

# Diabetes Surveillance Report



Prepared for  
North Dakota Department of Health  
Diabetes Control Program

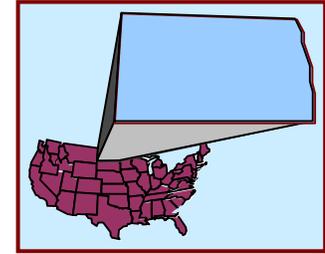
Prepared by  
North Dakota Health Care Review, Inc.  
*September 2000*



# NORTH DAKOTA

## 1998 DIABETES FACT SHEET

(Excerpted from the 1998 Diabetes Surveillance Report)



### What is diabetes?

Diabetes is a disorder of metabolism, the way the body processes and uses certain foods, especially carbohydrates. Normally the body converts carbohydrates to glucose, the simple sugar that is the main source of energy for the body's cells. To enter cells, glucose needs the help of insulin, a hormone produced by the pancreas. The pancreas is supposed to produce the right amount of insulin automatically to allow glucose to enter body cells from the blood and be converted into energy. However, when the pancreas produces either too little or no insulin, or the body does not respond to the insulin produced, the body cannot process glucose. As a result, it builds up in the blood stream, overflows into the urine, and passes out of the body, effectively depriving the body of its main source of fuel. Fasting blood sugar levels over 126 mg/dl can signal a diagnosis of diabetes. (*Centers for Disease Control and Prevention*)



### Signs and Symptoms

Among the signs and symptoms of diabetes are hyperglycemia, unexplained weight loss, frequent urination, increased food intake, excess thirst, itching, vision changes, fatigue, and frequent infections or wounds that won't heal.



### Impact

Diabetes is a growing public health problem, and its prevalence is on the rise. According to the American Diabetes Association, individuals with diabetes have approximately twice the annual death and disability rate of people without diabetes. The annual health care cost for people with diabetes is estimated at \$92 billion.

Diabetes is a leading cause of blindness, kidney failure, and amputations, and is a significant contributor to cardiovascular disease and stroke. The good news is that the Diabetes Control and Complications Trial (DCCT) and the United Kingdom Prospective Diabetes Study (UKPDS) demonstrated that near normal glucose control and early diagnosis and treatment can prevent the onset or slow the progression of many of these complications. This reduction can be better maintained if the American Diabetes Association's Standards of Care for people with diabetes are followed.

### American Diabetes Association's Standards of Care

Element of Care	Frequency
Glycated Hemoglobin	Quarterly if treatment changes or if not meeting control goals; semi-annually if stable
Dilated Eye Examination	Annually
Foot Examination	Every regular diabetes visit
Lipid Profile	Annually (or less frequently if normal)
Urinalysis (for protein)	Annually
Microalbumin	Annually if urinalysis is negative for protein
Blood Pressure	Every regular diabetes visit
Weight	Every regular diabetes visit

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## Risk Factors for Diabetes

Individuals are at increased risk for diabetes if they:

- are obese.
- have a family history of diabetes.
- are a member of a high-risk ethnic group (African American, Hispanic American, Native American, Asian American, Pacific Islander).
- have delivered a baby weighing more than 9 pounds and have been previously diagnosed with gestational diabetes.
- on previous testing, have had impaired glucose tolerance or impaired fasting glucose.

## 1998 Surveillance Report Key Findings

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The 1998 North Dakota Diabetes Surveillance Report contains the most current and comprehensive information available on the status of diabetes in North Dakota, including prevalence rates for most of North Dakota's insured population, rates of compliance with the ADA's Standards of Care for people with diabetes, birth and death rates, and rates of complications associated with diabetes.

### Prevalence

- Using Medicare and Blue Cross Blue Shield of North Dakota claims data, 18,594 North Dakota people were identified as having diabetes. These two entities insured just over 365,000 (about 57.0 percent) of North Dakota's residents in 1998.
- The Centers for Disease Control and Prevention estimates that 5.9 percent of the United States population has diabetes. This report indicates that about 5.1 percent of North Dakota's insured population has the disease. The estimated prevalence rate among North Dakota's Medicare (age>64) population is 13.0 percent.
- The overall rate of diabetes in males and females is almost identical at 5.2 percent and 5.0 percent, respectively. A difference in prevalence rates is noticeable in the older age groups. For example, in the 75 and older group, the diabetes rate among males is 15.6 percent, compared to 13.9 percent among females.

### Care Rates

- About 78.0 percent of the individuals identified as having diabetes had two or more primary care office visits in 1998.
- In 1998, 63.0 percent of the diabetic population had at least one glycosylated hemoglobin test.
- The percentage of people with diabetes who had at least one microalbumin test in 1998 was 15.8 percent.

### Complications

- Of the individuals identified by the surveillance report as having diabetes, almost one-half (49.9 percent) were also identified as having some degree of hypertension.
- According to the claims data, approximately 20.0 percent of the diabetic population also has a diagnosis of coronary artery disease, and about 30.0 percent has a diagnosis of hyperlipidemia.
- In North Dakota, the amputation rate is 5.0 per 1,000 residents with diabetes, and the kidney transplant rate is 5.0 per 1,000 residents with diabetes.
- According to North Dakota death certificate data, diabetes was listed as a primary or contributing cause of death for approximately 1 of every 11 North Dakota residents in 1998.

# Key Findings

## Prevalence

- ◆ Using Medicare and Blue Cross Blue Shield of North Dakota claims data, 18,594 North Dakota people were identified as having diabetes. These two entities insured just over 365,000 (approximately 57.0 percent) of North Dakota's residents in 1998.
- ◆ The Centers for Disease Control and Prevention estimates that 5.9 percent of the United States population has diabetes. This report indicates that about 5.1 percent of North Dakota's insured population has the disease. The estimated prevalence rate of diabetes among North Dakota's Medicare population (age >64) is 13.0 percent.
- ◆ The overall rate of diabetes among males and females is almost identical at 5.2 percent and 5.0 percent, respectively. A difference in prevalence rates between males and females is noticeable in the older age groups. For example, in the 75 and older age group, the diabetes rate among males is 15.6 percent, compared to 13.9 percent among females.

## Care Rates

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- ◆ In 1998, 63.0 percent of the diabetic population had at least one glycosylated hemoglobin test.
- ◆ The percentage of people with diabetes who had at least one microalbumin test in 1998 was 15.8 percent.

## Complications

- ◆ Of the individuals identified by the surveillance report as having diabetes, almost one-half (49.9 percent) also were identified as having some degree of hypertension.
- ◆ According to this claims data, about 20.0 percent of the diabetic population also has a diagnosis of coronary artery disease, and about 30.0 percent has a diagnosis of hyperlipidemia.
- ◆ In North Dakota, the amputation rate is 5.0 per 1,000 residents with diabetes, and the kidney transplant rate is 5.0 per 1,000 residents with diabetes.
- ◆ According to North Dakota death certificate data, diabetes was listed as a primary or contributing cause of death for about one of every 11 North Dakota residents in 1998.

# Diabetes Surveillance Report

## **Introduction**

Diabetes is a major public health problem. The disease affects as many as 10 million Americans, and its prevalence has increased six-fold since the 1940s, according to the Centers for Disease Control and Prevention. Individuals with diabetes have about twice the death and disability rate of people without diabetes. Annual health care costs for people with diabetes have been estimated at \$92 billion. The good news is that the Diabetes Control and Complications Trial (DCCT)<sup>1</sup> and the United Kingdom Prospective Diabetes Study (UKPDS)<sup>2</sup> have demonstrated that reduction in average blood sugar levels can prevent the onset or slow the progression of many of the complications associated with diabetes.

The goal of the 1998 North Dakota Diabetes Surveillance Report is to give health care providers and decision makers a tool to monitor the status of diabetes care and complications in North Dakota. Included are statewide, region, and county-specific analyses of compliance with diabetes care guidelines; prevalence of acute and chronic complications; and diabetes birth, death and prevalence data. In addition to illustrating the current status of diabetes, the information contained in this report can be used to target efforts for improving diabetes care and ultimately improving the health status of North Dakotans with diabetes.

## **What Is Diabetes?**

Diabetes is a disorder of metabolism, the way the body processes and uses certain foods, especially carbohydrates. Normally, the body converts carbohydrates to glucose, the simple sugar that is the main source of energy for the body's cells. To enter cells, glucose needs the help of insulin, a hormone produced by the pancreas. The pancreas is supposed to produce the right amount of insulin automatically to allow glucose to enter body cells from the blood and be converted into energy. However, when the pancreas produces either too little or no insulin or the body does not respond to the insulin produced, the body cannot process glucose. As a result, glucose builds up in the blood stream, overflows into the urine and passes out of the body, effectively depriving the body of its main source of fuel. High levels of glucose in the blood can signal a diagnosis of diabetes.<sup>3</sup> Diabetes can be divided into three major categories: type 1, type 2, and gestational diabetes.

### **Type 1**

Type 1 diabetes is characterized by beta cell destruction, which usually leads to absolute insulin deficiency. There are two categories of type 1 diabetes:

- *Immune-mediated diabetes mellitus* results from a cellular mediated autoimmune destruction of the beta cells of the pancreas.
- *Idiopathic diabetes mellitus* refers to forms of the disease that have no known etiology.

Type 1 diabetes may occur at any age, but most commonly develops before age 30. It is caused by an immune system attack on the insulin-producing beta cells of the pancreas. When these cells are destroyed, the pancreas can no longer produce insulin. People with type 1 diabetes must take insulin to survive.<sup>4</sup>

### **Type 2**

Type 2 diabetes is considered a disease of insulin resistance that usually has relative, rather than absolute, insulin deficiency. Whereas patients with this form of diabetes may have insulin levels that appear normal or elevated, the higher blood glucose levels in these diabetic patients would be expected to result in even higher insulin values had their  $\beta$ -cell function been normal. Thus, insulin secretion is defective in these patients and insufficient to compensate for the insulin resistance.<sup>5</sup> Type 2 diabetes most often occurs in people older than age 30 but it can develop in younger people. Control of type 2 diabetes can include diet and exercise, oral medications or insulin.<sup>6</sup>

## **Gestational Diabetes Mellitus**

Gestational diabetes is defined as any degree of glucose intolerance that has its onset or first recognition during pregnancy. Gestational diabetes may require diet modification or insulin for treatment, and may or may not persist after pregnancy.

## **The North Dakota Diabetes Surveillance Report**

The following information has been collected and analyzed to help frame the current status of diabetes in North Dakota. The results provide insights into the prevalence of diabetes in the state and trends in the health and health care status of people with diabetes. It also provides a foundation for tracking changes over the next several years in diabetes-related complications, diabetic health care and the health status of people with diabetes.

### **Standards of Care**

In 1999, the American Diabetes Association<sup>7</sup> released the revised recommended standards of care for people with diabetes. The screening guidelines include:

#### **American Diabetes Association Standards of Care**

<b>Element of Care</b>	<b>Frequency</b>
Glycated Hemoglobin	Quarterly if treatment changes or if not meeting control goals; semi-annually if stable
Dilated Eye Examination	Annually
Foot Examination	Every regular diabetes visit
Lipid Profile	Annually (or less frequently if normal)
Urinalysis (for protein)	Annually
Microalbumin	Annually if urinalysis is negative for protein
Blood Pressure	Every regular diabetes visit
Weight	Every regular diabetes visit

## **Data Sources and Methodologies**

### **Identifying People With Diabetes**

Individuals with diabetes (ICD-9-CM diagnosis code of 250.XX) were identified from 1996 and 1997 claims data. Following identification, all 1998 health care claims for these individuals were then extracted and used to calculate the 1998 rates contained in this report. This method was based on a University of Minnesota study, which investigated different methods of identifying diabetics using claims data.<sup>8</sup>

### **Medicare**

#### **Inclusions**

The Medicare cohort was defined as any Medicare beneficiary with at least one institutional or professional claim with a diagnosis code of 250.XX or two professional claims with a line item diagnosis code of 250.XX from January 1, 1996, through December 31, 1997.

#### **Exclusions**

- Any beneficiary who was not alive on January 1, 1999.
- Any beneficiary who was not Medicare eligible for the entire 12 months of 1998.
- Native Americans. Individuals who were identified as Native Americans in the Medicare database have been excluded from analysis. A significant portion of medical care for Native American people may have been provided by Indian Health Service (IHS), making the Medicare data for these individuals incomplete. Native Americans who were not identified as such in the Medicare database have been included in this analysis.
- Any beneficiary identified as having end stage renal disease.

## **Blue Cross Blue Shield of North Dakota**

### **Inclusions**

The Blue Cross Blue Shield of North Dakota cohort was defined as any beneficiary who had at least one paid institutional or professional claim with a diagnosis code of 250.XX from January 1, 1996, to December 31, 1997.

### **Exclusions**

- Any beneficiary who was not alive on January 1, 1999.
- Any person with MediGap insurance for any part of 1998.
- Any person who did not have continuous BCBS coverage for all of 1998.
- Any person with a Blue Cross Blue Shield policy, but Medicare was listed as the primary payor.
- Any person >64 was excluded to help reduce the overlap with Medicare.

## **Medicaid**

### **Inclusions**

The Medicaid cohort was defined as any patient with at least one paid institutional or professional claim with a diagnosis code of 250.XX from January 1, 1996, to December 31, 1997.

### **Exclusions**

- Any person who was not alive on January 1, 1999.
- Native Americans. Individuals who were identified as Native Americans in the Medicaid database have been excluded from analysis. A significant portion of medical care for Native American people may have been provided by Indian Health Service (IHS), making the Medicaid data for these individuals incomplete. Native Americans who were not identified as such in the Medicaid database have been included in this analysis.
- Any person who did not have continuous Medicaid coverage for all of 1998.
- Any person who was dually enrolled for Medicare at any time during 1998.

## **Data**

### *1998 Diabetes Prevalence Rate*

The 1998 Diabetes Surveillance Report is based primarily on Medicare, Blue Cross Blue Shield of North Dakota, and Medicaid claims data. However, the prevalence numbers are based only on Medicare and BCBSND. A total of 18,594 BCBSND and Medicare beneficiaries were identified with diabetes. This number is an estimate of the diabetes prevalence rate for North Dakota. While this estimate does not capture 100 percent of North Dakota's population with diabetes, these two entities do insure 365,230 North Dakota residents, or approximately 57.0 percent of North Dakota's total population.

### *1998 Diabetes Care and Complication Rates*

To calculate annual care and complication rates for people with diabetes, the population cohort was modified to include only people with diabetes who had no exclusions and who were continuously covered by one of the plans for all 12 months of 1998. Excluding these individuals reduces the denominator used to calculate care and complication rates from 18,594 to 18,199, excluding Medicaid. Including Medicaid raises this number to 18,523.

### *1998 Birth and Mortality Rates*

In addition to the claims data described above, information from the North Dakota Vital Records was used to calculate birth and mortality rates.

## **Rates by County**

County rates reflect the county of residence of the individuals with diabetes, not the county where the health care was provided. Slope and Billings counties were combined in this report due to their small populations.

## **Health Plan Employer Data & Information Set (HEDIS) Specifications**

The criteria for five of the indicators contained in this report reflect HEDIS 1999 specifications. Using HEDIS criteria, where possible, standardizes the indicators, allowing for comparisons of these rates with other states and the nation. The affected indicators are glycosylated hemoglobin evaluations, eye examinations, lipid evaluations, microalbumin evaluations, and nephrology complications.

## **Data Limitations**

### **Type 1 Versus Type 2**

Because this analysis is based on claims data, it was not possible to accurately distinguish between individuals with type 1 and type 2 diabetes. Consequently, when applying diabetes standards of care to the analysis, the minimum standards for both type 1 and type 2 were used.

### **Limitation to Services Billed**

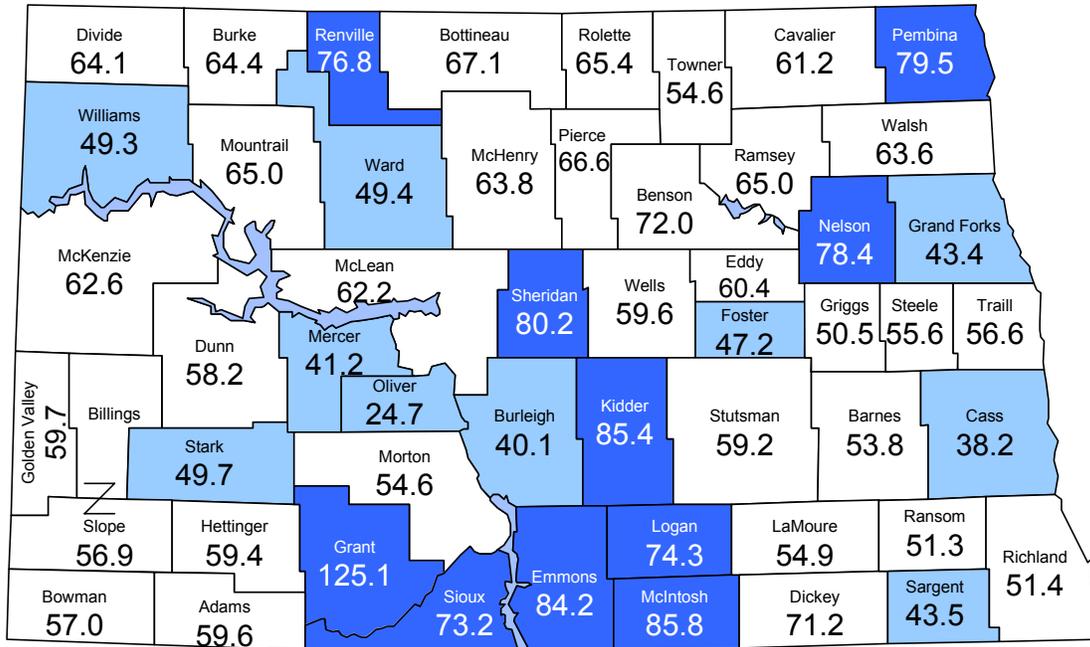
Although this report does not capture information about all people with diabetes in North Dakota, the above data sources account for a substantial percentage of all health care claims filed in North Dakota. This suggests that these sources provide claims information for a large percentage of all individuals with diabetes who have a source of health care coverage. Individuals covered by IHS and other private insurance companies, the uninsured, and self-payers comprise the remaining percentage unaccounted for in this report. Counties with a significant American Indian population would include Benson, Dunn, McKenzie, Montrail, Rolette and Sioux. Lack of claims data from Indian Health Service in these counties may underreport the impact of diabetes in these counties.

Information is not available for individuals with diabetes who are undiagnosed, who did not receive care during 1998, or who are self-pay. Because this report utilizes claims data, only billed services could be included. Therefore, information about care that is not billed, such as foot examinations or laboratory values, is not contained in this report.

# State Prevalence

# 1998 Prevalence of Diabetes

Rate per 1,000 Medicare and Blue Cross Blue Shield of North Dakota Enrollees



■ Counties with 10 highest rates    State Rate - 50.9/1,000    ■ Counties with 10 lowest rates

## Prevalence of Diabetes by Gender\*

Gender	Total # Patients	# Patients With Diabetes	Prevalence of Diabetes Per 1,000 Patients
Female	190,999	9,555	50.0
Male	174,231	9,039	51.9
Total	365,230	18,594	50.9

## Prevalence of Diabetes by Age Group\*

Age	Total # Patients	# Patients With Diabetes	Prevalence of Diabetes Per 1,000 Patients
0-19	87,163	251	2.9
20-44	107,860	1,452	13.5
45-64	75,935	4,682	61.7
65-74	47,189	5,347	113.3
75 and over	47,083	6,862	145.7
Total	365,230	18,594	50.9

## Prevalence of Diabetes by Age Group and Gender\*

<b>Age</b>	<b>Gender</b>	<b>Total # Patients</b>	<b># Patients With Diabetes</b>	<b>Prevalence of Diabetes Per 1,000 Patients</b>
0-19	Female	42,414	117	2.8
	Male	44,749	134	3.0
20-44	Female	55,657	742	13.3
	Male	52,203	710	13.6
45-64	Female	38,656	2,016	52.2
	Male	37,279	2,666	71.5
65-74	Female	25,052	2,612	104.3
	Male	22,137	2,735	123.5
75 and over	Female	29,220	4,068	139.2
	Male	17,863	2,794	156.4
All ages	Total	365,230	18,594	50.9

*\*Includes only Blue Cross Blue Shield of North Dakota and Medicare enrollees*

## 1998 Prevalence of Diabetes by County

County	# of Patients in County Covered by BCBS and Medicare	# of Patients with Diabetes	Prevalence of Diabetes Per 1,000 Patients
Adams	1,695	101	59.6
Barnes	7,233	389	53.8
Benson	2,596	187	72.0
Billings & Slope	424	23	56.9
Bottineau	4,175	280	67.1
Bowman	2,034	116	57.0
Burke	1,522	98	64.4
Burleigh	44,694	1,792	40.1
Cass	66,645	2,543	38.2
Cavalier	3,365	206	61.2
Dickey	3,625	258	71.2
Divide	1,530	98	64.1
Dunn	1,752	102	58.2
Eddy	2,036	123	60.4
Emmons	2,816	237	84.2
Foster	2,943	139	47.2
Golden Valley	989	59	59.7
Grand Forks	28,768	1,248	43.4
Grant	1,383	173	125.1
Griggs	2,020	102	50.5
Hettinger	2,341	139	59.4
Kidder	1,452	124	85.4
LaMoure	3,408	187	54.9
Logan	1,400	104	74.3
McHenry	3,905	249	63.8
McIntosh	2,565	220	85.8
McKenzie	2,522	158	62.6
McLean	6,146	382	62.2
Mercer	7,808	322	41.2

<b>County</b>	<b># of Patients in County Covered by BCBS and Medicare</b>	<b># of Patients with Diabetes</b>	<b>Prevalence of Diabetes Per 1,000 Patients</b>
Morton	15,389	841	54.6
Mountrail	3,815	248	65.0
Nelson	2,728	214	78.4
Oliver	2,021	50	24.7
Pembina	4,429	352	79.5
Pierce	2,539	169	66.6
Ramsey	7,472	486	65.0
Ransom	4,155	213	51.3
Renville	1,394	107	76.8
Richland	9,140	470	51.4
Rolette	4,266	279	65.4
Sargent	4,303	187	43.5
Sheridan	1,047	84	80.2
Sioux	628	46	73.2
Stark	13,983	695	49.7
Steele	1,438	80	55.6
Stutsman	13,099	776	59.2
Towner	1,995	109	54.6
Traill	5,175	293	56.6
Walsh	7,715	491	63.6
Ward	28,618	1,415	49.4
Wells	3,557	212	59.6
Williams	12,532	618	49.3
<b>State Total</b>	<b>365,230</b>	<b>18,594</b>	<b>50.9</b>

# Elements of Diabetes Care

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Office Visits

Glycated Hemoglobin

Eye Examinations

Microalbumin

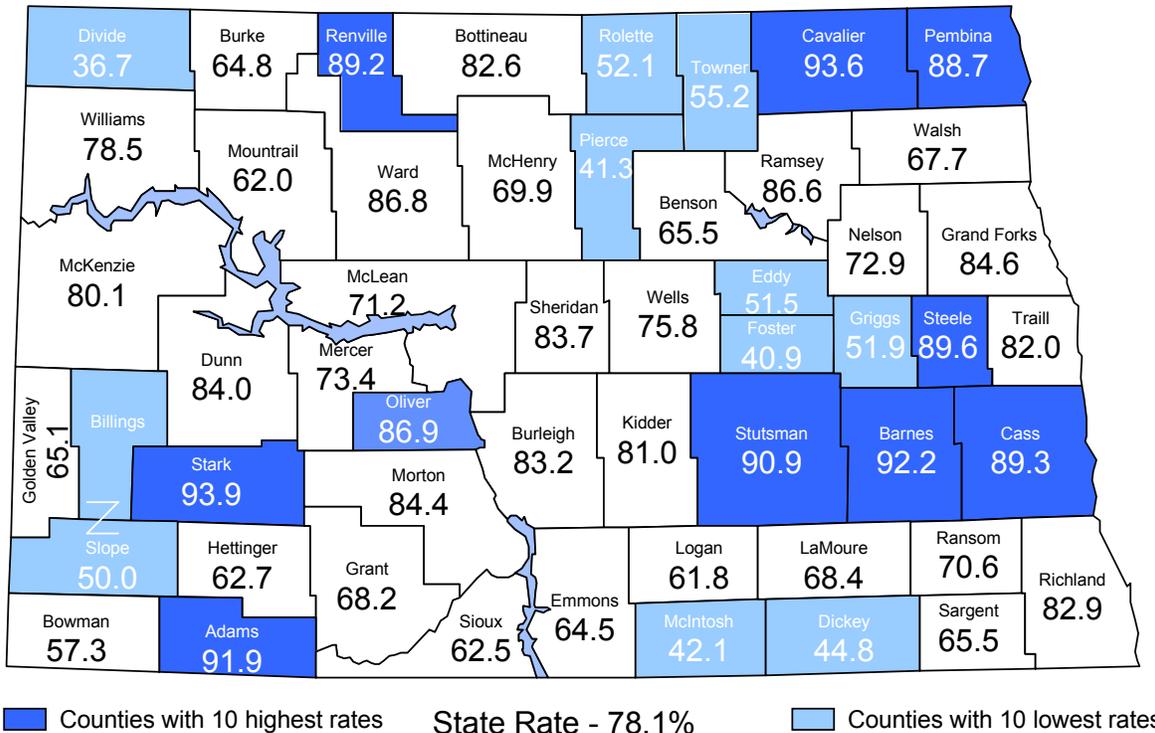
Lipid Evaluations

Influenza Immunizations

*Note: HEDIS 1999 coding criteria was used to calculate glycated hemoglobin, eye examinations, microalbumin and lipids rates.*

# Office Visits

Percentage of people with diabetes with two or more office visits in 1998



## Clinical Practice Recommendation

Generally, people with diabetes are recommended to have at least two office visits per year. However, they should be seen at least quarterly until achievement of treatment goals. Thereafter, the frequency of visits may be decreased as long as patients continue to achieve all treatment goals.

The frequency of recommended patient visits depends upon the following:

- Type of diabetes
- Blood glucose goals and the degree to which they are achieved
- Changes in the treatment regimen
- Presence of complications of diabetes or other medical conditions

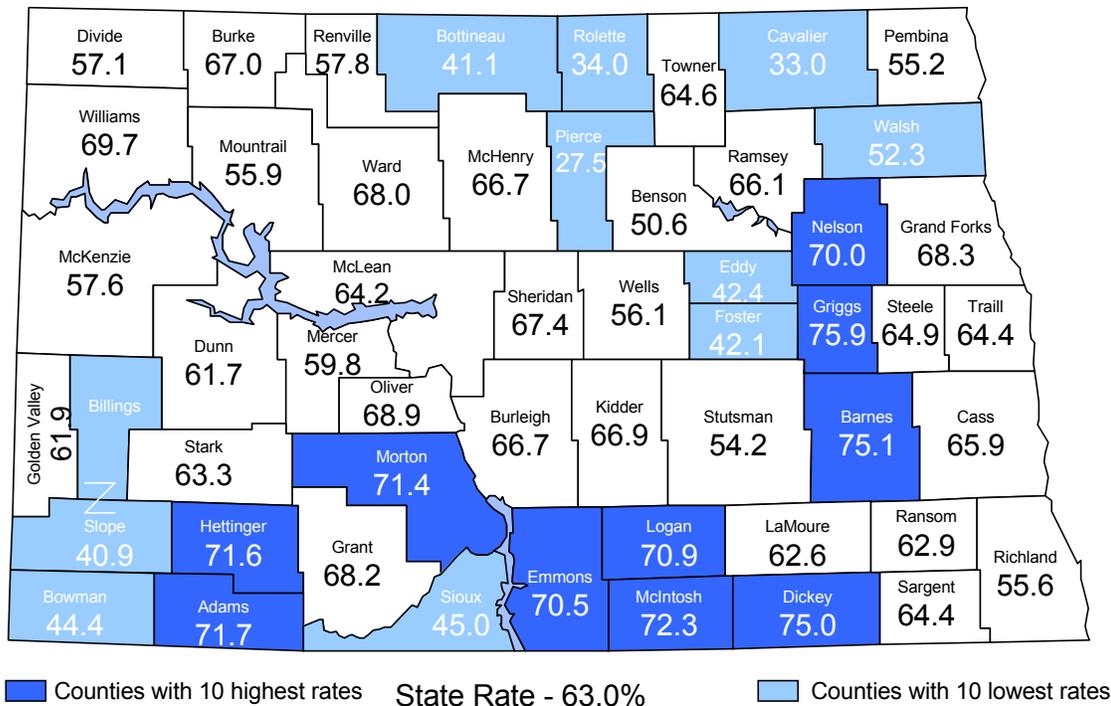
More frequent contact also may be required if patients are undergoing intensive insulin therapy, not meeting glycemic or blood pressure goals, or have evidence of progression of microvascular complications.<sup>9</sup>

**Special Note:** This analysis includes only office visits described by the codes listed in Appendix A and attended by a physician with a specialty of general practice, family practice, internal medicine, endocrinology, nephrology or pediatrics. Although diabetes care may be provided by physicians from other specialties, the vast majority of diabetes care is provided by physicians from these specialties.

Diagnosis and/or procedure codes used to establish these rates are found in Appendix A.

# Glycated Hemoglobin Evaluations

Percentage of people with diabetes receiving one or more in 1998



## Clinical Practice Recommendation

Glycated hemoglobin (GHb) testing should be performed routinely in all patients with diabetes, first to document the degree of glycemic control at initial assessment, then as part of continuing care. Since GHb reflects a mean glycemia over the preceding two to three months, measurement about every three months is required to determine whether a patient's metabolic control has continuously remained within the target range.

For any individual patient, the frequency of GHb testing should depend upon the treatment regimen used and the judgment of the clinician. Experts of diabetes care recommend testing at least twice a year in patients who are meeting treatment goals (and who have stable glycemic control) and more frequently (quarterly assessment) in patients whose therapy has changed or who are not meeting glycemic goals.<sup>10</sup>

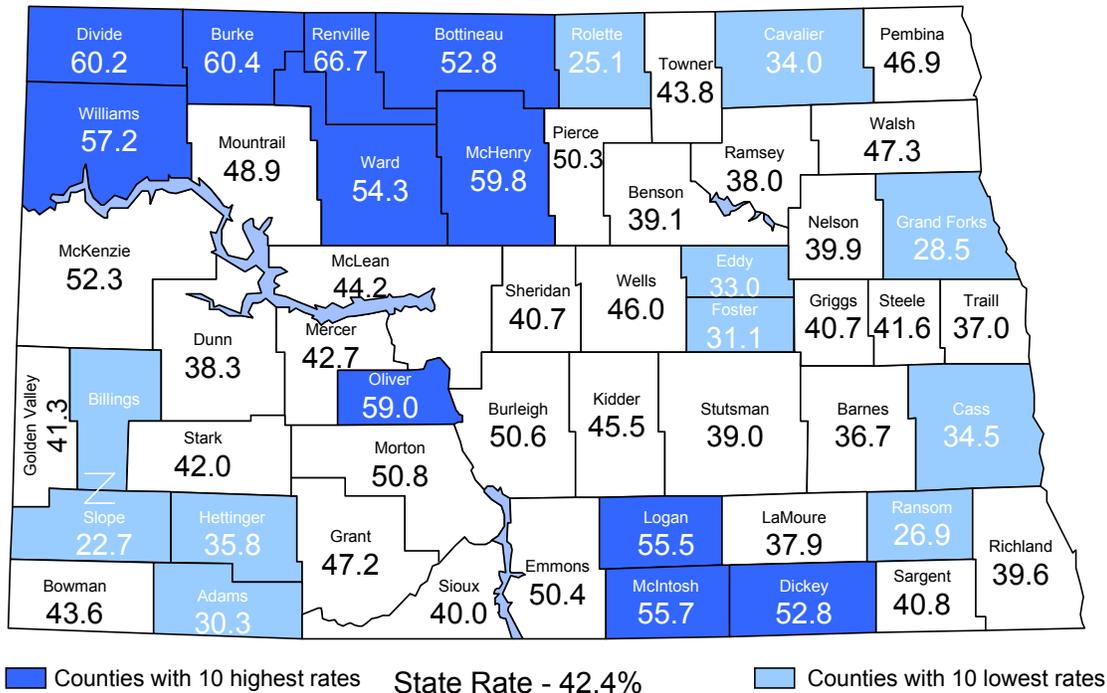
## Potential Complications

The GHb test is a clinical marker of glycemic control, with higher values indicating poorer control. The risk of complications and average medical costs for people with diabetes increase as glycemic control gets worse. The glycated hemoglobin value has been shown to predict the risk for development of many of the chronic complications listed throughout this report, such as diabetic retinopathy, lower extremity complications and amputations, nephropathy, neuropathy, etc.<sup>11</sup>

*Diagnosis and/or procedure codes used to establish these rates are found in Appendix B.*

# Eye Examinations

Percentage of people with diabetes receiving one or more in 1998



## Clinical Practice Recommendation

Patients 10 years of age or older with type 1 diabetes should have an initial dilated eye examination by an ophthalmologist or optometrist within three to five years after the onset of diabetes. In general, screening for diabetic eye disease is not necessary before 10 years of age. Patients with type 2 diabetes should have an initial dilated eye examination by an ophthalmologist or optometrist shortly after the initial diagnosis of diabetes. Due to the high rate of undiagnosed diabetes, many of these people have complications at diagnosis.

Subsequent examinations for both type 1 and type 2 diabetes should be repeated annually by an ophthalmologist or optometrist who is knowledgeable and experienced in diagnosing the presence of diabetic retinopathy and is aware of its management. Examinations will be required more frequently if retinopathy is progressing.

## Potential Complications

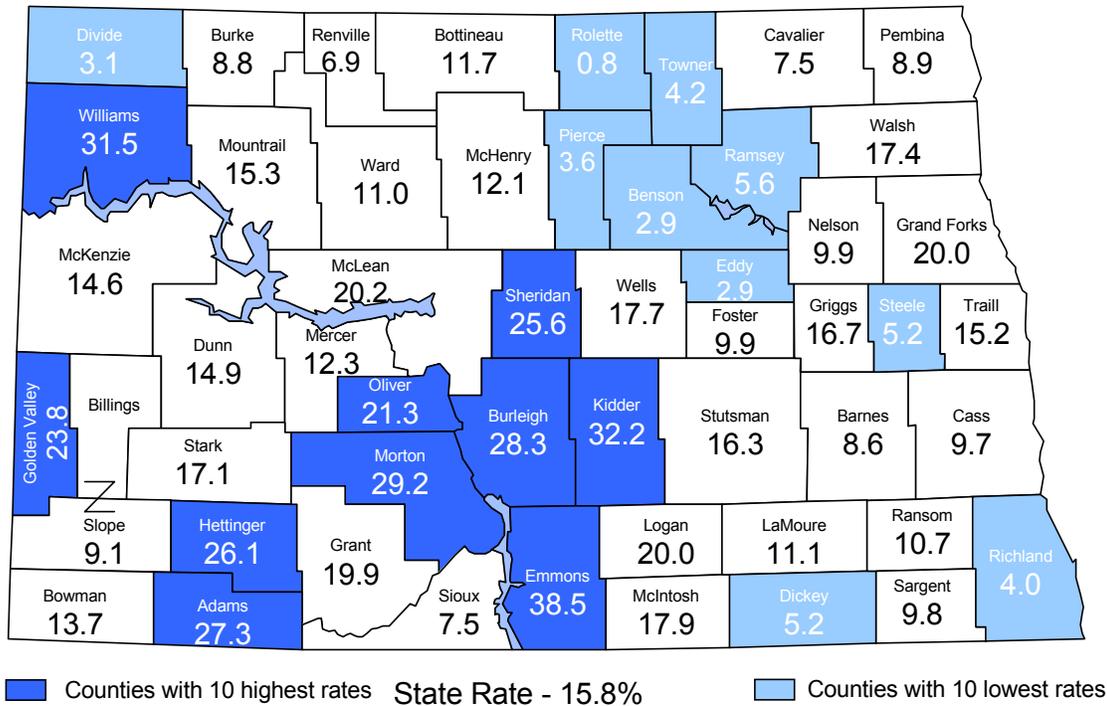
Diabetic retinopathy is a highly specific vascular complication of both type 1 and type 2 diabetes. The prevalence of retinopathy is strongly related to the duration of diabetes. After 20 years of diabetes, nearly all patients with type 1 diabetes and more than 60 percent of patients with type 2 diabetes have some degree of retinopathy. In the Wisconsin Epidemiologic Study of Diabetic Retinopathy (WESDR), 3.6 percent of younger-onset patients (aged 30 years or younger at diagnosis with an operational definition of type 1 diabetes) and 1.6 percent of older-onset patients (aged 30 years or older at diagnosis with an operational definition of type 2 diabetes) were legally blind. In the younger-onset group, 86.0 percent of blindness was attributed to diabetic retinopathy. In the older-onset group, where other eye diseases were common, one-third of the cases of legal blindness were due to diabetic retinopathy. Overall, diabetic retinopathy is estimated to be the most frequent cause of new cases of blindness among adults ages 20 to 74 years.<sup>12</sup>

*Special note: Because HEDIS 1999 criteria was used to calculate these rates, the eye examinations may be under-reported. This criteria includes only visits to an ophthalmologist or optometrist. If the ophthalmologist or optometrist billed using E&M or general office visit codes rather than the corresponding ophthalmology codes, the visits are not reflected in the analysis. HEDIS is considering restoring the E&M and/or general office visits codes to the HEDIS 2000 criteria. It also is possible that individuals who are not aware that eye care is a covered service may not have the service billed to the third-party payer.*

*Diagnosis and/or procedure codes used to establish these rates are found in Appendix C.*

# Microalbumin Evaluations

Percentage of people with diabetes receiving one or more in 1998



## Clinical Practice Recommendation

Routine urinalysis should be performed yearly in adults. If the urinalysis is negative for protein, a test for the presence of microalbumin is necessary. If positive for protein, a quantitative measure frequently is helpful in the development of a treatment plan. Screening in individuals with type 1 diabetes should begin with puberty and after five years' disease duration. Because of the difficulty in precisely identifying the onset of type 2 diabetes, such screening should begin at the time of diagnosis.

Screening for microalbumin can be performed by three methods:

1. 24-hour collection with creatinine, allowing the simultaneous measurement of creatinine clearance
2. Timed (e.g., four-hour or overnight) collection
3. Measurement of the albumin-to-creatinine ratio in a random spot collection

## Definitions of Abnormalities in Albumin Excretion

Category	24-h Collection (mg/24h)	Timed Collection (F/min)	Spot Collection (F/mg creatinine)
Normal	<30	<20	<30
Microalbuminuria	30-300	20-200	30-300
Clinical albuminuria	>300	>200	>300

*Note: Because of variability in urinary albumin excretion, two of three specimens collected within a three- to six-month period should be abnormal before a patient is considered to have crossed one of these diagnostic thresholds. Exercise within 24 hours, infection, fever, congestive heart failure, marked hyperglycemia and marked hypertension may elevate urinary albumin excretion over baseline values.*

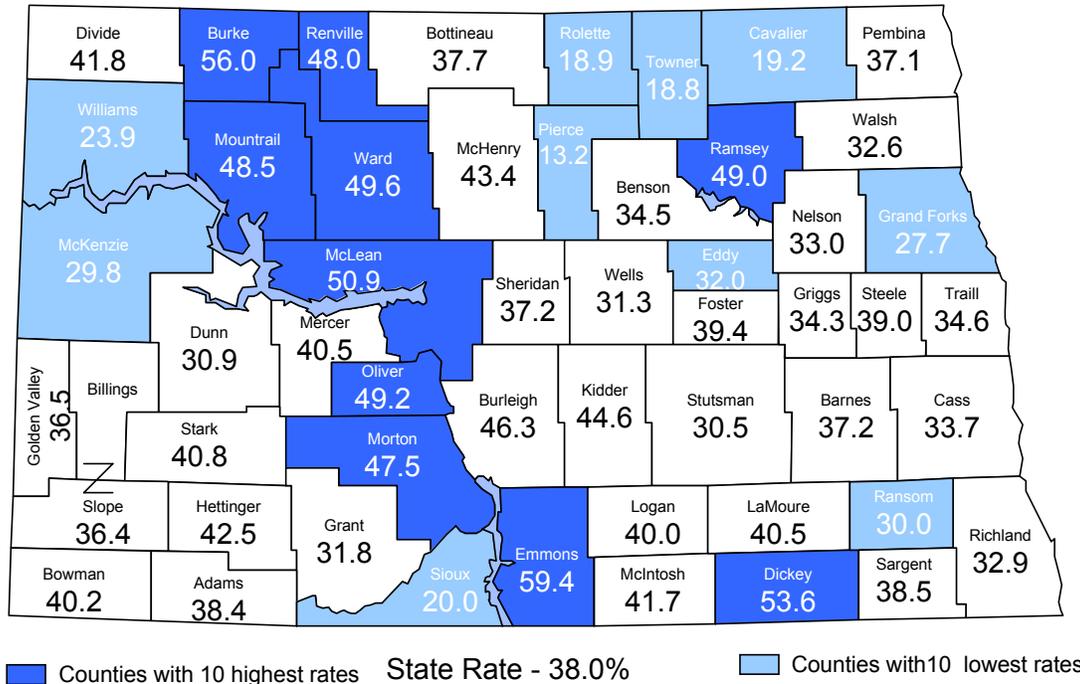
**Potential Complications**

Diabetes has become the single most common cause of end stage renal disease (ESRD) in the United States and Europe. In the United States, diabetic nephropathy accounts for about one-third of all cases of ESRD. About 20.0 percent to 30.0 percent of patients with type 1 or type 2 diabetes develop evidence of nephropathy, but in type 2 diabetes, a considerably smaller fraction of these progress to ESRD. However, because of the much greater prevalence of type 2 diabetes, such patients constitute more than one-half of those diabetic patients starting dialysis.<sup>13</sup>

*Diagnosis and/or procedure codes used to establish these rates are found in Appendix D.*

# Lipid Evaluations

Percentage of people with diabetes receiving one or more in 1998



## Clinical Practice Recommendation

Adult patients with diabetes should be tested annually for lipid disorders with fasting serum cholesterol, calculated low density lipoprotein (LDL) cholesterol measurements, high density lipoprotein (HDL) cholesterol measurements, and triglycerides. If values fall in lower-risk levels, an assessment should be repeated every two years. (See following table.) Tests resulting in borderline or abnormal values should be repeated for confirmation.

### Category of Risk Based on Lipoprotein Levels in Adults With Diabetes

Risk	LDL Cholesterol	HDL Cholesterol*	Triglyceride
High	>130	<35	>400
Borderline	100-129	35-45	200-399
Low	<100	>45	<200

Data are given in milligrams per deciliter.

\*For women, the HDL cholesterol values should be increased by 10 mg/dl.

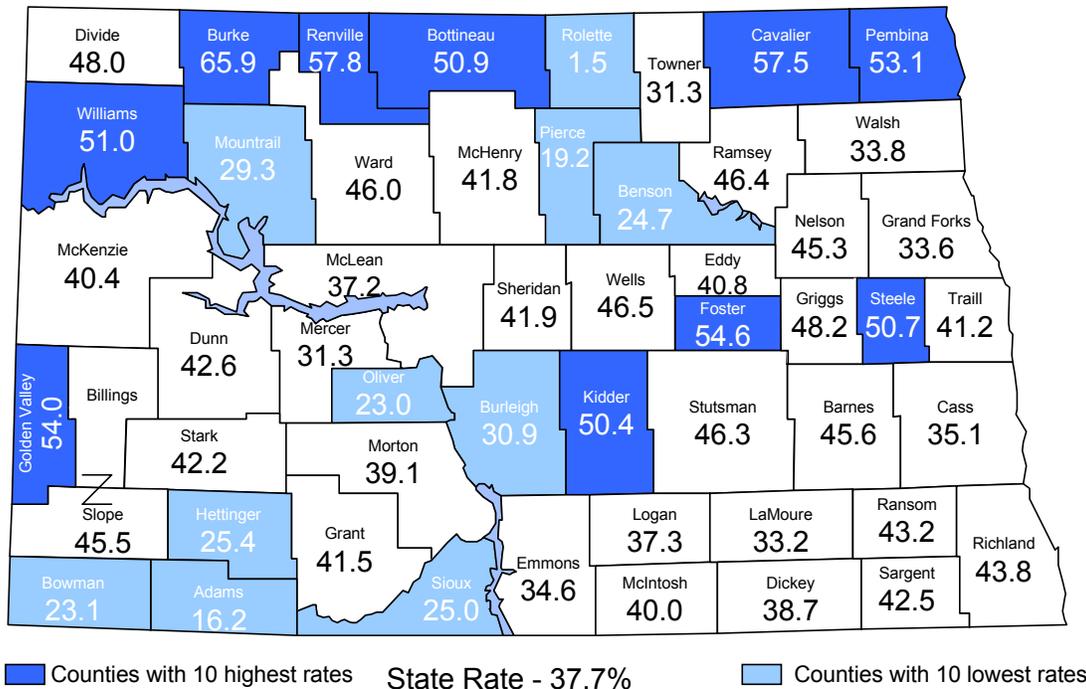
## Potential Complications

The most common cause of death in adults with diabetes is coronary artery disease. In contrast to people without diabetes, heart disease in people with diabetes appears earlier in life, affects women almost as often as men, and is more often fatal. Of all people who have had a myocardial infarction, studies show that diabetic patients are more likely to experience another infarction or death, and actually have twice the risk of having another infarction before leaving the hospital. In addition, adults with diabetes are more likely than those without diabetes to have hypertension and dyslipidemia.<sup>14</sup>

Diagnosis, procedure, and/or revenue codes used to establish these rates are found in Appendix E.

# Influenza Immunizations

Percentage of people with diabetes immunized in 1998



## Clinical Practice Recommendation

The Centers for Disease Control and Prevention recommends that influenza vaccinations be administered annually to people with diabetes.

## Potential Complications

People with diabetes are three times more likely to die from influenza and pneumonia complications and six times more likely to be hospitalized.

**Special note:** Overall, the rate of immunizations in the Blue Cross Blue Shield of North Dakota (BCBSND) and Medicaid population is 6.1 percent. Although influenza immunization is indicated for all people with diabetes, the BCBSND and Medicaid population is younger and therefore less likely to be immunized. In contrast, the rate in Medicare beneficiaries is 54.0 percent, with four counties above 70.0 percent. The influenza immunization rate in this population may be under-reported because of the variability in billing practices and the many sources for immunization that do not submit claims.

Diagnosis and/or procedure codes used to establish these rates are found in Appendix F.

# Chronic Complications of Diabetes

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## *Annual Rates*

Neuropathy

Eye Complications

Lower Extremity Complications

Amputations

Nephropathy

Kidney Transplants

Peripheral Vascular Disease

Hypertension

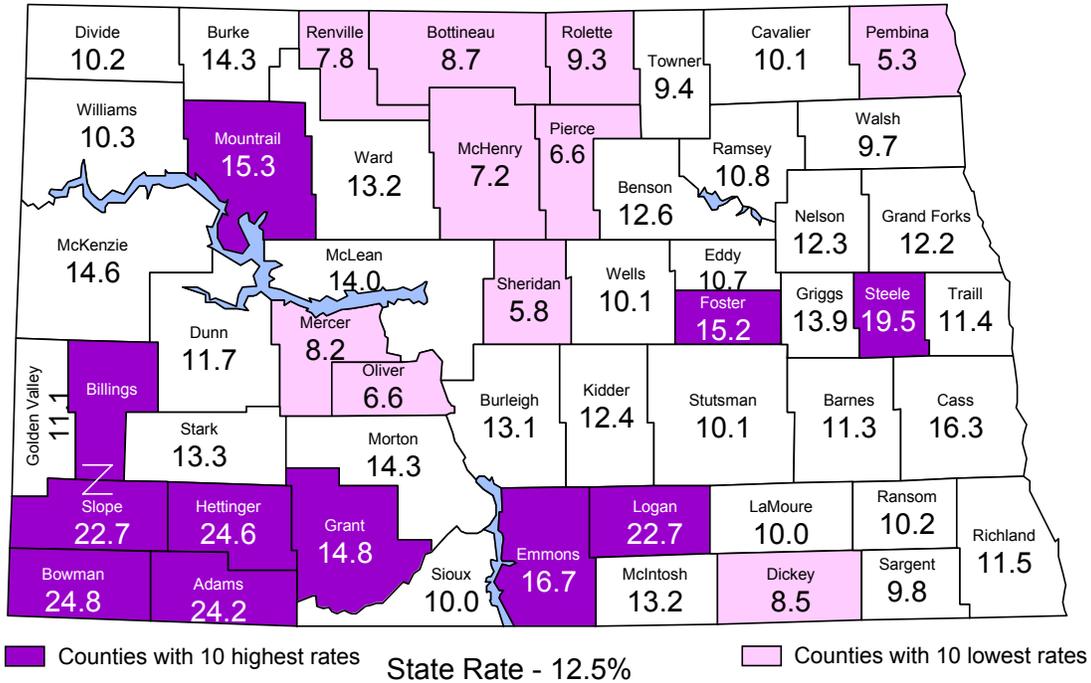
Coronary Artery Disease

Cerebrovascular Disease

Hyperlipidemia

# Neuropathy

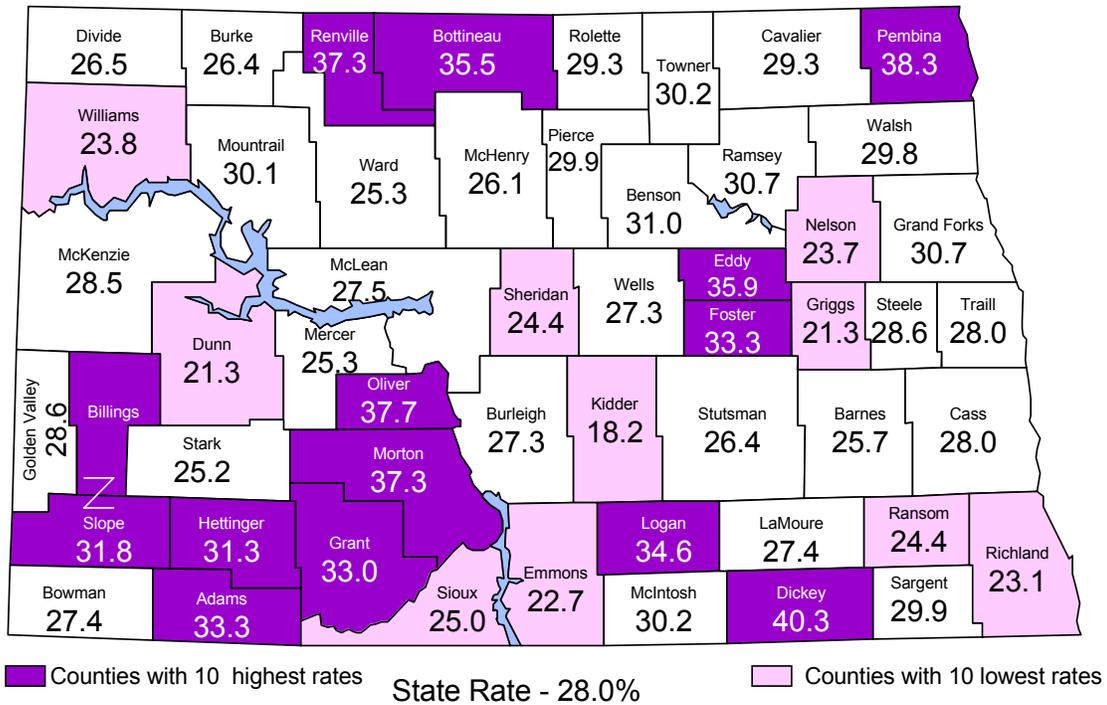
Percentage of people with diabetes with neuropathy in 1998



Diagnosis and/or procedures codes used to establish these rates are found in Appendix G.

# Eye Complications

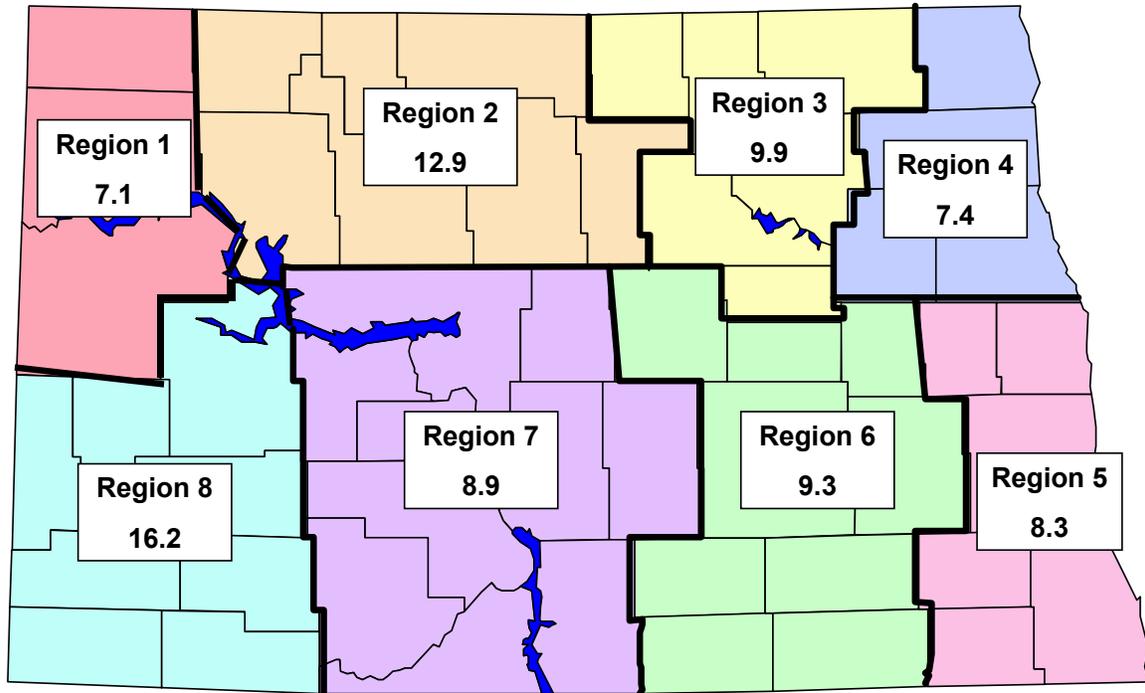
Percentage of people with diabetes with eye complications in 1998



Diagnosis and/or procedure codes used to establish these rates can be found in Appendix H.

## Lower Extremity Complications

Percentage of people with diabetes with lower extremity complications in 1998



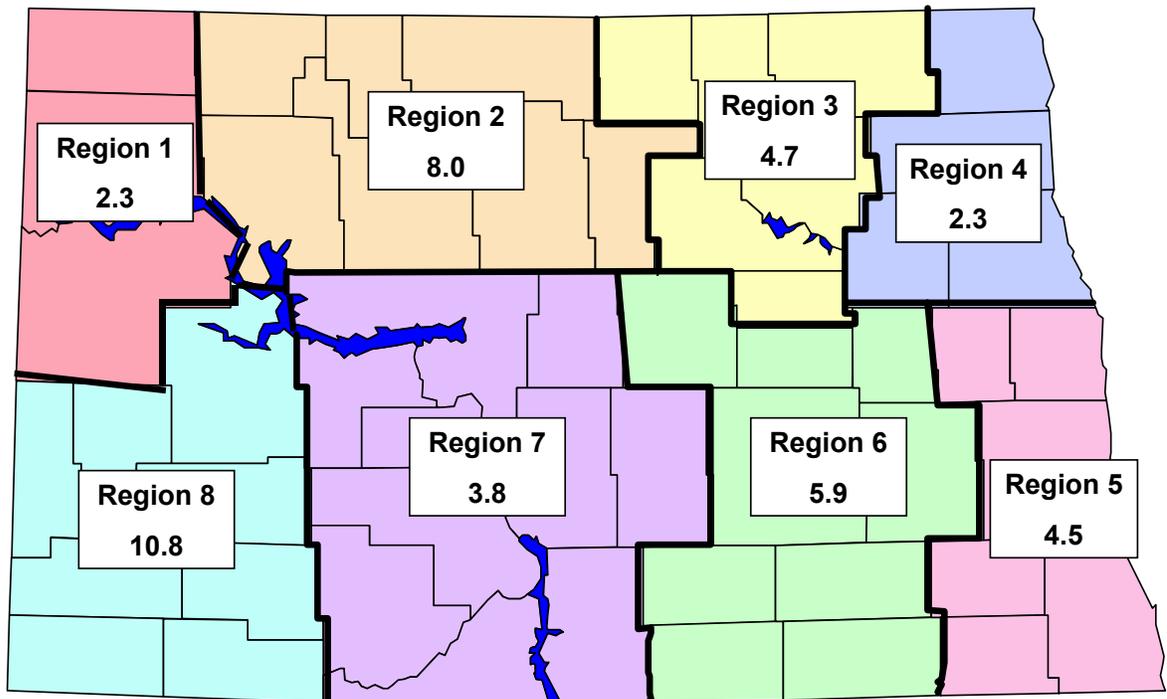
State Rate - 9.5%

*Diagnosis procedure used to these rates are Appendices I*

*and/or codes establish found in and J.*

## Amputations

Rate per 1,000 people with diabetes in 1998



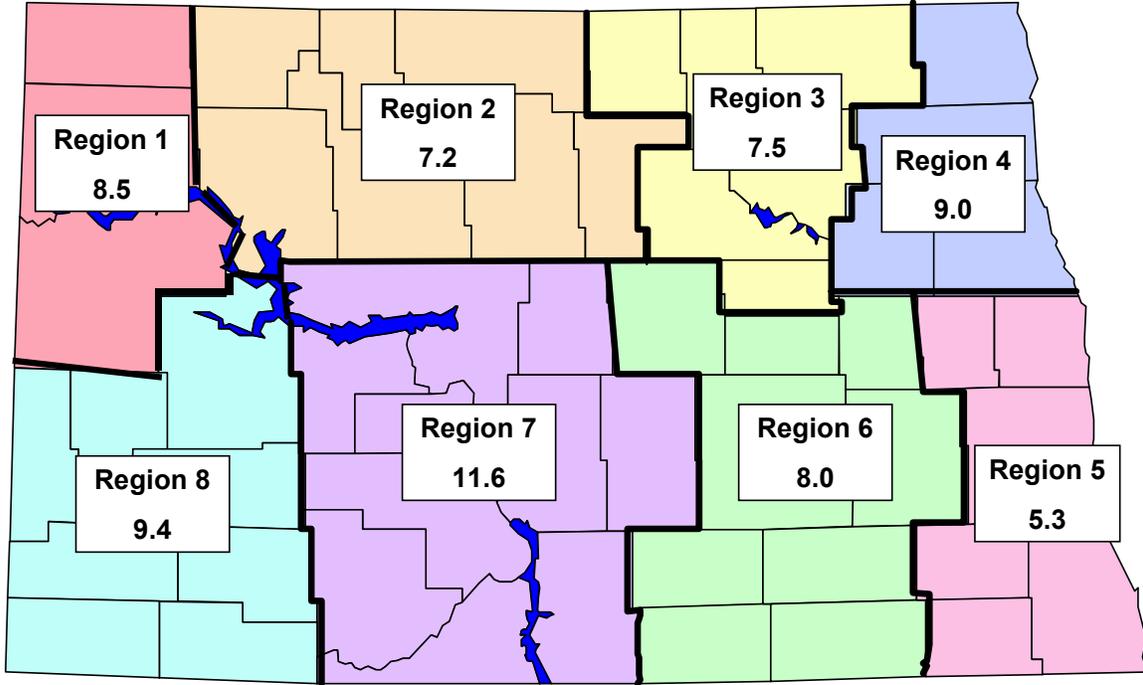
State Rate - 5.0/1,000

# Nephropathy

Percentage of people with diabetes with nephropathy in 1998

Diagnosis procedure to establish are found in

and/or codes used these rates Appendix J.



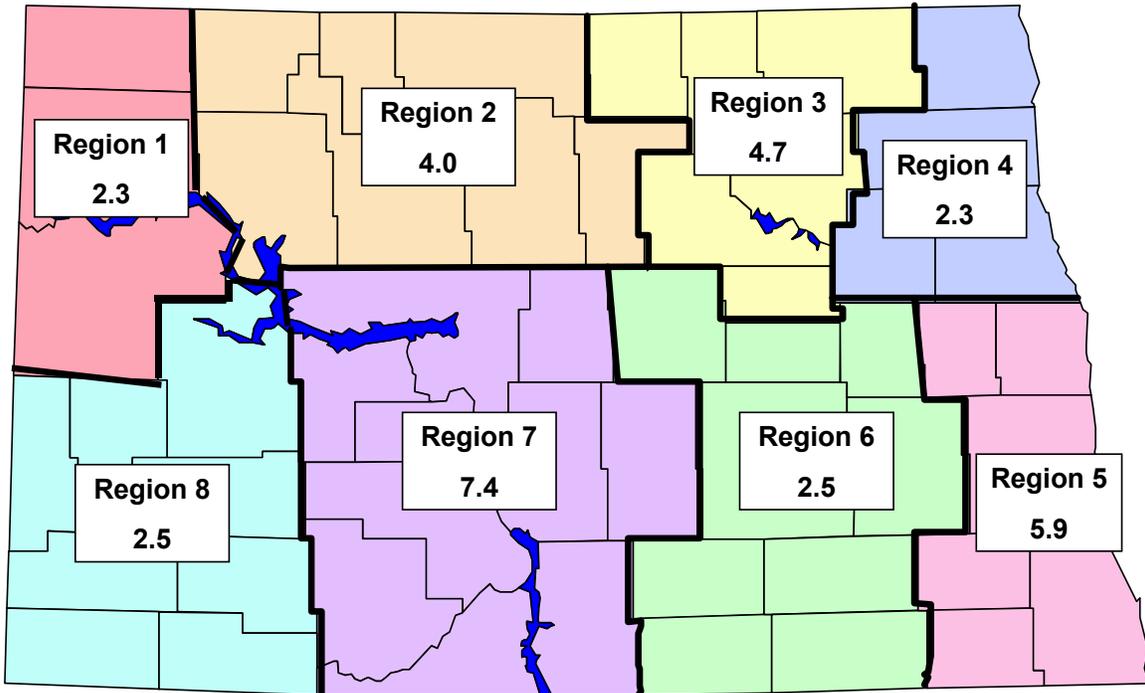
State Rate - 8.3%

# Kidney Transplants

Rate per 1,000 people with diabetes in 1998

The procedure, revenue establish are found in

diagnosis, and/or codes used to these rates Appendix K.

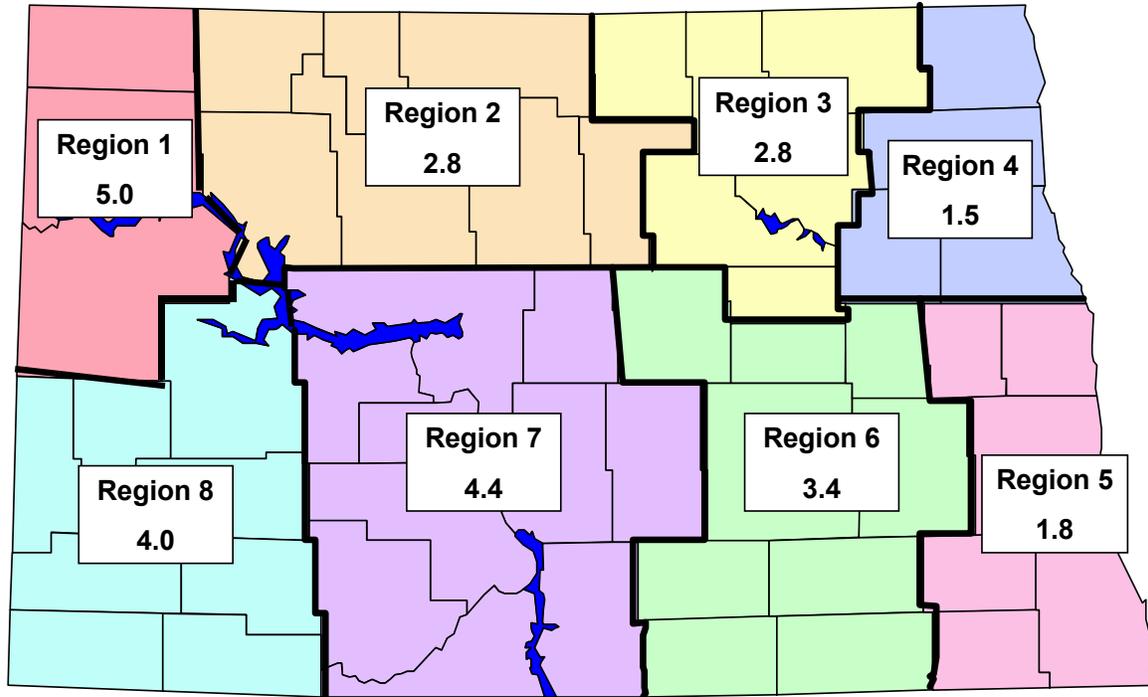


State Rate - 5.0/1,000

# Peripheral Vascular Disease

Percentage of people with diabetes with peripheral vascular disease in 1998

Diagnosis procedure to establish are found in



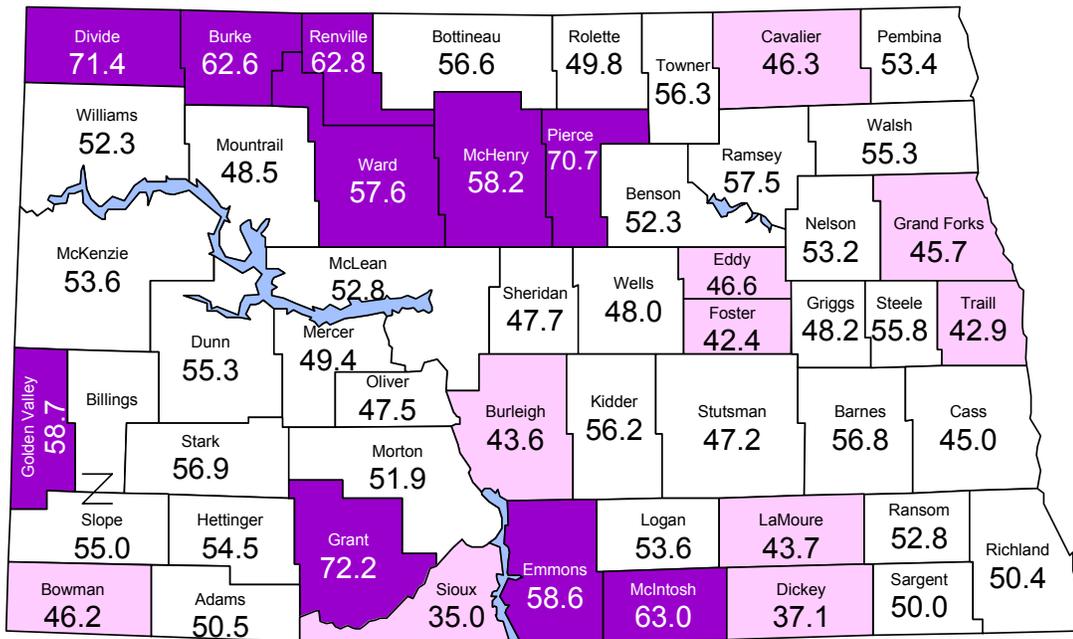
and/or codes used these rates Appendix L.

State Rate - 3.0%

# Hypertension

Percentage of people with diabetes with hypertension in 1998

Diagnosis procedure used to these rates can in Appendix M.



and/or codes establish be found

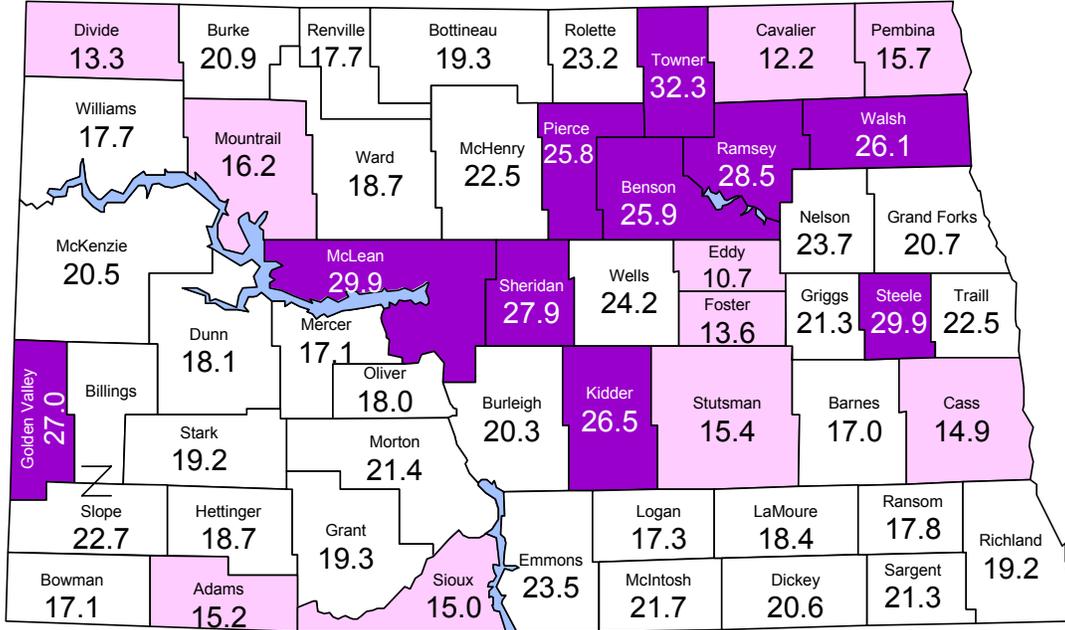
Counties with 10 highest rates

State Rate - 49.9%

Counties with 10 lowest rates

# Coronary Artery Disease

Percentage of people with diabetes with coronary artery disease In 1998



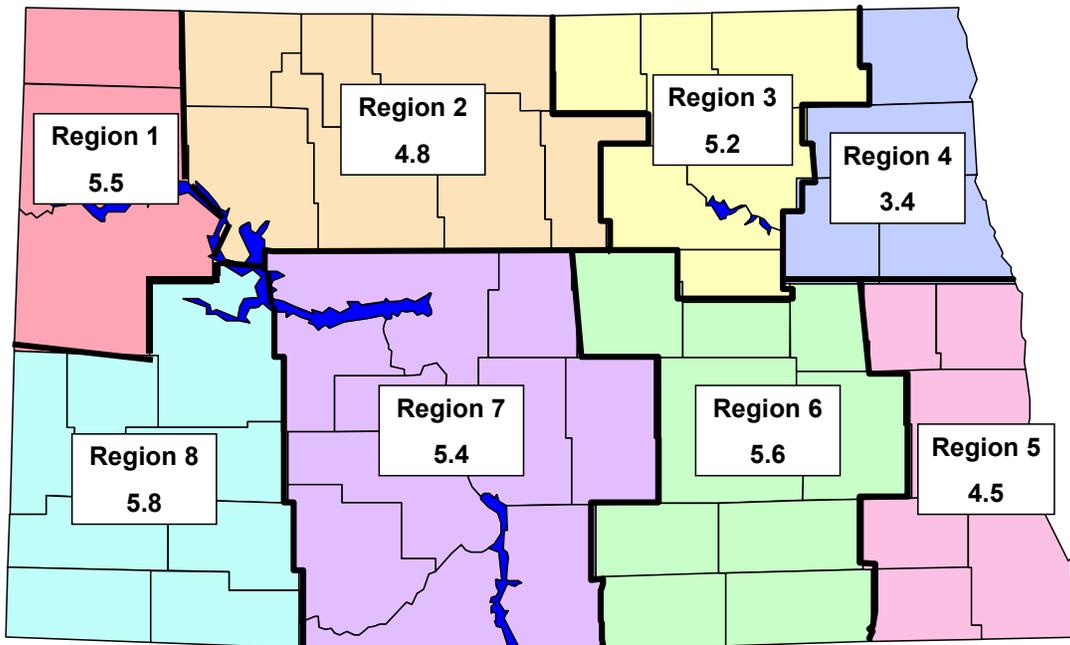
Diagnosis procedure to establish can be found N.

and/or codes used this rate in Appendix

Counties with 10 highest rates      State Rate - 19.2%      
  Counties with 10 lowest rates

# Cerebrovascular Disease

Percentage of people with diabetes with cerebrovascular disease in 1998



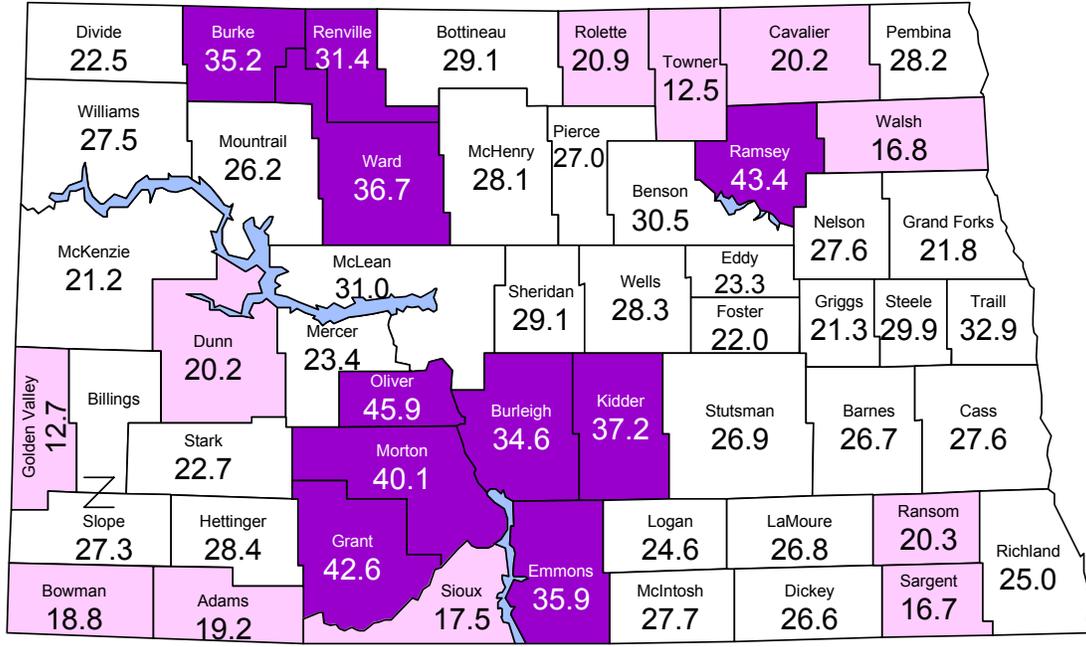
Diagnosis procedure codes these rates can Appendix O.

and/or used to establish be found in

State Rate - 4.8%

# Hyperlipidemia

Percentage of people with diabetes with hyperlipidemia in 1998



Counties with 10 highest rates
 State Rate - 28.4%
 Counties with 10 lowest rates

*Diagnosis procedure to these rates found in*

*and/or codes used establish can be Appendix P.*

*Diagnosis and/or procedure codes used to establish these rates can be found in Appendix Q.*

# Acute Complications of Diabetes

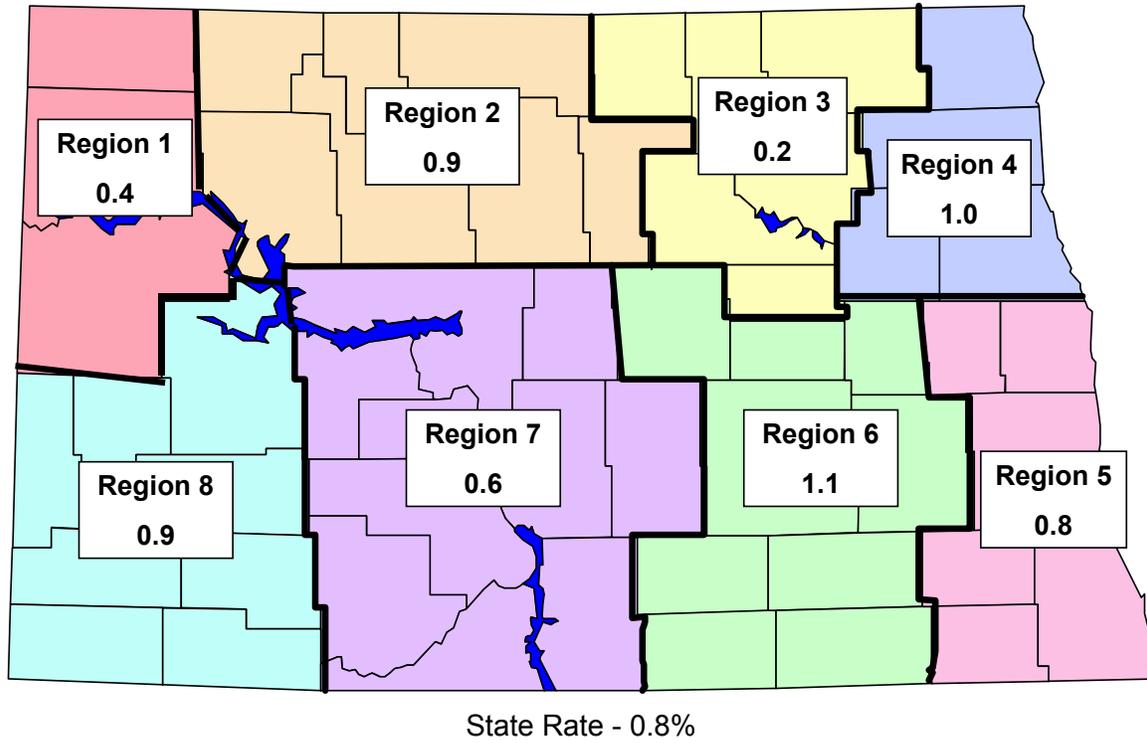
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## *Annual Rates*

Ketoacidosis

# Ketoacidosis

Percentage of people with diabetes with ketoacidosis in 1998



*Diagnosis and/or procedure codes used to establish these rates can be found in Appendix R.*

# Birth Information

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## *Annual Rates*

The birth rates contained in this report have been taken from 1998 North Dakota birth certificates.

The complication rates were calculated using information contained in field B43, "Complications of Labor and/or Delivery," on the birth certificate.

The congenital defect rates were calculated using information contained in field B46, "Congenital Anomalies of Child," on the birth certificate.

Mother's diabetes status was determined using field B40, "Medical Risk Factors," with a code of 04 for gestational diabetes and a code of 44 for diabetes.

## North Dakota Births 1994 to 1998

### Diabetes and Pregnancy

Optimal blood sugar control through early medical care, patient education and training needs to begin before conception for women with established diabetes and during pregnancy for women with established or gestational diabetes to prevent or reduce complications of pregnancy, birth, and or delivery.<sup>15</sup>

Blood sugar control needs to be achieved to reduce or prevent congenital malformations to infants of women with established diabetes and complications of labor and delivery for women with established and gestational diabetes.

### Results

While the percent of births associated with diabetes increased in North Dakota from 1994 to 1998, the percentage of births to women with established diabetes resulting in a congenital anomaly declined and the percentage of birth with complications of labor and delivery also declines for women with gestational diabetes during this same time period.

## Births to All Women Living in North Dakota

	1994	1995	1996	1997	1998
Number of births	8,585	8,479	8,364	8,365	7,935
Percent with congenital anomalies	2.0%	1.9%	1.7%	1.4%	1.8%
Percent with complications of birth and delivery	30.3%	30.7%	30.9%	31.0%	31.6%

	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
Births to women without diabetes	97.9%	97.6%	97.4%	96.8%	96.8%
Births to women with established diabetes	0.3%	0.5%	0.4%	0.4%	0.4%
Births to women with gestational diabetes	1.8%	1.9%	2.3%	2.8%	2.8%

### Births to Women in North Dakota without Diabetes

	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
Number of births	8,408	8,274	8,143	8,101	7,682
Percent with congenital anomalies	1.9%	1.8%	1.7%	1.5%	1.8%
Percent with complications of birth and delivery	30.0%	30.3%	30.5%	30.6%	31.5%

### Births to Women in North Dakota with Established Diabetes

	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
Number of births	22	45	32	34	32
Percent with congenital anomalies	9.1%	6.7%	6.3%	0.0%	0.0%
Percent with complications of birth and delivery	36.4%	55.6%	62.5%	52.9%	43.8%

### Births to Women in North Dakota with Gestational Diabetes

	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
Number of births	155	160	189	230	221
Percent with congenital anomalies	2.6%	3.1%	3.2%	0.9%	2.3%
Percent with complications of birth and delivery	45.1%	45.6%	40.7%	40.4%	33.9%

# Diabetes Mortality

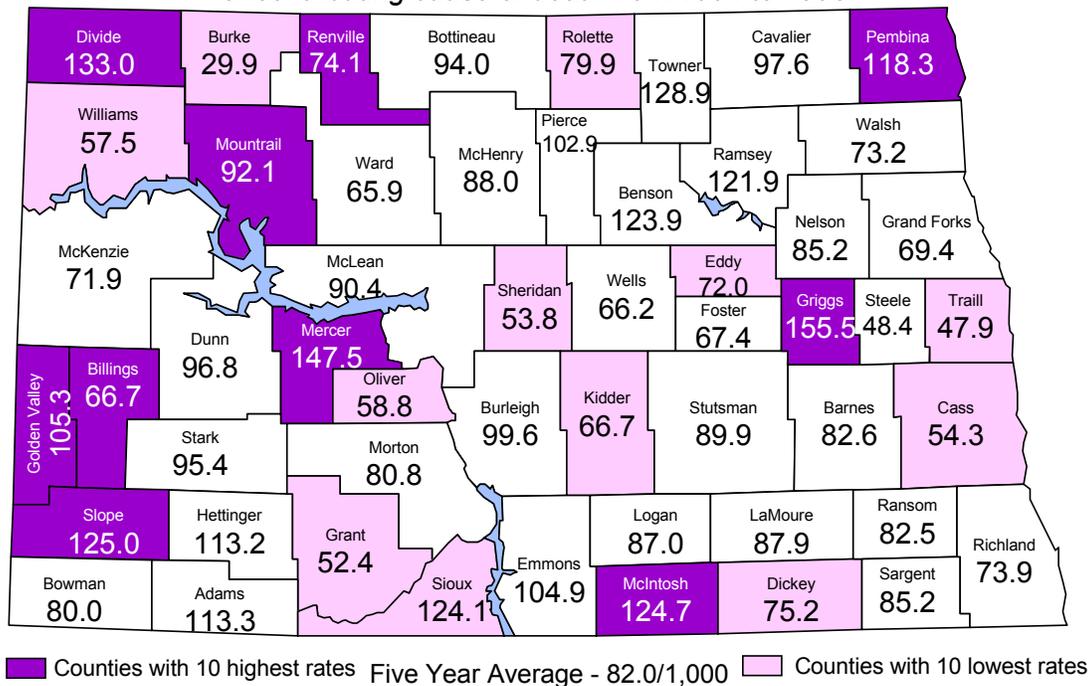
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## *Annual Rates*

The information used to calculate death rates was taken from fields D22, "Underlying Cause of Death," and D26, "Multiple Cause/Condition," on 1998 North Dakota death certificates.

## Diabetes Mortality

Five year average rate per 1,000 deaths where diabetes was a primary or contributing cause of death from 1994 to 1998



This information was taken from the North Dakota Division of Vital Statistics database and was constructed from information contained in fields D22 and D26 of the 1994 to 1998 North Dakota death certificates, which reflect the deaths in patients with diabetes listed as a primary or contributing cause of death.

# Appendices A-T

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## *Diabetes Diagnosis and Procedure Codes*

Enclosed are the codes used to define care and complication rates.

## Elements of Diabetes Care - Office Visits

Description	CPT-4 Evaluation and Management Code
Primary Office Visit	Physician specialty of General Practice, Family Practice, Internal Medicine, Pediatrics, Endocrinology or Nephrology and one of the following codes:
New patient (office)	99201-99205
Established patient (office)	99211-99215
Office consultation	99241-99245
New patient (home)	99341-99343
Established patient (home)	99351-99353
New patient (preventative medicine)	99381-99387
Established patient (preventative medicine)	99391-99397
Other E/M services	99499
Domiciliary care, new patient	99321-99323, 99331-99333
Nursing home	99311-99313

## Elements of Diabetes Care - Glycated Hemoglobin

Description	CPT-4 Procedure Code
Hemoglobin (glycated)	83036

## Elements of Diabetes Care - Eye Examinations

Description	CPT-4 E&M and Proc. Code
Repair of retinal detachment, one or more sessions; cryotherapy or diathermy with or without drainage of subretinal fluid	67101
Photocoagulation, with or without drainage of subretinal fluid	67105
Repair of retinal detachment; scleral buckling, with or without implant, with or without cryotherapy, photocoagulation, and drainage of subretinal fluid	67107
With vitrectomy, any method, with or without air or gas tamponade, focal endolaser, photocoagulation, cryotherapy, drainage or subretinal fluid, scleral buckling, and/or removal of lens by same technique	67108
By injection of air or other gas	67110
By scleral buckling or vitrectomy, on patient having previous ipsilateral retinal detachment repair(s) using scleral buckling or vitrectomy techniques	67112
Prophylaxis of retinal detachment without drainage, one or more sessions; cryotherapy, diathermy	67141
Photocoagulation (laser or xenon arc)	67145
Destruction of localized lesion of retina, one or more session; cryotherapy, diathermy	67208
Photocoagulation	67210
Radiation by implantation of source (includes removal of source)	67218
Destruction of extensive or progressive retinopathy, one or more sessions; cryotherapy, diathermy	67227
Photocoagulation (laser or xenon arc)	67228
New patient	92002
New patient, comprehensive	92004

Established patient	92012
Established patient, comprehensive	92014
Exam and evaluation under general anesthesia	92018
Limited exam	92019
Ophthalmoscopy, extended, with retinal drawing; initial	92225
Ophthalmoscopy, extended, with retinal drawing, subsequent	92226
Fluorescein angiography with medical diagnostic evaluation	92230
Fluorescein angiography with medical diagnostic evaluation	92235
Fundus photography	92250
Ophthalmodynamometry	92260
Specialized services with fluorescein angiography	92287
	<b>ICD-9-CM Proc. Code</b>
Diagnostic procedures on retina, choroid, vitreous, and posterior chamber	14.1X
Destruction of lesion or retina and choroid	14.2X
Repair of retinal tear	14.3X
Repair of retinal detachment with scleral buckling and implant	14.4X
Other repair of retinal detachment	14.5X
Other operations on retina, choroid, and posterior chamber	14.9X
Comprehensive eye examination	95.02
Eye examination under anesthesia	95.04
Fundus photography	95.11
Fluorescein angiography or angiography of eye	95.12
P32 and other tracer studies of eye	95.16

Appendix D

### Elements of Diabetes Care - Microalbumin

Description	CPT-4 Proc. Code
Urine, quantitative	82042
Urine, microalbumin, quantitative	82043
Urine, microalbumin, semiquantitative (e.g., reagent strip assay)	82044

Appendix E

### Elements of Diabetes Care - Lipid Evaluation

Description	CPT-4 Proc. Code
Lipid panel (and/or codes for specific tests)	80061
Lipoprotein cholesterol, high resolution	83716
LDL cholesterol	83721

## Influenza Immunization

Description	CPT-4 Proc. Code
Administration of influenza virus vaccine	G0008
Split virus, 6-35 months dosage	90657
Split virus, 3 years and above dosage	90658
Whole virus	90659

## Chronic Complications - Neuropathy

Description	ICD-9-CM DX Code
Diabetes with neurological manifestations	250.6X (0-3)
Peripheral autonomic neuropathy in disorders classified elsewhere -- Code first underlying disease: 250.6x (0-3)	337.1
Carpal mononeuritis of upper limb and mononeuritis multiplex	354.X
Lesion of sciatic nerve	355.0
Other lesion of femoral nerve	355.2
Lesion of lateral popliteal nerve	355.3
Lesion of medial popliteal nerve	355.4
Tarsal tunnel syndrome	355.5
Lesion of plantar nerve	355.6
Causalgia of lower limb	355.71
Other Mononeuritis of lower limb	355.79
Mononeuritis of lower limb, unspecified	355.8
Mononeuritis of unspecified site	355.9
Polyneuropathy in diabetes -- Code first underlying disease: 250.6X (0-3)	357.2
Myastenic syndromes in diseases classified elsewhere -- code first diabetes 250.6X (0-3)	358.1
Gastroparesis - code first diabetes 250.6X (0-3)	536.3
Arthropathy associated with neurological disorders -- Code first underlying disease: 250.6X (0-3)	713.5
Diarrhea - code first diabetes 250.6X (0-3)	787.91

## Chronic Complications - Eye Complications

Description	ICD-9-CM DX Code
Diabetes with ophthalmological manifestations	250.5X (0-3)
Profound impairment, both eyes	360.0X (0-4)
Blind hypotensive eye	360.41
Traction retina detachment	361.81
Diabetic retinopathy - Code first diabetes 250.5X (0-3)	362.0X
Other retinal disorders	362.8X
Preglaucoma, unspecified	365.00

Open angle with borderline findings	365.01
Anatomical narrow angle	365.02
Open-angle glaucoma, unspecified	365.10
Primary open-angle glaucoma	365.11
Low tension glaucoma	365.12
Pigmentary glaucoma	365.13
Residual stage of open-angle glaucoma	365.15
Primary angle-closure glaucoma, unspecified	365.2X
Glaucoma associated with systemic syndromes (Code first associated disease)	365.44
Glaucoma associated with vascular disorders	365.63
Unspecified glaucoma	365.9
Anterior subcapsular polar cataract	366.01
Posterior subcapsular polar cataract	366.02
Cortical, lamellar, or zonular cataract	366.03
Nuclear cataract	366.04
Other and combined forms of nonsenile cataract	366.09
Incipient cataract	366.12
Total or mature cataract	366.17
Hypermature cataract	366.18
Diabetic cataract - Code first diabetes 250.5X (0-3)	366.41
Unspecified cataract	366.9
Profound impairment, both eyes	369.0X
Moderate or severe impairment, better eye; profound impairment, lesser eye	369.1X
Moderate or sever impairment, both eyes	369.2X
Unqualified vision loss, both eyes	369.3
Legal blindness, as defined in U.S.A.	369.4
Profound impairment, one eye	369.6X
Moderate or severe impairment, one eye	369.7X
Unqualified visual loss, one eye	369.8
Unspecified vision loss	369.9
Vitreous degeneration	379.21
Vitreous hemorrhage	379.23
Other vitreous opacities	379.24
Vitreous membranes and strands	379.25

Vitreous prolapse	379.26
Other disorders of vitreous	379.29
	<b>CPT-4 Proc. Code</b>
Destruction of localized lesion of retina (e.g., maculopathy, chorioidopathy, small tumors), one or more sessions; cryotherapy, diathermy	67208
- focal laser treatment for diabetic macular edema (photocoagulation) (laser or xenon arc)	67210
Destruction of extensive or progressive retinopathy (e.g., diabetic retinopathy), one or more sessions; cryotherapy, diathermy	67227
- photocoagulation for proliferative diabetic retinopathy (laser or xenon arc)	67228

Appendix I

### Chronic Complications - Lower Extremity Complications

Description	ICD-9-CM DX Code
Carbuncle and Furuncle; leg, except foot	680.6
Carbuncle and Furuncle; foot	680.7
Carbuncle and Furuncle; unspecified site	680.9
Toe; cellulitis and abscess, unspecified	681.10
Onychia and paronychia of toe	681.11
Cellulitis and abscess of unspecified digit	681.9
Other cellulitis and abscess of leg, except foot	682.6
Other cellulitis and abscess of foot, except toes	682.7
Unspecified local infection of skin and subcutaneous tissue	686.9
Decubitus ulcer; skin	707.0
Skin ulcer of lower limbs, except decubitus	707.1
Chronic ulcer of other unspecified sites; skin	707.8
Arthropathy associated with neurological disorders -- Code first underlying disease: 250.6X (0-3)	713.5
Other bone involvement in diseases classified elsewhere -- Code first underlying disease: 250.8X (0-3)	731.8
Gangrene - Code first underlying disease: 250.7X (0-3)	785.4

Appendix J

### Chronic Complications - Amputation

Description	ICD-9-CM Proc. Code
Lower limb amputation, not otherwise specified	84.10
Amputation of toe	84.11
Amputation through foot	84.12
Disarticulation of ankle	84.13
Amputation of ankle through malleoli of tibia & fibula	84.14
Other amputation below knee	84.15
Amputation above knee	84.17
Revision of amputation stump	84.3

Amputation, not otherwise specified	84.91
	<b>CPT-4 Proc. Code</b>
Amputation, thigh, through femur, any level:	27590
- immediate fitting technique include first cast	27591
- open, circular (guillotine)	27592
- secondary closure or scar revision	27594
- re-amputation	27596
Disarticulation at knee	27598
Amputation, leg, through tibia and fibula	27880
- with immediate fitting technique include application of first cast	27881
- open, circular (guillotine)	27882
- secondary closure or scar revision	27884
- re-amputation	27886
Amputation, ankle, through malleoli of tibia and fibula (Syme, Pirogoff type procedures), with plastic closure & resection of nerves	27888
Ankle disarticulation	27889
Amputation, foot; midtarsal (Chopart type procedure)	28800
- transmetatarsal	28805
Amputation, metatarsal, with toe, single	28810
Amputation, toe; metatarsophalangeal joint	28820
- interphalangeal joint	28825

Appendix K

### Chronic Complications -- Nephropathy

<b>Description</b>	<b>CPT-4 Proc. Code</b>
Insertion of cannula for hemodialysis, other purpose; vein to vein	36800
Arteriovenous, external	36810
Arteriovenous, external revision, or closure	36815
Donor nephrectomy from cadaver donor	50300
Removal of transplanted renal allograft	50370
ESRD for a full month for patients 12 to 18 years	90920
ESRD for a full month for patients 20 years or older	90921
ESRD for less than a full month for patients 12 to 19 years	90924
ESRD for less than a full month for patients 20 years or older	90925
Hemodialysis procedure with single physician evaluation	90935
Hemodialysis procedure requiring repeated evaluation(s)	90937
Dialysis other than hemodialysis with single physician evaluation	90945

Dialysis other than hemodialysis requiring repeated evaluation(s)	90947
Dialysis training, patient, including helper, any mode, completed course	90989
Dialysis training, patient, including helper, any mode, course not completed, per training session	90993
Hemoperfusion	90997
Unlisted dialysis procedure, inpatient or outpatient	90999
	<b>ICD-9-CM Proc. Code</b>
Arteriovenostomy for renal dialysis	39.27
Revision of arteriovenous shunt for renal dialysis	39.42
Removal of arteriovenous shunt for renal dialysis	39.43
Repair of arteriovenous fistula	39.53
Insertion of vessel-to-vessel cannula	39.93
Replacement of vessel-to-vessel cannula	39.94
Hemodialysis	39.95
Peritoneal dialysis	54.98
Partial nephrectomy	55.4X
Transplant of kidney	55.6X
	<b>ICD-9-CM DX Code</b>
Diabetes with Renal Manifestations	250.4X (0-3)
Hypertensive renal disease	403.XX
Hypertensive heart and renal disease	404.XX
Secondary hypertension, benign, renovascular	405.11
Secondary hypertension, unspecified, renovascular	405.91
Acute renal failure	584.XX
Chronic renal failure	585
Renal failure, unspecified	586
Disorders resulting from impaired renal function	588.X
Congenital anomalies of urinary system	753.0
Cystic kidney disease	753.1X
Proteinuria	791.0
Amputation stump complication, unspecified complication	997.60
Neuroma of amputation stump	997.61
Infection; chronic	997.62
Not elsewhere classified	997.69
Renal dialysis status	V45.1
Extracorporeal dialysis	V56.0
Fitting and adjustment of extracorporeal dialysis catheter	V56.1
Other dialysis	V56.8
	<b>Revenue Code</b>
Inpatient renal dialysis	80X

Hemodialysis, outpatient or home, general	820
Support Services	825
Other outpatient hemodialysis	829
Peritoneal dialysis, outpatient or home	83X
CAPD, outpatient or home	84X
CCPD, outpatient or home	85X
Miscellaneous dialysis, general	880
Ultrafiltration	881
Home dialysis aid visit	882
Other miscellaneous dialysis	889

Appendix L

### Kidney Transplants

Description	CPT-4 Proc. Code
Recipient nephrectomy (separate procedure)	50340
Renal allotransplantation, implantation of graft, excluding donor and recipient nephrectomy	50360
Renal allotransplantation, with recipient nephrectomy	50365
Renal autotransplantation, reimplantation of kidney	50380
	ICD-9-CM Proc. Code
Organ or tissue replaced by transplant: kidney	V42.0

Appendix M

### Chronic Complications - Peripheral Vascular Disease

Description	ICD-9-CM DX Code
Diabetes with peripheral circulatory disorders of native arteries of the extremities	250.7X (0-3)
- atherosclerosis of the extremities, unspecified	440.20
- atherosclerosis of the extremities, with intermittent claudication	440.21
- atherosclerosis of the extremities with rest pain	440.22
- atherosclerosis of the extremities with ulceration	440.23
- atherosclerosis of the extremities with gangrene	440.24
Peripheral angiopathy in diseases classified elsewhere	443.81

Appendix N

### Chronic Complications - Hypertension

Description	ICD-9-CM DX Code
Essential hypertension	401.X
Hypertensive heart disease	402.XX
Hypertensive renal disease	403.XX
Hypertensive heart and renal disease	404.XX
Secondary hypertension	405.XX

## Chronic Complications - Coronary Artery Disease

Description	ICD-9-CM DX Code
Of unspecified type or vessel, native or graft	414.00
Of native coronary artery	414.01
Of autologous vein bypass graft	414.02
Of nonautologous biological bypass graft	414.03

## Chronic Complications - Cerebrovascular Disease

Description	ICD-9-CM DX Code
Acute, but ill-defined cerebrovascular disease	436
Basilar artery syndrome	435.0
Vertebral artery syndrome	435.1
Subclavian Steal syndrome	435.2
Vertebrobasilar artery syndrome	435.3
Other specified transient cerebral ischemia	435.8
Cerebral atherosclerosis	437.0
Other generalized ischemia cerebrovascular disease	437.1
Hypertensive encephalopathy	437.2
Transient global amnesia	437.7
Other	437.8

## Chronic Complications - Hyperlipidemia

Description	ICD-9-CM DX Code
Pure hypercholesterolemia	272.0
Pure hyperglyceridemia	272.1
Mixed hyperlipidemia	272.2
Other and unspecified hyperlipidemia	272.4

## Acute Complications - Ketoacidosis

Description	ICD-9-CM DX Code
Diabetes with ketoacidosis	250.1X (0-3)

## Complications of Labor and/or Delivery (Field B43)

Description	Code
None	00
Febrile (> 100 of. Or 38oc.)	01
Meconium, Moderate/Heavy	02
Premature Rupture of Membrane (> 12 hours)	03

Abruptio Placenta	04
Placenta Previa	05
Other Excessive Bleeding	06
Seizures During Labor	07
Precipitous Labor (< 3 hours)	08
Prolonged Labor (> 20 hours)	09
Dysfunctional Labor	10
Breech/Malpresentation	11
Cephalopelvic Disproportion	12
Cord Prolapse	13
Anesthetic Complications	14
Fetal Distress	15
Active Herpes Lesions	16
Other (specify)	17*
Not on Certificate	88
No Entry or Not Stated	99

*\*If complication code is cited on birth certificate, it must be accompanied by a corresponding ICD code, no blanks allowed.*

Appendix T

### Congenital Anomalies of Child (Field B46)

Description	Code
None	00
Anencephalus	01
Spina Bifida/Meningocele	02
Hydrocephalus	03
Microcephalus	04
Other Central Nervous System Anomalies (specify)	05*
Heart Malformations	06
Other Circulatory/Respiratory Anomalies (specify)	07*
Rectal Atresia/Stenosis	08
Tracheoesophageal Fistula/Esophageal Atresia	09
Omphalocele/Gastroschisis	10
Other Gastrointestinal Anomalies (specify)	11*
Malformed Genitalia	12
Renal Agenesis	13
Other Urogenital Anomalies (specify)	14*
Cleft Lip/Palate	15
Polydactyly/Syndactyly/Adactyly	16
Club Foot	17
Diaphragmatic Hernia	18

Other Musculoskeletal/Integumental Anomalies (specify)	19*
Down's Syndrome	20
Other Chromosomal Anomalies (specify)	21*
Other (specify)	22*
Not on Certificate	88
No Entry or Not Stated	99

*\*If complication code is cited on birth certificate, it must be accompanied by a corresponding ICD code, no blanks allowed.*