DIABETES

DIABETES IN NEW YORK CITY:
PUBLIC HEALTH BURDEN AND DISPARITIES

TABLE OF CONTENTS

LETTER FROM THE COMMISSIONER

EXECUTIVE SUMMARY

INTRODUCTION

CHAPTER 1 – PREVALENCE 1-1

CHAPTER 2 – OBESITY AND RELATED RISK FACTORS 2-1

CHAPTER 3 – MORBIDITY: HOSPITALIZATIONS AND END-STAGE RENAL DISEASE 3-1

CHAPTER 4 – MORTALITY 4-1

CHAPTER 5 – HEALTH CARE INDICATORS 5-1

CHAPTER 6 – DIABETES DURING PREGNANCY.....6-1

APPENDIX A – ABOUT THE DATA APXA-1

APPENDIX B – NEIGHBORHOOD TABLES AND MAPS ..APXB-1

REFERENCES REF-1

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THE CITY OF NEW YORK

DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Michael R. Bloomberg
Mayor

Thomas R. Frieden, M.D., M.P.H.
Commissioner

nyc.gov/health

June 2007

Dear Fellow New Yorkers:

Diabetes is epidemic in New York City. Diabetes prevalence has more than doubled over the past 10 years. More than half a million adult New Yorkers have diagnosed diabetes and an additional 200,000 have diabetes *but do not yet know it.* Diabetes and diabetes-associated cardiovascular disease are leading causes of death in NYC. About two-thirds of people with diabetes die from cardiovascular events. This report, *Diabetes in New York City: Public Health Burden and Disparities,* captures the devastating effects of the diabetes epidemic in NYC and the large disparities in its impact on different populations. This epidemic requires an effective public health response similar to that traditionally associated with communicable diseases.

Timely and complete population-level data on diabetes and its management are needed to support public health action and track its impact. Data compiled by the NYC Department of Health and Mental Hygiene (DOHMH) over the past few years, summarized in this first edition of *Diabetes in New York City,* are a good start but do not tell us enough about how well diabetes is being controlled. The two recent DOHMH initiatives detailed below will greatly enhance public health surveillance of the epidemic:

- As of January 15, 2006, the New York City Board of Health requires most clinical laboratories to report hemoglobin A1C test results electronically to the DOHMH. Laboratory data on A1C, a key measure of diabetes control, are being used to establish the first population-based A1C registry in the nation. The registry will enable the DOHMH to give clinicians and patients feedback and resources that can improve the quality of care and quality of life for New Yorkers with diabetes.

- The New York City Health and Nutrition Examination Survey (NYC HANES), conducted in 2004, provides data on A1C levels, blood pressure, lipids and smoking prevalence for a representative sample of New Yorkers with diabetes. For the first time, estimates on how well diabetes is controlled among NYC adults are available.

The DOHMH is working to provide clinical tools, diabetes resources and patient education materials to New Yorkers with diabetes and their health care providers. Better data will help us provide more timely and more focused resources, and will strengthen our partnership with patients and their health care providers.

Sincerely,

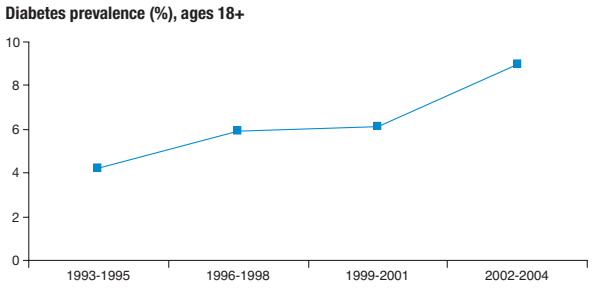
Thomas R. Frieden, MD, MPH
Commissioner
New York City Department of Health and Mental Hygiene

EXECUTIVE SUMMARY

Despite advances in knowledge of diabetes care and control, diabetes was the 4th leading cause of death in New York City (NYC) in 2003, directly causing more than 1,800 deaths and contributing to thousands more. In the past decade, the prevalence of diagnosed diabetes has more than doubled among adults in NYC **(Figure 1)**. More than 200,000 additional adult New Yorkers have diabetes *but have not yet been diagnosed.* This means that approximately 1 in 8 adults has diabetes. More than half of adult New Yorkers are overweight or obese, which increases the risk of diabetes.

FIGURE 1

The prevalence of diabetes among adults more than doubled between 1993 and 2004



Rates are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Sources: CDC, Behavioral Risk Factor Surveillance System, 1993-2001; NYC Community Health Survey, 2002-2004

- Uncontrolled diabetes is the leading cause of blindness, end-stage renal disease and non-traumatic lower extremity amputations in adults.
- Each year in NYC there are more than 20,000 hospitalizations with a principal diagnosis of diabetes.
- Although the hospitalization rate for diabetes has been stable in recent years, the increase in prevalence reflects a growing number of newly diagnosed, not yet hospitalized people.
- It is likely that diabetes-related hospitalizations will increase in the coming years.
- The health care costs attributed to diabetes and its complications are large and growing. The annual cost of hospitalizations with a principal diagnosis of diabetes – which reflects only a small portion of diabetes-related costs – doubled from 1990 to 2003, reaching $481 million.

Diabetes disproportionately affects black and Latino New Yorkers, as well as those living in low-income households and neighborhoods. These disparities are evident in diabetes prevalence, hospitalizations and mortality, and track closely with patterns of overweight and obesity, and with the related behaviors of physical inactivity and

FIGURE 2

Diabetes and obesity have their greatest impact in New York City's poorest neighborhoods

	Low-income neighborhoods*	High-income neighborhoods*	Low-income neighborhoods higher by...
Overweight and obesity prevalence (%)	61	47	1.3 times
Diabetes prevalence (%)	12	6	2 times
Diabetes hospitalization (per 100,000 population)	559	200	2.8 times
Diabetes mortality (per 100,000 population)	37	16	2.3 times

* See Appendix A.
Percents and rates are age-adjusted to the year 2000 U.S. Standard Population. Percents exclude individuals who did not report age.
Sources: NYC Community Health Survey, 2003; Bureau of Vital Statistics, NYC DOHMH, 2003; U.S. Census 2000/NYC Department of City Planning

unhealthy diet. However, neighborhood disparities in diabetes mortality and hospitalization are partly, but not completely, accounted for by differences in diabetes and overweight/obesity prevalence **(Figure 2)**. Neighborhood disparities in diabetes morbidity and mortality may be influenced by differences in diabetes severity, access to health care or availability of healthy foods and places to exercise.

Regular medical monitoring and patient involvement in diabetes self-management can dramatically reduce rates of diabetes-related morbidity and mortality. Unfortunately, there is still a large gap between recommended health services and current practices. For example, among NYC adults with diabetes:

- More than one-third did not receive an eye or foot exam in the past year
- 57% did not get a flu vaccine in the past year
- 72% have never been immunized against pneumonia
- 77% do not take aspirin regularly
- 56% have never taken a diabetes self-management class

Some good news is that the majority of adults with diabetes report that during the past year they had a routine checkup, had their blood pressure and cholesterol levels checked, and were counseled on weight, nutrition and exercise at their last doctor's visit. However, while 4 in 5 adults with diabetes in NYC report having had at least 1 hemoglobin A1C test in the past year, only 16% of these adults know their A1C level. Furthermore, data from the NYC HANES revealed that more than half of all adults with diagnosed diabetes have hemoglobin A1C levels of 7% or greater, indicating that their blood sugar levels are not well controlled. In addition, most did not have their blood pressure or cholesterol within recommended levels.

Poorly controlled diabetes during pregnancy, whether chronic (diagnosed before pregnancy) or gestational (diagnosed during pregnancy), is associated with a higher risk of poor birth outcomes. The prevalence of diabetes during pregnancy grew 47% between 1990 and 2003, when it was present in more than 4% of all pregnancies. Maternal obesity increases the risk of diabetes during pregnancy.

The data in this report illustrate the magnitude of the diabetes problem in NYC and its disproportionate impact on low-income New Yorkers and the neighborhoods where they live.

INTRODUCTION

New York City, in parallel with the nation overall, is experiencing an epidemic of diabetes driven, in turn, by another epidemic – obesity. Dramatic disparities are evident, with low-income populations, blacks and Hispanics disproportionately affected.

Diabetes is a chronic condition characterized by high levels of blood glucose. It is caused by resistance to insulin (a hormone that regulates levels of blood glucose), inadequate production of insulin, or both. There are 3 main types of diabetes: type 1, type 2 and gestational. Type 1 diabetes has a peak incidence in puberty, but can develop at any age. Type 2 diabetes usually occurs in adults aged 40 and older who have certain inherited and behavioral risk factors, such as a family history of diabetes, or who are overweight, obese or physically inactive. However, with the rise in overweight and obesity at young ages, type 2 diabetes is increasingly affecting adolescents. Gestational diabetes occurs during pregnancy, when the body is less sensitive to insulin.

This report presents an overview of diabetes among New Yorkers as reflected in data from surveys, hospital discharge records and birth and death records. The chapters are organized around the types of data presented – prevalence, risk factors, hospitalizations, mortality, health care indicators and diabetes during pregnancy. Within the chapters, data on time trends, demographic patterns and disparities are presented. Detailed neighborhood-specific tables and maps are provided in **Appendix B**.

This report presents data on adults 18 and older, unless otherwise noted. Only statistically significant, robust findings are discussed. Rates are age-standardized to the U.S. Standard Population 2000, unless otherwise noted, to allow comparisons among populations within NYC, as well as to national data. For a complete description of the data used in compiling this report, see **Appendix A**.

Facts and figures alone cannot capture the challenge faced by the hundreds of thousands of New Yorkers living with diabetes. Nonetheless, these data serve to illuminate this complex problem and to guide a comprehensive public health response.

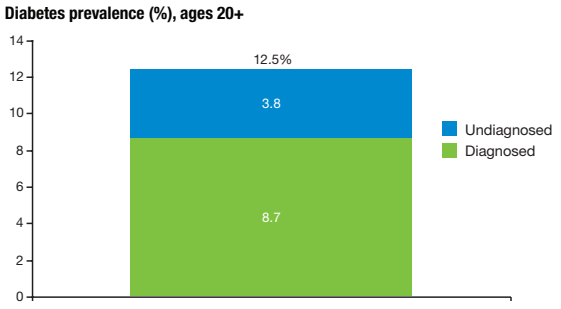
The Diabetes Prevention and Control Program strives to improve the quality of care and quality of life for New Yorkers with diabetes, and reduce the burden of diabetes, its complications, and of diabetes-related disparities in individuals, their families and communities. The program has a 5-point plan focused on prevention, improvement of diabetes quality of care, education, policy and advocacy, and surveillance and evaluation.

CHAPTER 1
PREVALENCE

In 2004, about half a million adults had diagnosed diabetes, and another 200,000 had it but didn't know it—bringing the total number with diabetes to 700,000, or 12.5% of all New York City (NYC) adults **(Figure 1-1)**. People with diabetes may have mild or no symptoms and often have it for 4 to 7 years before being diagnosed. There is no cure for diabetes, but once it is diagnosed, patients and health care providers can take action to control diabetes and reduce the risk of complications (see Chapter 5). The rest of this chapter describes the population of NYC adults who report they have been diagnosed with diabetes.

FIGURE 1-1

Roughly one of eight adult New Yorkers has diabetes



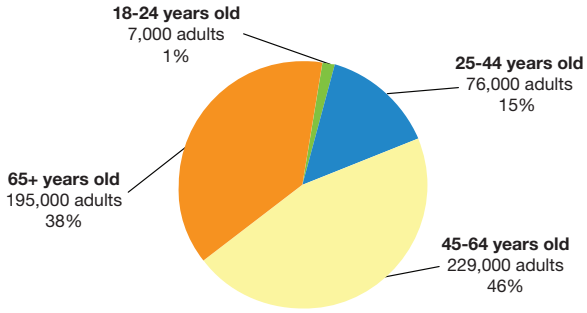
*Prevalence is age-adjusted to the 2000 U.S. Standard Population.
Source: NYC Health and Nutrition Examination Survey

Among adults with diabetes, 84% are 45 or older **(Figure 1-2)**, and 59% are black or Hispanic **(Figure 1-3)**.

The citywide age-adjusted prevalence of self-reported diabetes among adults is 9%, which is 28% higher than the prevalence in the U.S. overall **(Figure 1-4)**. Adults living in Highbridge-Morrisania, Hunts Point-Mott Haven, Williamsburg-Bushwick and East New York are most likely to report having diabetes **(Figure 1-5)**. More neighborhood-level diabetes data are shown in tables and

FIGURE 1-2

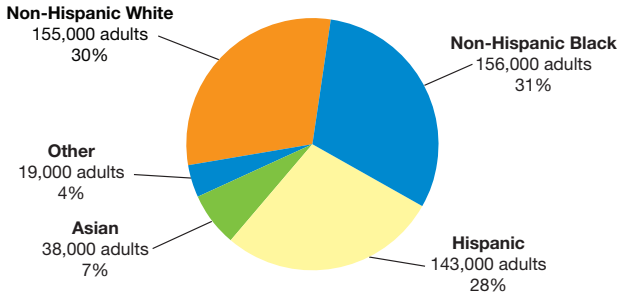
Most adults with diagnosed diabetes are age 45 or older



Percents are not age-adjusted.
Source: NYC Community Health Survey, 2002-2004

FIGURE 1-3

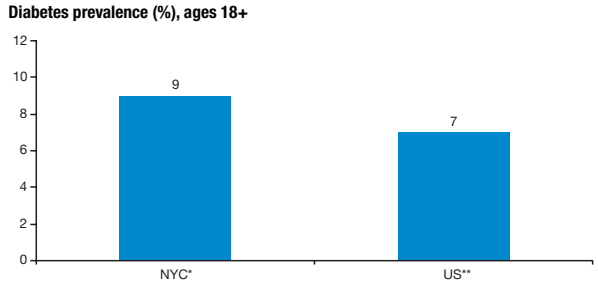
More than half of adults with diagnosed diabetes are black or Hispanic



Percents are not age-adjusted.
Source: NYC Community Health Survey, 2002-2004

FIGURE 1-4

The prevalence of diagnosed diabetes among adults in NYC is higher than among adults nationwide



Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
*Source: NYC Community Health Survey, 2002-2004
**Source: National Health Interview Survey, 2004.

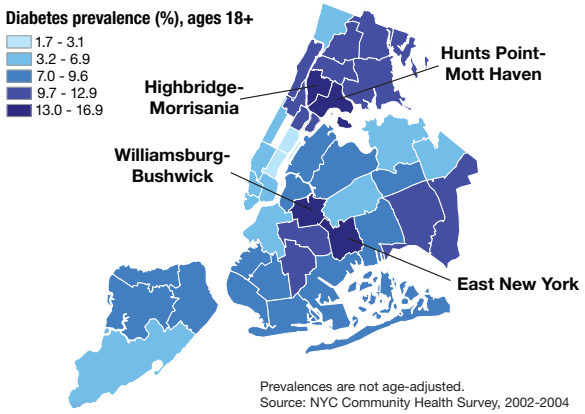
maps in Appendix B. The prevalence of self-reported diabetes among adults increases considerably with age among both men and women. More than 1 in 5 adults aged 65 and older reports having diabetes **(Figure 1-6)**. Men are somewhat more likely than women to report having diabetes (10% vs. 8%).

Adults with the lowest household income are more than twice as likely to report having diabetes as adults with the highest household income **(Figure 1-7)**. While the causes of disparities in diabetes prevalence are not fully understood, economic disadvantage can make it more difficult to access healthy foods and exercise regularly, contributing to disparities in the prevalence of obesity, a major risk factor for diabetes (see Chapter 2).

Racial/ethnic disparities in diabetes prevalence exist, with the highest prevalence occurring among black and Hispanic adults (12% and 13%, respectively). In comparison, diabetes prevalence among whites and Asians is 6% and 9%, respectively **(Figure 1-8)**.

FIGURE 1-5

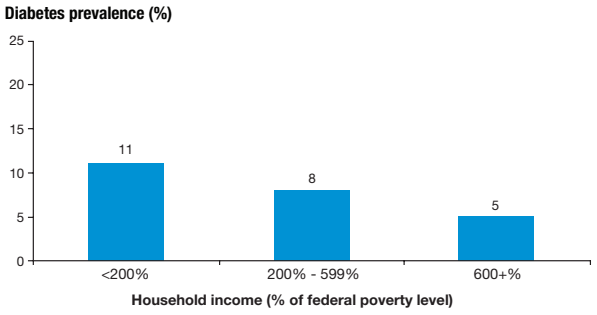
Diabetes prevalence varies by neighborhood



Prevalences are not age-adjusted.
Source: NYC Community Health Survey, 2002-2004

FIGURE 1-7

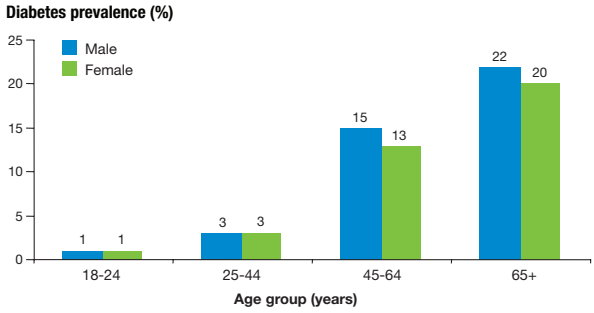
Diabetes prevalence is highest among adults from the lowest income households



Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: NYC Community Health Survey, 2002-2004

FIGURE 1-6

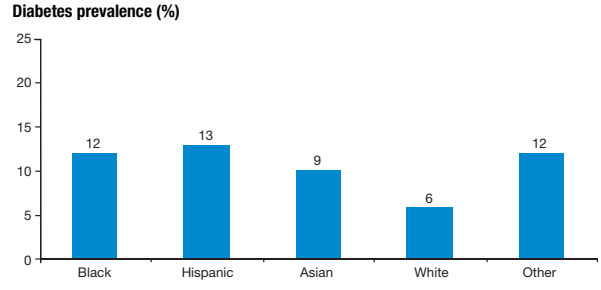
Diabetes prevalence increases with age



Source: NYC Community Health Survey, 2002-2004

FIGURE 1-8

Diabetes prevalence among blacks and Hispanics is more than twice that of whites



Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: NYC Community Health Survey, 2002-2004

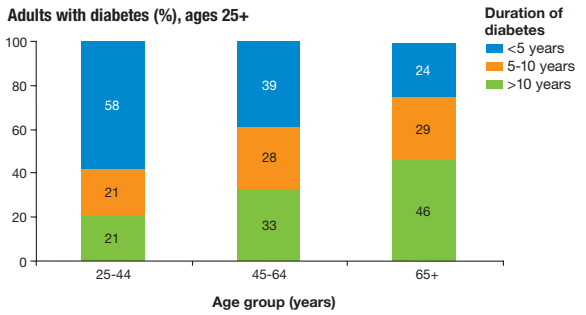
A number of studies have suggested that the risk of diabetes varies among Asian populations, with those of South Asian ancestry at highest risk. This pattern appears to hold true for NYC adults born in South Asia, among whom the prevalence of diabetes is more than 3 times higher than among those born in East Asia.[1]

Among adults aged 25 to 44, more than half have had diabetes for less than 5 years. Not surprisingly, older adults with diabetes are more likely to have had it longer, but more than half of adults 65 and older have had diabetes for 10 years or less **(Figure 1-9)**. The large proportion of recently diagnosed adults will contribute to a growing burden of diabetes complications, which increase in frequency over time.

Nearly half (46%) of adults with diabetes say that their health is fair or poor, compared to 19% of adults without diabetes. In addition, adults with diabetes are twice as likely to report that their usual activity was limited by poor health for at least 1 week in the past month. Adults with diabetes were also twice as likely to report emotional distress, compared to adults without diabetes **(Figure 1-10)**.

FIGURE 1-9

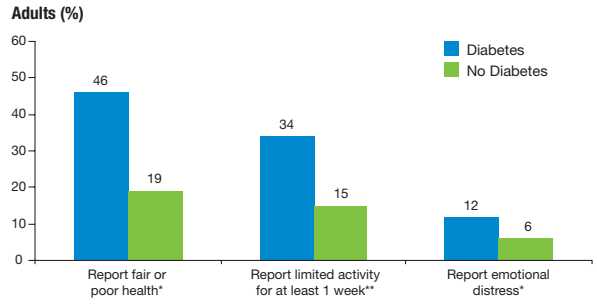
More than half of adults with diabetes have had it for 10 years or less



Source: NYC Community Health Survey, 2002, 2004

FIGURE 1-10

Adults with diabetes are more likely to report poor health, emotional distress and physical activity limitations than those without diabetes



Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
*Source: NYC Community Health Survey, 2002-2004
**Source: NYC Community Health Survey, Spring, Fall 2003

[1] Age-adjusted diabetes prevalence among those age < 65 years was 11% for South Asians compared with 3% for East Asians. There were too few South Asians surveyed who were 65 and older for inclusion in this comparison.

CHAPTER 2

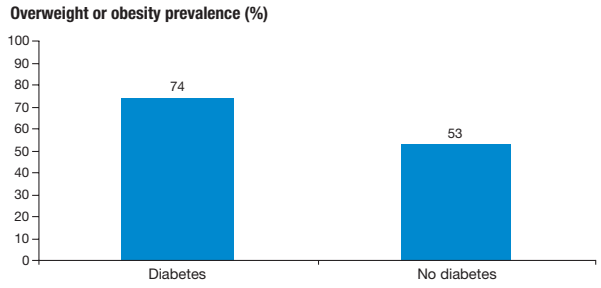
Obesity and Related Risk Factors

Patterns of overweight/obesity – and the related behaviors of physical inactivity and unhealthy diet – underlie the increasing prevalence and disparities in diabetes rates. Adults with diabetes are 40% more likely to be overweight or obese[1] than those without diabetes **(Figure 2-1)**.

While the prevalence of overweight or obesity is lower in New York City than nationwide (54% vs. 65%), more than half of NYC adults are overweight or obese, and 1 in every 5 adults is obese **(Figure 2-2)**.

FIGURE 2-1

Adults with diabetes are more likely to be overweight or obese than those without diabetes

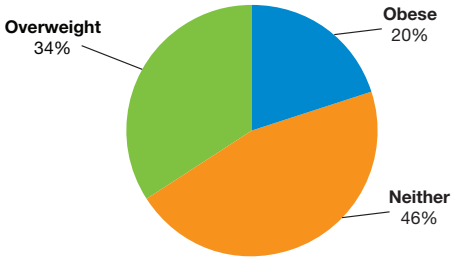


Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: NYC Community Health Survey, 2002-2004

FIGURE 2-2

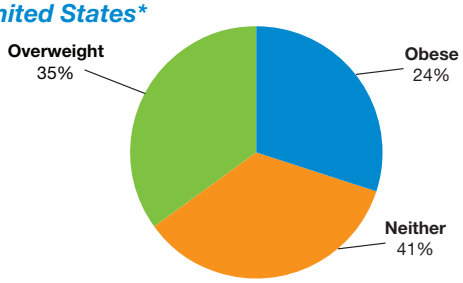
More than half of New York City adults are overweight or obese

New York City



Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: NYC Community Health Survey, 2002-2004

United States*



*Among adults ages 20 and older.
Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: National Health Interview Survey, 2004.

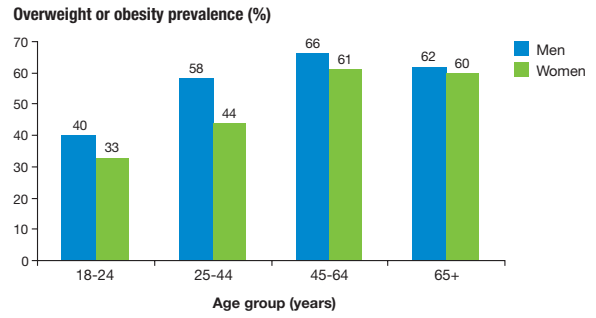
Physical inactivity and unhealthy eating may lead to overweight or obesity – increasing a person's risk of developing diabetes.

- 80% of adult New Yorkers do not get the recommended amount of exercise – at least 30 minutes per day, 5 or more days per week.
- 30% of New York City adults report no leisure-time exercise in the past month.
- 36% report that they did not walk or bicycle at least 10 blocks while commuting or doing errands in the past month.
- 90% of adults eat fewer than the recommended 5 or more servings of fruits or vegetables per day.

[1] Overweight and obesity are defined by an individual's body mass index (BMI), which is based on weight and height. An adult with a BMI between 25 and 30 is classified as overweight, and an adult with a BMI of 30 or greater is classified as obese.

FIGURE 2-3

Men are more likely than women to be overweight or obese in every age group



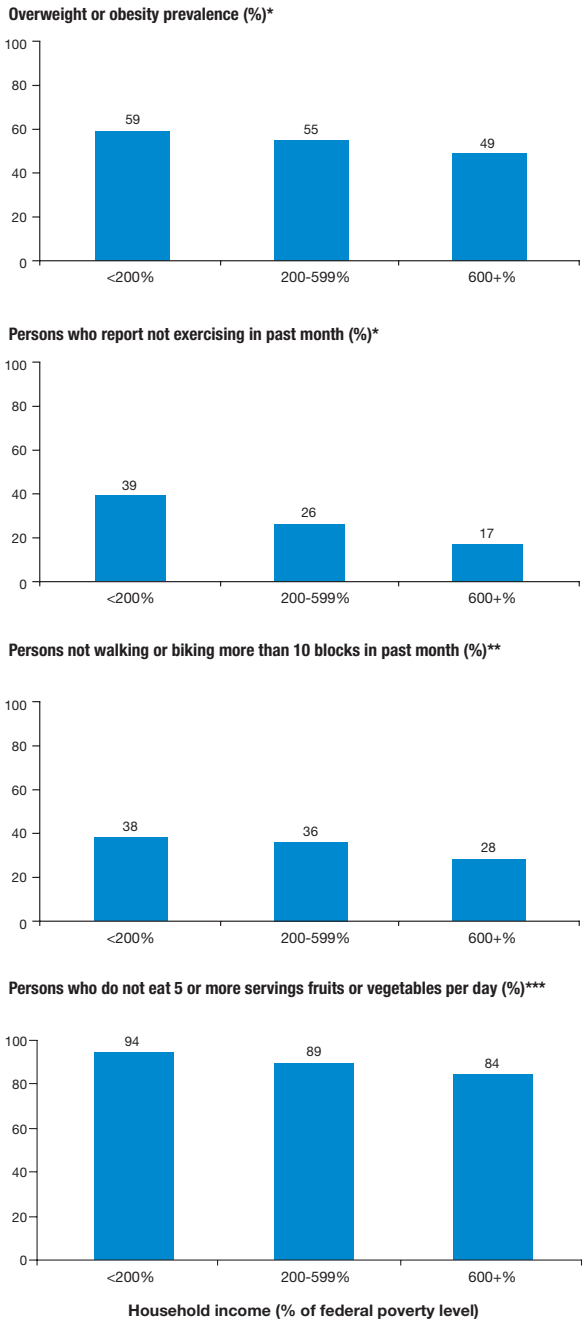
Source: NYC Community Health Survey, 2002-2004

Like diabetes, the prevalence of overweight or obesity rises with age through age 64 and is greater in men than in women **(Figure 2-3)**. The gender difference in overweight/obesity prevalence is driven by greater prevalence of overweight in men, since men are less likely than women to be obese.

Overweight or obesity is most common among adults with the lowest household income, and prevalence decreases with increasing income. Adults in the lowest income group are also more likely to report having risk factors associated with overweight or obesity – no leisure-time exercise, not walking or biking more than 10 blocks while commuting or doing errands and not eating the recommended servings of fruit and vegetables per day – compared to adults in the highest income group **(Figure 2-4)**.

FIGURE 2-4

Overweight and obesity and their associated risk factors are most common among adults in the lowest income group

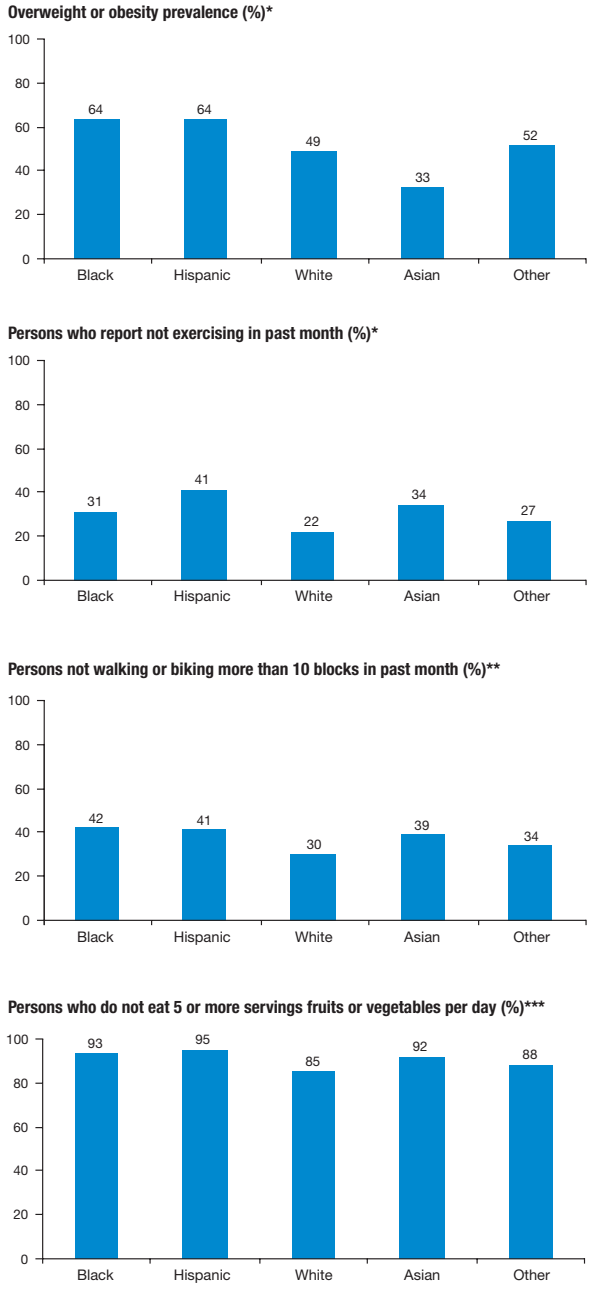


Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
*Source: NYC Community Health Survey, 2002-2004
**Source: NYC Community Health Survey, 2003-2004
***Source: NYC Community Health Survey, 2002, 2004

Overweight or obesity in NYC also differs by race/ethnicity. Nearly two-thirds of black and Hispanic adults are overweight or obese, compared to approximately half of whites and one-third of Asians. Compared to their white counterparts, blacks and Hispanics are also more likely to report having risk factors associated with overweight or obesity – no leisure-time exercise, not walking or biking more than 10 blocks while commuting or doing errands and not eating the recommended levels of fruit and vegetables per day **(Figure 2-5)**.

FIGURE 2-5

Overweight and obesity and their associated risk factors are most common among blacks and Hispanics



Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
*Source: NYC Community Health Survey, 2002-2004
**Source: NYC Community Health Survey, 2003-2004
***Source: NYC Community Health Survey, 2002, 2004

CHAPTER 3

Morbidity: Hospitalizations and End-Stage Renal Disease

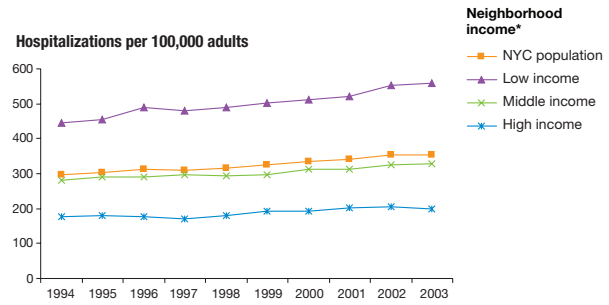
Diabetes is a common and costly cause of hospitalization in New York City. Many diabetes complications that lead to hospitalization can be prevented by effective diabetes management — including control of blood pressure, blood sugar and blood lipids through healthy eating, exercise and medication (see **Chapter 5**).

On the hospital discharge record, diabetes is sometimes listed as the principal diagnosis and other times as a listed diagnosis; in the latter instance, the principal diagnosis is often a condition in which diabetes is a contributing reason for admission (for example, cardiovascular disease). And sometimes, diabetes, while present, does not appear on the hospital discharge record. Therefore, while hospitalization data provide a useful overview of the problem, they do not fully capture the extent of diabetes-related hospitalization.

In 2003, there were 20,438 hospitalizations in NYC with a principal diagnosis of diabetes — 355 per 100,000 adults. This rate is about the same as in 2002 — 354 per 100,000, compared to 200 per 100,000 nationwide. Between 1994 and 2003, the overall diabetes hospitalization rate in NYC increased by 20%, but rates were much higher in some neighborhoods. New Yorkers in low-income neighborhoods consistently experienced diabetes hospitalization rates nearly 3 times higher than those living in wealthier neighborhoods **(Figure 3-1)**. While higher diabetes prevalence in low-income communities is one reason for this disparity, other contributing factors include differences in disease severity and management.

FIGURE 3-1

Diabetes hospitalization rates are increasing and are highest in low-income neighborhoods



* See Appendix A.
Rates are age-adjusted to the year 2000 U.S. Standard Population.
Source: NYS DOH, Statewide Planning and Research Cooperative System (SPARCS), 1994-2003; U.S. Census, 1990 and 2000/NYC Department of City Planning

Most hospitalizations with diabetes as the principal diagnosis involve complications specific for diabetes. These hospitalizations are called "ambulatory care sensitive" because they can be prevented with effective outpatient care (see **Appendix A**).

Hospitalizations from short-term complications and uncontrolled diabetes

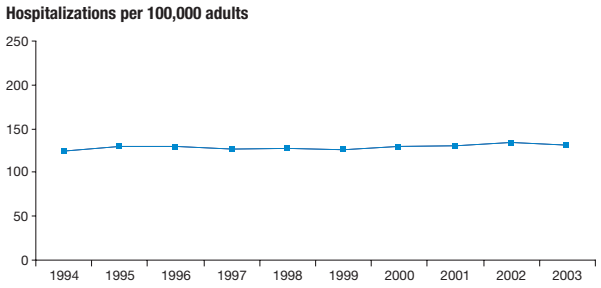
Short-term, potentially life-threatening complications of poorly controlled diabetes leading to hospitalization include diabetic ketoacidosis, hyperosmolarity and coma. Uncontrolled diabetes refers to blood glucose levels that put individuals with diabetes at risk for acute, potentially life-threatening complications.

A goal of the U.S. Department of Health and Human Services (Healthy People 2010) is to decrease, by 2010, hospitalizations for short-term complications and uncontrolled diabetes to 54 hospitalizations per 100,000 adults 18 to 64. In 2003, the New York City hospitalization rate for short-term and uncontrolled diabetes was 116 per 100,000 adults 18 to 64 - which is more than twice as high as the Healthy People 2010 goal.

Of the 20,438 hospitalizations in 2003 with a principal diagnosis of diabetes, 38% were a result of short-term complications due to uncontrolled diabetes. NYC hospitalization rates for these conditions have remained fairly stable between 1994 and 2003, with 134 hospitalizations per 100,000 in 2003 **(Figure 3-2)**.

FIGURE 3-2

Hospitalizations for short-term diabetes complications due to uncontrolled diabetes have remained stable over time



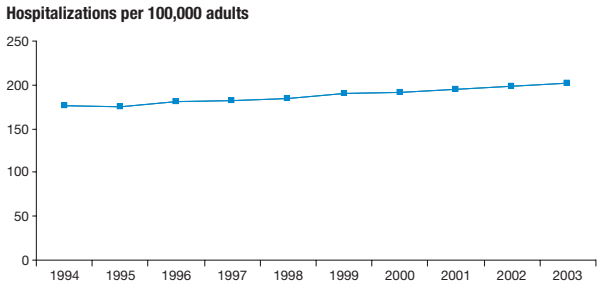
Rates are age-adjusted to the year 2000 U.S. Standard Population.
Source: NYS DOH, Statewide Planning and Research Cooperative System (SPARCS), 1994-2003; U.S. Census, 1990 and 2000/NYC Department of City Planning

Hospitalizations from long-term diabetes complications

Long-term diabetes complications include kidney, eye, neurological and circulatory disorders. Diabetes can also lead to non-traumatic lower-extremity amputations (LEA) by impairing circulation, sensation and resistance to infection. In 2003, of the 20,438 hospitalizations with a principal diagnosis of diabetes, 59% were a result of long-term complications. Between 1994 and 2003, hospitalizations for these conditions among persons with diabetes steadily climbed from 172 per 100,000 adults in 1994 to 212 per 100,000 adults in 2003, an increase of 23% **(Figure 3-3)**. Since many adults in NYC have recently-diagnosed diabetes, hospitalizations for long-term complications will continue to rise as those New Yorkers live with the condition over time.

FIGURE 3-3

Hospitalizations for long-term diabetes complications have increased over time



Rates are age-adjusted to the year 2000 U.S. Standard Population.
Source: NYS DOH, Statewide Planning and Research Cooperative System (SPARCS), 1994-2003; U.S. Census, 1990 and 2000/NYC Department of City Planning

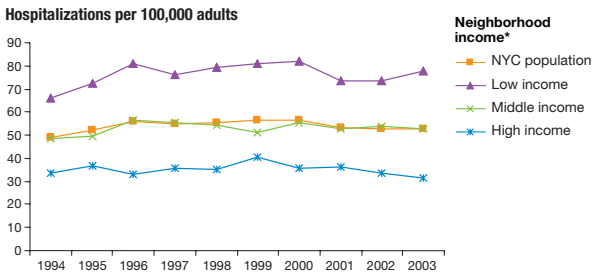
Non-traumatic lower-extremity amputations

A common long-term complication of diabetes is LEA, but regular foot exams and care can prevent sores and infections that lead to amputation. In 2003, 75% of all LEAs occurred in adults with diabetes. Between 1994 and 2000, there was a general upward trend in diabetes-related LEA hospitalization rates, which increased by 8% to 53 per 100,000 population during this period. However, rates then declined between 2000 and 2003. Since 1993, diabetes-related LEA hospitalization rates in low-income neighborhoods have been twice those in high-income neighborhoods **(Figure 3-4)**.

Another way of expressing the LEA rate is per 1,000 persons with diabetes. In 2003, the LEA hospitalization rate was 4 per 1,000 persons with diabetes, a rate twice as high as the Healthy People 2010 goal of 1.8 per 1,000 persons with diabetes.

FIGURE 3-4

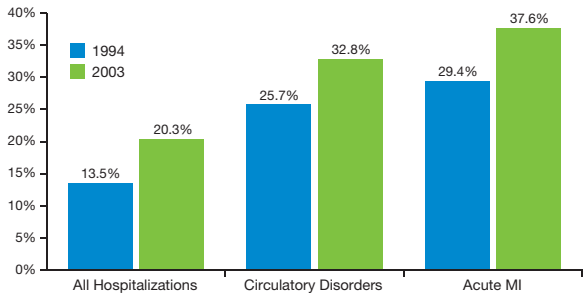
Hospitalizations for lower-extremity amputation with diabetes are more frequent among residents of low-income neighborhoods



*See Appendix A.
Source: NYS DOH, Statewide Planning and Research Cooperative System (SPARCS), 1994-2003; U.S. Census, 1990 and 2000/NYC Department of City Planning

FIGURE 3-5

Adults with diabetes now account for more than 1 in 5 of all hospitalizations and more than 1 in 3 acute myocardial infarction (MI) hospitalizations



Hospitalizations with any mention of diabetes

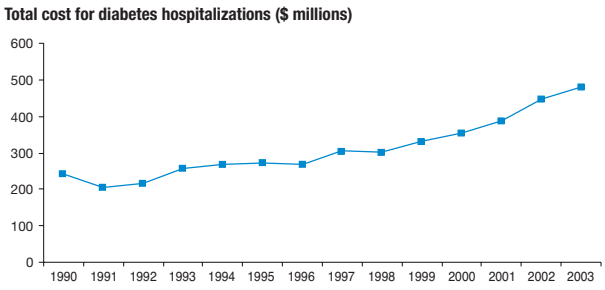
In 2003 there were 191,366 hospitalizations among NYC adults for which diabetes was mentioned in any diagnosis field. This represented 20.3% of all hospitalizations among adults and since 1994, a 60% increase in the number of hospitalizations with a mention of diabetes. Diabetes increases the risk of heart disease and stroke, and is a listed diagnosis in nearly one-third of all hospitalizations for circulatory disorders. The number of acute myocardial infarction (MI) hospitalizations with mention of diabetes increased 39% from 1994 to 2003, when it represented 37.6% of all acute MI hospitalizations **(Figure 3-5)**.

Cost of diabetes hospitalizations

Between 1990 and 2003, the total cost for hospitalizations with a principal diagnosis of diabetes doubled, from $242 million in 1990 to $481 million in 2003 **(Figure 3-6)**.

FIGURE 3-6

The total cost of diabetes hospitalizations in New York City has risen dramatically since 1998

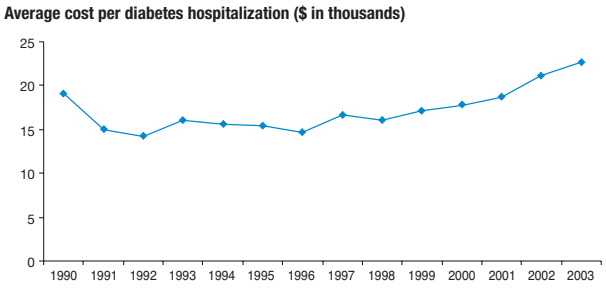


Source: NYS DOH, Statewide Planning and Research Cooperative System (SPARCS), 1994-2003; U.S. Census, 1990 and 2000/NYC Department of City Planning

This increase is due to both the rising number of hospitalizations in the past decade and the increase in average cost per hospitalization, which has risen steadily since the late 1990s **(Figure 3-7)**. In 2003, Medicare and Medicaid paid for more than three-quarters of the cost of diabetes hospitalizations in NYC. Medicare was the major payor, assuming almost half of the total cost **(Figure 3-8)**.

FIGURE 3-7

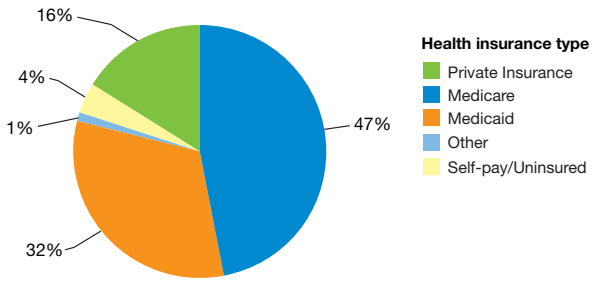
The average cost per diabetes hospitalization has been increasing steadily since the late 1990s



Source: NYS DOH, Statewide Planning and Research Cooperative System (SPARCS), 1994-2003; U.S. Census, 1990 and 2000/NYC Department of City Planning

FIGURE 3-8

Medicare and Medicaid paid more than three-quarters of diabetes hospitalization charges in 2003



Percents are age-adjusted to the year 2000 U.S. Standard Population.
Source: NYS DOH, Statewide Planning and Research Cooperative System (SPARCS), 1994-2003; U.S. Census, 1990 and 2000/NYC Department of City Planning

Treatment for end-stage renal disease

Renal (kidney) disease is a frequent long-term complication of diabetes and takes years to develop. Diabetes is the leading cause of end-stage renal disease (ESRD), and people with ESRD require either dialysis or a kidney transplant. Maintaining optimal control of blood sugar and blood pressure reduces the risk of developing ESRD. In 2004, of the 14,113 cases of ESRD receiving dialysis or a kidney transplant, 4,865 (34%) were due to diabetes **(Figure 3-9)**.

FIGURE 3-9

End-stage renal disease, New York City, 2004

	Total number	Number due to diabetes	Percent due to diabetes
New patients[1]	3,436	1,410	41%
Existing patients[2]	14,113	4,865	34%

[1] New cases are persons first diagnosed with ESRD during 2004.
[2] Existing cases are persons living with ESRD as of 12/31/04.
Source: U.S. Renal Data System, USRDS 2006 Annual Data Report: Atlas of End-Stage Renal Disease in the United States, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2006.

Among newly diagnosed cases of ESRD, 41% were due to diabetes, suggesting that this disease is increasingly caused by diabetes. In 2004, the total Medicare costs of ESRD due to diabetes reached almost $8.2 billion nationally, up from $4.7 billion in 1998. In New York State alone, Medicare costs of ESRD were $527 million in 2004, (U.S. Renal Data System, 2006).

CHAPTER 4
MORTALITY

In 2003, diabetes was listed as the underlying cause of 1,819 New York City deaths. This reflects an age-adjusted mortality rate of 24 per 100,000 population, making diabetes the 4th leading cause of death among New Yorkers, up from 6th in 2002. More than half (952) of these diabetes deaths occurred before age 75. On average, each of these deaths resulted in 14 years of potential life lost before age 75 (YPLL75). Among New Yorkers, blacks had the highest rate of mortality (42 per 100,000 population) and YPLL75 (288 years per 100,000) from diabetes—2.8 and 2.3 times higher, respectively, than the rates among whites **(Figure 4-1)**.

The number of deaths that list diabetes as the underlying cause greatly underestimates the overall impact of this disease on mortality. Diabetes also increases the risk of death from other conditions, including cardiovascular disease (the most common cause of death among people with diabetes), kidney disease and pneumonia.

FIGURE 4-1

The death rate from diabetes among blacks is nearly three times that of whites

	Number of deaths[1]	Deaths before age 75	Age-adjusted death rate/100,000 population	Average YPLL per death before age 75	YPLL/100,000 population <75 years of age
All New Yorkers	1,819	952	24	14	174
Black	653	366	42	15	288
Hispanic	400	250	32	14	160
White	583	235	15	14	127
Asian	90	57	17	11	84

[1] The sum of deaths by race/ethnicity will not equal the total number of deaths because residents with unknown or other race/ethnicity are not shown.
Rates are age-adjusted to the year 2000 U.S. Standard Population.
Source: Bureau of Vital Statistics, NYC DOHMH, 2003; U.S. Census 2000/NYC Department of City Planning

FIGURE 4-2

Diabetes is a contributing cause of thousands of deaths each year, most from cardiovascular disease

Underlying cause on death certificate	Total number of deaths[1]	Number of deaths with diabetes as contributing cause[2]	Percent (%) of death certificates with any mention of diabetes as contributing cause
Cardiovascular disease	23,320	1,631	7%
Cancer	12,167	309	3%
Influenza and pneumonia	2,279	125	5%
Cerebrovascular disease	1,741	145	8%
Chronic lower respiratory disease	1,616	94	6%
Human immunodeficiency virus (HIV)	1,602	33	2%
Accidents except drug poisoning	950	28	3%
Nephritis, nephritic syndrome and nephrosis (includes renal failure)	677	50	7%
Septicemia	535	69	13%
Essential hypertension and renal diseases	305	55	18%
All deaths	55,448	2,943	5%

[1] Total deaths by underlying cause as coded by NCHS differ from totals as coded by NYC Bureau of Vital Statistics and reported in 2002 Annual Summary.
[2] The number of deaths from NCHS Multiple-Cause File excludes decedents with unknown residence in the NYC Vital Statistics mortality file.
Source: NCHS Multiple-Cause Mortality File, 2002/analyzed by Bureau of Vital Statistics, NYC DOHMH

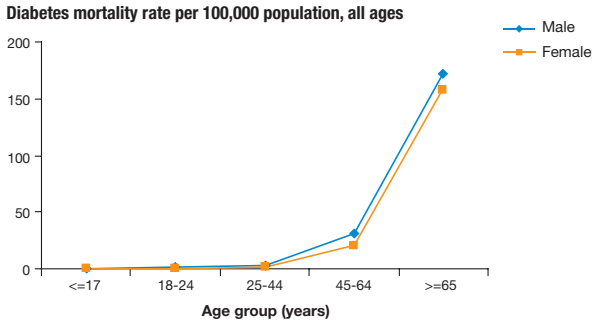
In such cases, diabetes may be listed as a contributing cause. In 2002, the most recent multiple-cause data available for NYC, diabetes was the underlying cause for 1,625 deaths and listed as a contributing cause on an additional 2,943 death certificates (NCHS, 2002) **(Figure 4-2)**. Thus measured, diabetes caused or contributed to 8% of NYC deaths in 2002. This is likely to be an underestimate, as diabetes is underreported as an underlying or contributing cause of death nationwide. Among persons who die with diabetes, it is estimated that only 10% to 15% of death certificates list it as an underlying cause, and on 35% to 40% is it listed anywhere on the death certificate. (CDC, National Diabetes Fact Sheet, 2003).

Diabetes mortality rates increase sharply with age in both men and women. In 2003, the mortality rates among men and women aged 65 years and older were 5 and 8 times higher, respectively, than among those aged 45 to 64 years **(Figure 4-3)**.

In NYC, diabetes mortality rates increased by 71% between 1990 and 2003, from 14 to 24 per 100,000 population. Historically, mortality rates have been lower in New York City than nationwide. However, since 1994 mortality rates in the city have been approaching national rates, and in 2003 the city and US rates were virtually identical **(Figure 4-4)**.

FIGURE 4-3

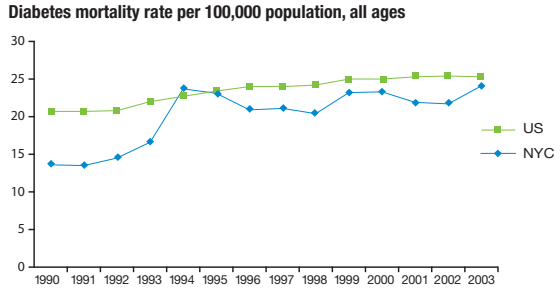
Diabetes mortality rates increase sharply at older ages



Source: Bureau of Vital Statistics, NYC DOHMH, 2003; U.S. Census 2000/NYC Department of City Planning

FIGURE 4-4

Mortality rates due to diabetes have increased since 1990



Rates are age-adjusted to the year 2000 U.S. Standard Population.
Sources: Bureau of Vital Statistics, NYC DOHMH, 1990-2003; U.S. Census 2000/NYC Department of City Planning; CDC/NCHS, National Vital Statistics System, 1990-2003

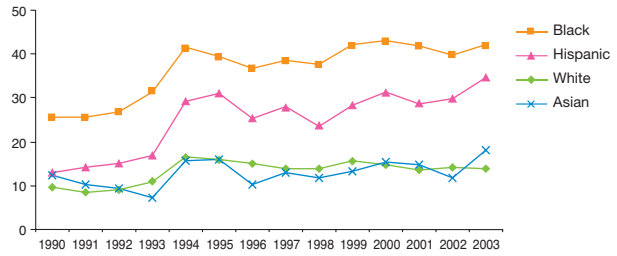
Diabetes mortality rates have increased over time among all racial/ethnic groups, but blacks and Hispanics have been disproportionately affected. For example, compared with white adults, the diabetes mortality rate among Hispanic adults was 1.4 times greater in 1990 but 2.5 times greater in 2003. While black New Yorkers have consistently had the highest diabetes mortality rates, Hispanics have experienced the greatest increase in mortality (169%) since 1990 **(Figure 4-5)**.

Between 1990 and 2003, diabetes mortality rates have increased in all NYC neighborhoods. However, mortality rates in low-income neighborhoods have been consistently 2 times higher than rates in high-income neighborhoods **(Figure 4-6)**.

FIGURE 4-5

Mortality rates from diabetes are increasing in all racial/ethnic groups, though most rapidly in Hispanics

Diabetes mortality rate per 100,000 population, all ages

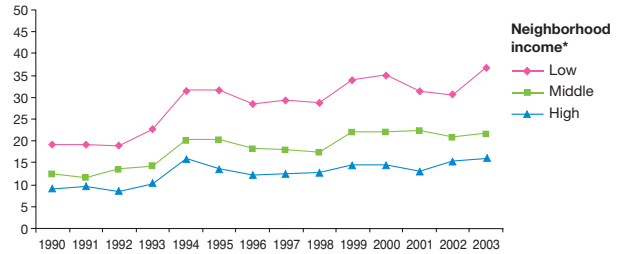


Rates are age-adjusted to the year 2000 U.S. Standard Population.
Sources: Bureau of Vital Statistics, NYC DOHMH, 1990-2003; U.S. Census 2000/NYC Department of City Planning

FIGURE 4-6

Neighborhood disparities in diabetes mortality rates persist over time, with low-income neighborhoods experiencing the highest rates

Diabetes mortality rate per 100,000 population, all ages



*See Appendix A.
Rates are age-adjusted to the year 2000 U.S. Standard Population.
Source: Bureau of Vital Statistics, NYC DOHMH, 1990-2003; U.S. Census 2000/NYC Department of City Planning

CHAPTER 5
Health Care Indicators

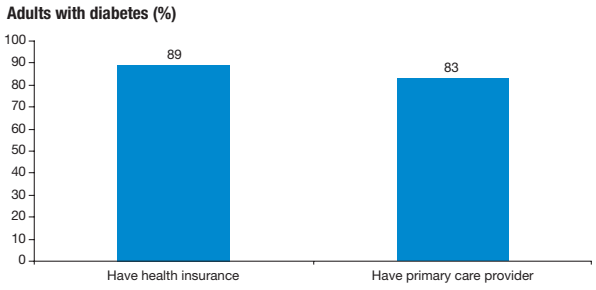
The risk of diabetes-related complications and mortality can be reduced with effective medical care. This chapter summarizes available data on access to health care for New Yorkers with diabetes and receipt of care that can reduce diabetes complications.

Having health insurance, a regular primary care provider and a usual source of care are important components of health care access. Among adults 18 and older with diabetes, the vast majority have health insurance and a primary care provider **(Figure 5-1)**. More than 4 in 10 reported being covered by Medicaid or Medicare **(Figure 5-2)**. Still, an estimated 35,000 adults with diabetes do not have insurance, and 62,000 do not have a primary care provider.

Obtaining routine medical care from an emergency department can indicate poor access to primary care and can lead to poor continuity of care. Among New Yorkers with diabetes, those with the lowest household incomes are 12 times more likely to use an emergency department as their usual source of care than those with high incomes **(Figure 5-3)**.

FIGURE 5-1

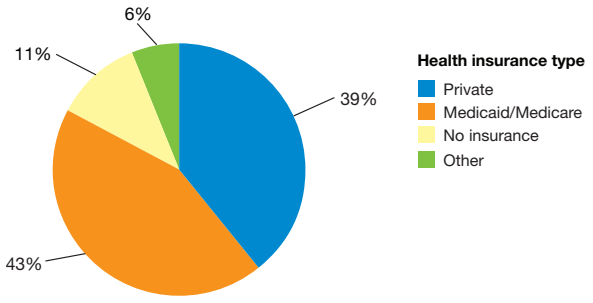
The majority of adults with diabetes have health care coverage and a primary care provider



Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: NYC Community Health Survey, 2002-2004

FIGURE 5-2

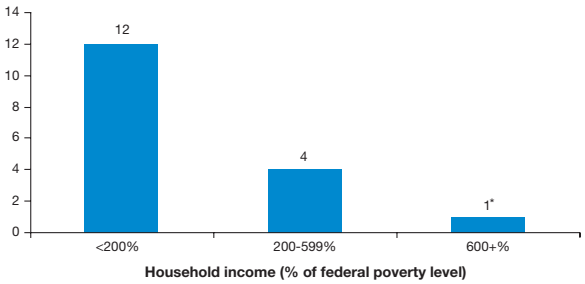
More than 4 in 10 adults with diabetes in New York City have public insurance



Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: NYC Community Health Survey, 2002-2004

FIGURE 5-3

Adults with diabetes with the lowest incomes are most likely to use emergency departments as their usual place of care

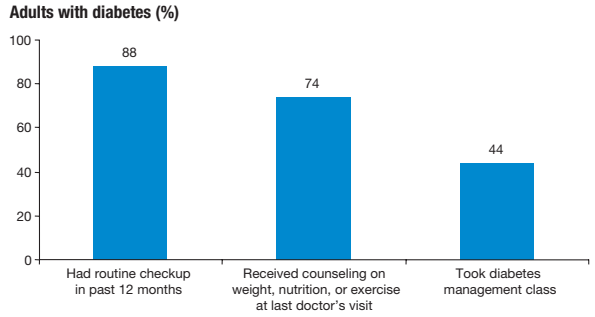


*Estimate has a relative standard error > 30% and should be interpreted with caution.
Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: NYC Community Health Survey, 2003-2004

The majority of adults with diabetes had a checkup in the past year and received counseling on weight, nutrition or exercise at their last doctor's visit. However, only 44% have ever taken a diabetes self-management class **(Figure 5-4)**.

FIGURE 5-4

While most adults with diabetes had a routine checkup in the past year, fewer than half have taken a diabetes self-management class



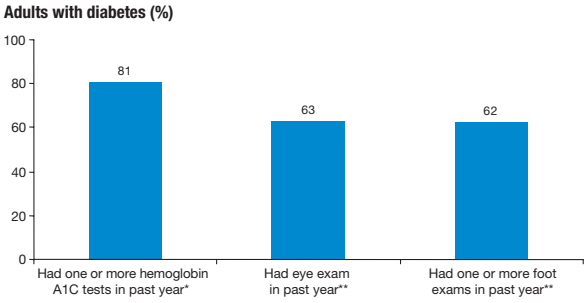
Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: NYC Community Health Survey, 2004

While good diabetes management involves many lifestyle changes and health care measures, the most important actions are described as the **ABCs**: controlling blood sugar (defined as an **A**1C <7%), keeping **B**lood pressure below 130/80, keeping the level of LDL or 'bad' **C**holesterol below 100, and quitting or abstaining from **S**moking.

Improving control of blood glucose levels reduces the risk of diabetes complications affecting the heart, eyes, kidneys and nerves. A hemoglobin A1C test reflects the average amount of glucose in the blood over the past 2 to 3 months and is recommended at least twice a year for persons with diabetes. Four in 5 adults with diabetes in New York City report having had at least 1 hemoglobin A1C test in the past year, but only 16% of those reporting a test know their A1C level. Eye and foot examinations are also an important component of care, since those with diabetes are vulnerable to a variety of serious complications such as glaucoma, cataracts, retinopathy and lower-extremity amputations. While many New Yorkers with diabetes had an eye exam and at least 1 foot exam in the past year, more than 1 in 3 did not receive these exams **(Figure 5-5)**.

FIGURE 5-5

Four in 5 adults with diabetes had at least 1 hemoglobin A1C test in the past year, but more than 1 in 3 adults did not receive an eye or foot exam



Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
*Source: NYC Community Health Survey, 2002
**Source: NYC Community Health Survey, Spring, Fall 2003

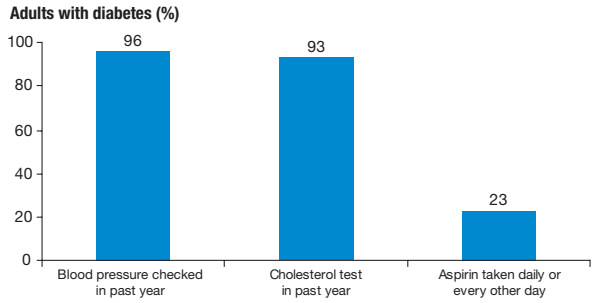
For people with diabetes, control of high blood pressure and cholesterol levels to prevent cardiovascular disease is especially important. The great majority of adults with diabetes have had their blood pressure and cholesterol level checked in the past year, but available data suggest

Starting in January 2006, NYC DOHMH has mandated electronic laboratory reporting of hemoglobin A1C values to permit surveillance on the extent to which A1C levels are under adequate control – see www.nyc.gov/health/diabetes.

most do not have these risk factors well controlled (see page 5-4). Another strategy for preventing heart attacks among adults with diabetes is regular use of aspirin. Fewer than 1 in 4 New Yorkers with diabetes reports taking aspirin daily or every other day **(Figure 5-6)**.

FIGURE 5-6

Most New Yorkers with diabetes had their blood pressure and cholesterol checked in the past year, but fewer than 1 in 4 takes aspirin regularly

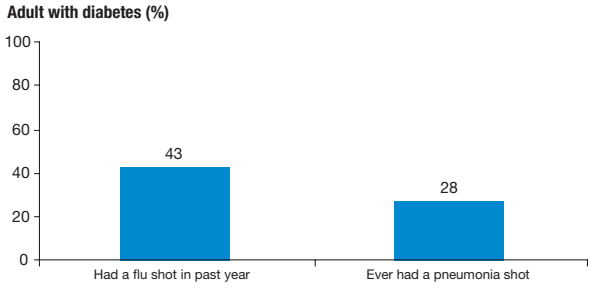


Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
Source: NYC Community Health Survey, 2002

Although people with diabetes are at increased risk of complications or death from influenza and pneumonia, only 43% of adults with diabetes report having had a flu shot in the past year. Even fewer had ever received a pneumonia shot (28%) **(Figure 5-7)**.

FIGURE 5-7

Fewer than half of adults with diabetes had a flu shot in the past year, and only 1 in 4 has ever had a pneumonia shot

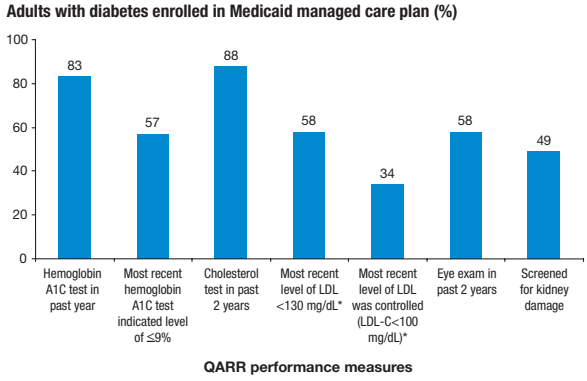


Percents are age-adjusted to the year 2000 U.S. Standard Population and exclude individuals who did not report age.
*Source: NYC Community Health Survey, 2002-2004

Data for a subset of low-income NYC adults with diabetes – those enrolled in Medicaid[1] – indicate that the vast majority received hemoglobin A1C tests in the past year. However, only 57% of those tested had a recent level of ≤9%, meaning that 43% had very poor control of blood glucose levels. Similarly, while 88% of those with diabetes had a cholesterol test in the past 2 years, only 34% had an LDL (low-density lipoprotein, or "bad" cholesterol) level less than 100 – the goal set in national guidelines for those with diabetes (NHLBI, 2001). Other diabetes care was not delivered consistently: 58% had an eye exam in the past 2 years and 49% were screened for kidney damage **(Figure 5-8)**.

FIGURE 5-8

Among Medicaid enrollees with diabetes, care is variable



*Among persons who had a cholesterol test in past 2 years.
Source: NYS DOH, Quality Assurance Reporting Requirements (QARR), 2004

[1] New York State Department of Health's Quality Assurance Reporting Requirements (QARR) consist of a set of clinical and administrative performance indicators reported by managed care plans. For New York City adults with diabetes enrolled in Medicaid, QARR provides a way to assess the quality of care and the extent to which diabetes is well managed.

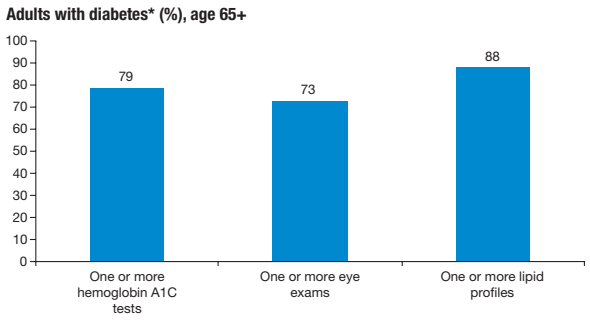
Among people with diabetes who were enrolled in Medicare[2] from April 2001 to March 2003, 79% had their hemoglobin A1C checked at least once, 73% had one or more eye exams, and 88% had their cholesterol level checked at least once, based on claims submitted **(Figure 5-9)**.

Until recently, no systematic data on diabetes control were available for all NYC adults with the condition. Data from the 2004 NYC HANES show that most adults with diagnosed diabetes are not meeting goals for A1C, blood pressure or cholesterol (ABCs), and that 1 in 4 is a current smoker **(Figure 5-10)**. For those with undiagnosed diabetes, the proportion not meeting goals for A1C, blood pressure or cholesterol is somewhat lower – probably because their diabetes developed more recently and is less severe.

Cigarette smoking increases the risk of developing both diabetes and diabetes-related complications, including cardiovascular disease, lower-extremity amputations, nerve damage and kidney disease. An estimated 1 in 3 adults with undiagnosed diabetes is a current smoker. Based on data from the Community Health Survey, among adults with diabetes who smoke, only 38% tried to quit using an effective cessation aid like nicotine patches, prescription medication or counseling. Health care providers can play a key role in reducing the impact of smoking by assessing smoking status at every visit, advising patients to quit and recommending or prescribing the use of medications and other effective cessation aids.

FIGURE 5-9

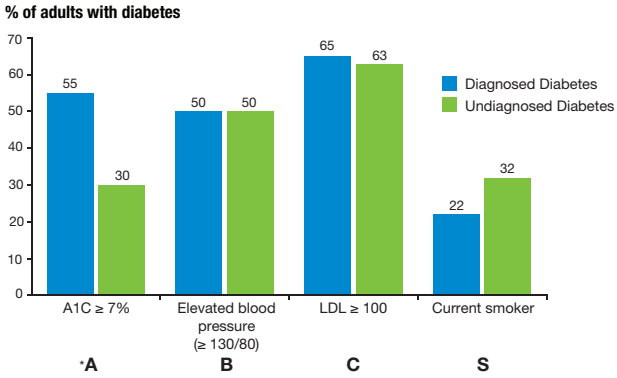
Among Medicare enrollees* with diabetes, most had a hemoglobin A1C test, eye exam, and lipid profile



*Among adults enrolled in Medicare from October 1, 2002-September 30, 2004.
Percents are not age-adjusted.
Source: IPRO, 2002-2004

FIGURE 5-10

Most New Yorkers with diabetes are not meeting goals for control of ABCs*



Source: NYC Health and Nutrition Examination Survey

[2] The Medicare-eligible population includes those eligible because they are 65 or older or are disabled.

CHAPTER 6

Diabetes During Pregnancy

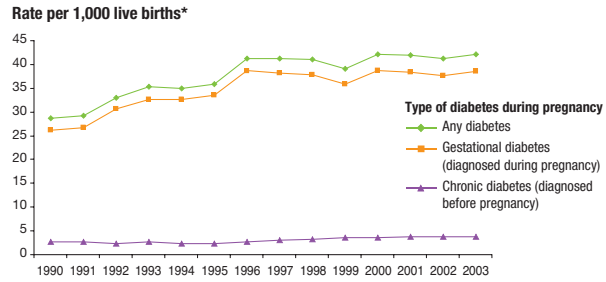
Metabolic changes during pregnancy can cause diabetes in women who did not have it before pregnancy; this is called "gestational diabetes." Gestational diabetes and diabetes present before pregnancy are associated with macrosomia (large-for-gestational-age babies), complications of labor and delivery, cesarean delivery, stillbirth, pre-term birth, congenital malformations and infant mortality. Preconception counseling for those with chronic diabetes and timely screening for pregnant women are essential to identify and treat diabetes during pregnancy. Birth records use a check box system to capture maternal diabetes.[1] This chapter summarizes demographic patterns of diabetes during pregnancy, including chronic and gestational, as noted on birth records.

The rate of any diabetes during pregnancy among delivering mothers increased 47% between 1990 and 2003. Among mothers identified with diabetes on birth certificates, gestational diabetes is far more common than chronic diabetes. In 2003, rates of gestational and chronic diabetes were 39 and 4 per 1,000 live births, respectively **(Figure 6-1)**.

The risk of any diabetes during pregnancy increases with maternal age. Between 1990 and 2003, the prevalence of diabetes during pregnancy was markedly higher among women 35 and older than among younger women. However, while the rate of diabetes during pregnancy has increased in both age groups since 1990, women 34 and younger experienced a 46% increase, compared with a 20% increase among older women **(Figure 6-2)**.

FIGURE 6-1

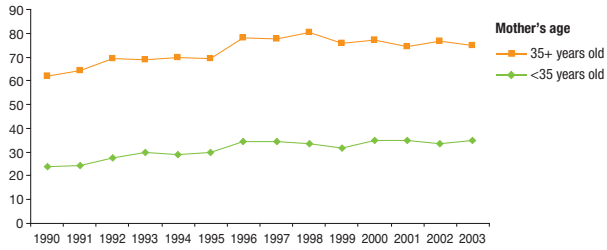
The rate of diabetes during pregnancy has increased over time



*Singleton births only. Among women of all ages.
Source: Bureau of Vital Statistics, NYC DOHMH, 1990-2003/analyzed by Health Promotion and Disease Prevention, Research, Surveillance, Evaluation, NYC DOHMH

FIGURE 6-2

Rates of diabetes during pregnancy have remained consistently higher among older mothers over time



*Singleton births only. Among women of all ages.
Source: Bureau of Vital Statistics, NYC DOHMH, 1990-2003/analyzed by Health Promotion and Disease Prevention, Research, Surveillance and Evaluation Unit, NYC DOHMH

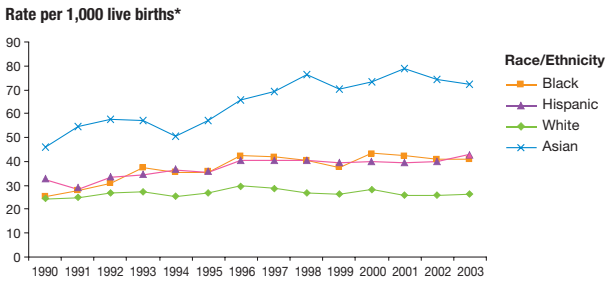
Because gestational diabetes is a risk factor for developing chronic diabetes, or may be the first indication of chronic diabetes, follow-up clinical evaluation for diabetes after pregnancy is essential for all those diagnosed with gestational diabetes.

[1] A first-time diagnosis of diabetes during pregnancy can indicate onset of diabetes resulting from the pregnancy, or detection of pre-existing diabetes. Thus, when diabetes is first diagnosed during pregnancy, it may not be known whether it was present prior to the pregnancy. A new diagnosis of diabetes during pregnancy is recorded on birth records as gestational diabetes despite this uncertainty. Diabetes is recorded as chronic if it was diagnosed prior to pregnancy.

Between 1990 and 2003, the rate of any diabetes during pregnancy increased in all racial/ethnic groups, and disparities between groups widened. Rates of diabetes during pregnancy were highest and increased dramatically (by 57%) among Asian women – to 72 per 1,000 live births in 2003. Rates were lower among black women but rose most rapidly in this group (by 63%) **(Figure 6-3)**.

FIGURE 6-3

Rates of diabetes during pregnancy have been highest and have increased the most among Asian mothers



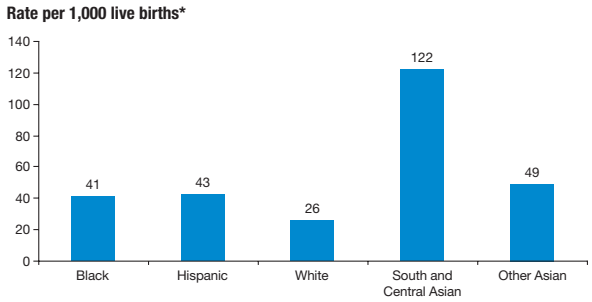
*Singleton births only. Among women of all ages.
Source: Bureau of Vital Statistics, NYC DOHMH, 1990-2003/analyzed by Health Promotion and Disease Prevention, Research, Surveillance and Evaluation Unit, NYC DOHMH

The high prevalence of diabetes during pregnancy among Asian mothers is most striking among South and Central Asians, with a rate of 122 per 1,000 live births. This represents 1 in 8 live births, a rate 2.5 times the rate in other Asian mothers, and more than 4.5 times the rate in white mothers **(Figure 6-4)**.

As with chronic diabetes, overweight and obesity increase the risk of diabetes during pregnancy. Although body mass index (BMI) during pregnancy cannot be determined from New York City birth certificates, pre-pregnancy weight recorded on birth certificates shows a strong, direct relationship to diabetes. Compared to women reporting a pre-pregnancy weight of 100 to 149 pounds, the prevalence of diabetes during pregnancy is nearly twice as high among women reporting pre-pregnancy weights of 150 to 199 pounds and nearly five times greater (15% of pregnancies) for mothers weighing more than 300 pounds **(Figure 6-5)**.

FIGURE 6-4

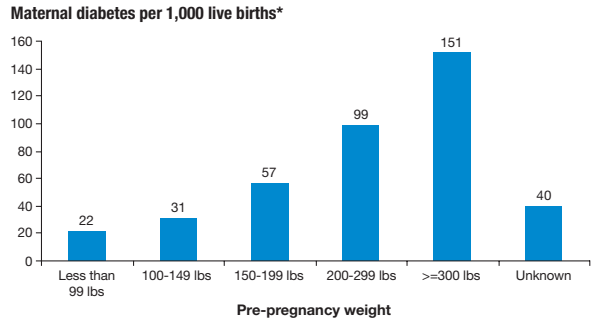
The high prevalence of diabetes during pregnancy among Asian mothers is due to the high rate seen among South and Central Asians



*Singleton births only. Among women of all ages.
Source: Bureau of Vital Statistics, NYC DOHMH, 2003/analyzed by Health Promotion and Disease Prevention, Research, Surveillance and Evaluation Unit, NYC DOHMH

FIGURE 6-5

There is a direct association between diabetes during pregnancy and maternal pre-pregnancy weight

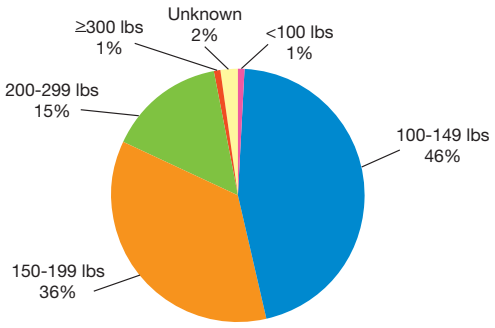


*Singleton births only. Among women of all ages.
Source: Bureau of Vital Statistics, NYC DOHMH, 2003/analyzed by Health Promotion and Disease Prevention, Research, Surveillance and Evaluation Unit, NYC DOHMH

Half of women with diabetes during pregnancy reported a pre-pregnancy weight of 150 pounds or more, which would be overweight (BMI>25) for a woman of average height (5 feet, 4 inches) **(Figure 6-6)**.

FIGURE 6-6

Half of women with diabetes during pregnancy had a pre-pregnancy weight of 150 pounds or more*



Pre-pregnancy weight

*Singleton births only. Among women of all ages.
Source: Bureau of Vital Statistics, NYC DOHMH, 2003/analyzed by Health Promotion and Disease Prevention, Research, Surveillance and Evaluation Unit, NYC DOHMH

APPENDIX A
About The Data

Adult prevalence, health care indicators, risk factor data

The New York City Community Health Survey (CHS) is a telephone survey conducted among non-institutionalized adults aged 18 and older. The survey is based on the CDC Behavioral Risk Factor Surveillance System (BRFSS; CDC, 2005). The CHS used a stratified random sample of United Hospital Fund (UHF) neighborhoods in the city. Households were selected at random using a random digit dialing method. Interviews were conducted in many languages, including Spanish.

New York City Health and Nutrition Examination Survey (NYC HANES)

NYC HANES was a household-based examination survey conducted among non-institutionalized NYC adults aged 20 and older. The survey is based on the National Health and Nutrition Examination Survey (NHANES). NYC HANES used a 3-stage cluster sample to achieve a representative sample of NYC adults. Households and participants were randomly selected from 144 city neighborhoods. Those individuals comprising the sample participated in a health interview and brief examination. Interviews were conducted in English and Spanish; interpreters were used for other languages.

Hospitalization data

The Statewide Planning and Research Cooperative System (SPARCS; New York State Department of Health, 2006) data set consists of hospital discharge administrative records for acute care hospitals in New York State. Criteria for inclusion of SPARCS records in this fact book included (1) a diagnosis code for diabetes (AHRQ, 2005) and (2) residence in NYC as determined by zip code at the time of the hospitalization.

Interpretation and presentation of the SPARCS data present certain difficulties. The data represent numbers of hospitalizations, not numbers of individuals hospitalized. Since some persons with diabetes may be hospitalized repeatedly in any given year, the numbers or rates may overestimate the number of persons with diabetes hospitalized.

Additionally, SPARCS data on the race and ethnicity of individual patients are imprecise. These data are not collected in a standardized manner across hospitals, and large numbers of records have race listed as "other." Consequently, race/ethnicity-specific rates for diabetes hospitalization could not be calculated.

We used SPARCS data to estimate ambulatory care-sensitive hospitalizations (AHRQ, 2001) which were identified and classified using the following ICD-9 codes:

Short-term diabetes complications and uncontrolled diabetes

250.10, 250.11, 250.12, 250.13, 250.20, 250.21, 250.22, 250.23, 250.30, 250.31, 250.32, 250.33

Long-term diabetes complications

250.40, 250.41, 250.42, 250.43, 250.50, 250.51, 250.52, 250.53, 250.60, 250.61, 250.62, 250.63, 250.70, 250.71, 250.72, 250.73, 250.80, 250.81, 250.82, 250.83, 250.90, 250.91, 250.92, 250.93

Hospital discharges that listed diabetes as a diagnosis were used to examine discharges involving lower extremity amputations (LEA) indicated by procedure code 84.10, 84.11, 84.12, 84.13, 84.14, 84.15, 84.16, 84.17, 84.18, 84.19. Discharges with a traumatic amputation diagnosis code (ICD-9 codes 895.0, 895.1, 896.0, 896.1, 896.2, 896.3, 897.0, 897.1, 897.2, 897.3, 897.4, 897.5, 897.6, 897.7) were excluded.

The LEA hospitalization rate per 1,000 persons with diabetes in 2003 was calculated using an estimate of the population with diabetes from the NYC Community Health Survey.

Treatment of end-stage renal disease (ESRD)

The United States Renal Data System (USRDS) is a data system that collects and distributes national data on end-stage renal disease (ESRD).The data reported here have been supplied by USRDS. The interpretation and reporting of these data are the responsibility of the author(s) and in no way should be seen as an official policy or interpretation of the U.S. government.

Mortality data

Mortality data are based on deaths of NYC residents whose underlying cause of death was diabetes. This categorization is selected in accordance with rules issued by the National Center for Health Statistics (NCHS) and codes of the International Classification of Diseases, Tenth Revision (ICD-10). Demographic data on death certificates are coded in agreement with NCHS standards. Interpretation of mortality data can be complicated because deaths with diabetes listed as underlying cause greatly underestimate the overall impact of diabetes on mortality. Studies have found that only 35% to 40% of persons who die with diabetes have it listed anywhere on the death certificate (CDC, National Diabetes Fact Sheet, 2003).

Census data

Population counts used as denominators for rates and to compute weights for the Community Health Survey are based on the year 2000 Census. Because of population growth since 2000, hospitalization and mortality rates may be overestimated, especially in neighborhoods where the population has increased significantly in recent years. Population estimates used to compute weights for the NYC HANES were obtained from the 2004 American Community Survey and Current Population Survey, conducted by the Census Bureau.

Medicaid data

New York State Department of Health's Quality Assurance Reporting Requirements (QARR) provided data on health care indicators among Medicaid enrollees. QARR consist of a set of clinical and administrative performance indicators reported by managed care plans. For NYC adults with diabetes who are enrolled in Medicaid, QARR provides a way to assess the quality of care and the extent to which diabetes is well managed.

Medicare data

Data on health care indicators among Medicare enrollees were compiled from summary claims data analyzed and provided to NYC DOHMH by IPRO, Lake Success, New York.

Comparison data

National diabetes and obesity prevalence data were based on the National Health Interview Survey 2004 (Lethbridge-Cejku et al, 2006).

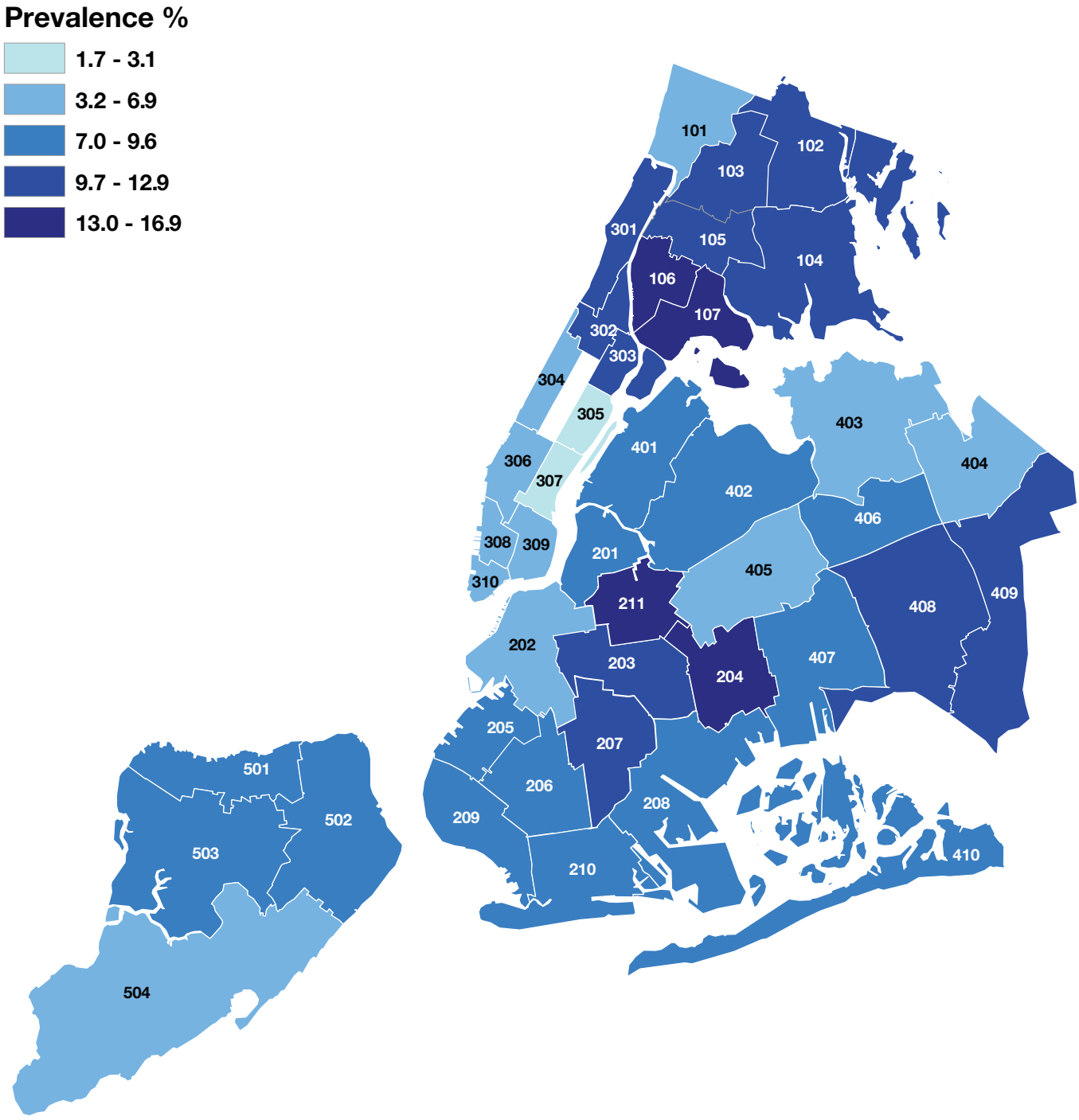
Presentation of data

Rates with relative standard errors (RSEs) of >30% indicated low reliability. These rates are either not presented or footnoted in the charts and/or tables. These rates should be interpreted with caution.

In this report, neighborhoods are groups of zip codes defined by the United Hospital Fund (UHF). Neighborhood income is defined by the percent of households in the neighborhood below 200% of the federal poverty guidelines and separated into thirds: low-income (45%-90%), middle-income (30%-44%) and high-income (<30%).

APPENDIX B
Neighborhood Tables and Maps

Diabetes prevalence by UHF neighborhood: age-adjusted percentage*, ages 18+, New York City, 2002-2004



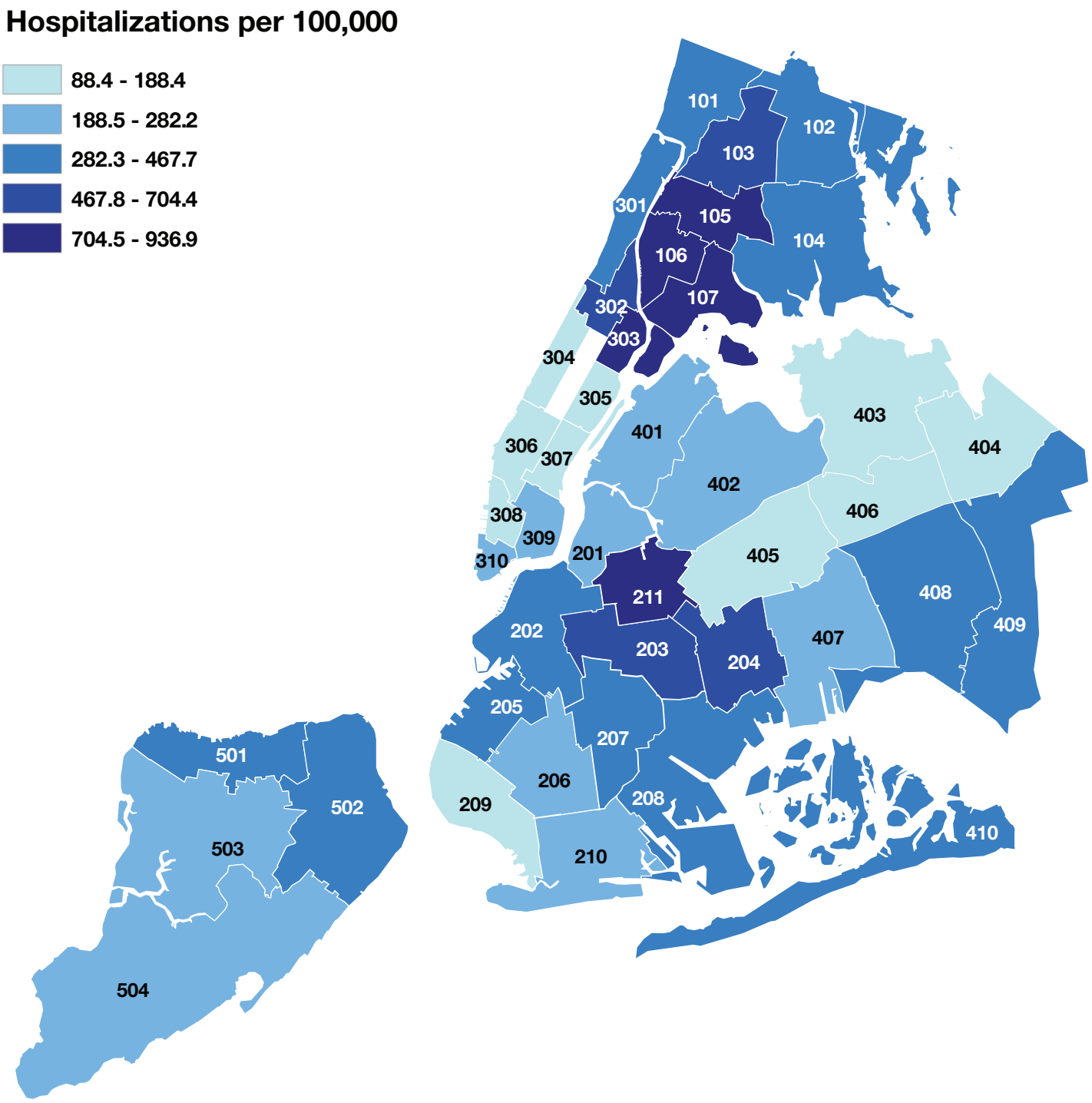
* Percents are age adjusted to the year 2000 U.S. Standard Population.

Diabetes prevalence by borough and UHF neighborhood: number and age-adjusted percentage*, ages 18+, New York City, 2002-2004

UHF#	Neighborhood	Estimated number	Age-adjusted percent (%)*
	Bronx	**102,000**	**12.1**
101	Kingsbridge-Riverdale	5,000	6.1
102	Northeast Bronx	17,000	11.9
103	Fordham-Bronx Park	18,000	12.4
104	Pelham	23,000	11.1
105	Crotona-Tremont	12,000	11.4
106	Highbridge-Morrisania	16,000	16.5
107	Hunts Point-Mott Haven	11,000	16.9
	Brooklyn	**164,000**	**9.7**
201	Greenpoint	6,000	7.7
202	Downtown-Heights-Slope	8,000	5.8
203	Bedford Stuyvesant-Crown Heights	24,000	12.3
204	East New York	15,000	15.7
205	Sunset Park	7,000	9.1
206	Borough Park	19,000	8.3
207	East Flatbush -Flatbush	22,000	10.5
208	Canarsie-Flatlands	13,000	8.9
209	Bensonhurst-Bay Ridge	12,000	7.3
210	Coney Island-Sheepshead Bay	24,000	9.5
211	Williamsburg-Bushwick	15,000	14.5
	Manhattan	**76,000**	**6.6**
301	Washington Heights-Inwood	19,000	10.5
302	Central Harlem-Morningside Heights	12,000	12.0
303	East Harlem	9,000	12.9
304	Upper West Side	9,000	5.0
305	Upper East Side	6,000	3.1**
306	Chelsea-Clinton	5,000	5.7
307	Gramercy Park-Murray Hill	2,000	1.7**
308	Greenwich Village-SoHo	3,000	4.9
309	Union Square-Lower East Side	9,000	6.4
310	Lower Manhattan	1,000	5.5
	Queens	140,000	8.5
401	Long Island City-Astoria	12,000	7.8
402	West Queens	26,000	8.2
403	Flushing-Clearview	13,000	5.9
404	Bayside-Little Neck	5,000	6.1
405	Ridgewood-Forest Hills	14,000	6.9
406	Fresh Meadows	6,000	7.7
407	Southwest Queens	18,000	9.6
408	Jamaica	22,000	11.1
409	South East Queens	17,000	10.8
410	Rockaway	7,000	9.4
	Staten Island	**23,000**	**7.1**
501	Port Richmond	4,000	9.0
502	Stapleton-St. George	6,000	7.7
503	Willowbrook	6,000	9.1
504	South Beach-Tottenville	7,000	5.1

Source: NYC Community Health Survey, 2002-2004
* Percents are age adjusted to the year 2000 U.S. Standard Population.
** Prevalence has a relative standard error > 30% and should be interpreted with caution.

Diabetes hospitalizations by UHF neighborhood: age-adjusted rate*, adults ages 18+, New York City, 2003



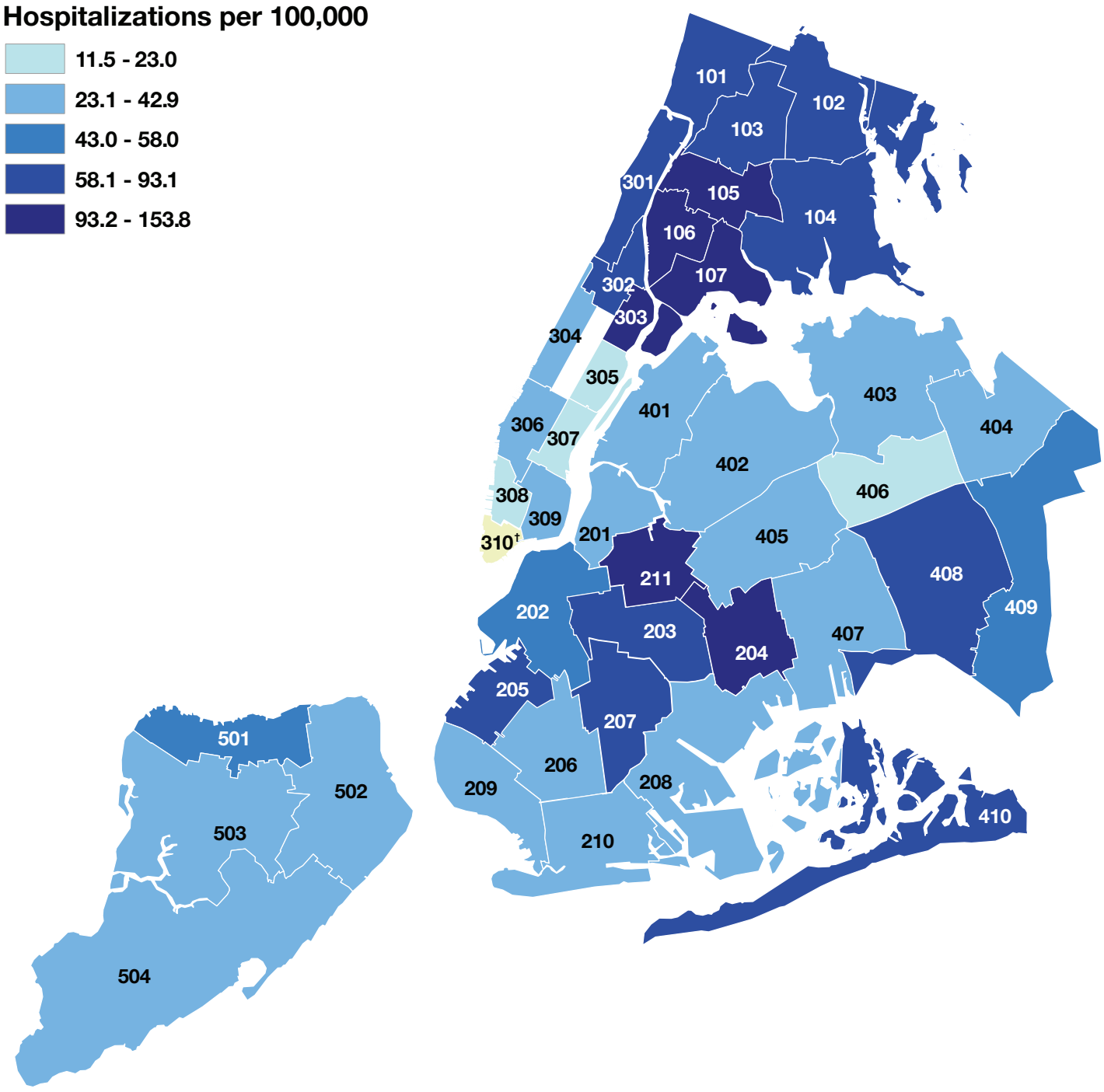
* Rates are calculated using U.S. Census 2000 and age-standardized to the year 2000 U.S. Standard Population.

Diabetes hospitalizations by borough and UHF neighborhood: number of hospitalizations and age-adjusted rate*, adults ages 18+, New York City, 1994 and 2003

UHF#	Neighborhood	1994 Number	1994 Age-adjusted rate/100,000*	2003 Number	2003 Age-adjusted rate/100,000*	% change
	Bronx	**3244**	**391**	**4870**	**566**	**45%**
101	Kingsbridge	172	214	262	329	54%
102	Northeast Bronx	416	292	618	424	45%
103	Fordham-Bronx Park	514	353	759	516	46%
104	Pelham-Throgs Neck	625	309	849	406	32%
105	Crotona-Tremont	529	555	894	863	56%
106	Highbridge-Morrisania	592	632	930	914	45%
107	Hunts Point-Mott Haven	394	622	558	837	35%
	Brooklyn	**5847**	**352**	**6962**	**404**	**15%**
201	Greenpoint	249	330	214	282	-14%
202	Downtown-Heights-Slope	508	359	523	375	5%
203	Bedford Stuyvesant - Crown Heights	1105	560	1390	704	26%
204	East New York	504	551	628	652	18%
205	Sunset Park	222	324	272	378	16%
206	Borough Park	481	211	519	216	3%
207	East Flatbush-Flatbush	696	347	937	468	35%
208	Canarsie-Flatlands	380	269	501	345	28%
209	Bensonhurst-Bay Ridge	329	197	306	178	-10%
210	Coney Island	602	240	644	253	6%
211	Williamsburg-Bushwick	764	705	1021	937	33%
	Manhattan	**3093**	**263**	**3424**	**290**	**10%**
301	Washington Heights-Inwood	595	338	748	420	24%
302	Central Harlem	551	527	630	607	15%
303	East Harlem	507	723	649	896	24%
304	Upper West Side	328	181	316	175	-3%
305	Upper East Side	142	77	166	88	15%
306	Chelsea-Clinton	217	211	188	188	-11%
307	Gramercy Park-Murray Hill	153	137	158	142	3%
308	Greenwich Village-SoHo	102	158	64	103	-35%
309	Union Square-Lower East Side	443	292	432	282	-4%
310	Lower Manhattan	44	210	65	271	29%
	Queens	**3541**	**221**	**4242**	**254**	**15%**
401	Long Island City-Astoria	332	214	335	216	1%
402	West Queens	563	191	702	223	17%
403	Flushing-Clearview	301	145	373	169	16%
404	Bayside-Little Neck	93	120	102	126	5%
405	Ridgewood-Forest Hills	351	175	374	184	5%
406	Fresh Meadows	123	169	120	155	-8%
407	Southwest Queens	351	199	471	258	30%
408	Jamaica	737	381	930	459	20%
409	Southeast Queens	361	243	500	325	34%
410	Rockaway	277	351	331	419	20%
	Staten Island	**768**	**270**	**940**	**290**	**7%**
501	Port Richmond	160	431	154	378	-12%
502	Stapleton-St George	289	370	319	372	1%
503	Willowbrook	115	200	175	262	31%
504	South Beach-Tottenville	204	186	292	223	19%

Source: NYS DOH, Statewide Planning and Research Cooperative System, 1994-2003 (updated April 2004);
* Rates are calculated using U.S. Census 1990, 2000 and age-standardized to the year 2000 U.S. Standard Population.

Lower-extremity amputation (LEA) with diabetes hospitalizations by UHF neighborhood: age-adjusted rate,* adults ages 18+, New York City, 2003



* Rates are calculated using U.S. Census 2000 and age-standardized to the year 2000 U.S. Standard Population.
† Fewer than 6 cases. Rate not computed.

Lower-extremity amputation (LEA) with diabetes hospitalizations by borough and UHF neighborhood: number of hospitalizations and age-adjusted rate per 100,000* adults ages 18+, New York City, 1994 and 2003

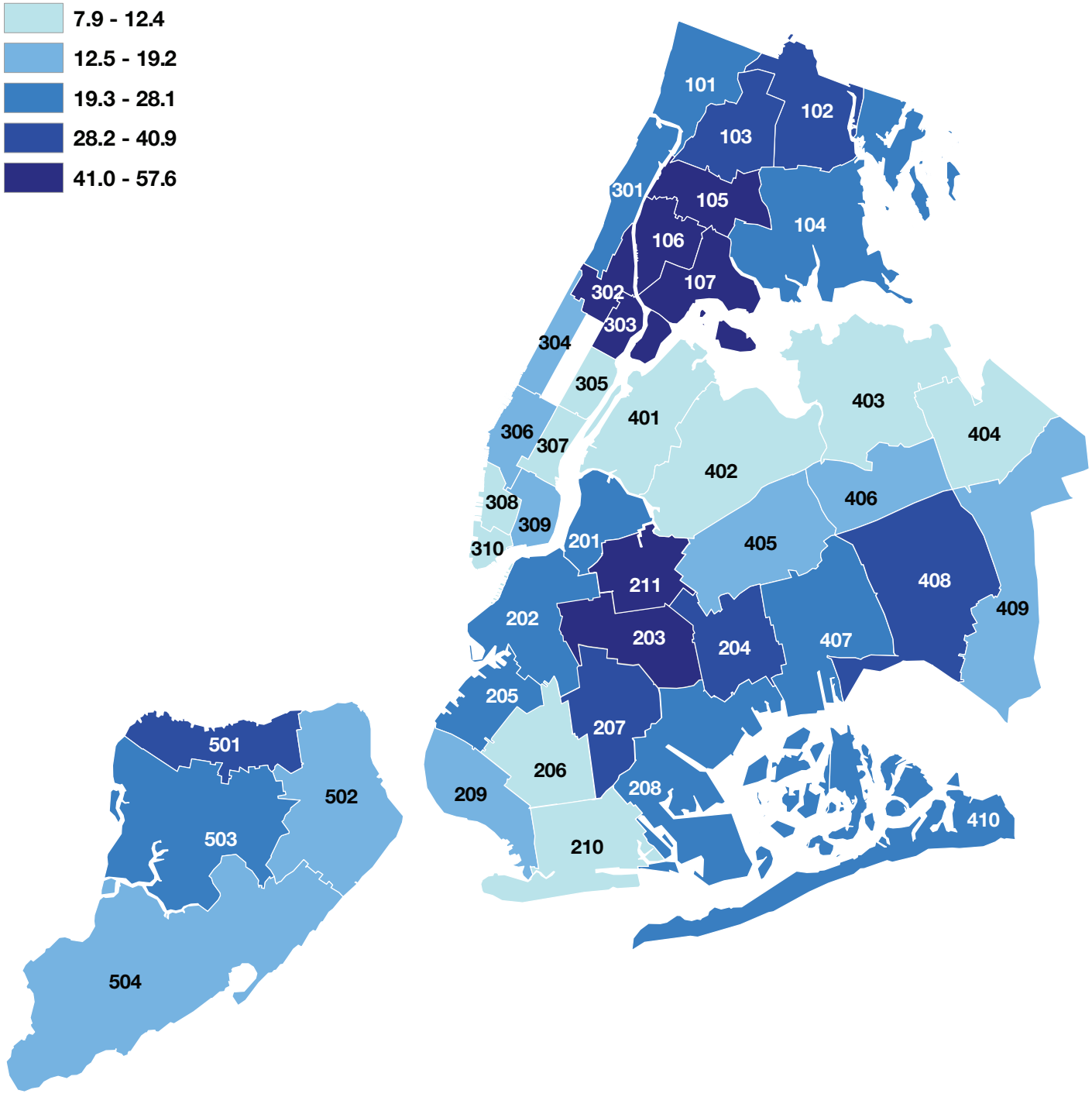
UHF#	Neighborhood	1994 Number	1994 Age-adjusted rate/100,000	2003 Number	2003 Age-adjusted rate/100,000	% change
	Bronx	**590**	**73.7**	**721**	**87.9**	**19%**
101	Kingsbridge	37	42.9	63	69.4	62%
102	Northeast Bronx	109	74.4	118	78.7	6%
103	Fordham-Bronx Park	95	69.7	126	93.1	34%
104	Pelham-Throgs Neck	146	72.5	154	74.3	2%
105	Crotona-Tremont	69	80.6	95	103.4	28%
106	Highbridge-Morrisania	83	99.9	102	112.4	13%
107	Hunts Point-Mott Haven	51	85.9	74	117.7	37%
	Brooklyn	**828**	**50.8**	**907**	**53.6**	**6%**
201	Greenpoint	27	37.9	29	38.4	1%
202	Downtown-Heights-Slope	74	58.1	75	57.4	-1%
203	Bedford Stuyvesant - Crown Heights	149	81.0	166	89.5	10%
204	East New York	64	81.5	85	98.3	21%
205	Sunset Park	18	27.5	46	68.2	148%
206	Borough Park	90	38.3	72	30.5	-20%
207	East Flatbush-Flatbush	88	49.2	130	69.1	40%
208	Canarsie-Flatlands	59	41.0	58	40.0	-2%
209	Bensonhurst-Bay Ridge	47	29.9	48	27.3	-9%
210	Coney Island	109	40.9	90	33.1	-19%
211	Williamsburg-Bushwick	103	104.6	108	106.4	2%
	Manhattan	**500**	**43.9**	**510**	**44.7**	**2%**
301	Washington Heights-Inwood	97	57.1	129	76.8	35%
302	Central Harlem	65	62.3	74	73.8	18%
303	East Harlem	78	115.9	108	153.8	33%
304	Upper West Side	78	44.7	64	36.7	-18%
305	Upper East Side	30	16.1	22	11.5	-29%
306	Chelsea-Clinton	45	45.8	30	31.0	-32%
307	Gramercy Park-Murray Hill	21	19.6	13	12.3	-37%
308	Greenwich Village-SoHo	11	19.7	12	18.9	-4%
309	Union Square-Lower East Side	66	44.1	55	36.8	-17%
310	Lower Manhattan	6	32.4	**	**	**
	Queens	**620**	**38.8**	**695**	**42.0**	**8%**
401	Long Island City-Astoria	44	29.2	48	32.9	13%
402	West Queens	86	30.3	122	40.1	32%
403	Flushing-Clearview	69	32.9	76	33.5	2%
404	Bayside-Little Neck	19	23.2	29	33.9	46%
405	Ridgewood-Forest Hills	85	42.2	60	29.4	-30%
406	Fresh Meadows	19	25.2	18	23.0	-9%
407	Southwest Queens	60	34.7	72	39.8	15%
408	Jamaica	116	61.4	134	67.2	9%
409	Southeast Queens	45	30.3	72	47.0	55%
410	Rockaway	69	83.5	63	79.6	-5%
	Staten Island	**128**	**46.2**	**125**	**38.5**	**-17%**
501	Port Richmond	22	60.7	23	58.0	-4%
502	Stapleton-St George	36	46.4	36	42.9	-8%
503	Willowbrook	30	53.5	25	36.4	-32%
504	South Beach-Tottenville	39	36.7	41	30.9	-16%

Source: NYS DOH, Statewide Planning and Research Cooperative System, 1994-2003 (updated April 2004)

* Rates are calculated using U.S. Census 1990, 2000 and age-standardized to the year 2000 U.S. Standard Population.

** Cells represent <6 persons and are not reported.

Diabetes mortality by UHF neighborhood, age-adjusted death rate*, all ages, New York City, 2002-2003



* Rates are calculated using U.S. Census 2000 and age-standardized to the year 2000 U.S. Standard Population.

Diabetes mortality by borough and UHF neighborhood, number and age-adjusted death rate*, all ages, New York City, 1994-1995 and 2002-2003

UHF#	Neighborhood	1994-1995 Number of deaths†	1994-1995 Age-adjusted death rate/ 100,000*	2002-2003 Number of deaths†	2002-2003 Age-adjusted death rate/ 100,000*	% change
	Bronx	**739**	**35**	**816**	**37.2**	**6%**
101	Kingsbridge-Riverdale	52	19.1	72	25.2	32%
102	Northeast Bronx	130	30.6	156	37.1	21%
103	Fordham-Bronx Park	96	25.4	125	35.3	39%
104	Pelham-Throgs Neck	143	25.4	145	25.9	2%
105	Crotona-Tremont	81	42.3	109	56.8	34%
106	Highbridge-Morrisania	112	50.7	122	53.2	5%
107	Hunts Point-Mott Haven	79	57.6	89	57.6	0%
	Brooklyn	**1,021**	**24.2**	**1,091**	**24.2**	**0%**
201	Greenpoint	43	23.2	49	26.1	13%
202	Downtown-Heights-Slope	104	31.5	93	28.1	-11%
203	Bedford Stuyvesant-Crown Heights	171	37.0	209	43.9	19%
204	East New York	82	39.1	86	40.9	5%
205	Sunset Park	29	17.5	38	22.1	26%
206	Borough Park	108	15.7	86	12.1	-23%
207	East Flatbush-Flatbush	103	22.7	138	31.4	38%
208	Canarsie-Flatlands	61	16.6	93	24.7	49%
209	Bensonhurst-Bay Ridge	77	15.6	76	14.7	-6%
210	Coney Island-Sheepshead Bay	112	14.3	94	11.6	-19%
211	Williamsburg-Bushwick	102	42.1	129	54.0	28%
	Manhattan	**690**	**23.3**	**590**	**19.4**	**-17%**
301	Washington Heights-Inwood	103	23.3	109	24.7	6%
302	Central Harlem-Morningside Heights	131	45.9	123	45.0	-2%
303	East Harlem	1020	56.8	91	47.7	-16%
304	Upper West Side	68	14.1	68	14.1	0%
305	Upper East Side	53	10.2	42	8.5	-17%
306	Chelsea-Clinton	47	17.8	42	17.2	-3%
307	Gramercy Park-Murray Hill	27	9.6	22	7.9**	18%
308	Greenwich Village-Soho	27	18.7	15	9.9**	47%
309	Union Square-Lower East Side	88	22.2	67	16.7	-25%
310	Lower Manhattan	16	33.0**	5	8.9**	73%
	Queens	**707**	**16.8**	**780**	**17.4**	**4%**
401	Long Island City-Astoria	71	17.5	49	12.3	-30%
402	West Queens	117	15.9	95	12.4	-22%
403	Flushing-Clearview	82	14.0	75	11.6	-17%
404	Bayside-Little Neck	21	10.0**	21	9.2**	8%
405	Ridgewood-Forest Hills	84	13.8	92	15.2	10%
406	Fresh Meadows	31	14.3	39	17.7	24%
407	Southwest Queens	91	20.2	116	24.7	22%
408	Jamaica	110	22.1	172	32.4	47%
409	Southeast Queens	42	11.2	66	17.4	55%
410	Rockaway	31	13.1	52	22.9	75%
	Staten Island	**180**	**25.2**	**179**	**21.4**	**-15%**
501	Port Richmond	33	35.8	31	30.3	-15%
502	Stapleton-St. George	46	21.6	44	19.2	-11%
503	Willowbrook	37	26.1	44	24.7	-5%
504	South Beach-Tottenville	59	21.6	60	18.4	-15%

Source: Bureau of Vital Statistics, NYC DOHMH, 1994-1995, 2002-2003

* Rates are calculated using U.S. Census 1990, 2000 and age-standardized to the year 2000 U.S. Standard Population.

† Total number of deaths by neighborhood may not equal number of deaths by borough due to residents with missing zip code.

** Mortality rate has a relative standard error > 30% and should be interpreted with caution.

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