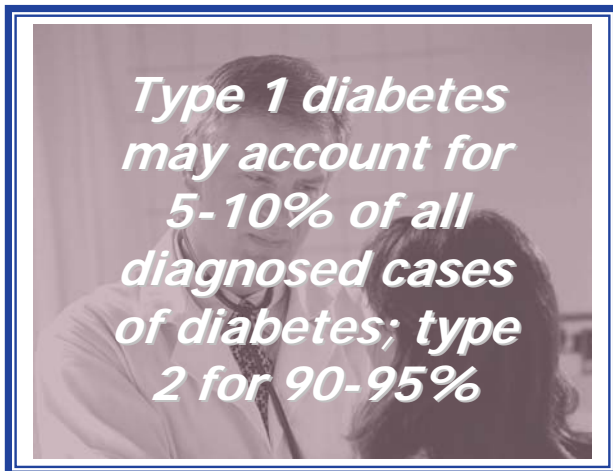


## WHAT IS DIABETES?

Diabetes mellitus is a chronic disease resulting from defects in insulin production or insulin action and is characterized by high levels of blood glucose. Insulin, a hormone produced by the pancreas, controls glucose, protein, and fat metabolism. Type 1 diabetes usually develops in children and young adults, and results



when the body's immune system destroys pancreatic beta cells, the only cells in the body that produce insulin. Individuals with type 1 diabetes must receive replacement insulin to survive. Risk factors may include autoimmune, genetic, and environmental factors. Type 1 diabetes accounts for approximately 5% to 10% of all diagnosed cases of diabetes.<sup>1</sup>

Type 2 diabetes usually develops in adults and is associated with obesity, physical inactivity, family history of diabetes, race/ethnicity, older age, and history of gestational diabetes. It usually begins with insulin resistance, a disorder in which the body cells do not properly respond to insulin. As the need for insulin rises, the pancreas gradually loses its ability to produce insulin. African Americans, Hispanic/Latino Americans, American Indians, some Asian Americans, and Native Hawaiians are at particularly high risk for type 2 diabetes. Type 2 diabetes may account for between 90% and 95% of all diagnosed cases of diabetes.<sup>1</sup>

People with type 2 diabetes often can control their blood glucose by following a diet and exercise program, losing excess weight, and taking oral medication. Approximately 57% of adults with diabetes take oral medications only, 12% take both insulin and oral

medications, 16% take insulin only, and 15% do not take either insulin or oral medications.<sup>1</sup>

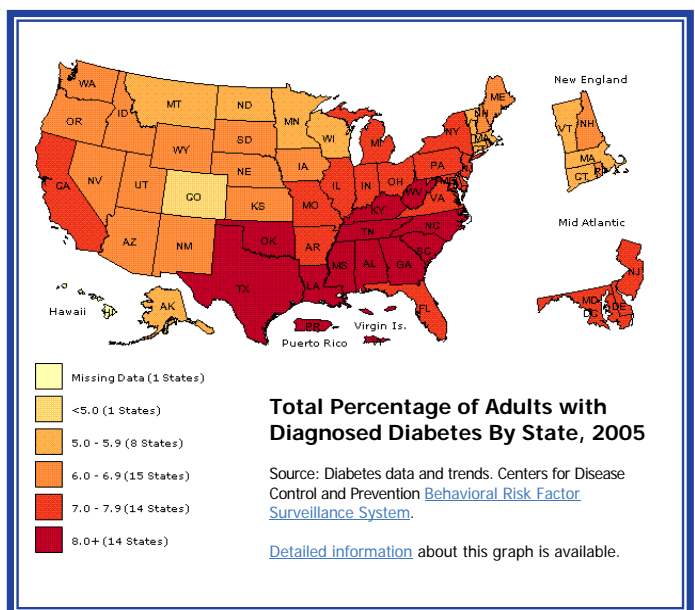
## PREVALENCE OF DIABETES IN THE UNITED STATES, 2005

Diabetes is a major public health problem in the United States and is becoming more prevalent in all age groups. In 2005, approximately 15.8 million Americans were diagnosed with diabetes.<sup>2</sup> An additional 6.2 million individuals were unaware that they had diabetes.<sup>1</sup> The increasing prevalence is attributed both to higher detection rates and to poorer health habits (particularly increased rates of obesity and physical inactivity). Approximately 20% of individuals age 65 and over had diabetes.<sup>3</sup>

According to the CDC National Diabetes Surveillance System, the prevalence of diagnosed diabetes in the United States in 2005 per 100 of population was:<sup>4</sup>

Prevalence	Age
1.4%	< 45
10.2%	45-64
18.5%	65-74
15.6%	≥ 75

Almost 40% of individuals with diabetes were 65 and over.<sup>2</sup>





# CLINICAL SNAPSHOT - Diabetes

Minority populations are disproportionately affected by diabetes. In 2005, the prevalence of diagnosed diabetes was:<sup>5</sup>

Prevalence	Race/Culture
8.0%	Black males
8.3%	Black females
7.1%	Hispanic males
7.5%	Hispanic females
5.4%	White males
4.7%	White females

For all race and ethnic groups, prevalence of diagnosed diabetes tends to be highest among persons aged 65 and older and lowest among persons less than 45 years of age.

In 2005, the prevalence of adults, age 20 and older, who had diabetes, both diagnosed and undiagnosed, varied significantly by race/culture when compared with the prevalence of diagnosed diabetes, particularly for minority groups:<sup>1</sup>

- 10.5% of all men
- 8.8% of all women
- 8.7% of all non-Hispanic whites
- 13.3% of all non-Hispanic blacks
  - Non-Hispanic blacks are 1.8 times as likely to have diabetes than non-Hispanic whites of similar age
- 9.5% of all Hispanic/Latino Americans
  - Hispanic/Latino Americans are 1.7 times more likely to have diabetes than non-Hispanic whites of similar age

- Residents of Puerto Rico are 1.8 times more likely to have diagnosed diabetes than U.S. non-Hispanic whites
- 15.1% of American Indians and Alaska Natives (receiving care from the Indian Health Service)
  - Diabetes is least common among Alaska Natives (8.1%)
  - Diabetes is most common among American Indians in the southern United States (26.7%) and southern Arizona (27.6%)
  - On average, American Indians and Alaska Natives are 2.2 times as likely to have diabetes as non-Hispanic whites of similar age
- Native Hawaiians and Japanese and Filipino residents of Hawaii were approximately 2 times as likely to have diagnosed diabetes as white residents of Hawaii of similar age

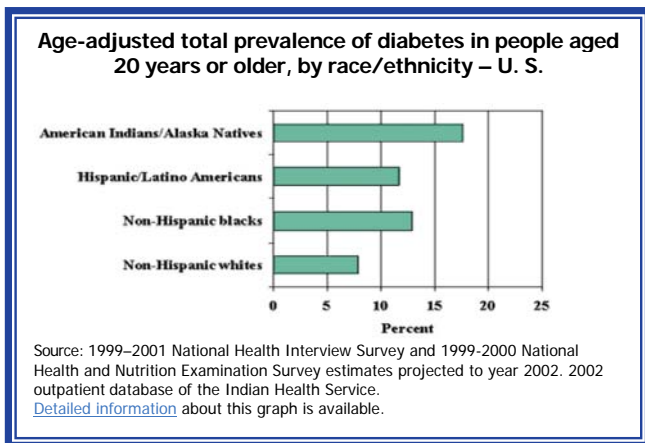
## COSTS OF DIABETES

In addition to increased morbidity and mortality associated with diabetes, the disease also imposes an economic burden on society, the Medicare program and patients. For example, the American Diabetes Association estimates the total direct and indirect expenditures attributable to diabetes in 2002 at \$132 billion. This includes approximately \$92 billion in direct medical expenditures for diabetes care, chronic complications attributable to the disease and excess prevalence of general medical conditions and about \$40 billion in indirect expenditures resulting from lost work-days, restricted activity days, mortality and permanent disability attributable to the disease. The Agency for Healthcare Research and Quality, based on the Medical Expenditure Panel Survey, estimates medical expenditures for the 65+ Medicare population at about \$3.5 billion for 2004. This includes outpatient and office-based medical provider visits, hospitalizations, emergency room visits, prescribed medicines and home health.<sup>6,7</sup>

## COMPLICATIONS OF DIABETES

Diabetes affects many parts of the body and can lead to serious complications including heart disease, blindness, kidney damage, and lower-limb amputations. Over 224,000 Americans died in 2002 from diabetes and its complications.<sup>1</sup>

Macrovascular disease is the leading cause of death for individuals with diabetes and increases the risk for myocardial infarction, stroke, and peripheral vascular disease. Hypertension is more common and atherosclerosis develops earlier in patients with diabetes. Persons with diabetes also suffer from



- Mexican Americans are over twice as likely to have diabetes as non-Hispanic whites of similar age



# CLINICAL SNAPSHOT - Diabetes

microvascular complications of the disease, including damage to retinas, kidneys, and nerves (particularly in the feet).

Complications from diabetes in the United States include:<sup>1,3</sup>

## Heart disease

- Heart disease is the leading cause of death for individuals with diabetes
- Adults with diabetes have heart disease death rates that are 2 to 4 times higher than adults without diabetes
- Approximately 65% of diabetic deaths are due to heart disease and stroke

## Hypertension/Stroke

- Approximately 73% of adults with diabetes either use prescription medications for hypertension or have blood pressure greater than or equal to 130/80 mm Hg
- The risk for stroke is 2 to 4 times higher than for people without diabetes

## Blindness

- Diabetes is the leading cause of new cases of blindness among adults age 20 to 74
- Diabetic retinopathy causes 12,000 to 24,000 new cases of blindness each year

## Kidney disease

- Diabetes is the leading cause of end-stage renal disease and accounts for 44% of new cases in 2002
- In 2002, 44,400 people with diabetes began treatment for end-stage renal disease
- In 2002, 153,730 people with end-stage renal disease due to diabetes were on chronic dialysis or had received a kidney transplant

## Lower Extremity Amputations

- Approximately 60% to 70% of people with diabetes have mild to severe forms of nervous system damage including impaired sensation or pain in the feet or hands, slowed gastric digestion of food, carpal tunnel syndrome, or other nerve problems
- Severe forms of diabetic nerve disease contribute to lower-extremity amputations
- More than 60% of nontraumatic lower-limb amputations occur among people with diabetes

- In 2002, approximately 82,000 nontraumatic lower-limb amputations were performed each year among people with diabetes

## PREVENTING DIABETES COMPLICATIONS

People with diabetes can work with their healthcare providers to reduce the occurrence of diabetes complications by controlling blood glucose, blood pressure, and blood lipid levels. Diabetes complications can be prevented or delayed by management of blood glucose through diet, exercise, and medication; by management of other health conditions including elevated cholesterol levels and hypertension; by smoking cessation; and by timely and appropriate foot exams and retinal eye exams. Diabetes self-management education is an important element of diabetes care.

A landmark study, the Diabetes Control and Complications Trial, established the benefits of intensive therapy to maintain glucose control for individuals with type 1 diabetes.<sup>8</sup> A second landmark study, the United Kingdom Prospective Study of Diabetes published in 1998, established that similar benefits of intensive therapy occur for patients with type 2 diabetes.<sup>9</sup> Based on these studies, it is recommended that patients are monitored using hemoglobin A1c (HbA1c) levels that measure glucose control over the previous two to three months.

### Glycemic Control<sup>1</sup>

- For every 1% reduction in HbA1c (e.g., from 8.0% to 7.0%), the risk of developing microvascular complications (eye, kidney, and nerve disease) is reduced by 40%

### Blood Pressure Control<sup>1</sup>

- Reduces cardiovascular disease (heart disease and stroke) by approximately 33% to 50%
- Reduces microvascular disease (eye, kidney, and nerve disease) by approximately 33%
- Reduces risk for any complication related to diabetes by 12% for every 10 millimeters of mercury (mm Hg) reduction in systolic blood pressure
- Reduces the decline in kidney function by 30% to 70% for individuals with early diabetic kidney disease

### Cholesterol Control (i.e., HDL, LDL, and triglycerides)<sup>1</sup>

- Reduces cardiovascular complications by 20% to 50%

### Comprehensive Foot Exam Programs<sup>1</sup>

- Reduces amputation rates by 45% to 85%

## TREATING DIABETES

Several organizations have published evidence-based guidelines for screening, monitoring, and treating persons with diabetes. The American Diabetes Association's<sup>10</sup> guidelines are updated annually and are available on its Web site, [http://care.diabetesjournals.org/content/vol30/suppl\\_1/](http://care.diabetesjournals.org/content/vol30/suppl_1/).

American Diabetes Association (ADA) 2007 Clinical Practice Recommendations for Type 2 Diabetes	
Clinical Measure	Recommendation
<i>HbA1c measurement frequency</i>	<ul style="list-style-type: none"> <li>At least twice a year if meeting treatment goals and with stable glycemic control – quarterly if therapy was changed or are not meeting glycemic goals.</li> </ul>
<i>HbA1c goal</i>	<ul style="list-style-type: none"> <li>&lt;7%</li> </ul>
<i>Dilated eye exam frequency</i>	<ul style="list-style-type: none"> <li>Dilated eye exam by ophthalmologist or optometrist shortly after diagnosis. Exam should be repeated annually. Less frequent exams may be considered with the advice of an eye care professional.</li> </ul>
<i>Blood pressure measurement frequency</i>	<ul style="list-style-type: none"> <li>Measure at every routine diabetes visit.</li> </ul>
<i>Blood pressure goal</i>	<ul style="list-style-type: none"> <li>Treat to a systolic blood pressure &lt;130 mmHg and a diastolic blood pressure &lt;80 mmHg.</li> </ul>
<i>Lipid measurement frequency</i>	<ul style="list-style-type: none"> <li>Test for lipid disorders at least annually and more often to achieve goals. If low risk, test every two years.</li> </ul>
<i>Lipid goals</i>	<ul style="list-style-type: none"> <li>Treatment goal for those with overt CVD: use statin therapy to achieve an LDL reduction of 30-40%.</li> <li>An LDL cholesterol of &lt;70 mg/dl, using a high dose statin is an option.</li> <li>For individuals &gt;40 with a cholesterol <math>\geq</math>135 mg/dl without overt CV is an LDL reduction of 30-40% regardless of baseline LDL.</li> <li>The primary goal is an LDL of &lt;100 mg/dl.</li> <li>Lower triglycerides to &lt;150 mg/dl and raise HDL cholesterol to &gt;40 mg/dl. In women, consider an HDL goal 10mg/dl higher.</li> </ul>
<i>Urine protein testing</i>	<ul style="list-style-type: none"> <li>Perform annual test for microalbuminuria starting at diagnosis.</li> </ul>
<i>Immunizations</i>	<ul style="list-style-type: none"> <li>Annually provide an influenza vaccine to all diabetics over 6 months of age.</li> <li>Provide at least one lifetime pneumococcal vaccine for adult diabetics. A one-time revaccination is recommended for individuals &gt;64 years of age if previous immunization occurred when &lt;65 years of age and the vaccine was administered &gt;5 years ago.</li> </ul>
<i>Nephropathy screening</i>	<ul style="list-style-type: none"> <li>Serum (blood) creatinine level should be measured at least annually for the estimation of glomerular filtration rate (GFR). The serum creatinine alone should not be used as a measure of kidney function, but rather used to estimate GFR and stage the level of chronic kidney disease (CKD).</li> </ul>
<i>Foot exam</i>	<ul style="list-style-type: none"> <li>Annual comprehensive foot exam using monofilament, tuning fork, palpation and visual examination.</li> <li>Visual inspection at each routine visit.</li> </ul>



# CLINICAL SNAPSHOT - Diabetes

For QIOs Supporting Physician Offices in the 8SoW

The American Association of Clinical Endocrinologists and American College of Endocrinology's (AAACE/ACE) has also developed diabetes guidelines that are available at:-  
<http://www.aace.com/pub/pdf/guidelines/DMGuidelines2007.pdf>

## CURRENT PERFORMANCE LEVEL

The current quality of care for Medicare beneficiaries within physician offices provides significant room for improvement. For example, Medicare data from April 2006 through March 2007 indicate that 85% of beneficiaries aged 18 to 75, identified as having diabetes received HbA1c monitoring; 79% received biennial lipid profiles; and 55% received biennial eye exams.

The Centers for Disease Control and Prevention's (CDC) Behavioral Risk Factor Surveillance System 2005 survey reported the following results for respondents aged 18 years and older who identified themselves as having diabetes:<sup>11</sup>

- Doctor visit for diabetes care, 88.9%
- HbA1c tested at least twice a year, 68.7%
- Annual dilated eye exam, 69.4%
- Annual foot exam, 68.7%
- Ever attended a diabetes self-management class, 53.1%
- Daily self-monitoring of blood glucose, 63%
- Daily self-exam of feet, 67.9%
- Received an influenza vaccination within the last year, 49.8%
- Received a pneumococcal vaccination at least once in their lifetime, 49%

These results indicate significant opportunities for improvement in care for individuals with diabetes.

## EFFORTS TO IMPROVE QUALITY OF CARE

CMS has created MedQIC, a national Web site, to support transformational change within physician offices, hospitals, nursing homes, and home health agencies. For physician offices, MedQIC is designed to help both QIOs and physician offices transform care, improve management of chronic diseases (including diabetes), and improve preventive healthcare services. The Diabetes section (<http://www.medqic.org/dcs/ContentServer?cid=1089815967014&pagename=Medqic%2FContent%2FParentShellTemplate&parentName=Topic&c=MQParents>) contains tools, literature, Web links, news stories, and other

materials to help physician offices transform care to improve health outcomes.

**FOR ADDITIONAL INFORMATION, PLEASE CONTACT:**  
Any member of the Physician Office QIOSC Team:

**Robin Weil**, M.S.H.A., RN, CPHQ, Senior Director  
(804) 289-5320 x 351  
[Email Senior Director](#)

**Bonnie Jorde**, MS, RN, CPHQ, Project Director  
(804) 289-5320 x 286  
[Email Project Director](#)

**John Michos**, M.D., PO QIOSC Medical Director  
(804) 289-5320 x 211  
[Email Medical Director](#)

**Sarat Gurram**, MS, Programmer/Analyst  
(804) 289-5320 x 284  
[Email Programmer/Analyst](#)

**Crystal Owens Frankart**, MA, Community of Practice Manager  
(804) 289-5320 x 316  
[Email Community of Practice Manager](#)

**Janet Fox**, RN, CCS, Project Manager  
(804) 289-5320 x 307  
[Email Project Manager](#)

**Kim Hindley**, RN, HCS-D, Project Coordinator  
(804) 289-5320, x 339  
[Email Project Coordinator](#)

**Sandra Atkins**, Project Assistant  
(804) 289-5320 x 319  
[Email Project Assistant](#)



# CLINICAL SNAPSHOT - Diabetes

## MEDICARE PREVENTION SERVICES FOR DIABETES

Full details on the diabetes prevention benefits for Medicare beneficiaries can be found at:

<http://www.cms.hhs.gov/DiabetesScreening/>

To be eligible for the diabetes screening tests beneficiaries must have any of the following risk factors:

- Individuals are considered at risk for diabetes if they have any of the following risk factors:
  - Hypertension
  - Dyslipidemia
  - Obesity (a body mass index greater than or equal to 30kg/m<sup>2</sup>)
  - Previous identification of an elevated impaired fasting glucose or glucose intolerance

OR at least two of the following characteristics:

- Individuals who have a risk factor consisting of at least 2 of the following characteristics:
  - Overweight (a body mass index greater than 25 but less than 30kg/m<sup>2</sup>)
  - Family history of diabetes
  - Age 65 or older
  - A history of gestational diabetes mellitus, or delivery of a baby weighing greater than 9 pounds

Medicare provides coverage of diabetes screening tests for individuals in the risk groups listed above, or those diagnosed with pre-diabetes. Pre-diabetes is a condition of abnormal glucose metabolism diagnosed from a previous fasting glucose level of 100-125 mg/dL or a 2-hour post-glucose challenge of 140-199 mg/dL. The term "pre-diabetes" includes impaired fasting glucose and impaired glucose tolerance.

What Medicare Covers:

- A fasting blood glucose test AND
- A post-glucose challenge test OR
- A 2-hour post-glucose challenge test alone

For those with pre-diabetes Medicare covers a maximum of two diabetes-screening tests within a 12-month period (but not less than 6 months apart).

For those who are not diabetics or have not previously been diagnosed as pre-diabetics, Medicare covers one diabetes screening test within a 12-month period (or that at least 11 months have passed following the month in which the last Medicare covered diabetes screening test was performed).

There is no coinsurance, co-payment or deductible for this benefit.

In addition to the benefits mentioned above, Medicare also covers certain diabetes self-management training services to help beneficiaries successfully manage their disease. Full details can be found at:

<http://www.cms.hhs.gov/DiabetesSelfManagement/>.

A beneficiary can receive diabetes self-management training services if he or she is at risk for complications from diabetes, has been recently diagnosed with diabetes, or has diabetes and is now eligible for Medicare.

Beneficiaries pay 20% of the Medicare-approved amount after the yearly Part B deductible for diabetes self-management training services. The physician managing the beneficiary's diabetes must certify that diabetes self-management training services are needed under a comprehensive plan of care.



# CLINICAL SNAPSHOT – Diabetes

For QIOs Supporting Physician Offices in the 8SoW

## REFERENCES

1. Centers for Disease Control and Prevention. National diabetes fact sheet: general information. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005. Available at [http://apps.nccd.cdc.gov/DDTSTRS/template/ndfs\\_2005.pdf](http://apps.nccd.cdc.gov/DDTSTRS/template/ndfs_2005.pdf). Accessed October 19, 2007.
2. Centers for Disease Control and Prevention.–Diabetes Data & Trends: number (in millions) of persons with diagnosed diabetes, United States, 1980-2005. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at <http://www.cdc.gov/diabetes/statistics/prev/national/fipersons.htm>. Accessed October 19, 2007.
3. Centers for Disease Control and Prevention. Diabetes: disabling, deadly, and on the rise, 2005. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005. Available at [http://www.cdc.gov/nccdphp/aag/aag\\_ddt.htm](http://www.cdc.gov/nccdphp/aag/aag_ddt.htm). Accessed November 5, 2007.
4. Centers for Disease Control and Prevention. National Diabetes Surveillance System: Prevalence of diabetes – prevalence of diagnosed diabetes per 100 population, by age, United States, 1980-2005. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at <http://www.cdc.gov/diabetes/statistics/prev/national/tablebyage.htm>. Accessed October 19, 2007.
5. Centers for Disease Control and Prevention. National Diabetes Surveillance System: Prevalence of diabetes – age-adjusted prevalence of diagnosed diabetes per 100 population, by race/ethnicity and sex, United States, 1980-2005. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at <http://www.cdc.gov/diabetes/statistics/prev/national/tablebyraceethsex.htm>. Accessed October 19, 2007.
6. American Diabetes Association. Economic Costs of Diabetes in the U.S. in 2002. *Diabetes Care*. (2003) 26:917-932. Available at <http://care.diabetesjournals.org/cgi/content/full/26/3/917>. Accessed June 27, 2006.
7. Agency for Healthcare Research and Quality. Medical Expenditure Panel Survey. Total expenses for conditions by site of service: United States, 2004. Available at [http://www.meps.ahrq.gov/mepsweb/data\\_stats/table\\_compensia\\_hh\\_interactive.jsp?SERVICE=MEPSSocket0&PROGRAM=MEPSPGM.TC.SAS&File=HCFY2004&Table=HCFY2004%5FCNDXP%5FC&Debug](http://www.meps.ahrq.gov/mepsweb/data_stats/table_compensia_hh_interactive.jsp?SERVICE=MEPSSocket0&PROGRAM=MEPSPGM.TC.SAS&File=HCFY2004&Table=HCFY2004%5FCNDXP%5FC&Debug). Accessed October 19, 2007.
8. DCCT Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993 Sep 30;329(14):977-986.
9. UK Prospective Diabetes Study Group (UKPDS). Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes. *Lancet* 1998 Sep 12;352(9131):837-853.
10. American Diabetes Association. Clinical Practice Recommendations *Diabetes Care*. 2007;30(suppl 1). Available at: [http://care.diabetesjournals.org/content/vol30/suppl\\_1/](http://care.diabetesjournals.org/content/vol30/suppl_1/). Accessed October 19, 2007.
11. Centers for Disease Control and Prevention. National Diabetes Surveillance System: Preventive care practices – rates of preventive care practices per 100 adults with diabetes, United States, 2005. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at <http://www.cdc.gov/diabetes/statistics/preventive/falpractices.htm>. Accessed November 5, 2007.

This material was prepared by Virginia Health Quality Center, the Quality Improvement Organization Support Center for Physician Office setting, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. VHQC/PO/11-15-2007/640

**The Physician Office QIOSC: “Supporting Transformational Change”**

Part of the National Healthcare Quality Improvement Project of the Centers for Medicare & Medicaid Services