Urban Diabetes Care and Outcomes Summary Report, Audit Years 2010-2014

Aggregate Results from Urban Indian Health Organizations

March 2015

Urban Indian Health Institute
A Division of the Seattle Indian Health Board

The mission of the UIHI is to support the health and well-being of urban Indian communities through information, scientific inquiry, and technology.

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INTRODUCTION

Background

Diabetes Mellitus is a major public health problem among American Indians and Alaska Natives (AI/ANs), and the prevalence of diabetes among AI/AN adults is twice that of non-Hispanic white adults.[1] In an effort to reduce the burden of diabetes among AI/ANs, Congress established the Special Diabetes Program for Indians (SDPI) in 1997.[2] The SDPI provides funding specifically to aid in the prevention and treatment of diabetes in AI/AN communities. SDPI includes the Community-Directed Diabetes Programs (tribal, IHS, and urban) and Initiatives (previously Demonstration Projects; now called the Diabetes Prevention and Healthy Heart Initiatives). This report focuses on the Community-Directed diabetes programs.

To document trends in diabetes services and outcomes among AI/AN patients with diabetes, Indian health facilities nationwide conduct an annual medical chart audit, known as the Indian Health Service (IHS) Diabetes Care and Outcomes Audit (or "Diabetes Audit"). Data collected by these facilities are submitted to the IHS Division of Diabetes Treatment and Prevention (DDTP). These data are used for diabetes surveillance and to provide a clinical overview of diabetes care and services throughout the Indian health system. The Diabetes Audit is based on consensus-derived standards of care, also known as the Standards of Care and Clinical Practice Recommendations: Type 2 Diabetes.[3]

The Urban Indian Health Institute, in collaboration with the IHS DDTP, developed the Urban Diabetes Care and Outcomes Summary Report to provide an overview of the annual Diabetes Audit data collected by participating SDPI recipients that are part of the network of Urban Indian Health Organizations (UIHOs). UIHOs are funded in part under Subtitle IV of the Indian Health Care Improvement Act and receive limited grants and contracts from the IHS. Thirty three UIHOs are located in 19 states supporting individuals in approximately 100 U.S. counties, in which over 1.2 million AI/ANs reside, according to the 2010 U.S. Census. UIHOs provide traditional health care services, cultural activities, and a culturally-appropriate place for urban AI/ANs to receive health care.

Methods and Analysis

The data for this analysis were obtained from the Diabetes Audit performed at participating UIHOs from 2010 through 2014. Each year, participating UIHOs submit data for AI/AN patients in their registry who had diagnosed diabetes and at least one primary care visit during the past 12 months. Some facilities audit 100% of AI/AN patients' medical records who meet eligibility criteria, while other facilities use a systematic random sampling scheme to select patients for auditing.[4]

UIHO aggregate estimates in this report are weighted to account for different sampling approaches used across facilities. Percentages shown are calculated as a proportion of all audited records for each Audit year, including those with missing/unknown values, unless otherwise indicated. Several measures included in this report were calculated by the IHS DDTP and were not directly reported by the facilities. Values determined to be data errors have been removed. Statistical tests to compare changes in percentages over time were not

performed. Stata version 13.1 (Stata Corp., College Station, Texas) was used to perform all statistical analyses.

For more information about the Diabetes Audit process, visit the IHS DDTP website: http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=resourcesAudit

Considerations

Data presented in this report provide an opportunity to track changes in diabetes measures over time. However, trends across years should be interpreted with caution, as the patient population in the registry as well as those audited may differ from year-to-year. These data cannot be used to track individual patients and their progress over the five-year period.

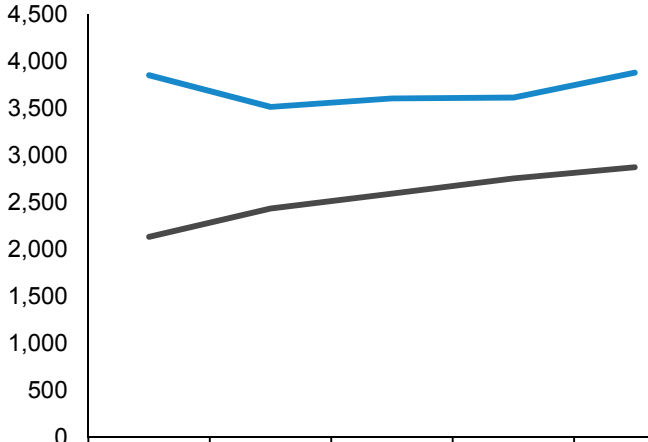
Some measures have a high proportion of missing values, which can affect the results. Continued reduction in the amount of missing data at each facility will improve the quality of future reports. The proportion of missing data for a given facility may be related to the patients' use of multiple health care providers in different health care systems, making it challenging for the facility to capture data.

While the Diabetes Audit provides information about diabetes care and patient outcomes, including changes over time, there may be important indicators not captured by these data that better represent the achievements and challenges of each program. Examples of potential indicators include setting and achieving individual patient goals, diet changes, and cultural connectedness.

Each UIHO service provider is unique, and the range of services offered varies considerably from site to site. An aggregate report of UIHO data cannot encompass all the nuances each individual program experiences; however, the intent of this report is to bring awareness about successes, opportunities, and challenges in diabetes care across the urban programs.

DIABETES AUDIT DATA – PATIENT REGISTRY AND NUMBERS

Figure 1: Patients in Diabetes Registries, Urban Indan Health Organizations, 2010 - 2014



	2010	2011	2012	2013	2014
Total Number in Registries*	3,849	3,512	3,603	3,611	3,877
Number of Patients Audited^	2,132	2,432	2,591	2,752	2,871
Percent of Patients Audited+	55%	69%	72%	76%	74%
Number of Facilities#	30	31	30	31	31

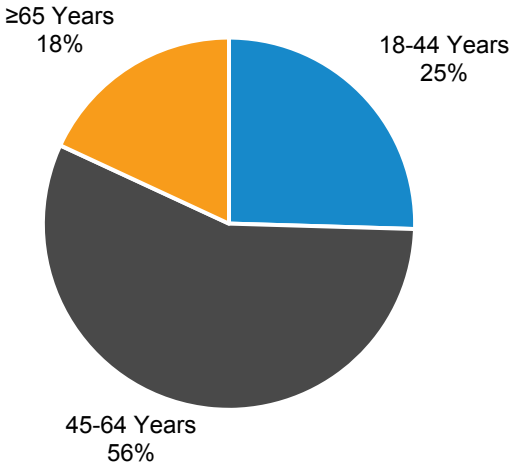
*Sum of all patients in each registry
^Sum of all patients in Audit
+(Number of patients audited/number of patients in registry) x 100
#Number of Urban Indian Health Organizations participating

Figure 1 shows the number of urban facilities reporting each year, the number of patients audited, and the number of patients included in the diabetes registries from all participating facilities.

Each year, a majority of the 33 UIHO receive SDPI funding from the IHS for Community Directed Diabetes Programs and participate in the Diabetes Audit. In 2014 there were 3,877 AI/AN patients in diabetes registries across 31 UIHO facilities (figure 1). While the number of patients in the registries has remained relatively consistent (figure 1), the percent of patients audited each year has increased from 55% in 2010 to 74% in 2014. This rise is possibly a result of increased use of the IHS WebAudit's upload tool, which allows data from UIHOs to be extracted from an electronic health record system directly to a central database instead of it being extracted and entered manually.

DIABETES AUDIT DATA – DEMOGRAPHICS AND VITAL STATISTICS

Figure 2: Age Categories of Audited Urban Patients with Diabetes, 2014



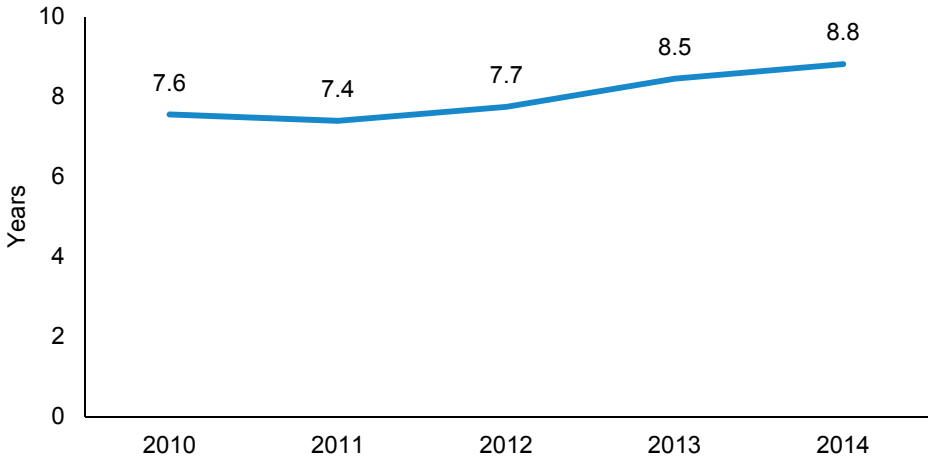
Over half (56%) of audited patients in 2014 were between the ages of 44-64 years (figure 2), similar to previous years' Audits. The age distribution did not change significantly over time, so only 2014 data are presented here. For more detailed information about age categories over time, see Table 1 in Appendix A.

The majority of audited patients each year in urban facilities were female (61% in 2014), with an average age of 52 years (data not shown).

Ninety-eight percent of audited patients from 2010-2014 had Type 2 diabetes, which is generally diagnosed in adulthood (data not shown). The remainder had Type 1 diabetes.

Mean duration of diabetes among patients was 8.8 years in 2014, an increase of approximately one year since 2010 (figure 3).

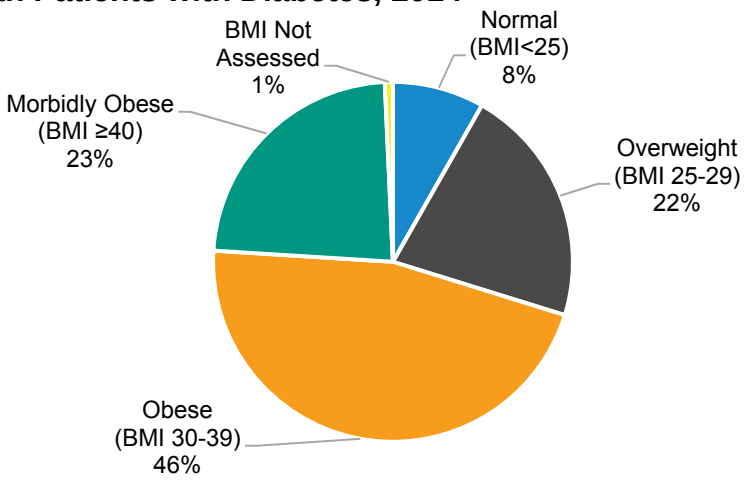
Figure 3: Average Duration of Diabetes among Audited Urban Patients with Diabetes, 2010-2014



DIABETES AUDIT DATA – DEMOGRAPHICS AND VITAL STATISTICS

Body mass index (BMI) is an estimate of body fat, measuring weight when adjusted for height. While using BMI clinically has certain limitations, it has been shown to correlate with future risk of health problems.[5]

Figure 4: Body Mass Index Categories among Audited Urban Patients with Diabetes, 2014



Overweight and obesity, which can be measured at a population level using BMI, can lead to poor health outcomes in individuals with diabetes specifically by increasing insulin resistance and raising blood glucose levels.[6] Obesity is also a major cause of and risk factor for developing Type 2 diabetes.

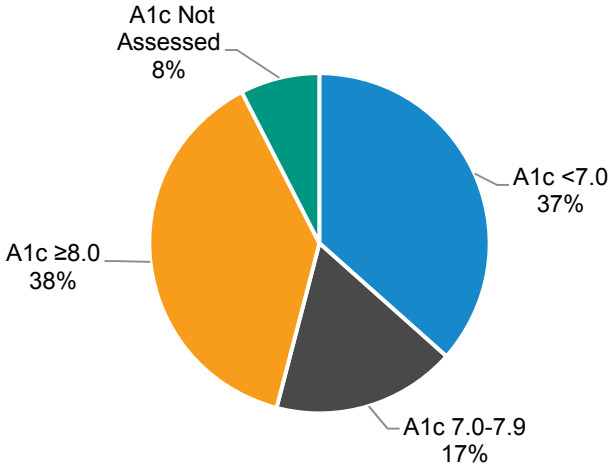
BMI measurements among audited urban patients have not changed significantly between the years 2010 and 2014, with approximately 91% of audited patients considered either overweight, obese, or severely obese (BMI>25) each year. For this reason, only 2014 data showing BMI categories are presented here (figure 4).

Mean BMI each year among audited patients was approximately 35 (data not shown). See Table 2 in Appendix A for more detailed information.

DIABETES AUDIT DATA – LAB DATA

Hemoglobin A1c

Figure 5: Hemoglobin A1c (%) Categories among Audited Urban Patients with Diabetes, 2014



Hemoglobin A1c (or A1c) measures an individual's average blood glucose in the past three months. Over the past five years, A1c results have remained stable among audited urban patients. For this reason, only 2014 data are presented (figure 5). In 2014, 37% of audited patients had an A1c <7.0% and more than half (54%) had an A1c <8.0%. More than 92% of audited patients were tested for A1c each year during the 2010-2014 time period (data not shown).

The IHS, via GPRA targets*, tracks patients with A1c levels under 8.0%. Patients with A1c of 8.0% or below are as a whole considered to have "good glycemic control." However, this is a population target that may not be appropriate for all patients. Hemoglobin A1c goals for individual patients should be adjusted based on duration of diabetes, comorbidities, and other factors.

2014 IHS GPRA Goal*

48.3% of patients will demonstrate good glycemic control (A1c<8.0%)

2014 Audit Results

54% of patients demonstrated good glycemic control (A1c<8.0%)

* Each year, the IHS reports on a range of health topics to Congress as part of the Government Performance and Results Act (GPRA). Although official GPRA results are not estimated using Audit data, diabetes GPRA goals for 2014 are included throughout this report for reference and comparison. More information about GRPA can be found in Appendix B.

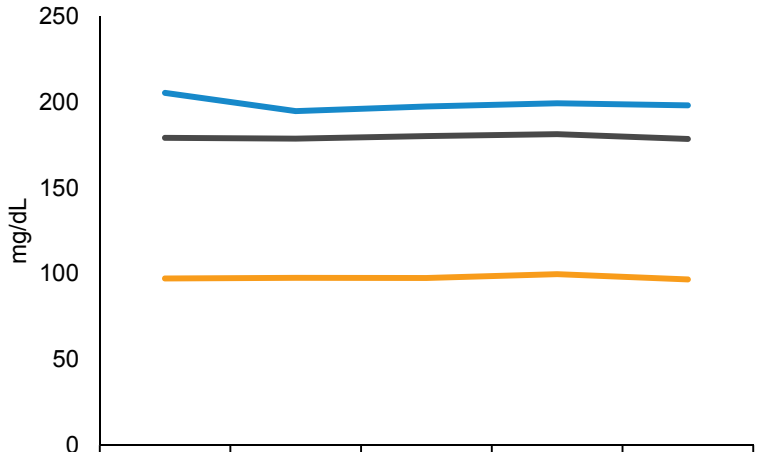
DIABETES AUDIT DATA – LAB DATA

Blood Lipids

Cholesterol and triglycerides are lipids found throughout the body, including the blood. Increased blood levels specifically of low-density lipoprotein (LDL) and triglycerides are associated with increased risk of cardiovascular disease, especially among those with diabetes.[7] IHS Diabetes Standards of Care[3] recommend annual lipid profile for all patients with diabetes and subsequent treatment primarily with statin drugs when indicated.

Each year, between 73% - 80% of audited urban patients had their lipids assessed (data not shown). See Table 3 in Appendix A for additional details.

Figure 6: Mean Blood Lipid Values* among Audited Urban Patients with Diabetes, 2010-2014



	2010	2011	2012	2013	2014
Mean Triglyceride	205	195	198	199	198
Mean Total Cholesterol	179	179	180	181	179
Mean LDL Cholesterol	97	98	97	100	97

*mg/dL

Among audited urban patients, mean lipid levels have remained relatively consistent over the past five years (figure 6). During this time, mean triglycerides have been consistently above 150 mg/dL while mean LDL has ranged between 97-100 mg/dL.

2014 IHS GPRA Goal*

73.9% of patients will be assessed for dyslipidemia (LDL cholesterol)

2014 Audit Results

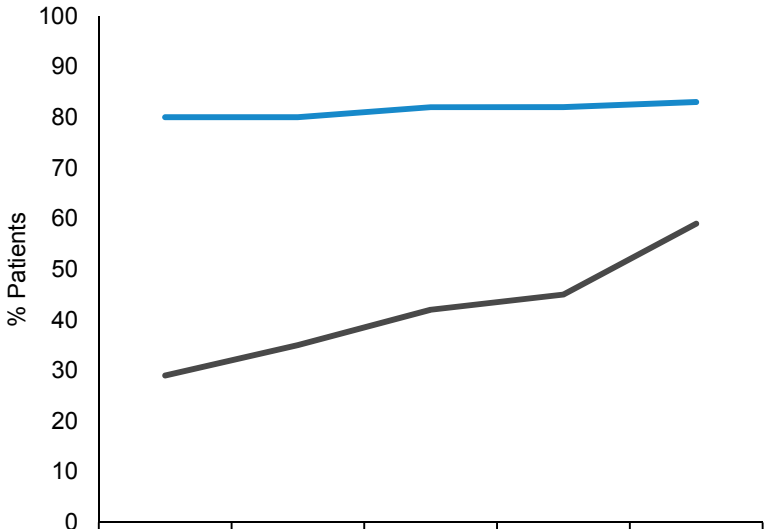
78% of patients were assessed for dyslipidemia

*Although official GPRA results are not estimated using Audit data, diabetes GPRA goals for 2014 are included throughout this report for reference and comparison. More information about GRPA can be found in Appendix B.

DIABETES AUDIT DATA – LAB DATA

Kidney Evaluation

Figure 7: Kidney Evaluation Performed among Audited Urban Patients with Diabetes, 2010-2014

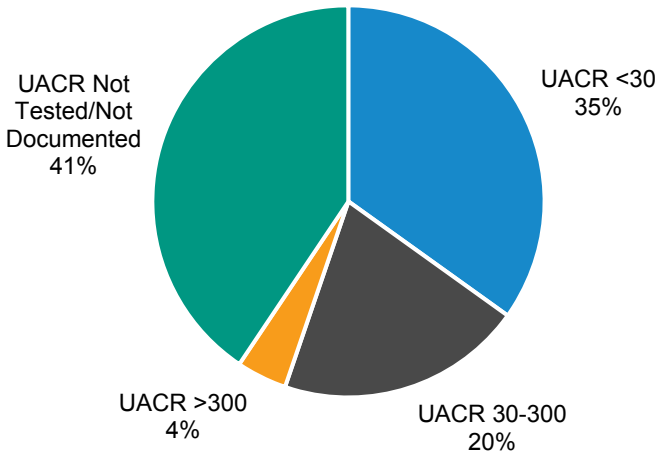


	2010	2011	2012	2013	2014
eGFR Assessed	80	80	82	82	83
UACR Assessed	29	35	42	45	59

Chronic kidney disease (CKD) is the loss of kidney function caused when blood vessels in the kidneys are damaged over time and hinder the kidney's ability to filter blood, which increases waste in the body's blood supply.[8] If CKD is not treated, it can progress to kidney failure or end stage renal disease, which can decrease quality of life and lead to premature death.[9] Diabetes is the leading cause of kidney disease and kidney failure, and accounted for 44% of new cases of kidney failure in the United States in 2011.[10,11]

Because early signs of kidney disease can occur without symptoms, regular assessment of kidney damage and function is recommended for patients with diabetes.[12] Two key markers are the estimated glomerular filtration rate (eGFR) and urine albumin – creatinine ratio (UACR). In 2012, new guidelines established that UACR is as important as eGFR in determining severity of kidney disease.[13] Figure 7 shows increased use of UACR over time, from just 29% of patients in 2010 to 59% in 2014. During the same time period, use of eGFR increased slightly from 80% in 2010 to 83% in 2014. In 2014, 57% of patients over age 18 received both eGFR and UACR assessment (data not shown).

Figure 8: UACR Categories* among Audited Urban Patients with Diabetes, 2014



*mg/g

In 2014 UACR was assessed on more than half of audited patients (59%) (figure 8).Twenty-four percent of patients had a UACR>30mg/g, indicating a loss of kidney function. Because healthier or younger patients without any symptoms may be less likely to be tested, these results may not be representative of all patients with diabetes.

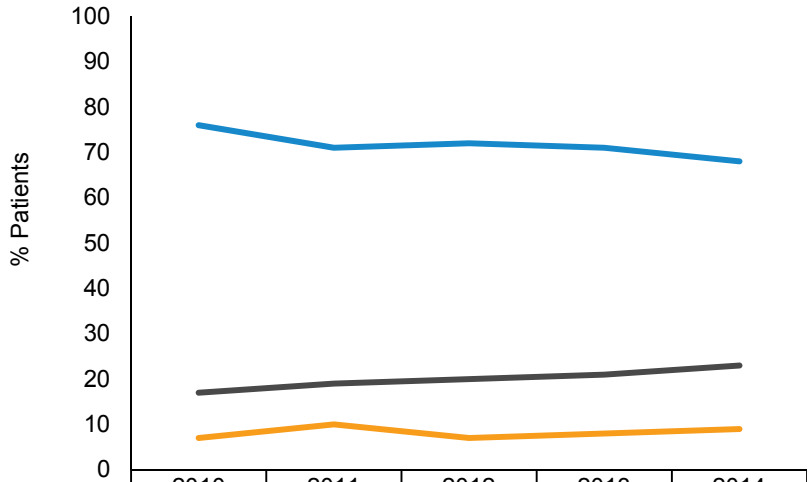
DIABETES AUDIT DATA – CARDIOVASCULAR HEALTH

Cardiovascular Disease (CVD) is the leading cause of death in the United States for the total population[14] and for AI/AN adults.[15] Adults with diabetes have heart disease death rates almost two times higher than adults without diabetes.[11] Tobacco use, poor diet, obesity, excessive alcohol use, high cholesterol, and other risk factors can put individuals at higher risk for developing CVD.[16]

Thirteen percent of audited patients had a current diagnosis of cardiovascular disease in 2014 (data not shown).

IHS Diabetes Best Practices state that targeting hypertension and lipid abnormalities have a significant effect on lowering risk of CVD.[17] See figure 6 for additional information about lipids.

Figure 9: Blood Pressure Categories* among Audited Urban Patients with Diabetes, 2010-2014



	2010	2011	2012	2013	2014
<140/<90	76	71	72	71	68
≥140/≥90	17	19	20	21	23
Not Documented	7	10	7	8	9

*Average of the last two or three blood pressures; mmHg

The number of patients with average blood pressure above 140/90 has increased from 17% to 23% during the five-year period (figure 9).

Average blood pressure less than 140/90 is an IHS GPRA Goal, however individual patients may have different treatment goals based on their own clinical needs.

In 2014, 62% of patients had a current diagnosis of hypertension, and 78% of these patients were prescribed an ACE inhibitor/ARB (data not shown).

2014 IHS GPRA Goal*

64.6% of patients with diabetes will achieve blood pressure control (<140/90)

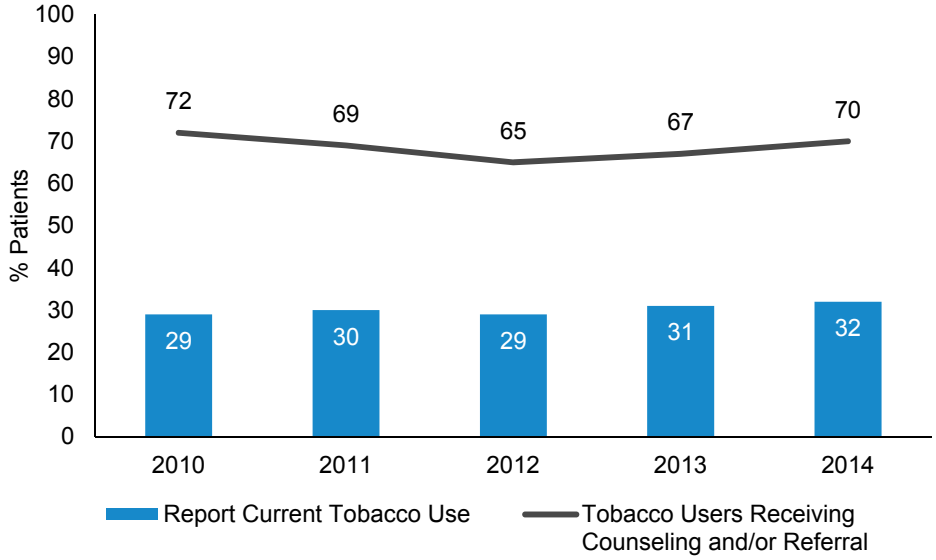
2014 Audit Results

68% of patients achieved blood pressure control (<140/90)

*Although official GPRA results are not estimated using Audit data, diabetes GPRA goals for 2014 are included throughout this report for reference and comparison. More information about GRPA can be found in Appendix B.

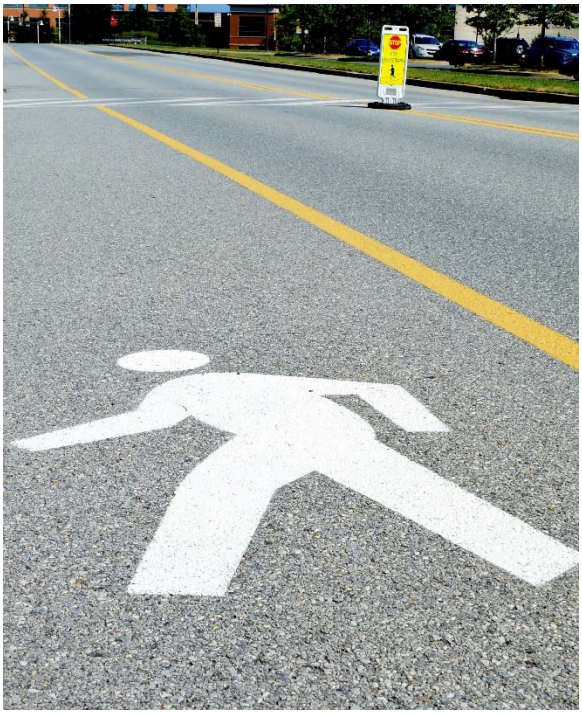
DIABETES AUDIT DATA – CARDIOVASCULAR HEALTH

Figure 10: Current Tobacco Use and Cessation Counseling among Audited Urban Patients with Diabetes, 2010-2014



Tobacco use remains one of the most important modifiable risk factors for CVD[18]. Approximately 30% of patients report using tobacco throughout the five-year period (figure 10). Although the percentage of tobacco users has remained stable, efforts to provide cessation counseling have remained high, with over 65% of tobacco users receiving counseling or referral each year during this time period (figure 10).

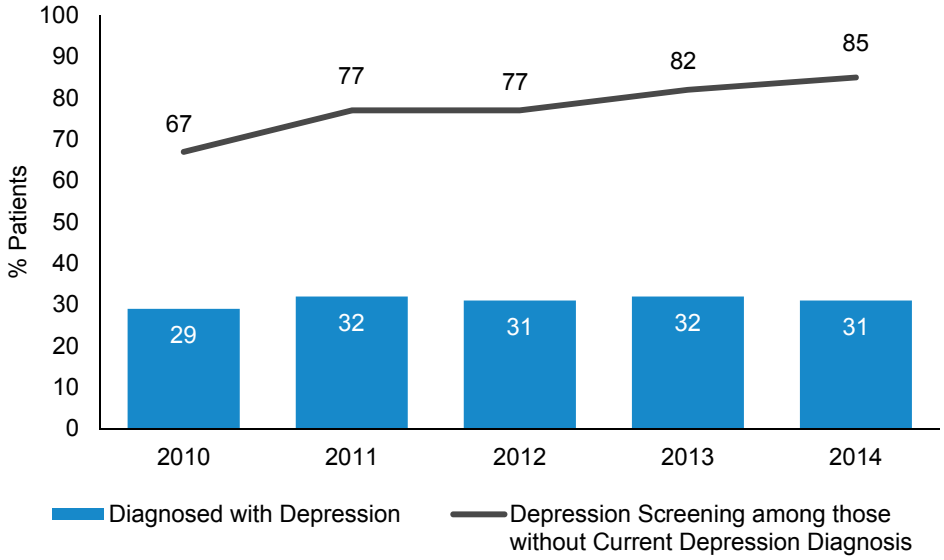
DIABETES AUDIT DATA – MENTAL HEALTH



Although diabetes is associated with an increased risk of depression, depression remains undiagnosed and untreated in about two-thirds of patients who have both conditions.[19] The comorbidity of depression and diabetes is particularly challenging, as the debilitating effects of depression may influence an individual's ability to successfully manage diabetes. Studies have suggested that AI/AN people with depression and diabetes have worse glycemic control than AI/AN people who have diabetes alone.[20] A recent study using data from the UIHOs has found that urban AI/ANs with both depression and diabetes are more likely to smoke and have higher BMI than patients who have diabetes but no depression.[21] Routine depression screening for people with diabetes is recommended, yet screening must be incorporated into an effective collaborative care system that includes ongoing treatment, care coordination, and psychoeducation.[3]

Screening for depression continues to rise each year, with screening rates among audited patients without a current diagnosis increasing from 67% in 2010 to 85% in 2014 (figure 11). Current rates of depression among audited patients have remained relatively steady, between 29% and 32% (figure 11).

Figure 11: Depression Diagnosis and Screening among Audited Urban Patients with Diabetes, 2010-2014



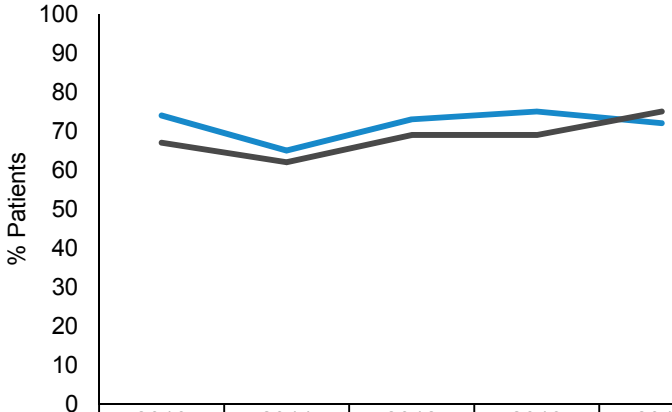
DIABETES AUDIT DATA – EDUCATION

The American Diabetes Association (ADA) recommends quality nutritional counseling both to prevent and control diabetes.[22] The ADA and the IHS recommend this education be provided by a registered dietitian, and that it should always be tailored to the individual patient.[22,23]

Increased physical activity in itself can lower blood glucose levels and may also contribute to weight loss. IHS Best Practices Guidelines stress the importance of physical activity education and individual goal setting for both these reasons.[23]

In 2014, 75% of audited patients received physical activity education and 72% received nutritional education (figure 12).

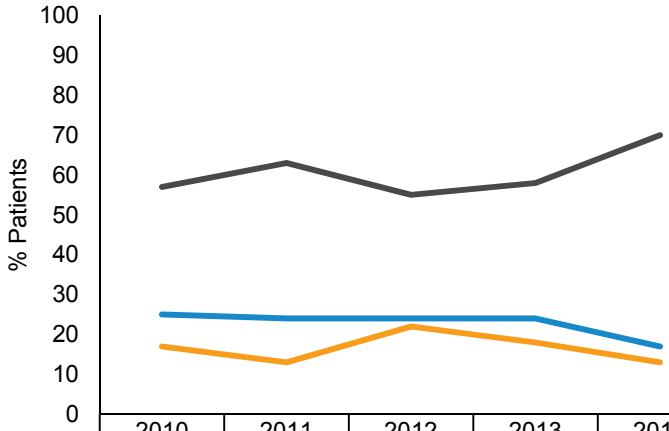
Figure 12: Education among Audited Urban Patients with Diabetes, 2010-2014



	2010	2011	2012	2013	2014
Received Nutrition Education	74	65	73	75	72
Received Physical Activity Instruction	67	62	69	69	75

Of those who received nutritional education in the previous year, the percent who met specifically with a registered dietitian decreased from 25% in 2010 to 17% in 2014 (figure 13).

Figure 13: Nutrition Education by Provider Type among Audited Urban Patients with Diabetes*, 2010-2014

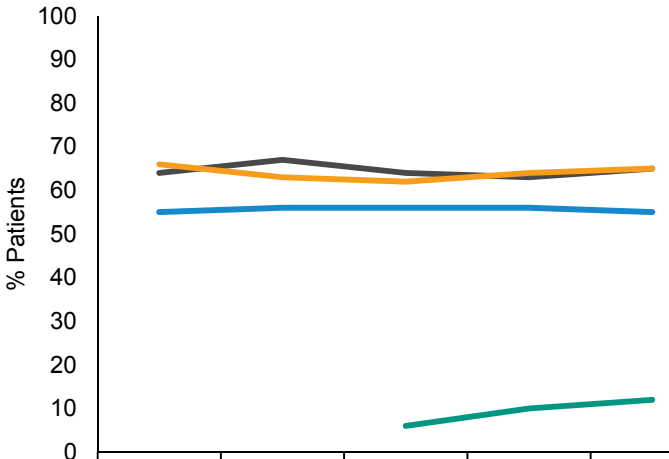


	2010	2011	2012	2013	2014
Registered Dietician	25	24	24	24	17
Other Provider	57	63	55	58	70
Both	17	13	22	18	13

*Among those who received any nutrition education

DIABETES AUDIT DATA – IMMUNIZATIONS

Figure 14: Documented Immunizations among Audited Urban Patients with Diabetes, 2010-2014



	2010	2011	2012	2013	2014
Influenza in Last Year	55	56	56	56	55
Pneumococcal Ever	64	67	64	63	65
Td in Last 10 Years	66	63	62	64	65
Complete Hepatitis B Series			6	10	12

People living with diabetes are at increased risk for acquiring certain vaccine-preventable diseases and may be more likely to develop complications when ill.[24]

Specific immunization rates that are tracked in the Diabetes Audit are those for influenza (annually), hepatitis B (ever completed series of three), pneumococcal (ever), and Tetanus/diphtheria (every ten years).

Rates for these have tended to stay steady; however completion of the Hepatitis B series has doubled in the three years it has been tracked from 6% in 2012 to 12% in 2014 (figure 14).

DIABETES AUDIT DATA – EXAMINATIONS

Poor glycemic control can cause significant microvascular damage over time throughout the body.[11] Specific exams are recommended annually for patients with diabetes to identify damage early and treat it when possible. Annual retinal, foot, and dental exams are all critical aspects of care and are all are tracked through the Diabetes Audit.

2014 IHS GPRA Goal*

58.6% of patients with diabetes will receive annual retinal examination

2014 Audit Result

41% of patients with diabetes received retinal examination

Retinal exams can identify early signs of damage, as diabetes can increase complications from diabetic retinopathy (DR), cataracts, glaucoma, and even disrupt brain functions associated with vision that lead to vision loss and blindness.[25]

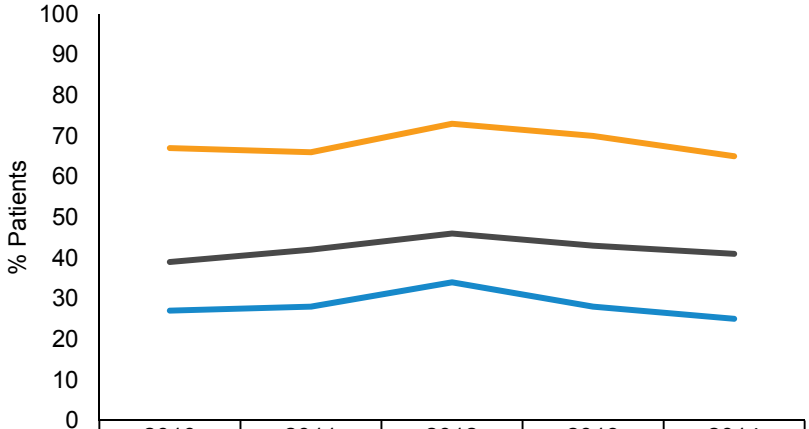
Foot exams conducted annually or more frequently are also important. Foot ulcers and amputation are common complications from diabetes, yet are preventable when identified early through regular foot examinations. Foot complications can be managed and prevented by providing foot care self-management education that includes information about smoking cessation, daily foot care, appropriate footwear, avoiding foot trauma, and controlling blood glucose, blood pressure, and lipids.[26]

Poorly controlled glucose levels increase the risk for periodontal disease, tooth decay, infections, and other serious oral health problems.[27] Infection and inflammation associated with periodontitis also can increase risk for diabetes complications such as cardiovascular disease, coronary artery disease, and chronic kidney disease.[28] Oral health education and regular oral evaluations can prevent, detect, and treat periodontal disease and dental caries early.[28]

While benefits of early and regular retinal, foot, and dental exams are well documented, rates for these services remain low overall among audited patients with diabetes. In 2014, 65% of patients had a record of a foot exam, 41% had a documented retinal exam, and 25% had a documented dental exam. These rates have been stable over the five-year period.

One possible reason for this could be that these services (especially dental care) may be obtained at other facilities and thus are not well-documented. Low rates could also indicate a lack of needed resources to provide and track these services in facilities serving urban AI/AN.

Figure 15: Documented Exams among Audited Urban Patients with Diabetes, 2010-2014



	2010	2011	2012	2013	2014
Dental Exam	27	28	34	28	25
Eye Exam	39	42	46	43	41
Foot Exam	67	66	73	70	65

*Although official GPRA results are not estimated using Audit data, diabetes GPRA goals for 2014 are included throughout this report for reference and comparison. More information about GRPA can be found in Appendix B.

DIABETES AUDIT DATA – STANDARD THERAPIES

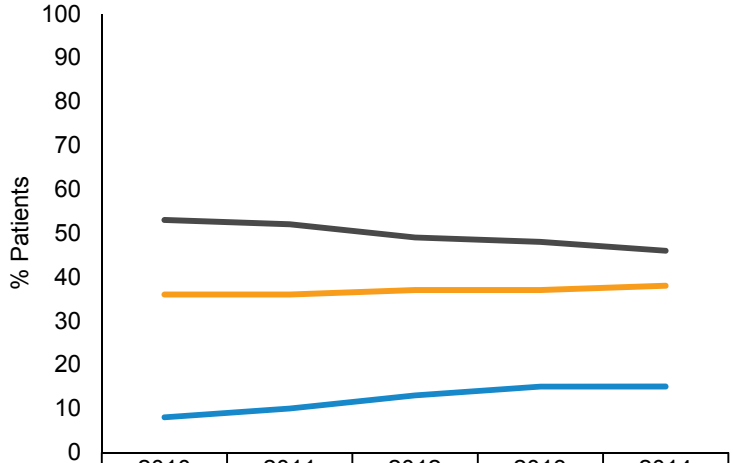
Many individuals with Type 2 diabetes, especially soon after diagnosis, manage their condition with diet and exercise changes alone.[11,29] The American Diabetes Association recommends initiating use of a pharmaceutical agent (for the majority of patients, Metformin) if these changes do not adequately lower blood glucose levels. Additional non-insulin pharmaceuticals may be added as well, including one or more of the following: sulfonylurea, thiazolidinedione, DPP-4 inhibitor, SGLT2 inhibitor, and GLP-1 receptor agonist.[29]

Insulin, which requires regular injections or an insulin pump, can be prescribed by itself, or in combination with other medications. Individual treatment plans may change over time, depending on clinical indicators and patient-specific factors.[29]

Use of diet and exercise alone without other pharmaceutical agents has increased among audited urban patients between 2010 (8%) and 2014 (15%) (figure 16). Use of insulin has remained relatively steady during this time period, while non-insulin pharmaceutical use has decreased slightly from 53% of patients in 2010 to 46% in 2014 (figure 16).

Other important therapies that are tracked by the Diabetes Audit include aspirin use and lipid-lowering medication, which are indicated for certain patients with specific identified needs. Results for these medications can be found in Table 7 of Appendix A.

Figure 16: Use of Standard Therapies among Audited Urban Patients with Diabetes, 2010-2014



	2010	2011	2012	2013	2014
Diet/Exercise Alone	8	10	13	15	15
No Insulin, Other Agent Only	53	52	49	48	46
Insulin, With or Without Other Agent	36	36	37	37	38

DISCUSSION

This report summarizes trends in diabetes services and clinical outcomes among AI/AN patients with diabetes at UIHOs participating in the Diabetes Audit from 2010 through 2014. These findings do not reflect changes experienced by individual patients over time, but instead highlight areas of progress and challenge across patients seen at urban facilities.

Over the 2010-2014 period, UIHOs have maintained or experienced improvements in important diabetes clinical care outcomes and receipt of critical screening and education services. Examples of improvements or sustained progress include exceeding GRPA targets for glycemic control, dyslipidemia assessment, and blood pressure control. In addition, the percent of patients without depression that had a record of a recent screening increased from 67% in 2010 to 85% in 2014, and tobacco counseling was offered consistently to more than 65% of patients who smoked. While completion levels of the Hepatitis B vaccine series are still very low, rates have doubled in the three years it has been tracked.

Urban diabetes programs also have struggled to effect change in specific areas, including a very high percent of patients who are overweight or obese (>90% each year), reported tobacco use consistently among approximately one-third of patients, and persistently low percentages of reported annual eye and dental exams that dropped even further in 2014.

Each facility is unique, and it is difficult to determine why some indicators are not improving over time. Ongoing commitment to diabetes care for urban AI/AN patients is critical in order to continue to effect change and provide these important services.

These data can bring awareness to UIHO staff and other stakeholders about challenges and opportunities in diabetes care across the urban programs. This report can hopefully motivate information-sharing around potential innovations or areas of need in clinical care, educational interventions, data collection, or other efforts focused on improving UIHO patients' diabetes care and outcomes.

APPENDIX A: TABLES

The following tables display urban aggregate data for the years 2010-2014. Both raw numbers and weighted percentages are included. Because percentages are rounded, the total may not add up to 100%. Cells are left blank if data were not collected for that indicator for a given year.

Table 1. Demographics of Audited Patients with Diabetes, 2010-2014

Year	**2010**		**2011**		**2012**		**2013**		**2014**	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%[+]	No.	%[+]	No.	%[+]	No.	%[+]	No.	%[+]
Sex										
Male	852	40%	972	40%	1,028	40%	1,100	41%	1,151	39%
Female	1,280	60%	1,460	60%	1,563	60%	1,652	59%	1,720	61%
Age (Years)										
<18	8	1%	2	0%	2	0%	5	0%	5	0%
18-44	608	28%	677	28%	679	28%	693	26%	690	25%
45-64	1,193	56%	1,389	56%	1,496	56%	1,609	58%	1,668	56%
≥65	323	16%	363	16%	414	16%	445	17%	508	18%
Mean age[+]	51.8		52.0		51.8		52.5		52.6	
Diabetes Duration (Years)										
<5	829	39%	931	38%	977	41%	879	34%	816	31%
5-9	506	26%	636	26%	680	26%	653	24%	657	22%
≥10	585	29%	713	27%	840	31%	905	32%	957	31%
Not documented	212	7%	152	8%	94	3%	315	10%	441	16%
Mean duration[+]	7.6		7.4		7.7		8.5		8.8	
Diabetes Type										
Type 1	46	2%	47	2%	53	2%	47	2%	56	2%
Type 2	2,086	98%	2,384	98%	2,538	98%	2,705	98%	2,815	98%

[+]Weighted Estimate

APPENDIX A: TABLES

Table 2. Vital Statistics of Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
Body Mass Index (BMI)*										
<25	139	7%	155	7%	183	8%	206	8%	229	8%
25-29	447	21%	542	22%	538	20%	590	20%	632	22%
30-39	970	46%	1,121	46%	1,223	48%	1,320	49%	1,341	46%
≥40	524	24%	577	23%	626	23%	618	22%	646	23%
Not tested or no valid result	52	2%	37	2%	21	1%	18	1%	23	1%
Mean BMI+	35.4		34.8		35.1		34.9		35.0	
Hypertension Diagnosis										
Yes									1,719	62%
No									1,152	38%
Blood Pressure (mmHg)										
<140/<90	1,576	76%	1,738	71%	1,861	72%	1,900	71%	1,915	68%
140/90-<160/<95	296	13%	363	15%	422	16%	475	16%	517	18%
≥160/≥95	97	4%	88	3%	126	5%	146	5%	164	5%
Not tested or no valid result	163	7%	243	10%	182	7%	231	8%	275	9%
Mean systolic+	127.7		127.9		128.6		129.2		129.8	
Mean diastolic+	76.5		76.5		77.3		77.9		78.3	
Cardiovascular Disease										
Yes							329	12%	360	13%
No							2,423	88%	2,511	87%

+ Weighted Estimate

* Weight in kilograms/(height in meters)^2; normal < 25, overweight 25-29, obese ≥30, morbidly obese≥40

APPENDIX A: TABLES

Table 3. Laboratory Results among Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
A1c (%)										
<7.0	775	35%	904	37%	1,000	38%	1,018	36%	1,069	37%
7.0-8.0	395	20%	459	19%	472	17%	545	19%	492	17%
>8.0	787	38%	919	38%	950	38%	1,031	39%	1,114	38%
Not tested or no valid result	175	7%	150	6%	169	6%	158	6%	196	8%
Mean A1c+	8.0		8.0		7.9		8.0		8.0	
Creatinine (mg/dL)										
<2.0	1,649	78%	1,931	77%	2,058	78%	2,170	79%	2,342	82%
≥2.0	33	2%	46	2%	61	2%	42	2%	53	2%
Not tested or no valid result	450	21%	455	21%	472	19%	540	19%	476	17%
Mean creatinine+	0.9		1.6		2.1		0.9		0.9	
Total Cholesterol (mg/dL)										
<200	1,167	58%	1,434	57%	1,519	56%	1,557	55%	1,696	58%
200-239	272	12%	332	14%	384	14%	433	16%	425	15%
≥240	138	6%	141	6%	165	6%	182	7%	196	7%
Not tested or no valid result	555	24%	525	24%	523	23%	580	23%	554	20%
Mean total cholesterol+	179		179		180		181		179	

+ Weighted Estimate

APPENDIX A: TABLES

Table 3 cont. Laboratory Results among Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
LDL Cholesterol (mg/dL)										
<100	841	41%	1,053	42%	1,143	42%	1,179	41%	1,294	43%
100-129	459	22%	547	22%	571	21%	598	22%	625	22%
130-160	177	8%	174	7%	209	8%	262	9%	238	8%
>160	65	3%	77	3%	87	3%	86	4%	102	4%
Not tested or no valid result	590	27%	581	27%	581	25%	627	24%	612	22%
Mean LDL cholesterol+	97		98		97		100		97	
HDL Cholesterol (mg/dL)										
<35	289	15%	340	13%	407	15%	452	16%	430	16%
35-45	600	29%	739	30%	754	28%	781	28%	849	29%
46-55	396	20%	449	18%	498	19%	519	19%	553	19%
>55	279	12%	371	15%	399	15%	413	14%	480	17%
Not tested or no valid result	568	25%	533	24%	533	23%	587	23%	559	20%
Mean HDL cholesterol+	45		46		46		46		46	
Non HDL Cholesterol (mg/dL)										
<130							1,055	37%	1,218	42%
130-159							586	21%	572	19%
160-190							334	12%	305	11%
>190							187	7%	211	7%
Not tested or no valid result							590	23%	565	20%
Mean non HDL cholesterol+							136		132	
Triglyceride (mg/dL)										
≤400	1,471	71%	1,799	71%	1,955	73%	2,042	73%	2,167	75%
>400	99	5%	112	5%	111	4%	132	5%	149	5%
Not tested or no valid result	562	24%	521	24%	525	23%	578	22%	555	20%
Mean triglyceride+	205		195		198		199		198	

+ Weighted Estimate

APPENDIX A: TABLES

Table 4. Tobacco Use among Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
Current Tobacco Use										
User	616	29%	741	30%	785	29%	877	31%	913	32%
Non-user	1,432	66%	1,569	66%	1,736	68%	1,826	67%	1,914	67%
Not documented	84	5%	122	4%	70	2%	49	2%	44	2%
Cessation Referral*										
Yes	442	72%	481	69%	500	65%	562	67%	619	70%
No	142	23%	230	26%	260	30%	315	33%	288	28%
Refused	32	4%	29	5%	24	5%				

+ Weighted Estimate
*Among current tobacco users

Table 5. Depression among Audited Patients with Diabetes, 20010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
Active Diagnosis of Depression										
Yes	648	29%	787	32%	834	31%	875	32%	886	31%
No	1,483	71%	1,641	68%	1,741	68%	1,877	68%	1,983	69%
Depression Screening*										
Yes	1,047	67%	1,331	77%	1,391	77%	1,552	82%	1,711	85%
No	427	33%	293	22%	341	22%	325	18%	272	15%
Refused	9	0%	15	1%	9	1%				

+ Weighted Estimate
*Among those without diagnosis of depression

APPENDIX A: TABLES

Table 6. Chronic Kidney Disease among Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
Estimated glom. filtration rate (eGRF)(ml/min/1.7m^2)*										
eGFR <30	29	2%	36	1%	56	2%	42	2%	44	1%
eGFR 30-59	433	14%	443	16%	242	9%	221	8%	237	9%
eGFR ≥ 60	1,232	64%	1,520	63%	1,856	71%	1,980	72%	2,097	73%
Not tested or no valid result	430	20%	431	20%	435	18%	504	18%	488	17%
Urine albumin to creatinine ratio (UACR) (mg/g)										
<30	472	21%	635	24%	795	28%	825	29%	1,095	35%
30-300	170	7%	213	8%	303	11%	356	13%	571	20%
> 300	47	2%	68	3%	82	3%	99	3%	124	4%
Not tested or no valid result	1,443	71%	1,516	65%	1,411	58%	1,472	55%	1,081	41%
Both eGFR and UACR Assessed*										
Yes									1,716	57%
No									1,150	43%

+ Weighted Estimate
*Age 18 years and older

APPENDIX A: TABLES

Table 7. Standard Therapies among Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
Diabetes Treatment										
Diet/Exercise alone	214	8%	284	10%	353	13%	501	15%	509	15%
Oral/Injectible agent only	1,154	53%	1,293	52%	1,266	49%	1,280	48%	1,315	46%
Insulin only	253	15%	277	14%	331	14%	403	15%	353	14%
Insulin and oral/injectible agent	445	21%	540	23%	609	23%	554	21%	687	24%
Refused/Unknown	66	4%	33	1%	32	1%				
Not tested or no valid result	0	0%	5	0%	0	0%	14	1%	7	0%
Aspirin/Antiplatelet Therapy*										
Yes							239	70%	256	72%
No							90	30%	104	28%
Statin^										
Yes	989	91%	1,215	91%	1,309	90%	1,340	86%	1,416	92%
No>	88	9%	137	9%	149	10%	216	14%	130	8%
ACE Inhibitor/ARBs#										
Yes									1,336	78%
No									383	22%

+ Weighted Estimate
*Among patients with diagnosed cardiovascular disease
^Among patients with at least one lipid lowering agent
>Refusals were also included in years 2010-2012
#Among patients with known hypertension

APPENDIX A: TABLES

Table 8. Diabetes Education among Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
Diet Instruction										
By RD only	376	19%	340	16%	343	17%	459	18%	315	12%
By other staff only	942	42%	1,024	41%	1,080	40%	1,254	44%	1,409	50%
By both RD and other staff	273	13%	249	9%	455	16%	336	13%	280	9%
No diet instruction	493	25%	769	33%	699	27%	703	25%	867	28%
Refused	47	1%	50	2%	14	1%				
Exercise Instruction										
Yes	1,467	67%	1,511	62%	1,827	69%	1,907	69%	2,138	75%
No	621	32%	844	36%	749	30%	845	31%	733	25%
Refused	43	1%	76	2%	15	1%				
Diabetes Education (Other)										
Yes	1,693	79%	1,909	77%	2,247	85%	2,362	86%	2,300	82%
No	400	20%	483	22%	332	14%	390	14%	570	18%
Refused	38	1%	40	2%	12	1%				

+ Weighted Estimate

Table 9. Exams among Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
Eye Exam										
Yes	901	39%	998	42%	1,171	46%	1,186	43%	1,221	41%
No	1,166	58%	1,366	55%	1,363	51%	1,566	57%	1,649	59%
Refused	64	3%	68	3%	57	3%				
Foot Exam										
Yes	1,379	67%	1,626	66%	1,883	73%	1,965	70%	2,001	65%
No	735	32%	789	34%	698	26%	787	30%	869	35%
Refused	17	1%	17	1%	10	0%				
Dental Exam										
Yes	612	27%	710	28%	828	34%	830	28%	733	25%
No	1,432	70%	1,632	69%	1,659	62%	1,922	72%	2,136	75%
Refused	86	4%	90	3%	104	4%				

+ Weighted Estimate

APPENDIX A: TABLES

Table 10. Immunizations among Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
Influenza Vaccine in Past Year										
Yes	1,122	55%	1,360	56%	1,528	56%	1,571	56%	1,644	55%
No	889	40%	909	38%	891	38%	990	38%	1,028	39%
Refused	119	5%	163	6%	172	6%	191	6%	198	6%
Pneumococcal Vaccine Ever										
Yes	1,351	64%	1,640	67%	1,747	64%	1,794	63%	1,998	65%
No	711	32%	704	30%	778	34%	898	35%	789	32%
Refused	68	3%	87	3%	66	2%	60	2%	82	3%
Td Vaccine in Past 10 Years										
Yes	1,311	66%	1,582	63%	1,654	62%	1,784	64%	1,978	65%
No	780	33%	779	34%	862	36%	895	34%	820	33%
Refused	39	1%	69	2%	75	2%	73	3%	70	2%
Hepatitis B Series										
Ever completed series					134	6%	239	10%	369	12%
Never completed series					2,385	92%	2,396	87%	2,438	86%
Refused					72	2%	117	3%	59	2%

+ Weighted Estimate

Table 11. Tuberculosis among Audited Patients with Diabetes, 2010-2014

Year	2010		2011		2012		2013		2014	
Number of charts audited	2,132		2,432		2,591		2,752		2,871	
	No.	%+	No.	%+	No.	%+	No.	%+	No.	%+
TB Status (PPD)										
Positive, INH complete	65	3%	87	3%	83	3%	75	2%	80	2%
Positive, not treated	67	3%	106	5%	82	3%	78	3%	79	3%
Negative, up to date	497	22%	592	22%	661	23%	635	21%	577	17%
Negative, outdated	96	4%	116	4%	100	4%	92	3%	89	3%
Negative, date unknown	108	3%	22	1%	16	1%	26	1%	28	1%
Status unknown	1,299	66%	1,473	63%	1,649	66%	1,846	70%	2,018	74%

+ Weighted Estimate

APPENDIX B: GLOSSARY OF TERMS

Diabetes Registry

List maintained by each UIHO that includes all patients diagnosed with diabetes. Some patients on a UIHO diabetes registry may not be eligible for inclusion in their Diabetes Audit.

Government Performance and Results Act (GPRA)

Passed by Congress in 1993, this act was designed to address government accountability and performance in the management of government-funded programs. The IHS reports on a range of health topics for GPRA, including diabetes. In 2013, there were five IHS GPRA goals related to diabetes and two additional diabetes measures that are reported to Congress (table below).

Please note that official GPRA results are prepared and distributed by the IHS Planning and Evaluation office. For more information about the IHS GPRA targets and measurements, visit: http://www.ihs.gov/CRS/index.cfm?module=crs_gpra_reporting.

FY2014 GPRA Indicators for Diabetes	Target
Good Glycemic Control Percentage of patients with diagnosed diabetes with good glycemic control (A1c less than (<) 8.0).	48.3%
Blood Pressure Control Percentage of patients with diagnosed diabetes that have achieved blood pressure control (less than (<) 140/90).	64.6%
LDL Assessment Percentage of patients with diagnosed diabetes assessed for dyslipidemia (LDL cholesterol).	73.9%
Nephropathy Assessment Proportion of patients with diagnosed diabetes assessed for nephropathy (GFR and UACR).	Baseline year, no target
Retinopathy Proportion of patients with diagnosed diabetes who received an annual retinal examination.	58.6%

Healthy People 2020 (HP2020)

National health promotion and disease prevention initiative established by the U.S. Department of Health and Human Services. HP2020 was designed to measure health-related outcomes and progress over time and was developed through a broad consultation process. For more information about HP2020, visit www.healthypeople.gov. For diabetes-specific objectives, visit: http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=8.

IHS Diabetes Care and Outcomes Audit ("Diabetes Audit")

Process to assess care and health outcomes among AI/AN patients with diagnosed diabetes who are seen at a tribal, IHS, or urban facility. May be performed manually (form filled out while examining medical record and then entered into on-line WebAudit portal) or electronically

APPENDIX B: GLOSSARY OF TERMS

(extraction of data from Electronic Health Record directly to a data file). Data for the Annual Audit is submitted to the IHS Division of Diabetes Treatment and Prevention for centralized processing and analysis. Facilities may also conduct Interim Audits for local use.

IHS Division of Diabetes Treatment and Prevention (DDTP)

Developer and coordinator of the Diabetes Audit. The Division was established in 1979 by Congress to address diabetes in AI/AN communities. Its mission is to "develop, document, and sustain clinical and public health efforts to treat and prevent diabetes in American Indians and Alaska Natives." For more information about IHS DDTP, visit http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=peopleDDTP.

Special Diabetes Program for Indians (SDPI)

Grant program that provides funding to aid in the prevention and treatment of diabetes among AI/AN. Established in 1997. For more information visit the SDPI website: http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=programsSDPI

Standards of Care and Clinical Practice Recommendations

Provide guidance to clinicians and educators in the care provided to AI/AN individuals who have or are at risk for type 2 diabetes. For more information, visit: http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=soc.

Urban Indian Health Institute (UIHI)

A division of the Seattle Indian Health Board, the UIHI provides centralized nationwide management of health surveillance, research, and policy regarding the health status of urban AI/AN people. The UIHI serves the national network of 33 UIHOs through scientific inquiry, technology, and information. For more information visit: www.uihi.org.

Urban Indian Health Organizations (UIHOs)

Network of 33 independent health agencies funded in part under Subtitle IV of the Indian Health Care Improvement Act. The UIHOs receive limited grants and contracts from the IHS. The UIHOs serve AI/ANs in select cities by providing a range of health and social services, from referral services to full ambulatory care. For more information about UIHOs and the populations they serve, visit: http://www.uihi.org/about-urban-indian-health-organizations/.

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Contact Us

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