REPORT ON DIABETES

SUNY DOWNSTATE MEDICAL CENTER

LETTER FROM THE PRESIDENT

Fellow residents and friends of Brooklyn:

A recent survey by the New York City Department of Health and Mental Hygiene found that nearly one in every ten people living in Brooklyn reports having diabetes. The number may be even higher—an estimated one third of Brooklyn residents may have diabetes without knowing it. Clearly, we are facing a public health problem of epidemic proportions.

Nearly one in every ten people living in Brooklyn reports having diabetes.

As the data presented in this *Report on Diabetes* show, diabetes is the sixth leading cause of death in Brooklyn and across the nation. It is also a major contributing factor in hospitalizations and deaths due to heart disease, stroke, kidney failure, pneumonia, and influenza.

Residents of Brooklyn's poorer neighborhoods are more likely to be diagnosed with diabetes. Making matters worse, residents in neighborhoods with the highest rates of diabetes often do not have access to the preventive care and medical treatment needed to avoid major complications from the disease. We must do more to address this problem.

Besides the human toll of diabetes, the costs to communities are enormous. The American Diabetes Association estimates that direct medical costs have more than doubled in five years, from $44 billion in 1997 to $91.8 billion in 2002. Indirect costs due to lost workdays, permanent disabilities, and death bring the total even higher.

The *Report on Diabetes* is intended to encourage greater action in preventing and treating this terrible disease. Many studies have shown that diabetes and its complications—high blood pressure, heart disease and stroke, miscarriage, eye damage, and other serious conditions—can be prevented or controlled through better eating habits, exercise, and medical care. By taking strong action, we can help more Brooklynites and other New Yorkers protect themselves from diabetes. We can also support the federal government's Healthy People 2010 goals by encouraging people with diabetes to seek preventive care: yearly eye exams to prevent blindness; foot exams to prevent amputations; treatment for high blood pressure; and annual vaccinations against flu and pneumonia, two leading causes of death in people with diabetes.

Please help us to halt the spread of diabetes. While it affects people of all ages, races, and nationalities nationwide, Blacks and Hispanics bear a greater burden of illness. Working together, we can find new avenues for education, treatment, and prevention, and advocate for better research.

John C. LaRosa, M.D.
President

WHAT IS DIABETES?

People with diabetes mellitus have a shortage of insulin, or their bodies cannot use it properly. Insulin is a hormone produced by the pancreas, an organ next to the stomach that converts the sugar from the foods we eat into energy for the body's cells. When diabetes is left untreated, glucose, a form of sugar, builds up in the blood and then, instead of being used to power the cells, is flushed out in the urine. Over time, uncontrolled diabetes can damage the kidneys, eyes, and blood vessels as well as lead to strokes, heart attacks, and eventual death.

There are four types of diabetes:

TYPE 1 DIABETES

Known as juvenile diabetes, type 1 diabetes appears in people under 30, most often during childhood or adolescence. In type 1 diabetes, the ability of the pancreas to produce insulin is destroyed. People with this condition need to take insulin regularly to stay alive and well. For this reason, type 1 diabetes is also called insulin dependent diabetes mellitus (IDDM). Approximately 5 to 10 percent of all diabetes cases are diagnosed as type 1 diabetes.

TYPE 2 DIABETES

Also known as non-insulin dependent diabetes mellitus, type 2 diabetes occurs when the body is unable to use insulin properly. It usually targets people over the age of 40. In recent years, however, growing numbers of children and teens have been diagnosed with type 2 diabetes. More common among Blacks, Hispanics, and Native Americans than Whites, type 2 diabetes is often found in people who are overweight and physically inactive, who have high blood pressure, or whose bodies do not produce enough insulin. About 90 to 95 percent of all diabetes cases are type 2.

GESTATIONAL DIABETES

This form of diabetes mellitus develops in women during pregnancy. Even though the pancreas is producing enough insulin, midway through pregnancy the growing placenta (which joins the unborn baby to the mother's uterus, or womb) starts producing hormones that prevent the insulin from working normally. Most women begin to produce extra insulin to combat this resistance, but in 2 to 5 percent of all pregnancies, they become diabetic. The diabetes usually disappears after the baby is born, but women with gestational diabetes have an increased risk of developing type 2 diabetes later in life.

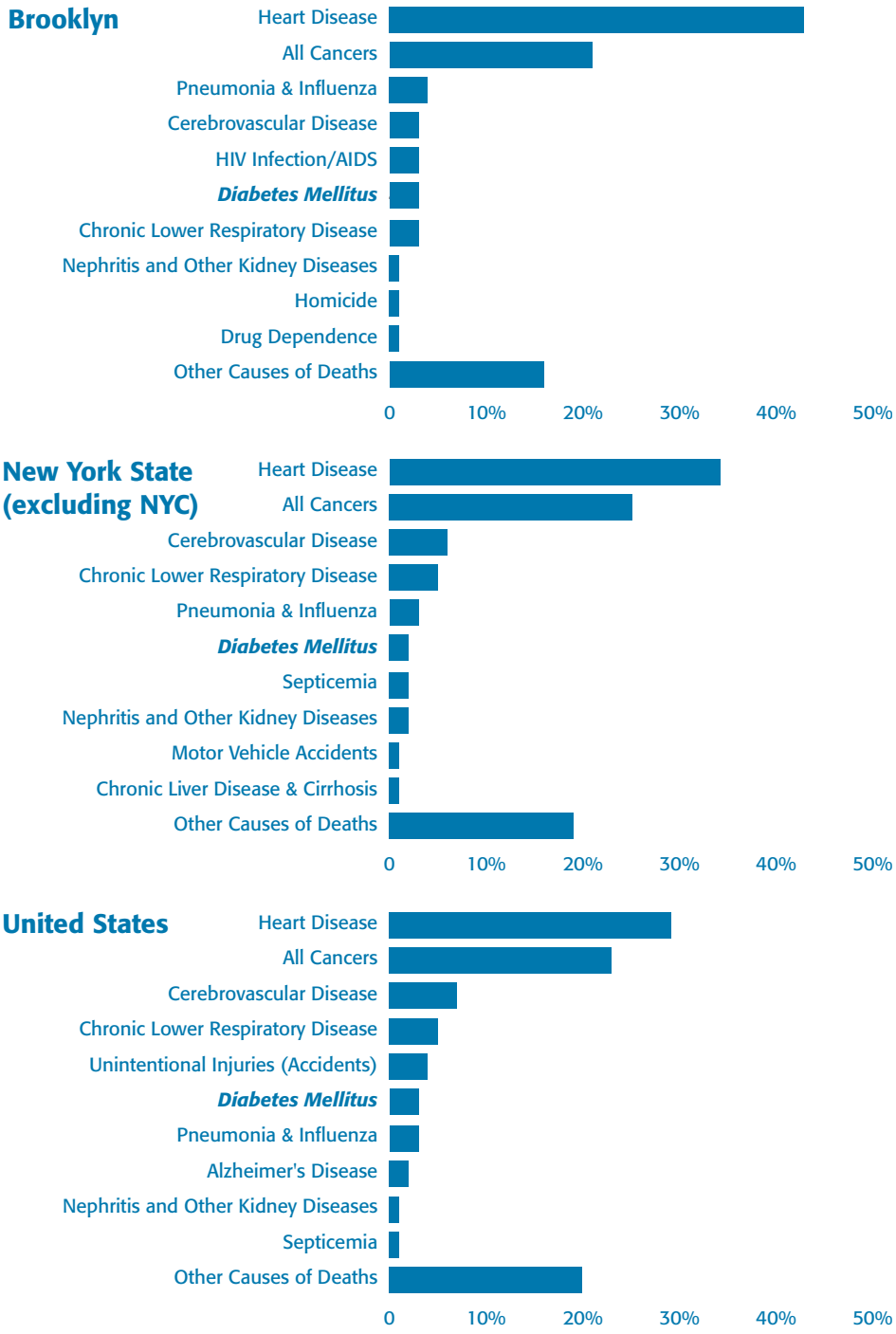
OTHER TYPES OF DIABETES

Inherited abnormalities, diseases of the pancreas (cancer) and liver (cirrhosis), and certain medications are associated with the development of diabetes.

DEATHS DUE TO DIABETES

Diabetes is the sixth leading cause of death in Brooklyn and throughout the nation. It is also a major contributing factor in deaths due to heart disease, cerebrovascular disease (stroke), kidney disease, and other serious illnesses. Forty percent of all deaths due to ischemic heart disease (caused by narrowing of the arteries that lead to the heart) are linked to type 2 diabetes, and persons with diabetes are twice as likely to die of pneumonia or influenza. All told, estimates suggest that diabetes has a role in one out of every five deaths in the United States.

Ten Leading Causes of Death, 1999

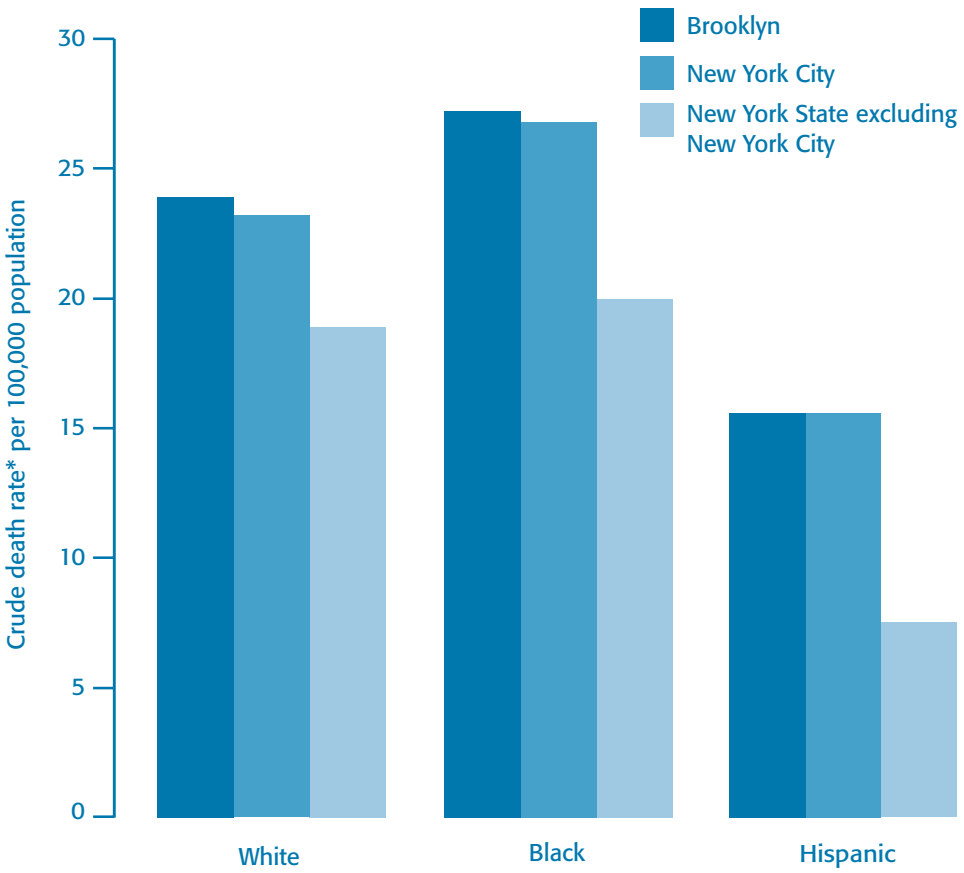


Sources: *1999 Vital Statistics Report of New York State*, 2001 Health - United States, US Dept of Health and Human Services

Diabetes Deaths by Race/Ethnicity, 1999

Across all racial groups, the death rate due to diabetes, adjusted for age and sex, is higher in Brooklyn than in the rest of New York City and New York State. Throughout the New York area, Blacks have the highest death rate from diabetes, and Hispanics have the lowest. In Brooklyn, Hispanics have a slightly lower death rate from diabetes than Whites, but on the national level (data not shown), Hispanics have a higher death rate than Whites.

While not shown here, Brooklyn has a larger percentage of Blacks and Hispanics who are at risk for getting diabetes. Black and Hispanics are more likely to have diabetes at a younger age and die earlier, which increases the overall death rate for the borough.



Source: *Vital Statistics of New York State*, 1999

*Includes deaths from type 1 and type 2 diabetes

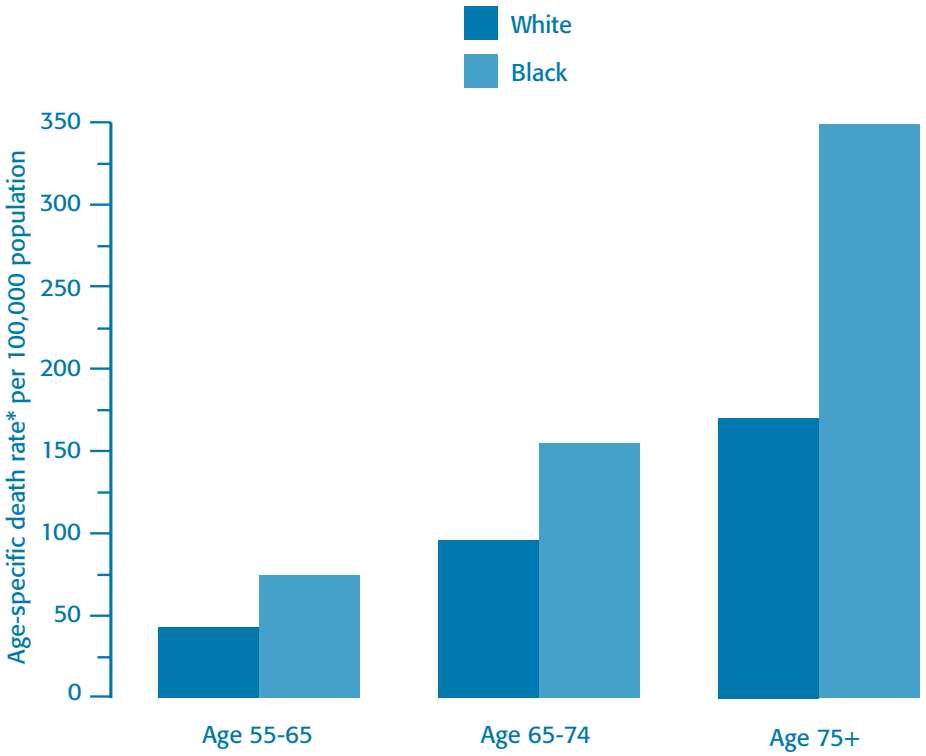
Note: The number of deaths due to diabetes for Asian and Pacific Islanders living in Brooklyn and New York City is too small to calculate accurately; however, national statistics show that they have lower death rates than Whites, Blacks, and Hispanics.

Diabetes Deaths by Race among Older Brooklyn Residents, 1999

Among all racial and ethnic groups, the danger of dying from diabetes, or from complications of diabetes, increases with age.

Although not shown in the chart below, women from all racial and ethnic groups are more likely to die of diabetes than men. Type 2 diabetes is the fourth leading cause of death among Black women, the fifth leading cause among Hispanic and American Indian women, and the seventh leading cause of death among White women (*Diabetes in America*, 2nd edition, NIH Publication No. 95-1468, 1995).

Studies have shown that the age at which a person develops diabetes has a major impact on his or her life expectancy. That is why proper diet and exercise, as well as seeing a doctor regularly, are so important for preventing or delaying the onset of diabetes.



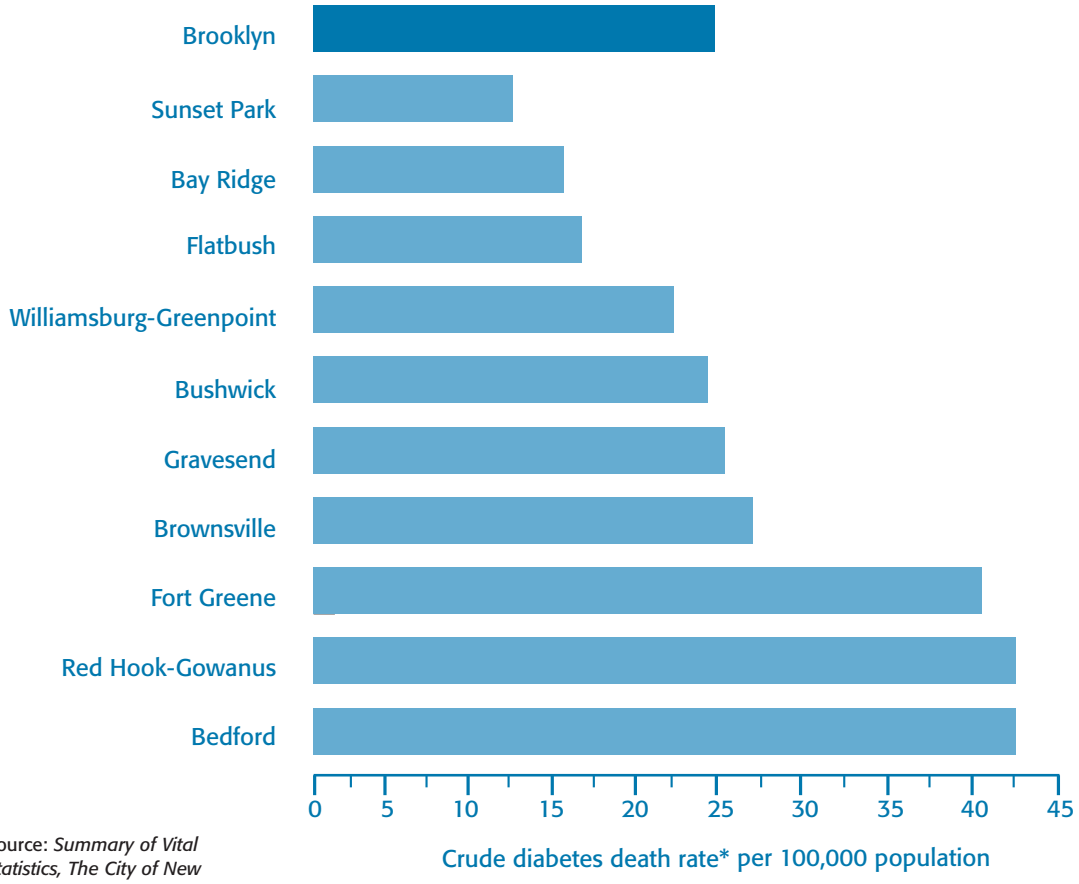
Data Source: Bureau of Biometrics, NYSDOH & US Census 2000

*Includes deaths from type 1 and type 2 diabetes

Note: The number of deaths due to diabetes among Hispanics and Asian and Pacific Islanders living in Brooklyn is too small to calculate age-specific death rates or to draw comparisons to Whites and Blacks.

Diabetes Death Rates in Brooklyn Health Center Districts, 2000

Three of Brooklyn's Health Center Districts have crude death rates for diabetes that are much higher than those in the borough's seven other districts. The higher death rates in Fort Greene, Red Hook–Gowanus, and Bedford may be due, in part, to the larger numbers of African- and Caribbean-American residents who live there. Local and national data show that Blacks are at greater risk for developing heart disease and other complications of diabetes than are members of any other racial group.

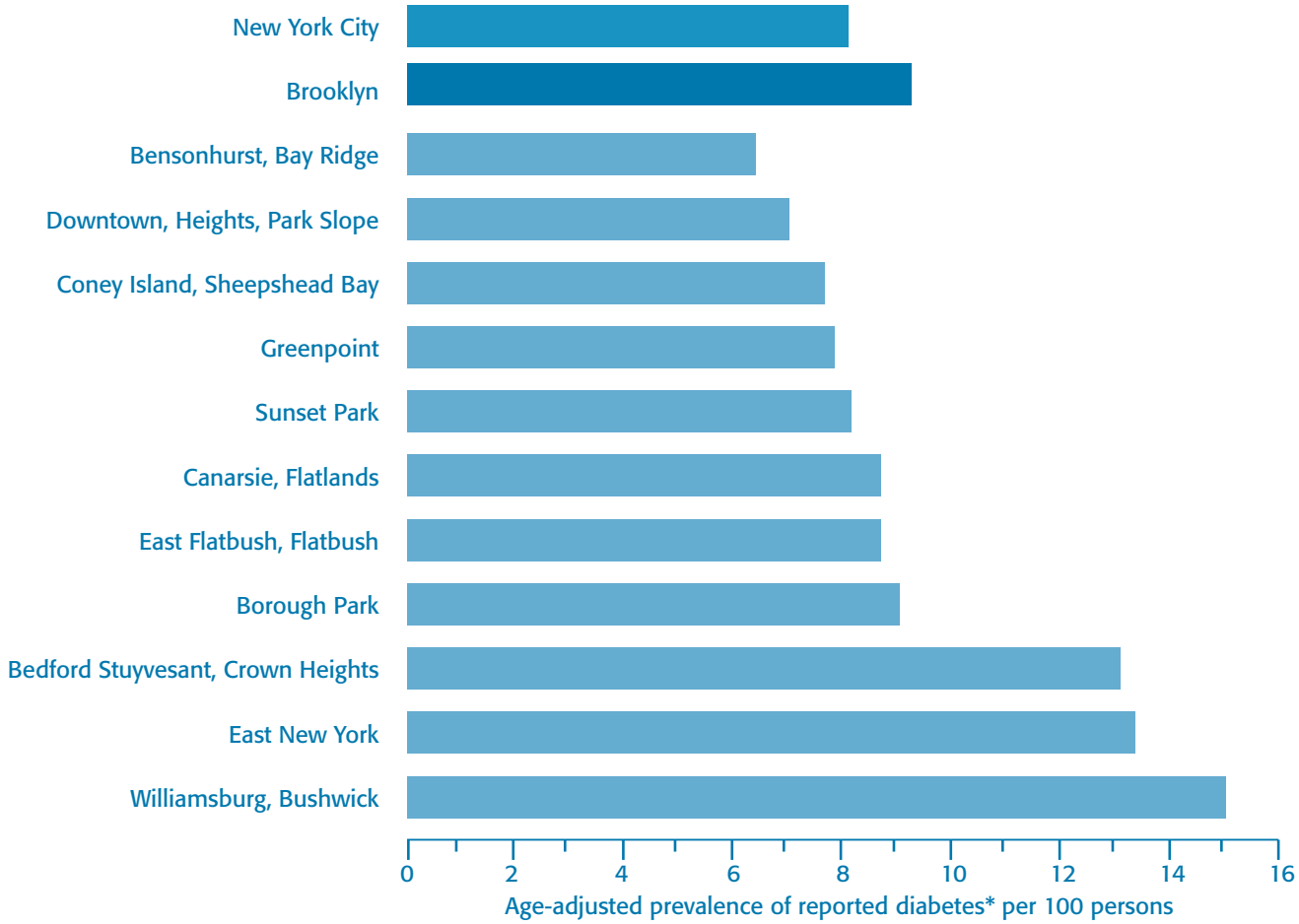


Source: *Summary of Vital Statistics, The City of New York*, NYC Dept of Health, 2000

*Crude death rates have not been adjusted to take into account the effects of age or other differences (such as sex or race/ethnicity) among groups of people.

People Living with Diabetes in Brooklyn, 2002

Among the United Hospital Fund (UHF) neighborhoods surveyed by the New York City Department of Health in Brooklyn, three have much higher percentages of residents reported to have diabetes than New York City and the rest of Brooklyn. Williamsburg-Bushwick has the highest percentage, with almost 1 in 7 residents living with diabetes, compared to 1 in 11 for Brooklyn as a whole. East New York and Bedford Stuyvesant-Crown Heights also have very high rates: about 1 in 8 residents have diabetes. In Brooklyn, the disease is most widespread in poor neighborhoods. Obesity, heart disease, and other complications of diabetes are more widespread in these neighborhoods, as well.



Source: "Community Health Survey," NYC Dept of Health, 2002

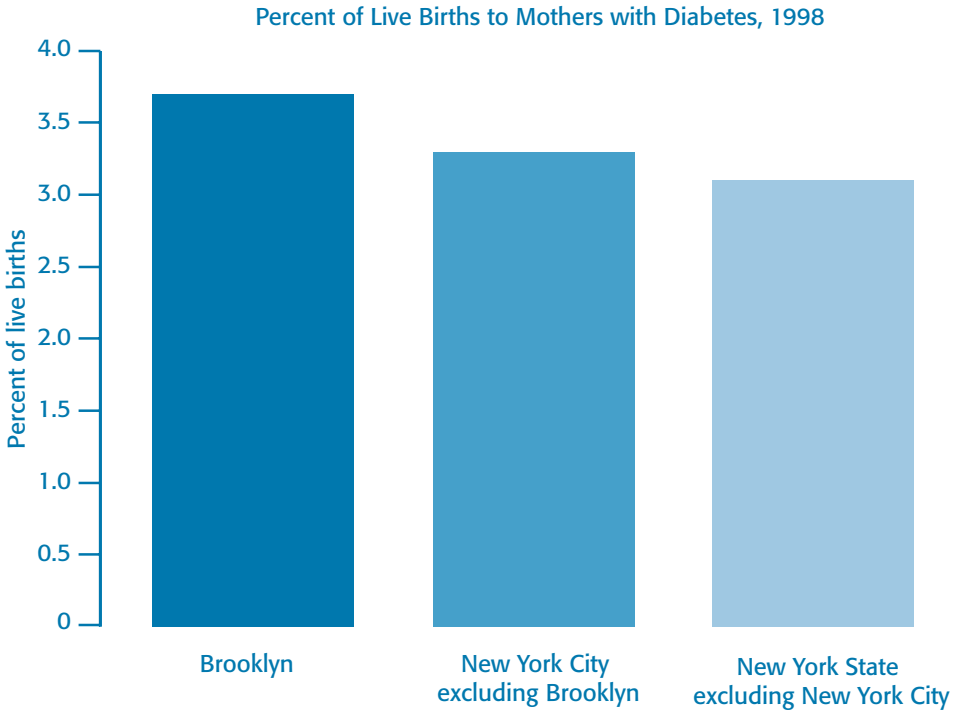
*Includes type 1 and type 2 diabetes

Diabetes among New Mothers, 1998

A form of diabetes, known as gestational diabetes mellitus (GDM), occurs in as many as one out of every 20 pregnancies. Mothers-to-be who have a history of diabetes, or who first develop it during pregnancy, have a greater risk of miscarriage and pre-term labor and delivery. As a precaution, women who know they have type 2 diabetes should ask their doctor for advice before they become pregnant. Pregnancies in diabetic women are also more likely to be complicated by hypertension (high blood pressure) and other medical problems associated with diabetes. In particular, women with GDM often have very large babies that need to be delivered by Cesarean section. If not properly controlled, GDM can also cause major birth defects.

GDM is increasingly common in the United States. In 1998, Brooklyn had a higher percentage of new mothers who had GDM or pre-existing diabetes than the rest of the city and state. GDM occurs more often among Black, Hispanic, and American Indian women. It is also more common among obese (extremely overweight) women and those with a family history of diabetes.

Although GDM often disappears after the baby is born, women with gestational diabetes have a 20 to 50 percent chance of developing diabetes in the next five to ten years. A careful diet and regular exercise can lessen this risk (Maresh, M, "Diabetes in Pregnancy," *Current Opinion in Obstetrics and Gynecology* 13:103-107, 2001).



Source: "Diabetes Surveillance in New York State," New York State Dept of Health, 2001

Summary of Vital Statistics, NYC DOH, 1998; and *Vital Statistics of NYS*, NYSDOH, 1998

Rate of Lower Extremity Amputations (LEA) in People with Diabetes, 1995 and 1999

Poor blood flow due to diabetes can cause severe nerve damage to the legs and feet. Nerve damage lessens a person's ability to feel heat or pain, which can lead to further damage and loss of the use of the legs and feet. When there is severe nerve damage, it may become necessary to amputate (surgically remove) the affected limb. More than 60 percent of all lower extremity (leg or portion of a leg) amputations happen among people with diabetes. It happens most often among the elderly.

While amputations due to diabetes declined in Brooklyn and New York City from 1995 to 1999, they rose for the rest of New York State. Overall, Brooklynites continue to have a higher rate of amputation than other New York City residents. Limited access to care and information on how to prevent severe nerve damage may be part of the cause.

Source: "Diabetes Surveillance in New York State," New York State Dept of Health, 2001

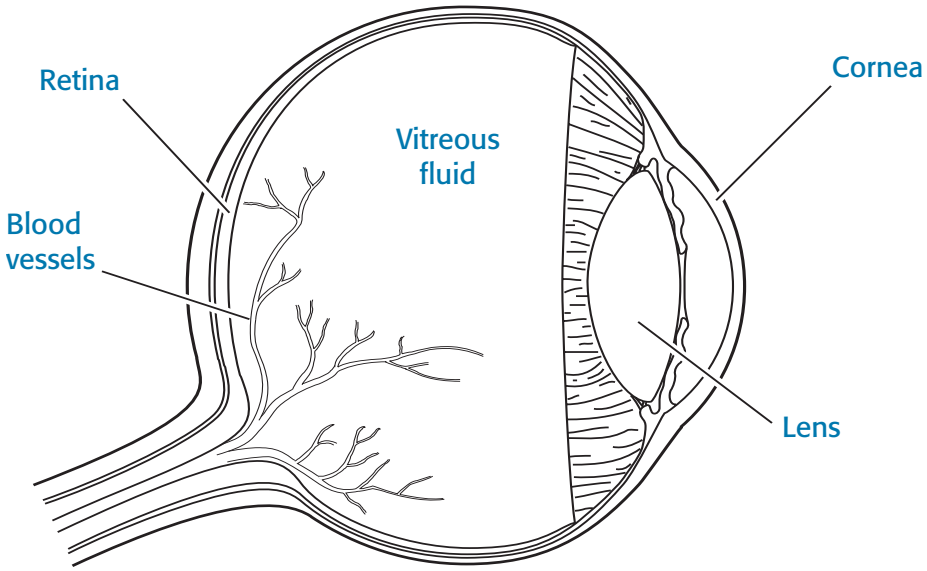
Note: These rates are not adjusted for age.

Diabetes and Blindness

Recent hospitalization data show that approximately 3 to 5 percent of all hospitalizations for diabetes in Brooklyn and the rest of the city are for diabetic retinopathy (damage to the blood vessels in the retina, the membrane that coats the back of the eye). Left untreated, or if treated too late, such a condition can lead to blindness. Diabetic retinopathy is the number one cause of preventable blindness in the United States.

Diabetic retinopathy is one of several diabetic eye diseases or problems that people who have type 2 diabetes are more likely to face. Other complications include cataract, the clouding of the eye's lens, and glaucoma, an increase in fluid pressure inside the eye.

These two eye problems can also lead to blindness. Although cataracts and glaucoma can affect anyone, people with diabetes have a greater risk of getting these complications.

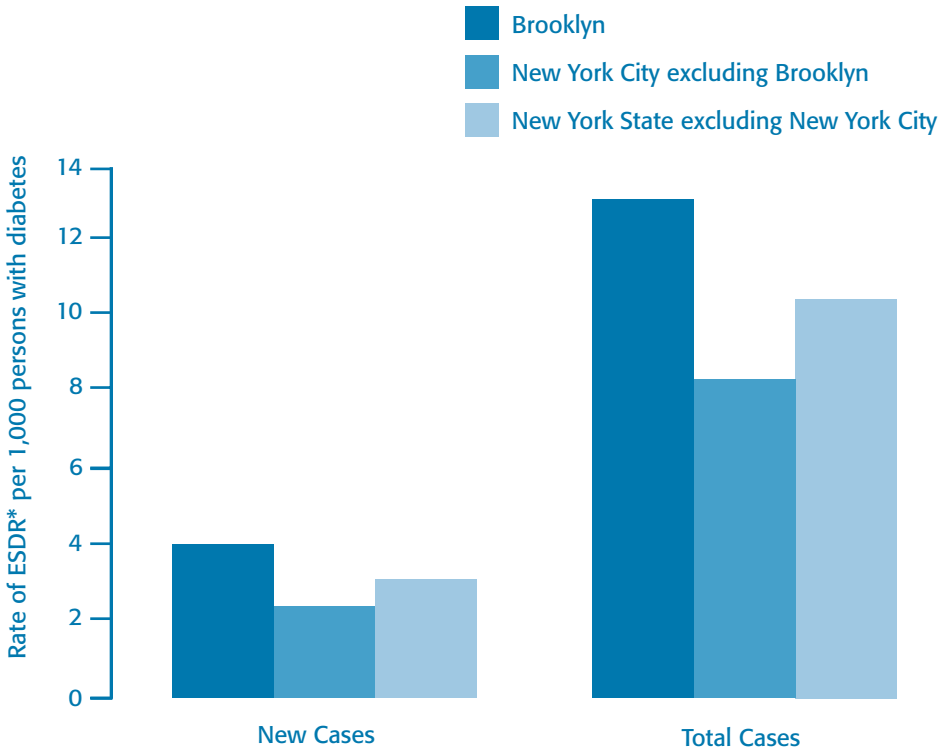


The Rate of End-Stage Renal Disease in People with Diabetes, 1998

Diabetes causes the build up of sugar and other chemicals in the body and kidneys. This can damage the kidneys and cause kidney failure (end-stage renal disease or ESRD). Diabetes is the major cause of end-stage renal disease. People who experience kidney failure need to have a transplant operation to receive a new kidney or receive dialysis treatment (to clean wastes from the blood) for the rest of their lives. Not all people on dialysis have diabetes, but their risk of dying from ESRD is greater if they do.

Compared to the rest of the city and state, Brooklyn has a higher number of new cases and a greater total number of cases of end-stage renal disease caused by diabetes. The numbers of new and ongoing cases of ESRD in Brooklyn mirrors the high percentage of residents in Brooklyn with diabetes. Blacks and the elderly are most likely to have ESRD.

Over the past two decades, the number of individuals receiving treatment for end-stage renal disease has increased dramatically. Approximately 40 percent of all patients who started dialysis in 2000 had diabetes listed as the cause of their renal disease.



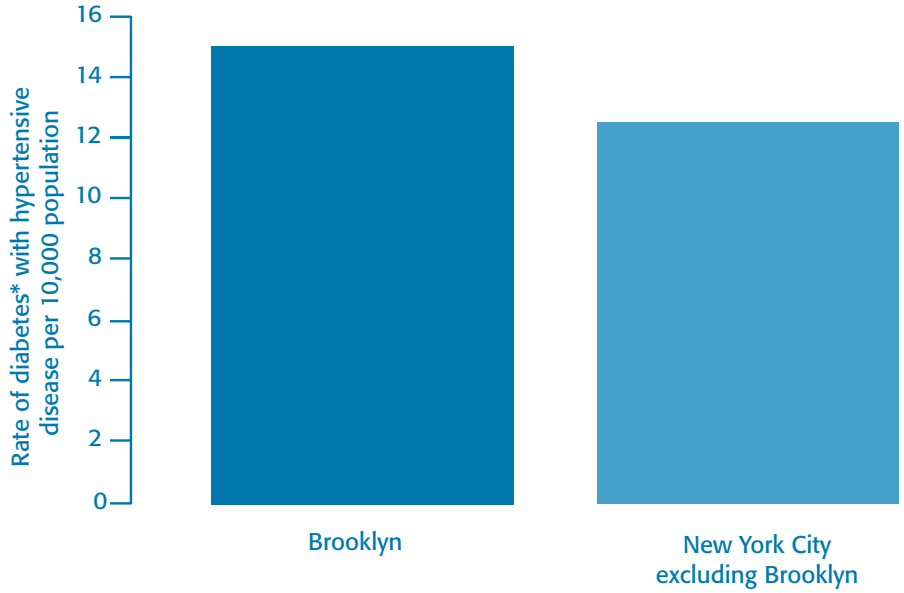
Source: "Diabetes Surveillance in New York State,"; New York State Dept of Health, 2001

* ESRD with diabetes as the primary diagnosis

Diabetes and Hypertensive Disease

Persons with type 2 diabetes are more likely to have hypertension (high blood pressure). Blacks with type 2 diabetes are more likely to have high blood pressure than Whites and Hispanics, and women are at greater risk than men. Uncontrolled high blood pressure can lead to stroke and possible death. The risk for stroke is 2 to 4 times higher among people with diabetes than in the general population.

Persons Hospitalized for Diabetes Who Also Have Hypertensive Disease, 2001



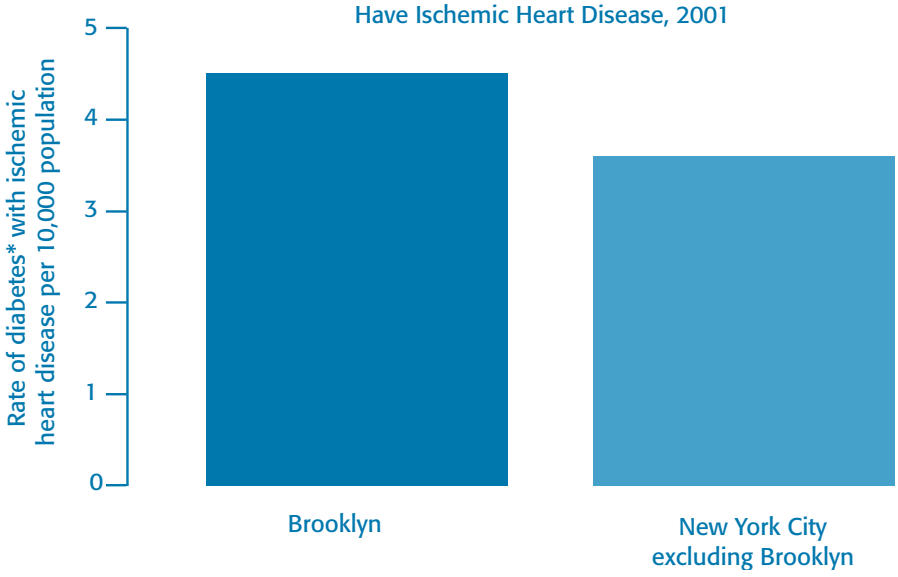
Data Source: Health Care Association of New York State, 2001

*Includes type 1 and type 2 diabetes

Diabetes and Ischemic Heart Disease

The risk of heart disease increases with age for everyone, but for people who have diabetes, heart disease may develop earlier in life. It is also more likely to be fatal for persons with diabetes. Heart disease is as common among women with diabetes as it is among diabetic men. The percentage of diabetic women who develop heart disease and stoke is twice that of other women, and they are four times as likely to be hospitalized for heart problems.

Persons Hospitalized for Diabetes Who Also Have Ischemic Heart Disease, 2001



Data Source: Health Care Association of New York State, 2001

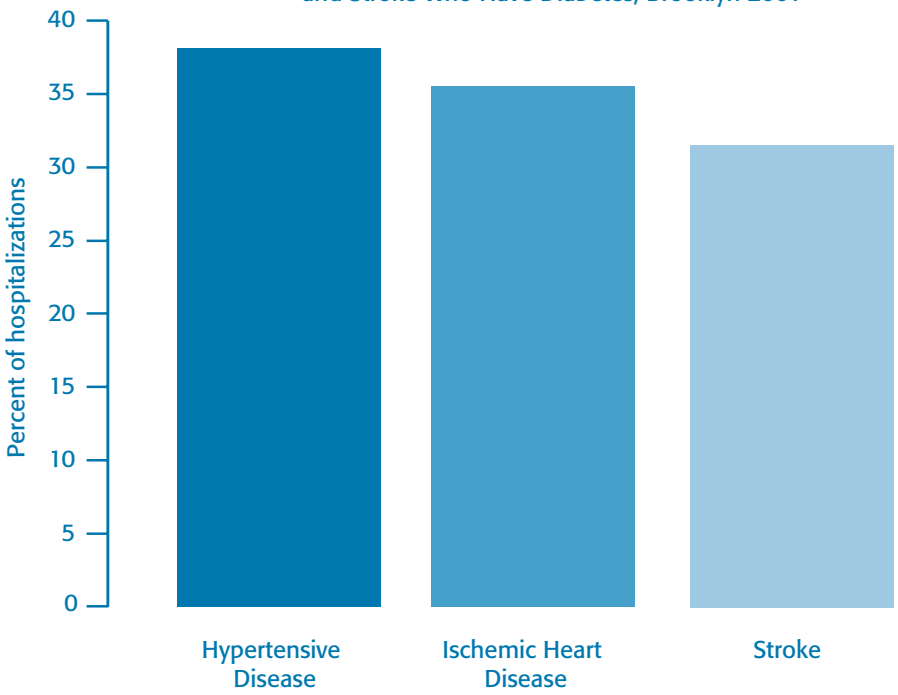
*Includes type 1 and type 2 diabetes

Diabetes' Effects on Other Major Diseases

High blood pressure, ischemic heart disease, and stroke are the leading causes or contributors to death in Brooklyn, the city, and the nation. In 2001, approximately a third of all patients hospitalized in Brooklyn for these three major diseases also had diabetes. Having diabetes can increase medical complications while hospitalized. This adds to the patient's suffering and increases medical costs.

As a person ages, the likelihood of suffering from or dying of high blood pressure, ischemic heart disease, and stroke increases a great deal. Preventing the onset of diabetes or controlling it is critical in lowering hospitalizations for these diseases and for diabetes.

Persons Hospitalized for Hypertensive Disease, Ischemic Heart Disease, and Stroke Who Have Diabetes, Brooklyn 2001



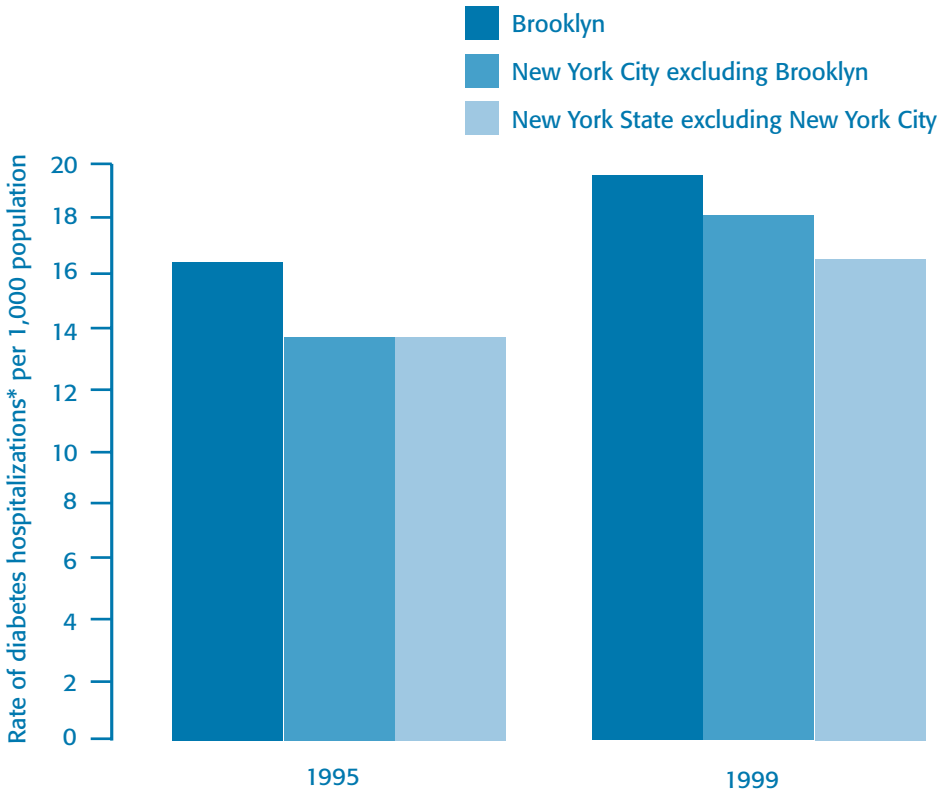
Data Source: Health Care Association of New York State, 2003

*Includes type 1 and type 2 diabetes

HOSPITALIZATION RATES FOR DIABETES

Hospitalization rates for diabetes have increased over the past five years in Brooklyn, New York City, and New York State. Brooklyn regularly has had higher rates of hospitalizations for diabetes than the city or state. In addition, the absolute number of hospitalizations for diabetes in Brooklyn is higher than in any of the city's other boroughs (data not shown).

The increase in hospitalizations for diabetes can mean many things. It may show that many Brooklynites are becoming older. A majority of those hospitalized for diabetes are over 50 years of age. In addition, many may be having problems controlling their diabetes. This may be due to a lack of health information or access to preventive and outpatient medical care.



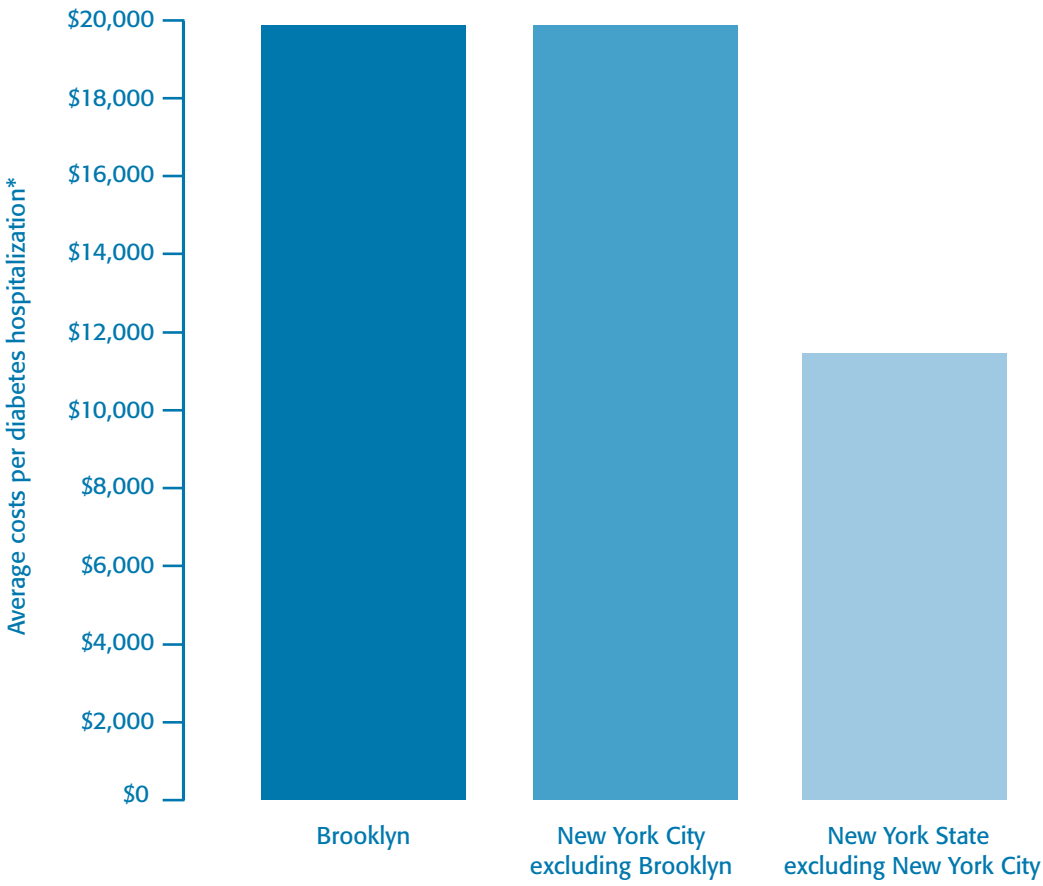
Data Source: Diabetes Control Program, New York State Dept of Health, 1997 and 2001

*Includes type 1 and type 2 diabetes as any diagnosis

Average Costs of Diabetes Hospitalizations, 1999

The average hospitalization cost for patients with diabetes is higher in Brooklyn and New York City than it is in the rest of the state. While not shown in this chart, Brooklynites who have diabetes spend an additional day, on average, in the hospital compared to other residents of New York State. These higher average charges, and longer average stays, may be the result of delayed treatment or limited access to preventive and outpatient services. Higher costs for hospital care divert limited health resources at the local level away from better health education (to teach patients how to self-monitor and control their condition), treatment, and outreach services in communities.

The most recent data from the federal government estimate that the average health care costs for a person with diabetes in the United States in 1997 was $10,071 compared to $2,699 for a person who does not have diabetes. This is much less than the average costs to care for people living with diabetes in Brooklyn and New York City and just below the average cost for New York State.

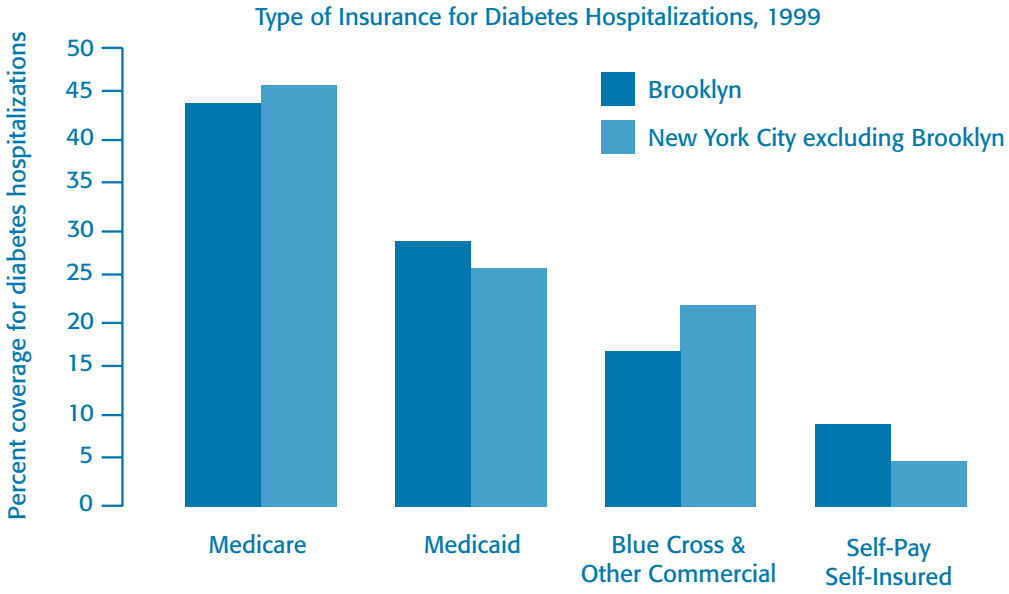


Source: "Diabetes Surveillance in New York State," New York State Dept of Health, 2001

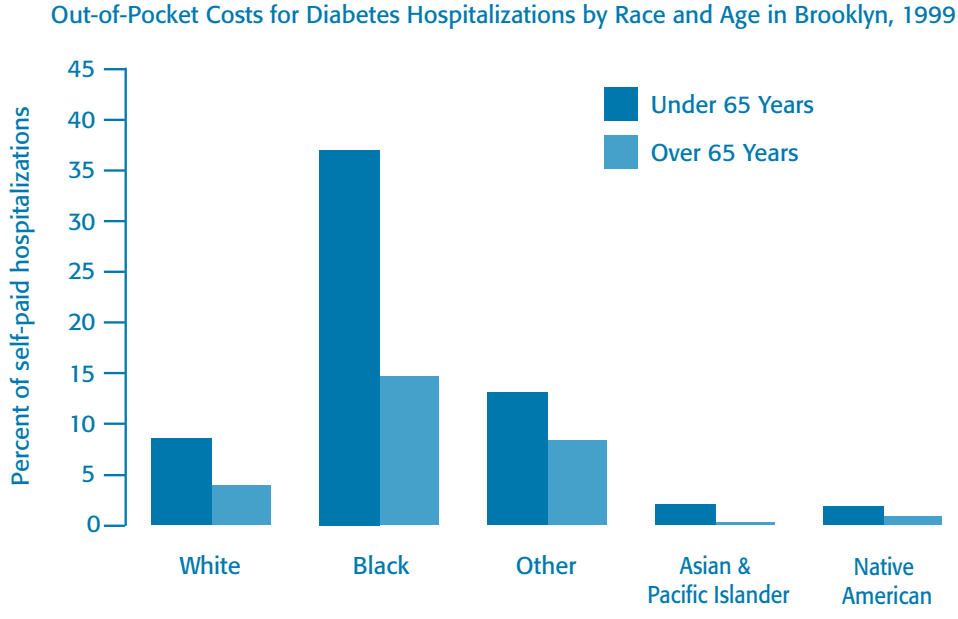
*Includes type 1 and type 2 diabetes

Insurance Coverage for Diabetes Hospitalizations, 1999

Compared to other New Yorkers, a greater percentage of Brooklynites pay out-of-pocket, or rely on Medicaid, to pay for diabetes hospitalizations (top chart). The majority of self-paying (uninsured) Brooklynites are African-American and other non-white residents (bottom chart). Among the uninsured, the majority are immigrants who work at jobs that do not pay for health insurance, who do not qualify for government assistance, and who cannot afford to buy insurance themselves.



Data Source: Hospital Association of New York State, 2002



Data Source: Hospital Association of New York State, 2002

Note: Total self-paid hospitalizations = 1,573

SOURCES OF DIABETES INFORMATION

American Diabetes Association, 149 Madison Avenue, Room 701, New York, NY, 10016; 212-725-4925 or 888- DIABETES; http://www.diabetes.org

Arthur Ashe Institute for Urban Health, 450 Clarkson Avenue, Box 1232, Brooklyn, NY 11203; 718-270-2600; http://www.arthurasheinstitute.org

Diabetes Club of Downstate, 395 Lenox Road, Brooklyn, NY 11203; 718-270-2020. Open to the public, the Diabetes Club is a joint effort between SUNY Downstate Medical Center's Center for Community Health Promotion and Wellness, Nursing Services, and the Division of Endocrinology in the Department of Medicine. Meetings are staffed by certified diabetes educators.

Eye Care America provides referrals for free dilated eye exams for people with diabetes who are 65 or older. Call 800-272-EYES (3937).

Juvenile Diabetes Research Foundation International, 120 Wall Street, New York, NY 10005-4001; 212-689-2860; http://www.jdrf.org

Take Charge of Your Diabetes is a guide for persons with diabetes. Available in English and Spanish, it provides information about the need for teamwork to control blood sugar levels, the value of community and family support, and steps to help prevent complications from diabetes. The guide is available on the Internet at http://www.cdc.gov/diabetes or you can call 1-877-CDC-DIAB (232-3422) toll free for more information and a copy of the book.

Other Important Internet Sites:

American Academy of Ophthalmology http://www.aao.org

American Association of Diabetes Educators http://www.aadenet.org

American Indian Community House http://www.aich.org

Indian Health Service http://www.ihs.gov

National Center for Chronic Disease Prevention and Health Promotion, Diabetes Public Health Resources http://www.cdc.gov/diabetes

National Center for Health Statistics http://www.cdc.gov/nchs

National Diabetes Information Clearinghouse, National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health
http://www.niddk.nih.gov

New York City Department of Public Health Diabetes Report
http://www.nyc.gov/health/survey

Office of Minority Health, U.S. Department of Health and Human Services
http://www.omhrc.gov

Veterans Health Administration Diabetes Program
http://www.va.gov/health/diabetes

GLOSSARY

Medical and Related Terms

Cardiovascular disease: Disease related to the heart and blood vessels (arteries and veins) of the body.

Cerebrovascular disease: A disease caused by problems of not getting enough blood to the brain. Stroke is a major form of cerebrovascular disease.

Complications of diabetes: Diabetes can lead to other serious illnesses, such as heart problems, blindness, kidney failure and amputations.

Diabetes mellitus: The two most common forms of this condition are type 1 diabetes, in which the pancreas is not able to produce enough insulin, and type 2 diabetes, in which the body is resistant to the effects of available insulin. Type 2 is also called non-insulin dependent diabetes.

Dialysis: The process of cleaning wastes from the blood is normally done by the kidneys. If the kidneys fail, the blood must be cleaned artificially with special equipment. The two major forms of dialysis are hemodialysis (removing blood from an artery, purifying and adding vital substances to it, and returning it to the body through a vein) and peritoneal dialysis (dialysis done in the abdominal region).

Dilated eye exam: Eye drops are used to enlarge the pupils to allow the eye care professional to see more of the inside of the eyes when checking for signs of disease.

End-stage renal disease: A condition where the kidneys fail and are no longer able to remove wastes from the blood.

Gestational diabetes: A type of diabetes that develops during pregnancy.

Healthy People 2010: A national health agenda sponsored by the U.S. Department of Health and Human Services. It is designed to identify the most serious and preventable threats to health and to establish national goals to reduce these threats.

Hypertension: High blood pressure.

Hypertensive disease: Diseases of the heart associated with or resulting from high blood pressure.

Insulin: A hormone manufactured by the pancreas (an organ next to the stomach) to convert glucose, also known as blood sugar, into energy for the body's cells and tissues.

Ischemic heart disease: The narrowing of the arteries leading to the heart.

Juvenile diabetes: Another name for type 1 diabetes, since it most often affects children and young adults.

Lower extremity amputation: Surgically removing a foot or leg.

Transplantation: The surgical replacement of a damaged or diseased organ with another from a different person.

Numerical Calculations–Rates

Rate: A calculated number that is used to express the number of events (deaths or cases) within a group of individuals in a given period of time. For example, 150 events per 100,000 people per year.

Age-adjusted rate: A rate that has been calculated in a way that eliminates the effect of age differences between populations when comparing rates among different groups of people.

Crude rate: A simple rate that presents the number of events (deaths or cases) of a specific disease in a group divided by the number of people in the group or population. This rate does not take other factors, such as age, into account.

Incidence: Number of new cases of, or people who have been newly diagnosed with, a condition.

Prevalence: Total number of people who are known to have a condition or disease. Generally expressed as the percentage of the population that has the disease.

Technical Notes

The hospitalization data for this report come from the Statewide Planning and Research Cooperative System (SPARCS), New York State Department of Health (NYSDOH). This database contains inpatient hospital information from all hospitals statewide for each calendar year. Additional information regarding medical complications due to diabetes is from "Diabetes Surveillance in New York State," a report compiled by the Office of Diabetes Control, NYSDOH.

Death data for this report come from *Vital Statistics of New York State, 2000*, a compendium of mortality and health-related conditions reported by cities and counties to the Bureau of Biometrics, NYSDOH. City and borough data come from *Summary of Vital Statistics of the City of New York, 2000*, Office of Vital Statistics, NYCDOH. National death information is from *Health, United States, 2001, with Health and Aging Chartbook*, published by the National Center for Health Statistics.

We calculated age-specific rates and other nonadjusted rates using the appropriate populations derived from the 2000 U.S. Census. Rates were not calculated for certain populations because the number of deaths reported was too small to provide an accurate depiction of that disease for the given population.

Efforts to analyze local data for particular diseases, such as diabetes, can present the researcher with considerable difficulties. For example, death certificates filled out at the time of death provide the primary cause of death but often leave out contributing causes. The death certificate may cite stroke as the primary cause of death but not include diabetes as a major factor contributing to that death. Another problem faced by the researcher is that the number of deaths reported for a disease in a borough may be so few that breaking out deaths by age, sex, or race/ethnicity produces numbers too small to calculate reliable rates and percentages. This is the case for most diabetes deaths in Brooklyn.

The documentation of hospitalization rates by race and ethnicity varies from hospital to hospital and from year to year. Hospitalizations for Hispanics, in particular, are underdocumented. State authorities are attempting to address these and related concerns but there are still serious shortcomings in the ways data are collected.

Another problem is the age distribution of a population and the impact of disease at certain ages. For example, diabetes, like other chronic diseases, causes more deaths in later years (see page 5 of this report). In addition, if a population is large and has a younger age profile, as is true of Hispanics living in Brooklyn and New York City, the number of diabetes deaths can be expected to be much smaller compared to Whites and Blacks, who have an older age profile. Therefore, when we calculate crude death rates, the death rate for Hispanics will be lower than for Whites or Blacks. In these situations, one would age-adjust the death rate; however, the lack of data on diabetes deaths by age for Hispanics prevents us from performing this calculation. (Please refer to page 4, which illustrates this phenomenon.) Nevertheless, we have made every effort to accurately portray the information at the borough level.

SUNY Downstate Medical Center would like to thank the following individuals for their help in preparing the Report on Cancer.

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Design: Frank Fasano, cover photos: Ernest A. Cuni, Division of Biomedical Communications. Published by SUNY Downstate Medical Center, 2003.