participants have completed an assessment approximately three years after starting the intervention.

Following the SDPI HH intervention, participants reported improvements in key behavioral CVD risk factors from baseline to the third annual assessment (Table 2).

Table 2. SDPI HH Changes in Behavioral CVD Risk Factors

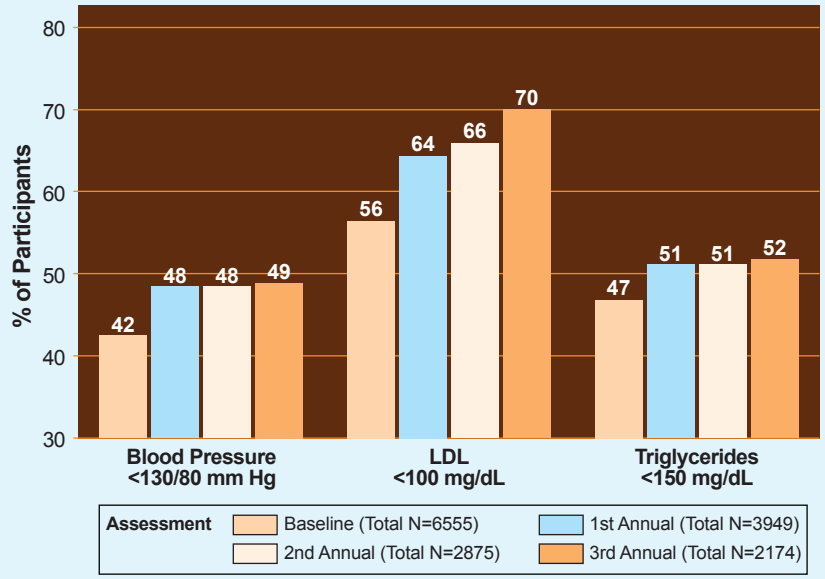
MEASURE	RESULTS	
	Baseline[1] (n=6,555)	Year 3[2] (n=2,174)
Non-smokers	78%	85%[a]
Ate healthy foods once or more per week	80%	83%
Ate unhealthy foods less than once per week	66%	76%[a]
Regular physical activity[3]	34%	39%

[1] Baseline = before starting the SDPI HH intervention
[2] Year 3 = approximately 3 years after baseline
[a] These changes from baseline to Year 3 were statistically significant (P < 0.0001) for participants who completed the Year 3 assessment.
[3] Regular physical activity = 30 minutes or more per day of moderate physical activities, 5 or more days per week **or** 20 minutes or more per day of vigorous physical activities, 3 or more days per week

Source: Evaluation of the SDPI Healthy Heart Demonstration Project and Initiative, May 2014

These changes in behaviors and intensive case management were associated with significant improvements in SDPI HH participants' achievement of clinical CVD risk factor targets, including those for blood pressure, LDL, and triglycerides (Figure 4).

Figure 4. SDPI HH Achievement of CVD Risk Factor Targets



*All annual percentages are significantly different from baseline (P <0.005) for participants who completed the assessment.

Source: Evaluation of the SDPI Healthy Heart Demonstration Project and Initiative

These results demonstrate that the SDPI HH succeeded in implementing intensive case management to reduce cardiovascular risk factors in AI/AN people with diabetes. Improvements in these clinical measures can lead to reductions in CVD resulting in health care cost savings and improved quality of life for people with diabetes.

Just as Congress envisioned, both the SDPI DP and SDPI HH Initiatives continue to show that research-based interventions can be translated successfully in AI/AN communities. More importantly, these Initiatives (1) reduce risk factors for developing diabetes, and (2) reduce CVD risk factors in people with diabetes.

The SDPI Community-Directed Diabetes Programs: 17 Years of Successful Interventions

Since 1998, SDPI funding has made it possible for AI/AN communities to develop and sustain quality diabetes treatment and prevention programs. Based on local needs and priorities, the SDPI Community-Directed Diabetes Programs implement proven interventions to address the diabetes epidemic, often where few resources existed before. SDPI funding has enabled staff and programs to dramatically increase access to diabetes treatment and prevention services throughout the Indian health system (Table 3).

Table 3. Percent of SDPI Community-Directed Programs Reporting Diabetes Services

INTERVENTION	1997[1]	2013
Diabetes clinical teams	30%	96%
Diabetes patient registries	34%	98%
Nutrition services for adults	39%	93%
Access to registered dietitians	37%	79%
Access to physical activity specialists	8%	74%
Access to culturally tailored diabetes education materials	36%	97%
Adult weight management programs	19%	78%
Nutrition services for children and youth	65%	84%
Community-based physical activity programs for children and youth	13%	80%
Physical activity programs for school-age youth	9%	80%

[1] Baseline = before SDPI funding was available
Source: Evaluation of the SDPI Community-Directed Diabettes Program, 2013

At the national level, the IHS Division of Diabetes provides the supportive structures necessary for SDPI Community-Directed Diabetes Programs to implement these interventions successfully, including:

- **National and Area Diabetes Consultants** – expertise on diabetes and technical assistance to grantees for improving program implementation and grant accountability;
- **Clinical Tools** – guidance for providing quality care, including Standards of Care, Best Practices, treatment algorithms, quick-reference cards;
- **Data Infrastructure** – resources and support for diabetes surveillance, the IHS National Data Warehouse, the IHS Electronic Health Record, and diabetes patient care tools; and
- **Diabetes Care and Outcomes Audit** – annual review of patient charts for monitoring the quality and outcomes of diabetes clinical care. In 2014, 331 I/T/U facilities participated and provided data on more than 115,000 AI/AN patients with diabetes.

The training and resources provided by the IHS Division of Diabetes are used extensively by SDPI grantees and Indian health system clinicians nationwide, as indicated in Table 4 below.

Table 4. Use of IHS Division of Diabetes Training and Resources - FY 2013

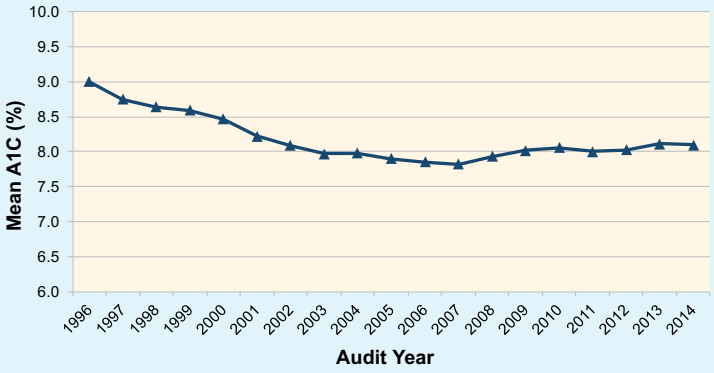
RESOURCE	DESCRIPTION	USAGE
Comprehensive Diabetes Training	Clinical training offered through online courses and virtual webinars.	2,452 CME/CE[1] hours[2]
SDPI Grant Program Training	Grantee training and technical assistance offered through virtual webinars.	9,723 hours[2]
IHS Division of Diabetes Website	A central information source for SDPI tools, training, and resources.	144,346 hits
Diabetes Self-Management Education and Support Materials	Items ordered through online catalog and distributed to customers nationwide.	1,030,205 items

[1] CME/CE=Continuing Medical Education/Continuing Education
[2] Hours=hours of training offered multiplied by the number of people who attended

Clinical Diabetes Outcomes during the SDPI

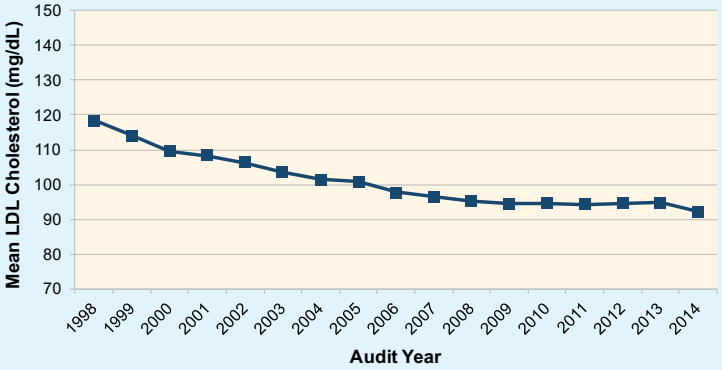
At the same time that access to diabetes services increased markedly, key outcome measures for AI/AN people with diabetes showed achievement or maintenance at or near national targets. These results have been sustained throughout the SDPI era (Figures 5-7).

Figure 5. Mean Blood Sugar



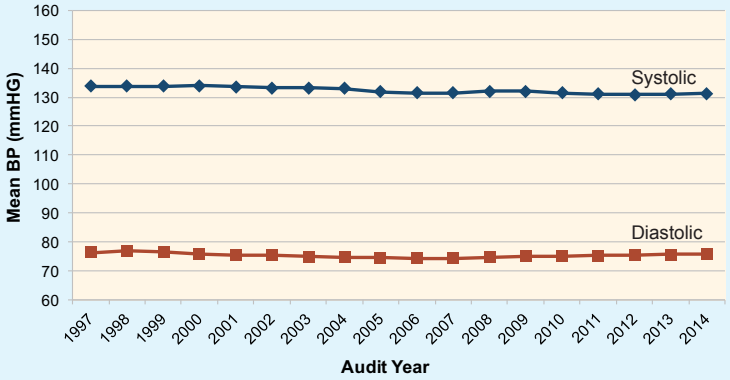
Target: A1C < 8% for most patients.
Outcome: The mean blood sugar level decreased from 9.0% in 1996 to 8.1% in 2014.
Source: IHS Diabetes Care and Outcomes Audit

Figure 6. Mean LDL Cholesterol



Target: LDL cholesterol < 100 mg/dL
Outcome: Mean LDL cholesterol declined from 118 mg/dL in 1998 to 92 mg/dL in 2014.
Source: IHS Diabetes Care and Outcomes Audit

Figure 7. Mean Blood Pressure

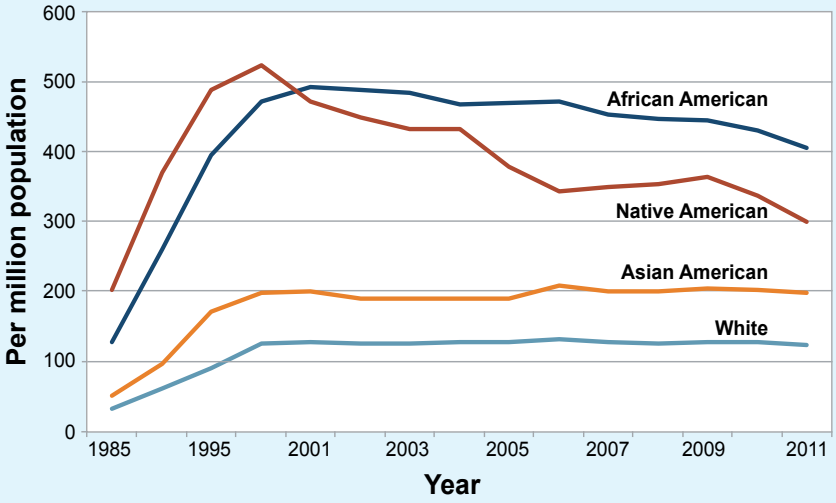


Target: Blood pressure <140/<90 mmHg
Outcome: Blood pressure has been well-controlled throughout the SDPI era. The mean blood pressure was 131/76 in 2014.

Source: IHS Diabetes Care and Outcomes Audit

Clinical improvements in blood sugar, LDL cholesterol, and blood pressure control such as these are associated with a tremendous impact on reducing rates of diabetes complications such as end stage renal disease (ESRD). Following the inception of the SDPI, rates of ESRD in AI/AN people with diabetes decreased dramatically (Figure 8).

Figure 8. Incidence Rates of ESRD due to Diabetes, by Race



Source: United States Renal Data System 2013

Between 2000 and 2011, incidence rates of ESRD in AI/AN people with diabetes decreased 43 percent—more than for any other racial group in the U.S.

The rate of new cases of ESRD due to diabetes among AI/AN people decreased beginning in 2000 after steadily increasing for the previous two decades. This decrease reduced dialysis costs that would have been incurred. Medicare costs per year for one patient on hemodialysis were $87,945 in 2011 (USRDS, 2013). **Reducing the rate of progression to kidney failure requiring dialysis translates into millions of dollars in cost savings for Medicare, the IHS, and other third-party payers.**

The SDPI Community-Directed Diabetes Programs, now with 17 years of sustained intervention, are continuing to implement diabetes services that improve clinical outcomes for AI/AN people.

SDPI: Turning Hope into Reality

In 1997, there was fear that the diabetes epidemic in AI/AN communities would continue to grow unabated and affect youth and adults at increasing rates. Congress responded to these concerns and established the SDPI to provide resources and hope that the course of this epidemic could be changed. Affecting the course of a public health problem such as diabetes requires years of sustained effort and intervention. As evidenced by recent data presented in this interim report, the SDPI is turning hope into reality for AI/AN people:

- Increases in diabetes prevalence rates in adults are slowing.
- In youth, diabetes remains rare and prevalence rates are not increasing.
- Long-term control of key diabetes clinical measures is being sustained.
- The ESRD incidence rate in people with diabetes is decreasing.

Although it is not possible to determine the extent to which these remarkable outcomes are due solely to the SDPI, nothing else has impacted diabetes resources across the Indian health system as much as the SDPI over the past 17 years. The SDPI has provided funding for services, training, support, and clinical data to help the Indian health system make tremendous improvements in the health of AI/AN people.

Guided by Congress's vision, scientific research, and community-driven priorities, SDPI funding supports one of the most comprehensive and effective systems to prevent and treat diabetes in the U.S. Partnerships with Tribes have been essential to the success of the SDPI in diverse communities and settings nationwide.

In 1997, it appeared that the trajectory of the diabetes epidemic was on course to devastate AI/AN people and their communities. Were it not for the SDPI, that future may have come to pass. Instead, there is a healthier reality emerging throughout AI/AN communities.

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