



# **Urban Diabetes Care and Outcomes Audit Report: Aggregate Results from Urban Indian Health Organizations, 2006-2010**

*October 2011*







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

This report was prepared by Elizabeth Knaster, MPH, Amber Lenhart, BA, and Sarah Simpson, BA, BIS.

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***Please contact the Urban Indian Health Institute with your comments by e-mailing [info@uihi.org](mailto:info@uihi.org), calling 206-812-3030 or visiting us online at [www.uihi.org](http://www.uihi.org).***

## ACKNOWLEDGEMENTS



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The Urban Indian Health Institute would like to thank the staff at the urban Indian health organizations for the excellent work they do daily on behalf of their communities.

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# EXECUTIVE SUMMARY

## INTRODUCTION

The purpose of this report is to provide a description of the annual Diabetes Audit data collected by participating Indian Health Service (IHS) funded urban Indian health organizations (UIHO). This report's format is based on the IHS Diabetes Best Practice Guidelines. First developed in 2001 by a workgroup coordinated by the IHS Division of Diabetes Prevention and Treatment, best practices are based on the latest scientific research as well as diabetes success stories and experiences within American Indian and Alaska Native (AI/AN) communities. Included are selected "key measures" from the Best Practice Guidelines, with accompanying aggregated data from participating UIHOs between the years 2006-2010.

## METHODS

The data examined for this report were collected for the annual Diabetes Audit of medical records performed at participating UIHOs from 2006 through 2010. The Diabetes Audit data collected and submitted to IHS by participating UIHOs were provided to the Urban Indian Health Institute by the IHS Division of Diabetes Prevention and Treatment for analysis and reporting purposes.

## RESULTS

The number of urban facilities participating increased each year between 2006 and 2010. In 2010, 30 facilities participated in the annual Diabetes Audit, representing over 3,800 urban AI/AN patients with diabetes nationwide.

Some key findings for urban facilities include:

- During the past five years, the percentage of audited patients with diabetes screened for depression increased from 44% to 67%, while the percent diagnosed with depression remained relatively constant (29-33%).
- In 2010, approximately 35% of audited patients with diabetes had a Hemoglobin A1c measure <7.0%, meeting the 2010 IHS GPRA goal to have 33% of patients with an A1c <7.0%.
- In 2010, 72% of tobacco users with diabetes received tobacco cessation counseling and/or referrals, an increase from previous years.
- Over 67% of patients were overweight (BMI 25-29) or obese (BMI 30-39), and almost one-quarter were considered morbidly obese (BMI 40+).
- For all five years, documented eye exams, foot exams and dental exams all fell beneath the HP2010 objectives and 2010 IHS GPRA goals for those indicators.
- In 2010, 74% of audited patients with diabetes received nutritional instruction from a Registered Dietitian or other provider.
- Of the 27 youth audited between 2006-2010, 18 received both nutrition and physical activity education.

## DISCUSSION

This report summarizes the performance of UIHO diabetes programs using Diabetes Audit data to track select key measures. The majority of clinical indicators have remained stable during the past five years, with several seen improvements in 2010, including nutrition instruction, blood pressure control, tobacco cessation counseling and depression screening. Others have reached or exceeded 2010 IHS GPRA goals, including goals for LDL cholesterol assessment and glycemic control. This report highlights areas of growth and continued improvement in meeting the current diabetes best practices guidelines.

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# INTRODUCTION

## BACKGROUND

Diabetes Mellitus is a major cause of chronic disease among American Indians and Alaska Natives (AI/AN), and the prevalence of diagnosed diabetes among AI/AN adults is more than twice that of non-Hispanic white adults.<sup>1</sup> In an effort to reduce the burden of diabetes among AI/ANs, Congress established the Special Diabetes Program for Indians (SDPI) in 1998.<sup>2</sup> This program provides funding specifically to aid in the prevention and treatment of diabetes in AI/AN communities.

In an effort to gain a better understanding of the trends in diabetes services and outcomes among AI/AN people, Indian health facilities nationwide conduct an annual medical chart review, also known as the Indian Health Service (IHS) Diabetes Care and Outcomes Audit (or “Diabetes Audit”). Information collected by these facilities is submitted to the IHS Division of Diabetes Treatment and Prevention (DDTP). This information is used for diabetes surveillance and to help create a clinical picture of the AI/AN population who receive diabetes care and services through the Indian health system. The Urban Indian Health Institute (UIHI) received raw de-identified Diabetes Audit data from IHS for analysis and reporting purposes.

The purpose of this report is to provide a description of the annual Diabetes Audit data collected by participating SDPI recipients that are part of the network of IHS-funded urban Indian health organizations (UIHO). UIHI collaborated with the IHS DDTP in the development of this report.

## REPORT CONTENT

This report’s format is based on the IHS Diabetes Best Practice Guidelines.<sup>3</sup> First developed in 2001 by a workgroup coordinated by IHS DDTP, best practices are based on the latest scientific research as well as diabetes success stories and experiences within AI/AN communities. The best practices are focused on both clinical (e.g. weight management) and community (e.g. school health) settings. IHS has revised their Diabetes Best Practices and Key Measures for 2011. Future Diabetes Audit reports will contain information about these changes.

This report presents information about the performance of UIHO diabetes programs as a whole in relationship to the clinical best practices\* using Diabetes Audit data to track select key measures. Since the Diabetes Audit primarily focuses on clinical care outcomes rather than community outcomes, this report provides information about clinical best practices only. The following information is included in the report:

- **Description of the topic and its relevance to diabetes:** A brief description of the clinical best practice is included at the beginning of each section to provide background on the topic’s relevance to diabetes care and to diabetes disease outcomes. All background information comes from the best practice guidelines.
- **Key clinical practice recommendations:** A list of the major clinical recommendations in each best practice topic area also is included in this report. More in-depth information for each can be found in the best practice guidelines.

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\* Pharmaceutical Care is not included in this report as no relevant data are available from the Diabetes Audit.

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- **Key measures and comparisons:** Two measures were selected by the IHS workgroup for each best practice topic area as important indicators that can be used to measure a diabetes program's progress and outcomes. When Diabetes Audit data can be used to evaluate these measures, a graph of aggregate urban data is presented, along with a brief description of the results. When applicable, 2010 IHS Government Performance Results Act (GPRA) Goals<sup>4</sup> and Healthy People 2010 (HP2010) Objectives also were included for reference. Please note that official GPRA results are prepared and distributed by the IHS Planning and Evaluation office.

Data from sources other than the Diabetes Audit are needed to assess some key measures, and information is not available in this report for these indicators. For some best practice topics, one or two "alternative key measures" are presented graphically using Diabetes Audit data. These alternative measures are based on the key clinical recommendations and offer additional tracking opportunities.

- **Appendices:** Appendix A contains aggregate urban descriptive data tables over the past five years (2006-2010). Appendix B contains background information about GPRA and HP2010.

## URBAN AI/AN AND URBAN INDIAN HEALTH ORGANIZATIONS

American Indians and Alaska Natives are a diverse and growing population. Over the past half-century, AI/ANs have increasingly relocated from rural communities and reservations into urban centers, both by choice and by force through federal policy.<sup>5</sup> Despite this geographical shift, urban AI/ANs have not always been included in the Indian health community, nor are they customarily recognized as a minority population in local and national assessments.<sup>5</sup> Data describing health and health care service trends among urban AI/ANs are of great value in the ongoing effort to understand the strengths and needs of the population.

IHS-funded UIHOs are private, non-profit corporations that are governed by AI/AN majority Boards of Directors and serve as health and social service hubs for AI/ANs in select cities. These organizations provide a wide array of culturally appropriate health care services to AI/AN and low-income patients. While the scope and delivery of health care services vary among facilities, all receive SDPI funding to provide diabetes care.

## METHODS

### *Data Source*

The data examined for this report were collected for the annual Diabetes Audit of medical records performed at participating UIHOs from 2006 through 2010. Guided by written instructions, diabetes coordinators or trained staff at each of the participating organizations performed the Diabetes Audit. Some facilities audit 100% of Diabetes Registry charts, while other facilities use a systematic random sampling scheme with a sufficient sample size to provide estimates within 10 percent of the true estimate.<sup>6</sup> Some measures included in this report were calculated by IHS DDTP and not directly reported from the UIHO diabetes programs.

### *Target Population*

Data for this report come from paper charts or electronic health records for patients in diabetes registries of the urban sites that participated in the Diabetes Audit. The organizations were instructed to include data from AI/AN patients with diagnosed diabetes who received diabetes health care services and who had a least one primary care visit during the past 12 months. They were instructed to exclude patients who met any of the following criteria: received primary referral or contract care paid by IHS, arranged other health care services



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with non-IHS monies, received primary care at another IHS or tribal facility, lived in a jail or nursing home and received care in those institutions, attended a dialysis unit (if on-site dialysis was not available), had gestational diabetes, had pre-diabetes only, or had moved, died or were non-contactable after three tries in 12 months.

## *Survey Design*

The IHS Diabetes Audit is based on consensus-derived standards of care, also known as the IHS Standards of Care for Patients with Type 2 Diabetes.<sup>6</sup> These standards were first developed in 1986, and are regularly reviewed and updated by the IHS DDTP. Using the Audit, health facilities can assess their performance on a number of key measures relevant to the health of people with diabetes, including demographic characteristics, vital statistics, examinations, educational services, therapy services, immunizations and laboratory data.

## *Data Collection*

Two options for data collection were made available to the health organizations: 1) a manual diabetes audit or 2) a computerized diabetes audit. The manual diabetes audit data were collected by gathering information from paper charts using the IHS DDTP Audit data collection form. The computerized diabetes audit extracts data from the IHS Resource and Patient Management System (RPMS), an integrated electronic system for the management of clinical and administrative information used by IHS.

Starting in 2008, all participating facilities submitted data via a secure web application (the WebAudit) directly to the IHS DDTP. In previous years, some facilities submitted data to their local IHS area office, which then submitted data to the IHS DDTP. Partly as a result of this change, more urban facilities are represented in this national report starting in 2008, although they may have collected and submitted data to their local office in previous years. More information about the WebAudit can be found here:

<http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=resourcesAudit>.

Diabetes Audit data collected and submitted by participating UIHOs through 2010 were provided to the UIHI by the IHS DDTP for analysis and reporting purposes.

## *Data Analysis*

Stata 10 was used to perform all statistical analyses. Because some facilities audit a random sample of their patients with diabetes, a weighting procedure was applied to calculate accurate estimations of Audit statistics. This is necessary when combining data from multiple sites and when not all patients are audited. Statistical tests to compare changes in rates over time were not performed.

## *IHS Best Practice Guidelines*

The IHS Diabetes Best Practices offer diabetes programs guidance on providing effective services to AI/ANs. Originally developed in 2001 by a workgroup convened by IHS, the best practices are updated and expanded as needed. There are 19 best practices aimed at both community and clinical settings. Each best practice includes guidelines; key recommendations; information about program monitoring and evaluation, including for key measures; additional tools and resources; and recommendations for improving IHS programs. More about IHS best practices can be found here: <http://www.diabetes.ihs.gov/index.cfm?module=toolsBestPractices>.

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## *Comparison to National Standards: GPRA and Healthy People 2010*

A comparison of select indicators to national standards also is included in this report. Comparing the urban aggregate results to national goals may provide important information about progress toward providing diabetes-related services and achieving specific health outcomes. Passed in 1993, the Government Performance Results Act (GPRA) was designed to address a broad range of concerns regarding government accountability and performance in the management of government-funded public needs projects. The general purpose of GPRA is to improve the confidence of Americans in the Federal government by holding Federal agencies accountable for achieving program results.<sup>4</sup> IHS reports on a range of health topics for GPRA, including diabetes.

Healthy People 2010 (HP2010) is a national health promotion and disease prevention initiative established by Health and Human Services. HP2010 was designed to measure health-related outcomes and progress over time and was developed through a broad consultation process, built on scientific knowledge and other government health initiatives pursued over the past two decades. HP2010 Objectives are action statements toward which the nation, communities, institutions and local groups can work.

More about GPRA and HP2010, their target measures, and urban aggregate data can be found in Appendix B.

## *Limitations*

Each year, only a selection of patients with diabetes is included in the IHS Diabetes Audit. This is a limitation when examining trends using these data, as the patient population may be different from year-to-year. Any changes in patient outcomes (e.g. lab values) seen over the years should not necessarily be taken as a result of the programs themselves, but rather may be a result of changes in the patient population that is audited each year. Provided that patient selection was random, as outlined in the instructions, the patients audited should be representative of the entire population of patients at each facility and there should not be any bias or large effect on the results due to sampling.

Another limitation pertains to the lack of general demographic data for all registry patients. The Audit does not collect information on the socioeconomic indicators of education, income, employment status or mobility. Understanding the baseline distribution of these variables and changes over time could provide important information concerning the audited population.

While the Diabetes Audit data provides a description of the progress of the urban SDPI programs, there may be important indicators not captured by these systems that better represent the challenges and strengths of the UIHO programs. Identifying and collecting these additional indicators may provide a more detailed understanding of how UIHOs are doing in meeting goals. Examples of potential indicators include family stability, drug reduction, diet changes, cultural connectedness and self-esteem.

Finally, the amount of missing information for a few select variables should be considered in the interpretation of these findings. In our analyses, all percentages are computed as a proportion of all audited records, unless otherwise specified. Patients with missing values (not tested or no valid result) for a particular measure are included in the denominator. Some measures have a high portion of missing values; this can affect the results. Reducing the amount of missing data at each site will improve the quality of future reports. It also is important to note the varying scope of health care services offered by UIHO facilities. For example, not all sites provide

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clinical services. Additionally, the availability of laboratory-related services may be either lacking or provided off-site, and retrieving follow up laboratory values may pose challenges.

**Data Note:** Due to a change to the weighting procedure used in the UIHO aggregate analyses for this report, there may be differences observed from the results from previous years’ reports. If you have questions about this, please contact [info@uihi.org](mailto:info@uihi.org).

## KEY DIABETES AUDIT MEASURES

There are certain key Diabetes Audit measures that are frequently examined and are included throughout this report. Results for these key Audit measures may be found both in the body of the report and in the tables of Appendix A. These measures include:

|                                    | <u>Graph</u> | <u>Table</u> |
|------------------------------------|--------------|--------------|
| • Demographics of Audited Patients |              | Page 31      |
| • Hemoglobin A1c Results           | Page 18      | Page 36      |
| • Blood Pressure Results           | Page 12      | Page 32      |
| • Blood Lipid Values               | Page 14      | Page 36      |
| • Nutrition Education              | Page 9       | Page 34      |
| • Exercise Instruction             |              | Page 34      |
| • Other Diabetes Education         |              | Page 34      |

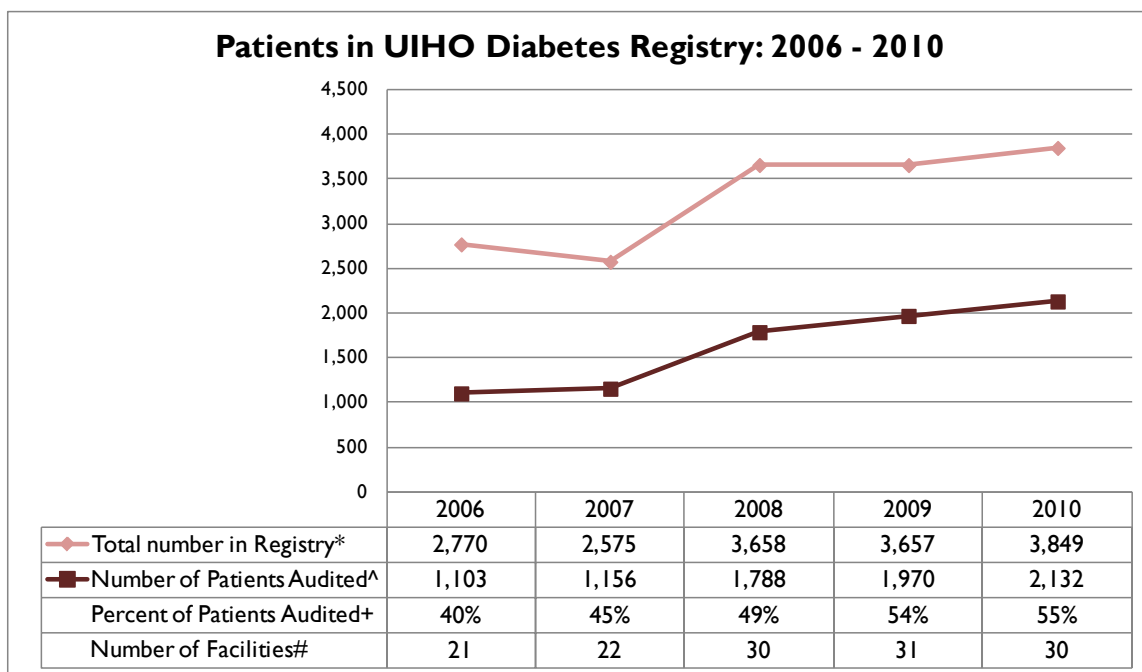
For questions or comments about this Diabetes Audit Report please contact the UIHI at (206) 812-3030 or email [info@uihi.org](mailto:info@uihi.org).

# DIABETES REGISTRY:

## Urban Indian Health Organizations (UIHO)

The following graph displays 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.

**Graph 1**



\*Sum of all patients in each registry

^Sum of all patients in audit

+Number of patients audited/number of patients in registry

#Number of urban Indian health organizations participating. Data from IHS demonstration sites are not included.

**Description of Graphic:** In 2010, 30 UIHOs participated in the Diabetes Audit. For all sites combined, Audit information was collected from 2,132 patients, 55% of all patients in diabetes registries at these facilities. This is a 38% increase from 2006, where 1,103 patients in diabetes registries were audited from 21 facilities. Some part of this increase may be attributable to changes in the data submission process; starting in 2008, all facilities submitted data via a secure web application directly to the IHS DDTP.



# BEST PRACTICE I: Adult Weight Management

Overweight and obesity can lead to poor health outcomes of individuals with diabetes through increasing insulin resistance and raising blood glucose levels. Obesity contributes to long-term complications of diabetes such as reduced circulation and to chronic health conditions such as high blood pressure and kidney disease. For individuals with diabetes and those with pre-diabetes, maintaining a healthy weight can decrease insulin resistance, lower glucose levels and reduce the need for medication. Healthy weight also can reduce the long-term risk of heart disease, high blood pressure and other chronic conditions.\*

## Key Clinical Practice Recommendations Related to Adult Weight Management

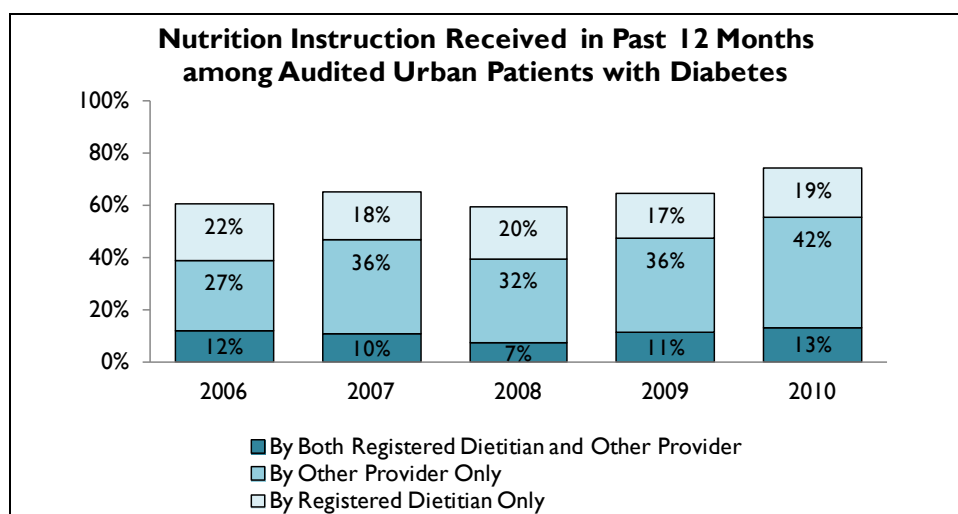
- Recognize exclusions from weight-loss therapy.
- Assess for overweight and obesity.
- Use lifestyle approaches for long-term weight loss success, including a focus on nutrition approaches, physical activity, behavior change, pharmacologic therapy, weight loss surgery and weight maintenance.

## Best Practice Key Measures Used Related to Adult Weight Management

**Key Measure 1:** Percentage of diabetes patients with documented nutrition education from a registered dietitian or other provider in the past 12 months.

*Nutrition education provided by a Registered Dietitian or other professional can help patients learn specific methods to safely reduce their caloric intake and make other dietary changes. Dietary changes alone can lead to moderate weight loss, which in turn can significantly improve health outcomes among people with diabetes.*

### Graph 2



**Description of Graphic:** In 2010, 74% of audited urban patients nationwide had a record of receiving nutrition instruction from a Registered Dietitian or other provider, an increase from earlier years where 59-64% received nutrition instruction. Additionally, in 2010 32% received instruction from a Registered Dietitian, with or without additional education from another provider.

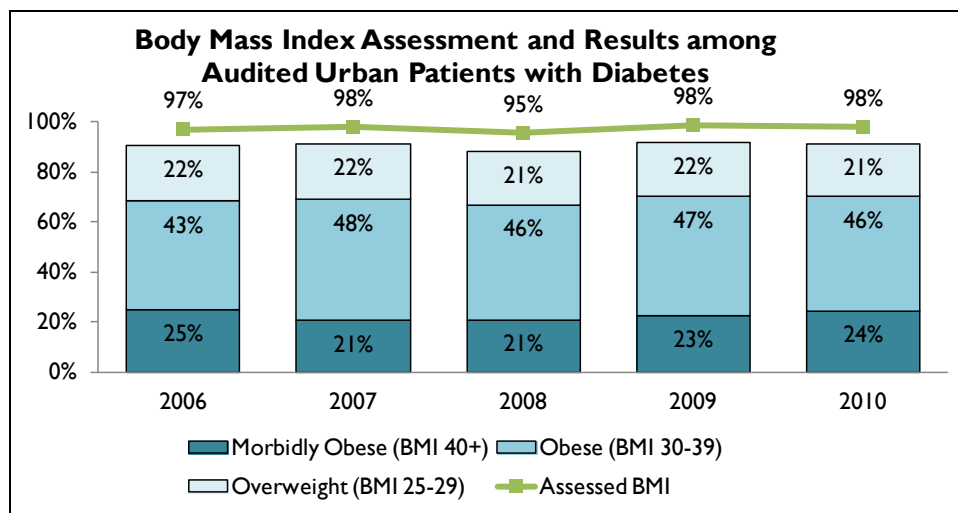
\* All background information for Best Practices reference the IHS Best Practice Guidelines only unless otherwise noted.

# BEST PRACTICE I: Adult Weight Management

**Key Measure 2:** Percentage of diabetes patients with a documented assessment for overweight/obesity in past 12 months.

*Obtaining measures of a patient's height and weight can help determine individual risk profiles due to overweight/obesity. Regular measures of height and weight can be used to set goals for future weight loss and weight maintenance, and are crucial to successful diabetes care and management.*

## Graph 3



**Description of Graphic:** Approximately 98% of audited urban patients had a record of being assessed for overweight/obesity in 2010, similar to earlier years. Approximately 67% of patients were overweight (BMI 25-29) or obese (BMI 30-39), and almost one-quarter were considered morbidly obese (BMI 40+). These rates were not notably different from previous years.

# BEST PRACTICE II: Cardiovascular Disease

Cardiovascular disease (CVD) includes high blood pressure, cerebrovascular disease (or stroke) and coronary heart disease (which can lead to heart attack). People with diabetes have a higher risk of developing CVD, and CVD is the leading cause of death among individuals with diabetes. High blood pressure and elevated cholesterol and triglyceride levels are major risk factors for CVD. Blood pressure and lipid control through the use of medication and lifestyle modification (including healthy diet, increased physical activity and no smoking) have been shown to significantly reduce the risk of developing heart disease, stroke and peripheral vascular disease among people with diabetes.

## Key Clinical Practice Recommendations Related to Cardiovascular Disease

- Control blood glucose.
- Assess smoking status, provide counseling and implement a cessation program.
- Provide medical nutrition therapy.
- Provide patient education to encourage daily physical activity.
- Conduct BMI screening and assist with weight management.
- Assess emotional health.
- Assess, control and treat high blood pressure (hypertension).
- Measure, evaluate and treat lipids.
- Provide aspirin and antiplatelet therapy.
- Stop or slow the progression of albuminuria.
- Assess and treat anemia related to chronic kidney disease.
- Identify and treat sleep apnea.

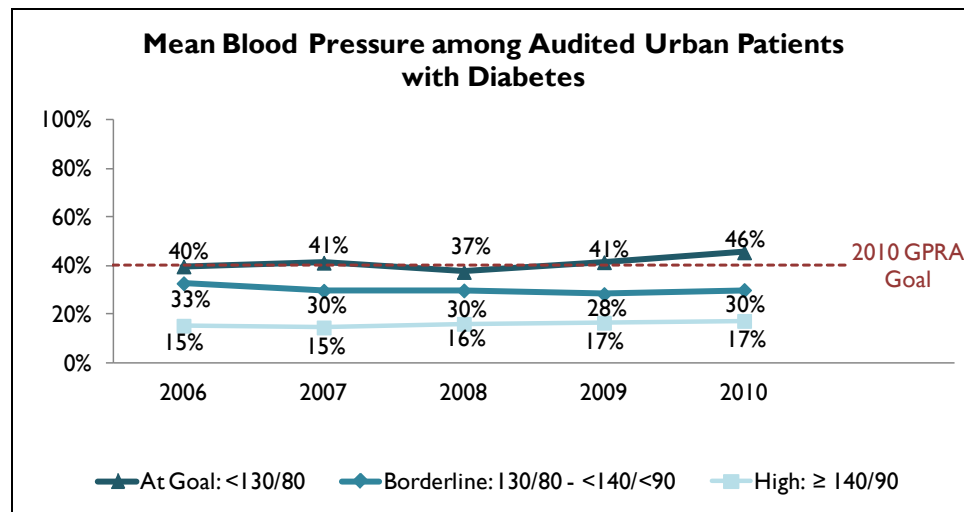
## Best Practice Key Measures Related to Cardiovascular Disease

**Key Measure I:** Percentage of diabetes patients who have recent blood pressure measurements that are at goal in past 12 months (mean < 130/80).

*Reduction of blood pressure through medication and/or lifestyle changes is a key intervention for patients with diabetes and hypertension. Blood pressure should be assessed at each visit to determine if it is being adequately controlled with current interventions.*

# BEST PRACTICE II: Cardiovascular Disease

**Graph**  
**4**



**2010 IHS GPRA goal:** 40% of patients with diabetes achieve blood pressure control (average of <130/80 for last three blood pressures).

**Description of Graphic:** In 2010, 46% of all audited urban patients whose blood pressure was recently assessed had mean blood pressure values less than 130/80 (“at goal”), more than in the previous five years. This exceeds the 2010 IHS GPRA goal for 40% of patients to achieve blood pressure control. In 2010, 30% of assessed diabetes patients had mean blood pressures that are considered borderline hypertension (between 130/80 and 140/90) and 17% had high mean blood pressures (≥140/90), both consistent with previous Audit years.

**Key Measure 2:** Percentage of diabetes patients with documented CVD or hypertension education in past 12 months.

*This key measure is not analyzable using current IHS Diabetes Audit data.*

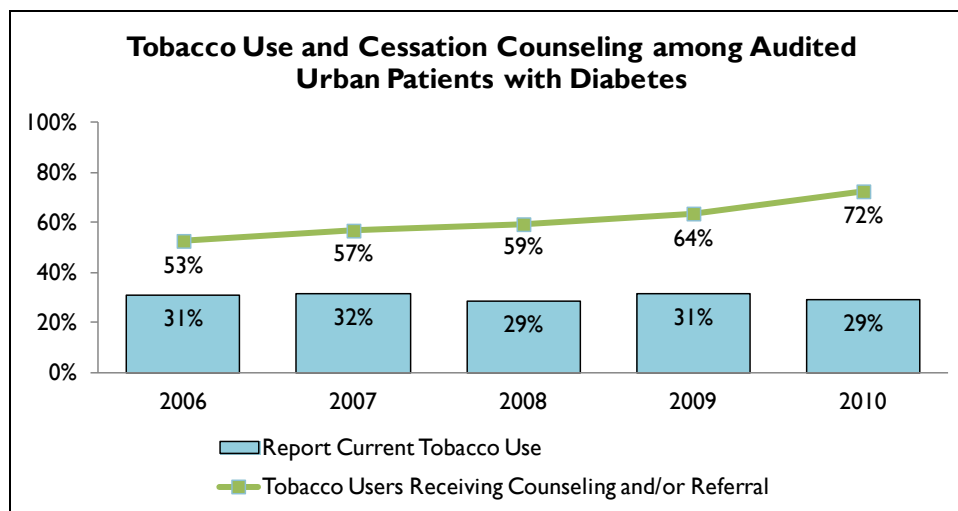


# BEST PRACTICE II: Cardiovascular Disease

**Alternative Measure 1:** Percentage of patients who smoke that were referred for or provided with smoking cessation counseling.

*One of the key clinical recommendations related to cardiovascular disease is to assess tobacco use and to provide cessation counseling when needed. Smoking is a significant risk factor for CVD, and cessation counseling has been shown to be a cost-effective and safe intervention.*

**Graph 5**



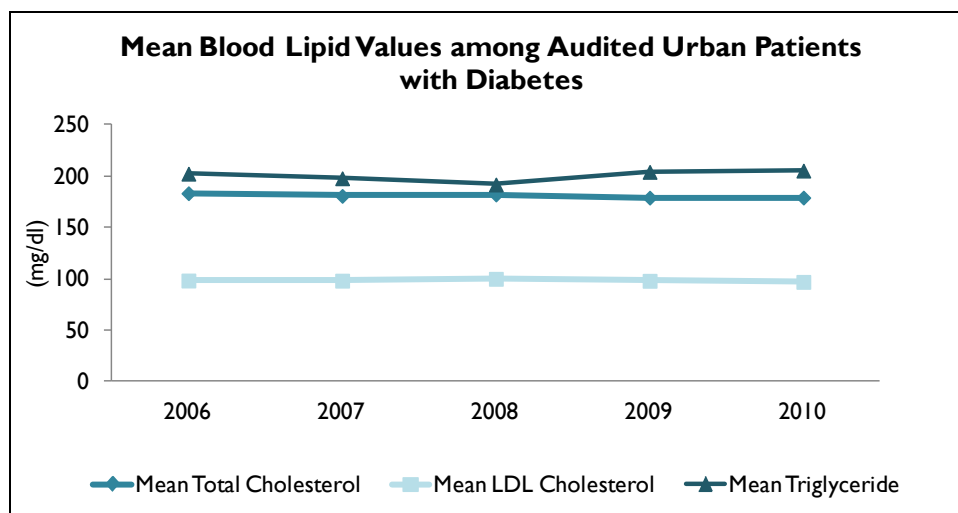
**Description of Graphic:** Approximately one-third of audited urban patients with diabetes reported current tobacco use between years 2006-2010. The majority of these patients received tobacco counseling and/or were referred to someone else for counseling, with 72% of tobacco users receiving counseling and/or referral in 2010, an increase from previous years. While there is no record in the Diabetes Audit of the number of patients that quit using tobacco, it may be inferred from the constant rates of tobacco use over the five-year period that few patients are quitting.

**Alternative Measure 2:** Tracking of mean blood lipid values among audited patients with diabetes.

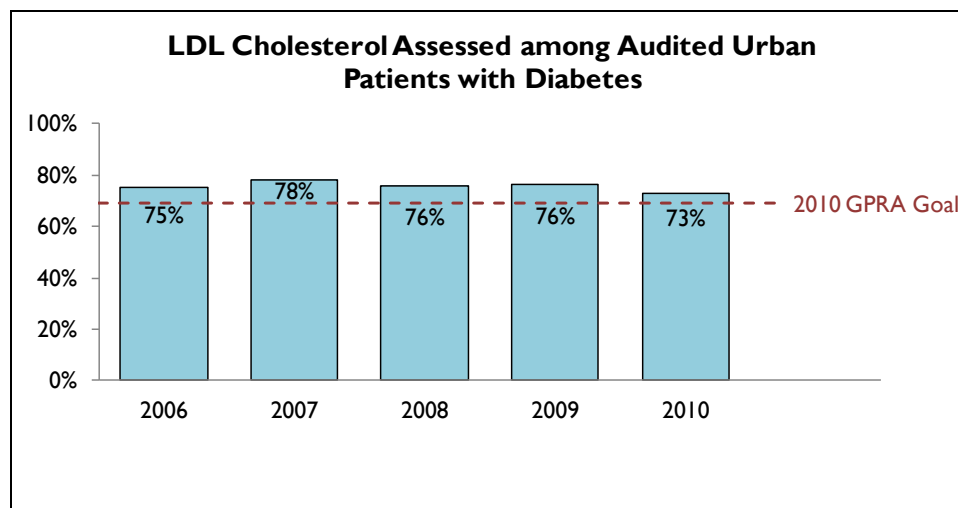
*One key clinical best practice recommendation related to cardiovascular disease is to measure, evaluate and treat lipids. Lipids, or fats carried in the blood, include total cholesterol, LDL and HDL cholesterol, and triglycerides. While cholesterol is itself necessary for life, too much can clog arteries and contribute to heart disease. Total cholesterol is a measure of all the cholesterol in the blood, while LDL, or low-density lipoprotein, cholesterol is one type (the “bad” type). Triglycerides are another type of lipid that can contribute to cardiovascular disease when levels are too high.*

# BEST PRACTICE II: Cardiovascular Disease

**Graph 6**



**Graph 7**



**2010 IHS GPRA goal:** 69% of diabetic patients receive at least one assessment of low-density lipoprotein (LDL) cholesterol annually.

**Description of Graphics:** Mean lipid values were not notably different over the past five years (Graph 6). Mean LDL cholesterol values have remained at or less than 100 mg/dl, considered the cut-off for ideal LDL cholesterol. Total cholesterol preferably should be under 200 mg/dl, and the mean values have ranged from 179 to 183 mg/dl. Ideal triglyceride values are less than 150 mg/dl; however, the mean for all audited urban patients ranged between 192 and 205. Between 73-78% of audited patients over the past five years have had LDL cholesterol levels assessed, exceeding the 2010 IHS GPRA goal of 69% of diabetic patients receiving an LDL cholesterol assessment (Graph 7). The percent of audited patients assessed for LDL cholesterol annually has remained relatively stable over the past five years.

# BEST PRACTICE III: Chronic Kidney Disease

Diabetes is the most common cause of kidney disease, a serious condition that can lead to progressive and irreversible damage to the kidneys over time. If not diagnosed and treated in an early stage, kidney disease may require dialysis or a kidney transplant and can contribute to cardiovascular disease and premature death. Chronic kidney disease, however, can be prevented or successfully managed if diagnosed early. Prevention and control methods include early detection, close monitoring and control of blood sugar levels, weight loss, treatment of related diseases, such as hypertension and cholesterol, and patient education aimed at changing lifestyle and nutritional practices.

## Key Clinical Practice Recommendations Related to Chronic Kidney Disease

- Identify patients at risk for chronic kidney disease in order to prevent or prolong the development of end-stage kidney disease.
- Provide kidney disease education to the community to increase awareness of kidney protective measures and reduce end-stage kidney disease rates.
- Control blood pressure.
- Include a Registered Dietitian and a pharmacist on the multi-disciplinary care team.
- Develop clear mechanisms to facilitate vascular access placement, transplant referral and diagnostic imaging.

## Best Practice Key Measures Related to Chronic Kidney Disease

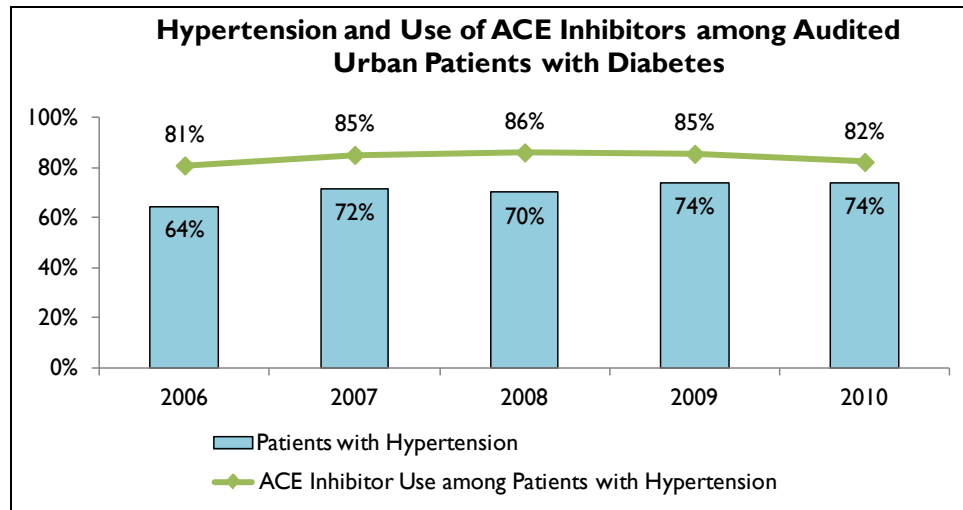
**Key Measure 1:** Percentage of diabetes patients whose most recent blood pressure was <130/80.  
See Best Practice II: Cardiovascular Disease, Key Measure 1 (pg 11) for a similar measure.

**Key Measure 2:** Percentage of diabetes patients with hypertension who have been prescribed a renin angiotensin system antagonist (e.g. ACE Inhibitor, ARB) in the past 12 months.

*Controlling blood pressure is an important means of reducing a patient's risk for kidney disease. Over time, high blood pressure damages small vessels in the kidneys, which are critical to filtering the body's waste products and regulating fluid levels. Ace Inhibitors and ARBs have been shown to protect kidneys more than other types of medication for hypertension.<sup>7</sup>*

# BEST PRACTICE III: Chronic Kidney Disease

## Graph 8



**Description of Graphic:** During 2006-2010, 64-74% of audited patients with diabetes had a diagnosis of hypertension or were on medication to control blood pressure, and over 80% of these patients each year had documentation of taking an ACE Inhibitor or ARB during the past 12 months. These numbers, however, should be interpreted with caution. Because the Audit question used to assess hypertension allows the reporter to respond affirmatively if there is a diagnosis or there is a record of medication, these estimates may overestimate the burden of hypertension in the community if patients were using the medication for prevention rather than treatment of hypertension.



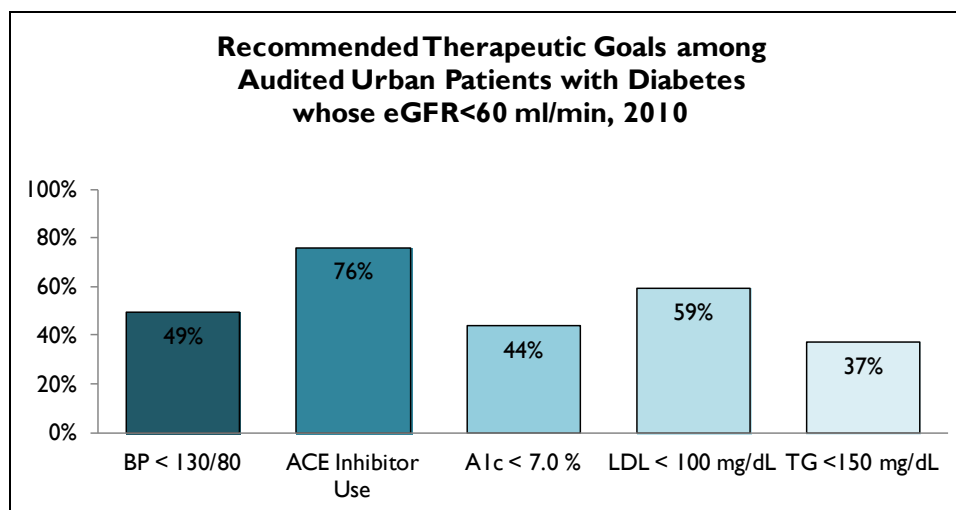
# BEST PRACTICE III: Chronic Kidney Disease

**Key Measure 3:** Percentage of diabetes patients with an estimated glomerular filtration rate (eGFR) of <60ml/min who met recommended therapeutic goals in the past 12 months:

- BP <130/80 mmHg
- Use of renin angiotensin system antagonists (e.g. ACE Inhibitor, ARB)
- A1c <7.0%
- LDL <100 mg/dL or <70 pending risk factors
- TG <150mg/dL
- Control phosphorus (bone disease)
- Hgb 11-12 g/dL (when treating anemia with an erythropoietin-stimulating agent)

*The eGFR is a measure of kidney function. A rate less than 60ml/min indicates a moderate amount of kidney damage has already occurred. Not all therapeutic goals can be measured using the Audit data, and information on phosphorus and hemoglobin is not available. Only 2010 data are presented due to changes in how the information is collected in the Audit each year.*

## Graph 9



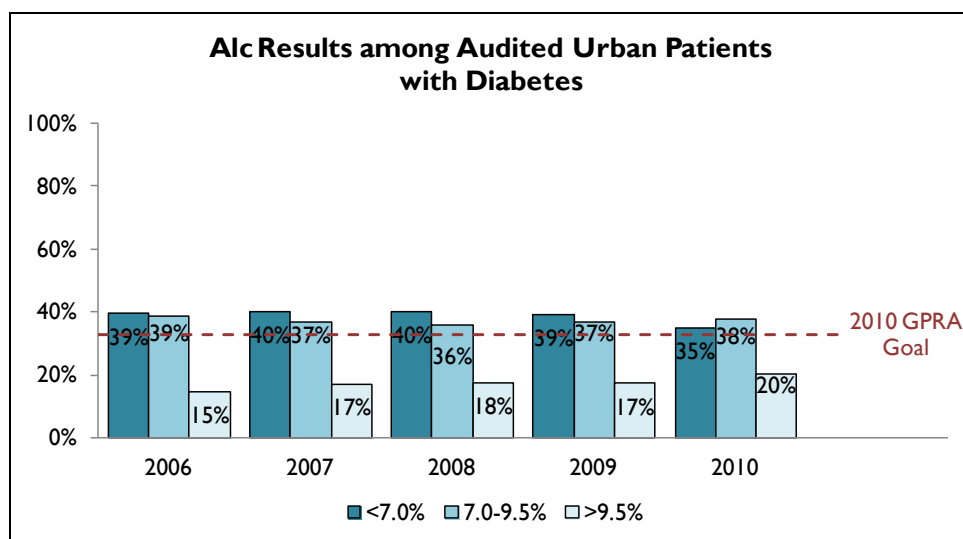
**Description of Graphic:** In 2010, the majority of urban audited patients with signs of moderate kidney disease (eGFR<60ml/min) were not meeting recommended therapeutic goals for blood pressure, blood glucose and triglyceride control. Most patients (76%) had been prescribed an ACE Inhibitor. Blood lipid levels (LDL cholesterol and triglyceride) were above recommended levels for approximately 40% and 63% of patients, respectively. Only 44% had adequate blood glucose control (A1c <7.0%) and 49% had a mean blood pressure value less than 130/80.

# BEST PRACTICE III: Chronic Kidney Disease

## **Alternative Measure I:** Percentage of diabetes patients with ideal glycemic control (A1c <7.0%).

Hemoglobin A1c is a long-term measure of a patient's blood glucose level. It is used to assess the amount of glucose (sugar) that is circulating in the blood over a period of weeks or months.<sup>7</sup> The American Diabetes Association recommends most patients with diabetes maintain their A1c level at 7.0% or less for successful diabetes management and to prevent vascular complications due to diabetes.<sup>7</sup>

Graph  
10



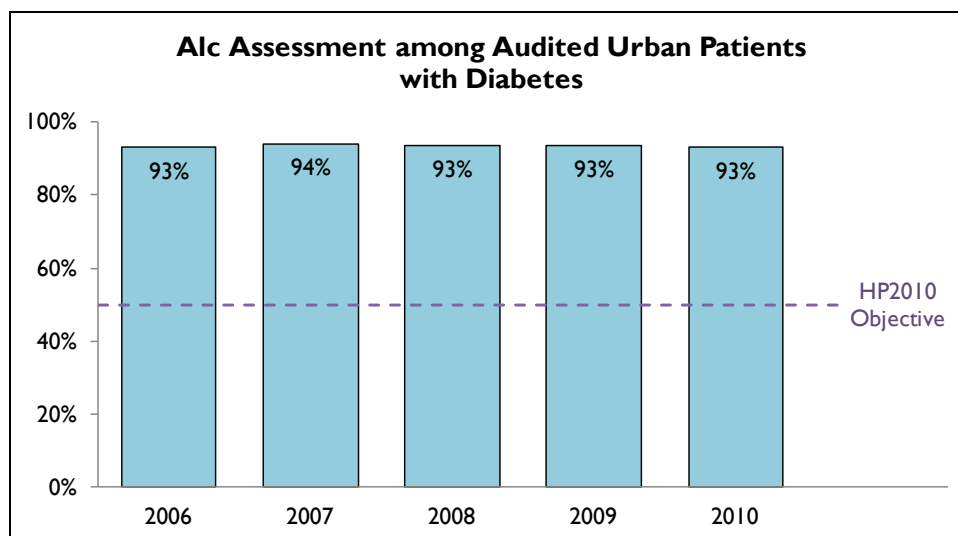
**2010 IHS GPRA goal:** 33% of diabetes patients show adequate glycemic control (hemoglobin A1c < 7.0%).

**2010 IHS GPRA goal:** 16% (or less) of diabetes patients have evidence of poor glycemic control (hemoglobin A1c value > 9.5%) (lower is better).

**Description of Graphic:** In 2010, 35% of urban audited patients with diabetes had A1c values under 7.0%. This compares favorably with the 2010 IHS GPRA goal to have 33% of patients show adequate glycemic control (A1c < 7.0%). Additionally, in 2010 20% had evidence of poor glycemic control (A1c > 9.5%), which does not meet the 2010 IHS GPRA goal to have 16% or less of patients with A1c values greater than 9.5%. Mostly, A1c rates were not notably different over the past five years, although there was a slight increase in the percentage of diabetes patients with poor glycemic control from 15% in 2006 to 20% in 2010.

# BEST PRACTICE III: Chronic Kidney Disease

Graph  
11



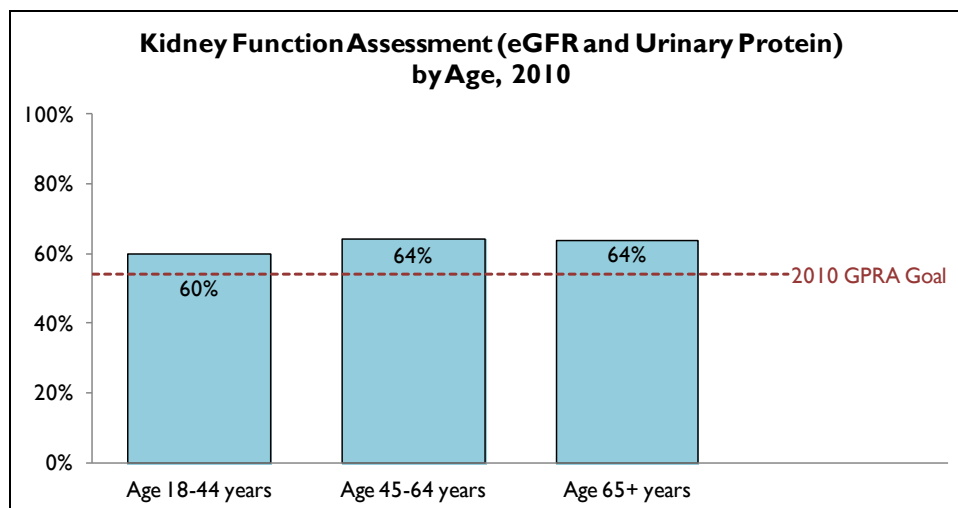
**HP2010 Objective:** 50% of diabetes patients receive an annual hemoglobin Alc test.

**Description of Graphic:** Approximately 93% of audited patients each year had a record of a recent Alc assessment. This exceeds the HP2010 objective for 50% of diabetes patients to receive this test. These rates were relatively stable over this time period.

**Alternative Measure 2:** Percentage of diabetes patients who were assessed for poor kidney function.

*Serious kidney damage can be prevented or delayed if caught early, and there are common laboratory tests available to monitor kidney function. It is recommended that the eGFR be assessed each year in patients with diabetes. Only 2010 data are presented due to changes in how the information is collected in the audit.*

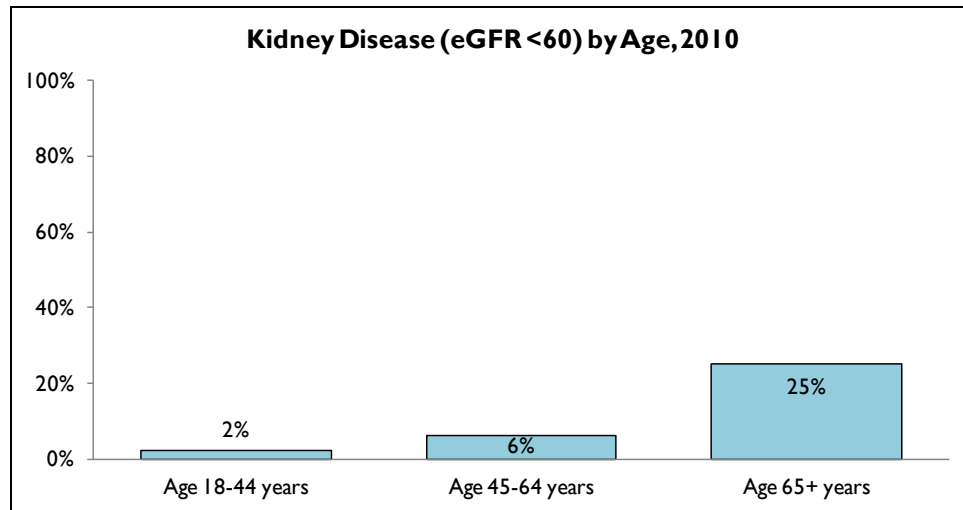
Graph  
12



**2010 IHS GPRA goal:** 54% of diabetes patients are assessed for poor kidney function (eGFR and quantitative urinary protein assessment).

# BEST PRACTICE III: Chronic Kidney Disease

## Graph 13



**Description of Graphics:** In 2010, the majority of urban audited patients with diabetes were assessed for kidney disease: 60% of individuals age 18-44 and 64% of individuals age 45 and older had both a calculated GFR and a quantitative urinary protein assessment (Graph 12). This exceeds the 2010 IHS GPRA goal for 54% of diabetes patients to be assessed for nephropathy. The percent of patients with signs of kidney disease (eGFR<60ml/min) increased with age, ranging from 2% among patients age 18-44 years to 25% among patients age 65 years and older (Graph 13).



# BEST PRACTICE IV: Depression

There is a strong relationship between diabetes and depression. People with diabetes are twice as likely to have depression than people without diabetes, and people with depression are at a higher risk of developing diabetes in the future.<sup>8</sup> Diabetes outcomes, including diabetes self-management and control of blood sugar and A1c levels, often are worse for people with both diabetes and untreated depression. Thus, diagnosis and treatment of depression are vital to improving both the physical and psychological health of those living with diabetes. Coordinated care between primary health and behavioral health is optimal when treating an individual with both diabetes and depression.

## Key Clinical Practice Recommendations Related to Depression

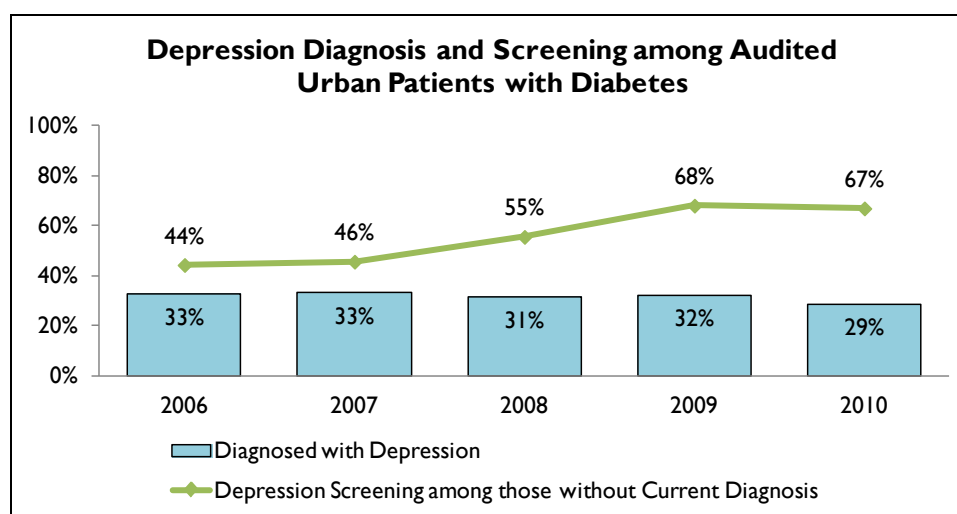
- Educate providers on how to screen for and treat depression.
- Screen for depression among patients with diabetes.
- Provide depression care and treatment, and recognize when to refer patients for expert care.
- Commit to improving depression care in people with diabetes.
- Dedicate funds to improve depression care in people with diabetes.
- Coordinate depression care between behavioral and primary care settings.
- Help patients connect to resources, which can alleviate life stresses contributing to depression.
- Organizations must commit to improving depression care in people with diabetes.
- Educate the community on the connection between diabetes and depression, and that good treatments are available.

## Best Practice Key Measures Related to Depression

**Key Measure I:** Percentage of diabetes patients who were screened for depression in the past 12 months.

*Simple screening tools are available to identify patients who may be at risk for depression. These can be incorporated into a clinic's system of care.*

**Graph  
14**



**Description of Graphic:** Over the 2006-2010 time period, approximately one third of audited patients with diabetes had a current diagnosis of depression. Depression screening among audited patients without a current diagnosis of depression increased during this time period from 44% in 2006 to 67% in 2010.

## BEST PRACTICE IV: Depression

**Key Measure 2:** Percentage of diabetes patients with depression diagnosed in the past 12 months who received appropriate treatment.

*This key measure is not analyzable using current IHS Diabetes Audit data.*

# BEST PRACTICE V: Eye Care

People living with diabetes are at increased risk of serious eye problems including glaucoma, cataracts and diabetic retinopathy. Although diabetic retinopathy is the most common cause of blindness among working-age adults in the United States, it is possible to prevent or delay its progression. Since initial eye damage can occur without symptoms, the only means of diagnosing early eye disease is through regular dilated eye exams by a professional. Treating glucose levels and other diabetes-related issues is important in preventing eye disease; high A1c levels, high blood pressure, kidney failure, obesity and anemia all are associated with an increased risk of retinopathy.

## Key Clinical Practice Recommendations Related to Eye Care

- Provide a diabetic retinopathy (DR) education component in all diabetes education programs for patients and family.
- Adhere to the accepted standards of care for DR surveillance.
- Use a qualifying examination for DR surveillance:
  - Dilated eye examination by an optometrist or ophthalmologist
  - Qualifying photographic retinal examination
    - Dilated seven standard field stereoscopic examination (Early Treatment Diabetic Retinopathy Study-ETDRS)
    - Other photographic method formally validated to ETDRS
- Recognize early when to refer patient for consideration of treatment. Monitor risk factors and treatments.
- Provide ophthalmology referral for all cases determined to be at risk for vision loss and possible candidates for treatment. Provide visual rehabilitation for patients with vision loss.

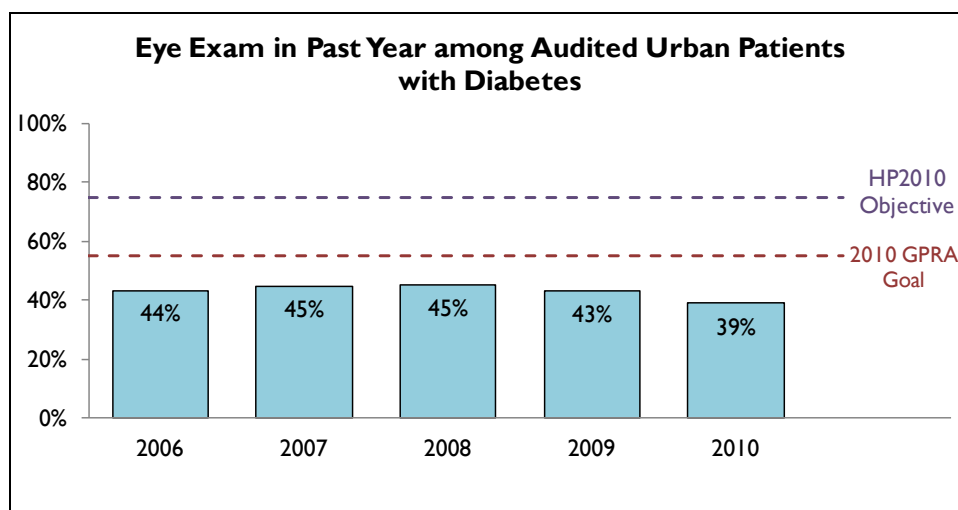
## Best Practice Key Measures Related to Eye Care

**Key Measure 1:** Percentage of diabetes patients with a documented qualifying eye exam in past 12 months.

*Through early detection and treatment, serious vision loss from diabetes can be reduced by approximately 95%. Patients with diabetes should receive an examination for retinopathy soon after diagnosis and annually from then on.*

# BEST PRACTICE V: Eye Care

## Graph 15



**2010 IHS GPRA goal:** 55% of diabetes patients receive an annual eye exam. This includes patients that have a documented visit for a qualified retinal evaluation or documentation of refusing such an exam.

**HP2010 Objective:** 75% of diabetes patients receive an annual eye exam.

**Description of Graphic:** In 2010, 39% of urban audited patients with diabetes had a record of receiving a qualifying eye exam in the previous year, a slight decrease from rates in 2006. In all five years, the percentages have fallen below the 2010 IHS GPRA goal (55% of patients receive an annual eye exam) and the HP2010 objective (75% of patients receive an annual eye exam). Access to specialty care, recognized as a serious problem for urban AI/ANs, may be a factor in obtaining an eye exam. Additionally, these figures may underestimate the number of patients that received eye exams if patients received exams outside the UIHOs that were not documented in patient records.

**Key Measure 2:** Percentage of diabetes patients receiving appropriate retinal treatment in the past 12 months, for example, retinal laser treatment and vitrectomy procedure.

*This key measure is not analyzable using current IHS Diabetes Audit data.*

# BEST PRACTICE VI: Foot Care

Foot ulcers and amputations are among the most preventable complications for people living with diabetes. Nerve damage can cause numbness, pain, burning, or reduced feeling in the feet and legs, and can reduce circulation that is critical for wound healing. Regular foot examinations combined with education about proper foot care have been shown to decrease the risk of ulcerations and amputations by as much as 80%. Controlling glucose, blood pressure and lipids also can help to reduce the risk of foot complications.

## Key Clinical Practice Recommendations Related to Foot Care

- Educate and instruct patients on the importance of proper foot care.
- Conduct a comprehensive annual foot exam in all patients with diabetes to identify risk factors predictive of ulcers and amputations.
- Provide podiatry care and recognize when to refer.
- Develop a mechanism for providing appropriate footwear.
- Assess, classify and manage foot ulcers.
- Develop clear mechanisms for referring patients to home care, field health workers, podiatry care, footwear specialists, vascular assessment and surgical consultation.
- Develop a team approach to diabetes care to include foot care.
- Train field health personnel in foot risk assessment and risk-specific foot care education.
- Include specific foot outcome measures in annual performance-based objectives.

## Best Practice Key Measures Related to Foot Care

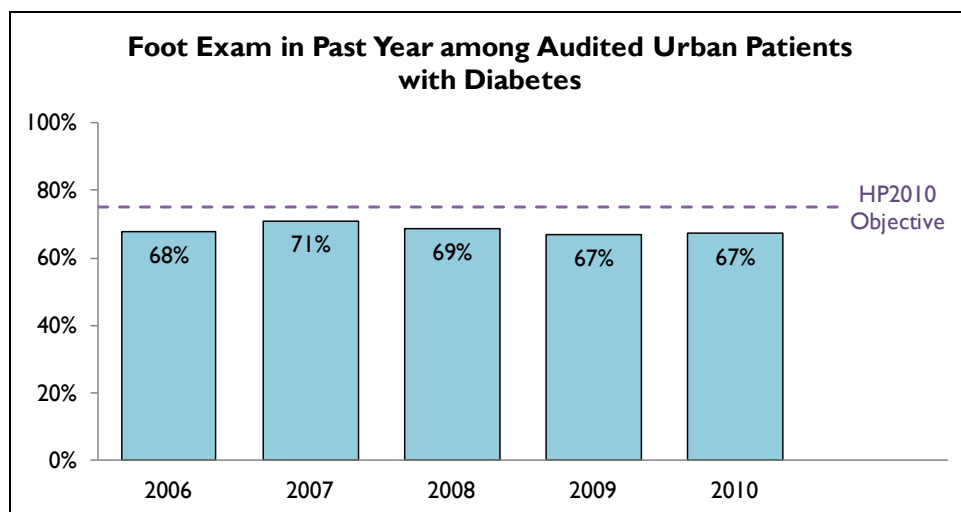
**Key Measure I:** Percentage of diabetes patients with documented foot exams in the past 12 months.

*A trained provider can assess for reduced sensation, physical abnormalities and vascular flow during a foot exam. Finding early signs of reduced circulation or other risks allows for timely intervention. Education about proper self-care, podiatry care, proper footwear and referrals all can help reduce the chances of serious complications.*



# BEST PRACTICE VI: Foot Care

Graph  
16



**HP2010 Objective:** 75% of diabetes patients receive an annual foot exam.

**Description of Graphic:** The majority of audited urban patients with diabetes in the past five years had a record of a recent foot exam during the previous year (67%-71%). This is lower than the HP2010 Objective for 75% of diabetes patients to have an annual foot exam.

**Key Measure 2:** Percentage of diabetes patients with documented risk-appropriate foot care education in the past 12 months.

*This key measure is not analyzable using current IHS Diabetes Audit data.*

# BEST PRACTICE VII: Oral Health

High glucose levels can lead to serious oral health problems including periodontal disease, tooth decay, delayed healing and fungal infections. The most significant issue is periodontal disease, which involves the gums and bones surrounding the teeth and can result in tooth loss. In addition to tooth loss, periodontal disease also contributes to increased difficulties with blood glucose control among people with diabetes. Prevention and treatment of periodontal disease are critical, and clinical interventions include assuring access to regular dental care, providing education on oral hygiene and self-care, and taking measures to control blood sugar.

## Key Clinical Practice Recommendations Related to Oral Health

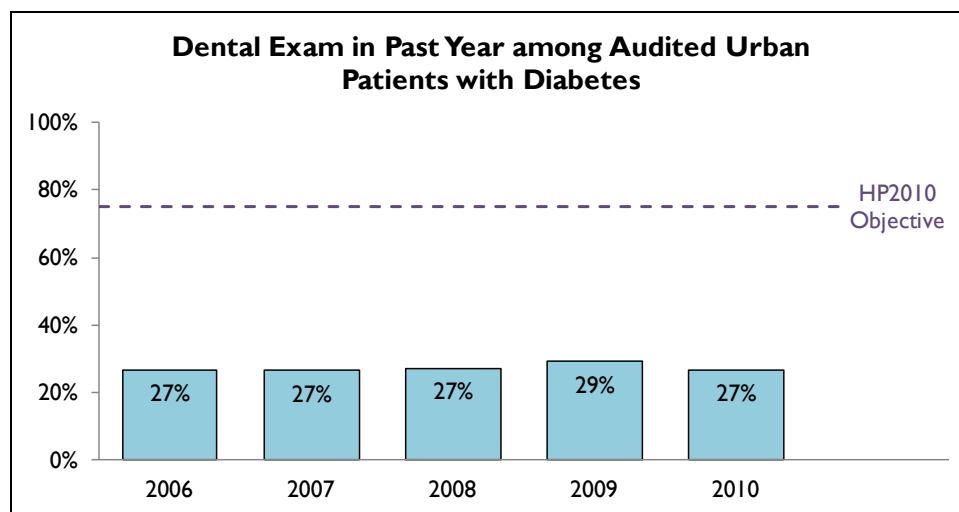
- Establish priorities for dental treatment and oral health education for people with diabetes.
- Provide patient education to prevent and reduce adverse oral health outcomes.
- Conduct annual dental examinations and cleanings, and restore caries in all people with diabetes.
- Provide recalls (follow-up visits) to maintain periodontal health.

## Best Practice Key Measures Related to Oral Health

**Key Measure 1:** Percentage of diabetes patients with a documented oral health exam in the past 12 months.

*Primary care providers play a role in ensuring patients with diabetes receive regular dental exams. A systematic method of documenting patients' reports of dental exams can be maintained and can help providers to encourage patients to follow through on needed exams.*

**Graph 17**



**HP2010 Objective:** 75% of diabetes patients receive an annual dental exam.

**Description of Graphic:** Less than one-third of audited urban patients with diabetes each year had a record of a recent dental exam. This is lower than the HP2010 Objective for 75% of diabetes patients to receive an annual dental exam. However, these figures may underestimate the number of patients that received dental exams if patients received exams outside the UIHOs that were not documented in patient records. Additionally, access to care may be a significant factor in a patient's ability to obtain dental services.

## BEST PRACTICE VII: Oral Health

**Key Measure 2:** Whether a dental provider actively participates in the diabetes team to address oral health-related issues.

*This key measure is not analyzable using current IHS Diabetes Audit data.*

# BEST PRACTICE VIII: Youth and Type 2 Diabetes

The rate of diabetes and pre-diabetes in youth is growing at an alarming rate. During the 14-year period between 1990-2004 the prevalence of type 2 diabetes increased 128% among American Indian and Alaska Native adolescents.<sup>9</sup> Since individuals who develop diabetes at younger ages are at an increased risk of developing debilitating and costly diabetes complications, such as kidney disease, diabetic retinopathy, heart attack and stroke, efforts to prevent or delay the onset of diabetes are crucial. Preventative measures that should be encouraged include promotion of breastfeeding, a decrease of the exposure to high glucose levels in utero, and the reduction of obesity in childhood and adolescence through increased physical activity and improved nutrition. Early identification and education of adolescents with impaired glucose tolerance also can be important in preventing youth from developing more advanced disease.

## Key Clinical Practice Recommendations Related to Youth and Type 2 Diabetes

- Promote breastfeeding of infants for at least two months.
- Reduce in utero exposure to elevated blood glucose levels.
- Find cases early, make diagnoses and make appropriate referrals.
- Treat youth with type 2 diabetes.
- Establish programs to increase physical activity and encourage healthy eating early in life.

## Best Practice Key Measures Related to Youth and Type 2 Diabetes

**Key Measure 1:** Percentage of diabetes patients aged six to 17 years with documented nutrition and physical activity education in the past 12 months.

*Like adults, adolescents can benefit from individual education that explains why and how to make behavioral changes aimed at improving their health. Increasing physical activity and improving nutritional intake are safe and effective interventions that can help prevent or delay more severe chronic health problems due to diabetes.*

- Of the 27 youth audited between 2006-2010, 18 had a record of receiving both nutrition and physical activity education.
- Among the 11 sites with at least one audited patient under age 18 years, six sites provided both nutrition and physical activity education to all audited youth.

**Key Measure 2:** Percentage of diabetes patients aged six to 17 years with A1c less than 7.0% in the past 12 months.

*Early identification of youth with poorly controlled diabetes can help providers make appropriate interventions before advance disease develops. Tracking A1c should start when an individual is diagnosed, regardless of age.*

- Of the 27 youth audited between 2006-2010, 22 had a record of an A1c test within the past 12 months.
- Among these 22 youth with A1c lab tests, results showed:

| A1c result    | Number of Youth |
|---------------|-----------------|
| <7.0 mg/dl    | 13              |
| 7.0–9.5 mg/dl | 6               |
| >9.5 mg/dl    | 3               |

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# APPENDIX A

The following tables display urban aggregate data between the years 2006-2010. Both raw numbers and percents are included. Because percents are rounded, the total may not add up to 100%.

| <b>Table 1. Demographics of Audited Patients with Diabetes, 2006-2010</b> |             |                |             |                |             |                |             |                |             |                |
|---|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|
| <b>Year</b>   | <b>2006</b> |                | <b>2007</b> |                | <b>2008</b> |                | <b>2009</b> |                | <b>2010</b> |                |
| No. charts audited  | 1,103       |                | 1,156       |                | 1,788       |                | 1,970       |                | 2,132       |                |
|   | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> |
| <b>Sex</b>  |             |                |             |                |             |                |             |                |             |                |
| Male  | 426         | 39%            | 451         | 41%            | 697         | 40%            | 779         | 41%            | 852         | 40%            |
| Female  | 677         | 61%            | 705         | 59%            | 1,091       | 60%            | 1,191       | 59%            | 1,280       | 60%            |
| <b>Age</b>  |             |                |             |                |             |                |             |                |             |                |
| < 18 years  | 3           | 0%             | 3           | 0%             | 8           | 0%             | 5           | 0%             | 8           | 1%             |
| 18-44 years   | 306         | 27%            | 324         | 27%            | 497         | 28%            | 563         | 28%            | 608         | 28%            |
| 45-64 years   | 619         | 57%            | 637         | 56%            | 988         | 55%            | 1,095       | 56%            | 1,193       | 56%            |
| ≥ 65 years  | 175         | 15%            | 190         | 17%            | 295         | 16%            | 307         | 16%            | 323         | 16%            |
| <b>Diabetes Duration</b>  |             |                |             |                |             |                |             |                |             |                |
| < 5 years   | 426         | 41%            | 454         | 41%            | 693         | 39%            | 703         | 35%            | 829         | 39%            |
| 5 – 9 years   | 282         | 23%            | 300         | 24%            | 453         | 24%            | 468         | 25%            | 506         | 26%            |
| ≥ 10 years  | 297         | 28%            | 312         | 27%            | 465         | 26%            | 527         | 28%            | 591         | 29%            |
| Not tested or no valid result   | 98          | 8%             | 90          | 7%             | 177         | 11%            | 272         | 13%            | 206         | 7%             |
| <b>Diabetes Type</b>  |             |                |             |                |             |                |             |                |             |                |
| Type 1  | 21          | 3%             | 29          | 3%             | 49          | 3%             | 36          | 2%             | 46          | 2%             |
| Type 2  | 1,081       | 97%            | 1,125       | 97%            | 1,736       | 97%            | 1,934       | 98%            | 2,086       | 98%            |

+Weighted estimate

# APPENDIX A

| Table 2. Vital Statistics of Audited Patients with Diabetes, 2006-2010 |       |                |       |                |       |                |       |                |       |                |
|--|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|
| Year   | 2006  |                | 2007  |                | 2008  |                | 2009  |                | 2010  |                |
| No. charts audited   | 1,103 |                | 1,156 |                | 1,788 |                | 1,970 |                | 2,132 |                |
|  | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> |
| <b>Body Mass Index (BMI)*</b>  |       |                |       |                |       |                |       |                |       |                |
| < 25   | 75    | 7%             | 75    | 7%             | 133   | 7%             | 134   | 7%             | 139   | 7%             |
| 25 - 29  | 240   | 22%            | 260   | 22%            | 377   | 21%            | 443   | 22%            | 447   | 21%            |
| 30 - 40  | 472   | 43%            | 541   | 48%            | 818   | 46%            | 918   | 47%            | 970   | 46%            |
| ≥ 40   | 277   | 25%            | 247   | 21%            | 396   | 21%            | 438   | 23%            | 524   | 24%            |
| Not tested or no valid result  | 39    | 3%             | 33    | 2%             | 64    | 5%             | 37    | 2%             | 52    | 2%             |
| <b>Hypertension<sup>^</sup></b>  |       |                |       |                |       |                |       |                |       |                |
| Yes  | 712   | 64%            | 804   | 72%            | 1,248 | 70%            | 1,433 | 74%            | 1,528 | 74%            |
| No   | 382   | 34%            | 348   | 28%            | 528   | 29%            | 537   | 26%            | 604   | 26%            |
| Not tested or no valid result  | 9     | 1%             | 4     | 0%             | 12    | 1%             | 0     | 0%             | 0     | 0%             |
| <b>Blood Pressure (mmHg)</b>   |       |                |       |                |       |                |       |                |       |                |
| <130/<80   | 427   | 40%            | 442   | 41%            | 666   | 37%            | 795   | 41%            | 968   | 46%            |
| 130/80-<140/<90  | 339   | 33%            | 328   | 30%            | 505   | 30%            | 514   | 28%            | 608   | 30%            |
| 140+/90+   | 159   | 15%            | 169   | 15%            | 309   | 16%            | 331   | 17%            | 393   | 17%            |
| Not tested or no valid result  | 178   | 12%            | 217   | 14%            | 308   | 16%            | 330   | 13%            | 163   | 7%             |

+Weighted estimate

\*Weight in kilograms/(height in meters)<sup>2</sup>; normal < 25, overweight 25-29, obese ≥30

<sup>^</sup>Documented diagnosis or taking prescription medication



# APPENDIX A

| <b>Table 3. Exams in Past Year among Audited Patients with Diabetes, 2006-2010</b> |             |                |             |                |             |                |             |                |             |                |
|--|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|
| <b>Year</b>  | <b>2006</b> |                | <b>2007</b> |                | <b>2008</b> |                | <b>2009</b> |                | <b>2010</b> |                |
| No. charts audited   | 1,103       |                | 1,156       |                | 1,788       |                | 1,970       |                | 2,132       |                |
|  | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> |
| <b>Eye Exam</b>  |             |                |             |                |             |                |             |                |             |                |
| Yes  | 485         | 44%            | 534         | 45%            | 856         | 45%            | 886         | 43%            | 901         | 39%            |
| No   | 547         | 48%            | 606         | 54%            | 877         | 51%            | 1,039       | 54%            | 1,166       | 58%            |
| Refused  | 61          | 7%             | 16          | 1%             | 40          | 3%             | 45          | 2%             | 64          | 3%             |
| Not tested or no valid result  | 10          | 1%             | 0           | 0%             | 15          | 1%             | 0           | 0%             | 1           | 0%             |
| <b>Foot Exam</b>   |             |                |             |                |             |                |             |                |             |                |
| Yes  | 722         | 68%            | 789         | 71%            | 1,210       | 69%            | 1,257       | 67%            | 1,379       | 67%            |
| No   | 337         | 27%            | 350         | 28%            | 557         | 30%            | 695         | 32%            | 735         | 32%            |
| Refused  | 39          | 5%             | 15          | 1%             | 13          | 1%             | 18          | 1%             | 17          | 1%             |
| Not tested or no valid result  | 5           | 1%             | 2           | 0%             | 8           | 1%             | 0           | 0%             | 1           | 0%             |
| <b>Dental Exam</b>   |             |                |             |                |             |                |             |                |             |                |
| Yes  | 344         | 27%            | 372         | 27%            | 535         | 27%            | 621         | 29%            | 612         | 27%            |
| No   | 681         | 65%            | 759         | 72%            | 1,160       | 67%            | 1,269       | 67%            | 1,432       | 70%            |
| Refused  | 70          | 8%             | 24          | 1%             | 70          | 4%             | 80          | 4%             | 86          | 4%             |
| Not tested or no valid result  | 8           | 1%             | 1           | 0%             | 23          | 2%             | 0           | 0%             | 2           | 0%             |

+Weighted estimate

# APPENDIX A

| <b>Table 4. Diabetes Education among Audited Patients with Diabetes, 2006-2010</b> |             |                |             |                |             |                |             |                |             |                |
|--|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|
| <b>Year</b>  | <b>2006</b> |                | <b>2007</b> |                | <b>2008</b> |                | <b>2009</b> |                | <b>2010</b> |                |
| No. charts audited   | 1,103       |                | 1,156       |                | 1,788       |                | 1,970       |                | 2,132       |                |
|  | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> |
| <b>Diet Instruction</b>  |             |                |             |                |             |                |             |                |             |                |
| By registered dietitian only   | 233         | 22%            | 215         | 18%            | 336         | 20%            | 326         | 17%            | 376         | 19%            |
| By other staff only  | 296         | 27%            | 426         | 36%            | 652         | 32%            | 789         | 36%            | 942         | 42%            |
| By both RD and other   | 193         | 12%            | 166         | 10%            | 187         | 7%             | 229         | 11%            | 273         | 13%            |
| No diet instruction  | 347         | 36%            | 338         | 34%            | 581         | 38%            | 575         | 32%            | 493         | 25%            |
| Refused  | 31          | 4%             | 10          | 1%             | 25          | 2%             | 51          | 4%             | 47          | 1%             |
| Not tested or no valid result  | 3           | 0%             | 1           | 0%             | 7           | 1%             | 0           | 0%             | 1           | 0%             |
| <b>Exercise Instruction</b>  |             |                |             |                |             |                |             |                |             |                |
| Yes  | 669         | 59%            | 745         | 59%            | 1,099       | 56%            | 1,269       | 61%            | 1,467       | 67%            |
| No   | 306         | 31%            | 394         | 40%            | 655         | 42%            | 667         | 37%            | 621         | 32%            |
| Refused  | 122         | 10%            | 16          | 1%             | 24          | 2%             | 34          | 2%             | 43          | 1%             |
| Not tested or no valid result  | 6           | 1%             | 1           | 0%             | 10          | 1%             | 0           | 0%             | 1           | 0%             |
| <b>Diabetes Education (other)</b>  |             |                |             |                |             |                |             |                |             |                |
| Yes  | 854         | 75%            | 920         | 79%            | 1,317       | 70%            | 1,483       | 71%            | 1,693       | 79%            |
| No   | 157         | 16%            | 226         | 21%            | 433         | 28%            | 449         | 25%            | 400         | 20%            |
| Refused  | 89          | 8%             | 10          | 1%             | 26          | 2%             | 38          | 3%             | 38          | 1%             |
| Not tested or no valid result  | 3           | 0%             | 0           | 0%             | 12          | 1%             | 0           | 0%             | 1           | 0%             |

+Weighted estimate

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| <b>Table 5. Immunizations among Audited Patients with Diabetes, 2006-2010</b> |             |                |             |                |             |                |             |                |             |                |
|---|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|
| <b>Year</b>   | <b>2006</b> |                | <b>2007</b> |                | <b>2008</b> |                | <b>2009</b> |                | <b>2010</b> |                |
| No. charts audited  | 1,103       |                | 1,156       |                | 1,788       |                | 1,970       |                | 2,132       |                |
|   | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> |
| <b>Influenza Vaccine in Past Year</b>   |             |                |             |                |             |                |             |                |             |                |
| Yes   | 609         | 55%            | 633         | 56%            | 1,099       | 60%            | 1,191       | 60%            | 1,122       | 55%            |
| No  | 418         | 38%            | 451         | 39%            | 557         | 32%            | 639         | 33%            | 889         | 40%            |
| Refused   | 67          | 6%             | 70          | 6%             | 118         | 7%             | 140         | 7%             | 119         | 5%             |
| Not tested or no valid result   | 9           | 1%             | 2           | 0%             | 14          | 1%             | 0           | 0%             | 2           | 0%             |
| <b>Pneumococcal Vaccine Ever</b>  |             |                |             |                |             |                |             |                |             |                |
| Yes   | 646         | 56%            | 682         | 60%            | 1,103       | 62%            | 1,277       | 65%            | 1,351       | 64%            |
| No  | 424         | 41%            | 437         | 37%            | 615         | 34%            | 618         | 31%            | 711         | 32%            |
| Refused   | 22          | 2%             | 35          | 3%             | 51          | 3%             | 75          | 4%             | 68          | 3%             |
| Not tested or no valid result   | 11          | 1%             | 2           | 0%             | 19          | 1%             | 0           | 0%             | 2           | 0%             |
| <b>Td Vaccine in Past 10 Years</b>  |             |                |             |                |             |                |             |                |             |                |
| Yes   | 621         | 59%            | 671         | 63%            | 1,090       | 63%            | 1,207       | 64%            | 1,311       | 66%            |
| No  | 453         | 38%            | 463         | 36%            | 657         | 35%            | 733         | 34%            | 780         | 33%            |
| Refused   | 12          | 2%             | 16          | 1%             | 23          | 1%             | 30          | 1%             | 39          | 1%             |
| Not tested or no valid result   | 17          | 2%             | 6           | 0%             | 18          | 1%             | 0           | 0%             | 2           | 0%             |

+Weighted estimate

| <b>Table 6. Laboratory Services among Audited Patients with Diabetes, 2006-2010</b> |             |                |             |                |             |                |             |                |             |                |
|---|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|
| <b>Year</b>   | <b>2006</b> |                | <b>2007</b> |                | <b>2008</b> |                | <b>2009</b> |                | <b>2010</b> |                |
| No. charts audited  | 1,103       |                | 1,156       |                | 1,788       |                | 1,970       |                | 2,132       |                |
|   | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> |
| <b>Labs Done in Past Year</b>   |             |                |             |                |             |                |             |                |             |                |
| A1c   | 974         | 93%            | 1,048       | 94%            | 1,647       | 93%            | 1,806       | 93%            | 1,957       | 93%            |
| Total cholesterol   | 847         | 80%            | 911         | 81%            | 1,363       | 78%            | 1,484       | 78%            | 1,577       | 76%            |
| LDL cholesterol   | 794         | 75%            | 863         | 78%            | 1,317       | 76%            | 1,475       | 76%            | 1,542       | 73%            |
| Triglycerides   | 836         | 79%            | 918         | 82%            | 1,365       | 79%            | 1,501       | 79%            | 1,570       | 76%            |

+Weighted estimate

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| <b>Table 7. Laboratory Results among Audited Patients with Diabetes, 2006-2010</b> |             |                |             |                |             |                |             |                |             |                |
|--|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|
| <b>Year</b>  | <b>2006</b> |                | <b>2007</b> |                | <b>2008</b> |                | <b>2009</b> |                | <b>2010</b> |                |
| No. charts audited   | 1,103       |                | 1,156       |                | 1,788       |                | 1,970       |                | 2,132       |                |
|  | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> |
| <b>A1c (%)</b>   |             |                |             |                |             |                |             |                |             |                |
| <7.0   | 413         | 39%            | 454         | 40%            | 706         | 40%            | 742         | 39%            | 775         | 35%            |
| 7.0 – 9.5  | 393         | 39%            | 396         | 37%            | 626         | 36%            | 700         | 37%            | 764         | 38%            |
| > 9.5  | 168         | 15%            | 198         | 17%            | 315         | 18%            | 364         | 17%            | 418         | 20%            |
| Not tested or no valid result  | 129         | 7%             | 108         | 6%             | 141         | 7%             | 164         | 7%             | 175         | 7%             |
| Mean A1c <sup>+</sup>  | 7.8         |                | 7.8         |                | 7.9         |                | 7.9         |                | 8.0         |                |
| <b>Total Cholesterol (mg/dl)</b>   |             |                |             |                |             |                |             |                |             |                |
| < 200  | 579         | 56%            | 628         | 57%            | 937         | 56%            | 1,046       | 57%            | 1,167       | 58%            |
| 200 – 239  | 193         | 17%            | 207         | 18%            | 283         | 15%            | 296         | 14%            | 272         | 12%            |
| ≥ 240  | 75          | 7%             | 76          | 6%             | 143         | 8%             | 142         | 6%             | 138         | 6%             |
| Not tested or no valid result  | 256         | 20%            | 245         | 19%            | 425         | 22%            | 486         | 22%            | 555         | 24%            |
| Mean total cholesterol <sup>+</sup>  | 183         |                | 181         |                | 182         |                | 179         |                | 179         |                |
| <b>LDL Cholesterol (mg/dl)</b>   |             |                |             |                |             |                |             |                |             |                |
| < 100  | 433         | 41%            | 469         | 44%            | 690         | 41%            | 800         | 43%            | 841         | 41%            |
| 100 – 129  | 233         | 22%            | 252         | 22%            | 375         | 22%            | 417         | 21%            | 459         | 22%            |
| 130 – 160  | 94          | 9%             | 101         | 8%             | 174         | 9%             | 187         | 9%             | 177         | 8%             |
| > 160  | 34          | 3%             | 38          | 3%             | 78          | 4%             | 71          | 3%             | 65          | 3%             |
| Not tested or no valid result  | 309         | 25%            | 296         | 22%            | 471         | 24%            | 495         | 24%            | 590         | 27%            |
| Mean LDL cholesterol <sup>+</sup>  | 99          |                | 98          |                | 100         |                | 98          |                | 97          |                |
| <b>Triglyceride (mg/dl)</b>  |             |                |             |                |             |                |             |                |             |                |
| < 150  | 326         | 32%            | 405         | 37%            | 622         | 37%            | 665         | 36%            | 717         | 35%            |
| 150 – 199  | 213         | 20%            | 190         | 18%            | 284         | 17%            | 342         | 18%            | 336         | 15%            |
| 200 – 400  | 238         | 21%            | 261         | 23%            | 365         | 21%            | 380         | 20%            | 418         | 20%            |
| > 400  | 59          | 6%             | 62          | 5%             | 94          | 5%             | 114         | 6%             | 99          | 5%             |
| Not tested or no valid result  | 267         | 21%            | 238         | 18%            | 423         | 21%            | 469         | 21%            | 562         | 24%            |
| Mean triglyceride <sup>+</sup>   | 202         |                | 198         |                | 192         |                | 204         |                | 205         |                |

+Weighted estimate

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| <b>Table 8. Use of Standard Therapies among Audited Patients with Diabetes, 2006-2010</b> |             |                |             |                |             |                |             |                |             |                |
|---|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|
| <b>Year</b>   | <b>2006</b> |                | <b>2007</b> |                | <b>2008</b> |                | <b>2009</b> |                | <b>2010</b> |                |
| No. charts audited  | 1,103       |                | 1,156       |                | 1,788       |                | 1,970       |                | 2,132       |                |
|   | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> | No.         | % <sup>+</sup> |
| <b>Diabetes Treatment</b>   |             |                |             |                |             |                |             |                |             |                |
| Diet/Exercise alone   | 140         | 9%             | 142         | 9%             | 174         | 8%             | 214         | 8%             | 214         | 8%             |
| Oral agent only   | 653         | 60%            | 647         | 55%            | 1,031       | 56%            | 1,106       | 56%            | 1,154       | 53%            |
| Insulin only  | 107         | 12%            | 122         | 13%            | 232         | 16%            | 208         | 13%            | 253         | 15%            |
| Oral agent and insulin  | 173         | 17%            | 208         | 20%            | 325         | 20%            | 399         | 21%            | 445         | 21%            |
| Refused/Unknown   | 30          | 2%             | 28          | 1%             | 26          | 1%             | 24          | 1%             | 66          | 4%             |
| Not tested or no valid result   | 0           | 0%             | 9           | 1%             | 0           | 0%             | 19          | 1%             | 0           | 0%             |
| <b>Chronic Aspirin*</b>   |             |                |             |                |             |                |             |                |             |                |
| Yes   | 716         | 70%            | 747         | 72%            | 1,210       | 74%            | 1,251       | 68%            | 1,296       | 64%            |
| No/Refused  | 337         | 28%            | 369         | 28%            | 485         | 25%            | 631         | 32%            | 745         | 36%            |
| Not tested or no valid result   | 14          | 2%             | 0           | 0%             | 14          | 1%             | 0           | 0%             | 0           | 0%             |
| <b>Lipid Lowering Agent</b>   |             |                |             |                |             |                |             |                |             |                |
| Yes   | 577         | 54%            | 613         | 57%            | 953         | 55%            | 1,048       | 57%            | 1,077       | 54%            |
| No/Refused  | 520         | 45%            | 542         | 43%            | 818         | 44%            | 922         | 43%            | 1,055       | 46%            |
| Not tested or no valid result   | 6           | 1%             | 1           | 0%             | 17          | 1%             | 0           | 0%             | 0           | 0%             |
| <b>ACE Inhibitor</b>  |             |                |             |                |             |                |             |                |             |                |
| Yes   | 685         | 66%            | 773         | 72%            | 1,262       | 71%            | 1,388       | 72%            | 1,471       | 69%            |
| No/Refused  | 404         | 32%            | 382         | 28%            | 513         | 28%            | 582         | 28%            | 661         | 31%            |
| Not tested or no valid result   | 14          | 2%             | 1           | 0%             | 13          | 1%             | 0           | 0%             | 0           | 0%             |

+Weighted estimate

\*Among patients 30 years and older

# APPENDIX A

| Table 9. Tobacco Use among Audited Patients with Diabetes, 2006-2010 |       |                |       |                |       |                |       |                |       |                |
|--|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|
| Year   | 2006  |                | 2007  |                | 2008  |                | 2009  |                | 2010  |                |
| No. charts audited   | 1,103 |                | 1,156 |                | 1,788 |                | 1,970 |                | 2,132 |                |
|  | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> |
| <b>Current Tobacco Use</b>   |       |                |       |                |       |                |       |                |       |                |
| User   | 327   | 31%            | 349   | 32%            | 534   | 29%            | 602   | 31%            | 616   | 29%            |
| Non-user   | 735   | 66%            | 746   | 65%            | 1,191 | 68%            | 1,233 | 63%            | 1,432 | 66%            |
| Not documented   | 41    | 3%             | 61    | 4%             | 63    | 3%             | 135   | 6%             | 84    | 5%             |
| <b>Cessation Referral*</b>   |       |                |       |                |       |                |       |                |       |                |
| Yes  | 191   | 53%            | 219   | 57%            | 326   | 59%            | 415   | 64%            | 442   | 72%            |
| No   | 118   | 42%            | 112   | 38%            | 163   | 29%            | 127   | 21%            | 142   | 23%            |
| Refused  | 11    | 4%             | 15    | 5%             | 36    | 9%             | 60    | 15%            | 32    | 4%             |
| Not tested or no valid result  | 7     | 2%             | 3     | 1%             | 9     | 2%             | 0     | 0%             | 0     | 0%             |

+Weighted estimate

\*Among current tobacco users

| Table 10. Depression among Audited Patients with Diabetes, 2006-2010 |       |                |       |                |       |                |       |                |       |                |
|--|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|
| Year   | 2006  |                | 2007  |                | 2008  |                | 2009  |                | 2010  |                |
| No. charts audited   | 1,103 |                | 1,156 |                | 1,788 |                | 1,970 |                | 2,132 |                |
|  | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> | No.   | % <sup>+</sup> |
| <b>Active Diagnosis of Depression</b>                                |       |                |       |                |       |                |       |                |       |                |
| Yes  | 325   | 33%            | 363   | 33%            | 616   | 31%            | 715   | 32%            | 648   | 29%            |
| No   | 767   | 66%            | 792   | 67%            | 1,160 | 68%            | 1,255 | 68%            | 1,483 | 71%            |
| Not tested or no valid result  | 11    | 1%             | 1     | 0%             | 12    | 1%             | 0     | 0%             | 1     | 0%             |
| <b>Depression Screening*</b>   |       |                |       |                |       |                |       |                |       |                |
| Yes  | 342   | 44%            | 384   | 46%            | 637   | 55%            | 819   | 68%            | 1,047 | 67%            |
| No   | 416   | 55%            | 399   | 54%            | 472   | 38%            | 424   | 31%            | 427   | 33%            |
| Refused  | 6     | 1%             | 5     | 0%             | 12    | 1%             | 12    | 1%             | 9     | 0%             |
| Not tested or no valid result  | 3     | 0%             | 4     | 1%             | 39    | 5%             | 0     | 0%             | 0     | 0%             |

+Weighted estimate

\*Among those without diagnosis of depression

# APPENDIX B

## National Standards: GPRA and Healthy People 2010

The table below provides information on how audited patients at all UIHOs combined compare with the 2010 IHS GPRA goals and Healthy People 2010 targets.

| Year                              | 2006           | 2007           | 2008           | 2009           | 2010           | 2010 IHS GPRA Goal | HP2010 Objective |
|-----------------------------------|----------------|----------------|----------------|----------------|----------------|--------------------|------------------|
| No. charts audited                | 1,103          | 1,156          | 1,788          | 1,970          | 2,132          |                    |                  |
|                                   | % <sup>+</sup> | % <sup>+</sup> | % <sup>+</sup> | % <sup>+</sup> | % <sup>+</sup> |                    |                  |
| A1c < 7.0%                        | 39%            | 40%            | 40%            | 39%            | 35%            | 33%                |                  |
| A1c > 9.5% (lower is better)      | 15%            | 17%            | 18%            | 17%            | 20%            | 16%                |                  |
| Blood pressure (mmHg) < 130/80    | 40%            | 41%            | 37%            | 41%            | 46%            | 40%                |                  |
| LDL cholesterol assessed          | 75%            | 78%            | 76%            | 76%            | 73%            | 69%                |                  |
| Retinopathy assessment (eye exam) | 44%            | 45%            | 45%            | 43%            | 39%            | 55%                | 75%              |
| Foot exam                         | 68%            | 71%            | 69%            | 67%            | 67%            |                    | 75%              |
| Dental exam                       | 27%            | 27%            | 27%            | 29%            | 27%            |                    | 75%              |
| Chronic aspirin*                  | 70%            | 72%            | 74%            | 68%            | 64%            |                    | 30%              |
| A1c done                          | 93%            | 94%            | 93%            | 93%            | 93%            |                    | 50%              |

+Weighted estimate

\*Among patients age 30 and older

### Government Performance Results Act (GPRA)

Passed in 1993, the Government Performance Results Act (GPRA) was designed to address a broad range of concerns regarding government accountability and performance in the management of government-funded public needs projects. The general purpose of GPRA is to improve the confidence of Americans in the Federal government by holding Federal agencies accountable for achieving program results. IHS reports on a range of health topics for GPRA including diabetes. In 2010, there were six GPRA goals related to diabetes and two additional diabetes measures that are reported to Congress. These measures are intended to gauge progress toward improving diabetes care and related services. For more information about IHS GPRA targets and measurements, visit:

[http://www.ihs.gov/NonMedicalPrograms/quality/index.cfm?module=gpra\\_list](http://www.ihs.gov/NonMedicalPrograms/quality/index.cfm?module=gpra_list)

| GPRA Indicators for Diabetes                     | Definition  |
|--|---|
| Poor Glycemic Control                            | Last recorded hemoglobin A1c > 9.5 %  |
| Ideal Glycemic Control                           | Last recorded hemoglobin A1c < 7.0 %  |
| Ideal Blood Pressure Control                     | Mean of last three recorded blood pressures <130/ <80 mmHg  |
| Assessed for Dyslipidemia in Preceding 12 Months | Proportion of audited sample with low density lipoprotein (LDL) cholesterol tested in preceding 12 months                               |
| Assessed for Nephropathy in Preceding 12 Months  | Proportion of the audited sample with both an estimated glomerular filtration rate (eGFR) and a quantitative urinary protein assessment |
| Assessed for Retinopathy in Preceding 12 Months  | Proportion of the audited sample in which a retinal exam was documented in the preceding 12 months                                      |



# APPENDIX B

## ***Healthy People 2010***

Healthy People 2010 (HP2010) is a national health promotion and disease prevention initiative established by the Department of Health and Human Services. HP2010 was designed to measure health-related outcomes and progress over time and was developed through a broad consultation process, built on scientific knowledge and other government health initiatives pursued over the past two decades. HP2010 Objectives are action statements toward which the nation, communities, institutions and local groups can work.

HP2010 was designed to achieve two overarching goals: to help individuals of all ages increase life expectancy and improve their quality of life, and to eliminate health disparities. In addition to these overarching goals, HP2010 identifies 28 major focus areas including one that addresses diabetes. The diabetes focus area and its goals to reduce disease and improve the quality of life are further detailed within 17 objectives, four of which can be tracked using data from the Diabetes Audit.

Healthy People 2020 goals and objectives have been released and are now available. For more information, visit [www.healthypeople.gov](http://www.healthypeople.gov).

| HP2010 Focus Area Diabetes Objectives  | Target |
|--|--------|
| 5-12. Increase the proportion of adults with diabetes who have a glycosylated hemoglobin measurement at least once a year. | 50%    |
| 5-13. Increase the proportion of adults with diabetes who have an annual dilated eye examination.                          | 75%    |
| 5-14. Increase the proportion of adults with diabetes who have at least an annual foot examination.                        | 75%    |
| 5-15. Increase the proportion of persons with diabetes who have at least an annual dental examination.                     | 75%    |
| 5-16. Increase the proportion of adults with diabetes who take aspirin at least 15 times per month.                        | 30%    |

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