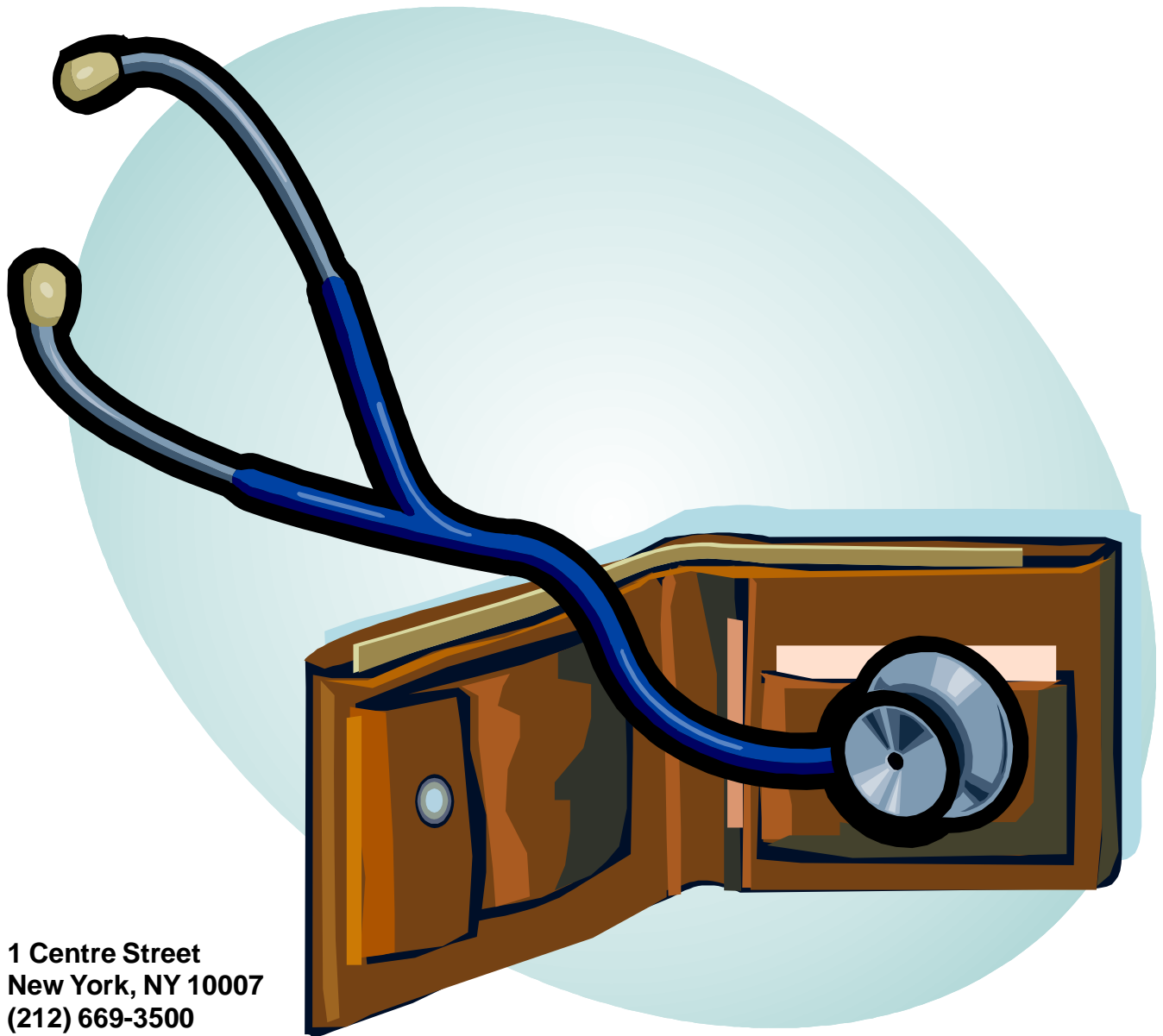

policy report

Office of the New York City Comptroller
Office of Policy Management

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Health and Wealth: Assessing and Addressing Income Disparities in the Health of New Yorkers



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Summary

Introduction

Throughout the United States, people who live in low-income communities are more likely to suffer from a range of diseases and medical conditions. The Office of the Comptroller undertook this analysis of New York City trends since 1990 in diabetes, heart disease, cancer, childhood asthma, and infant mortality to determine:

- How much key health indicators are widening or narrowing between lower income and higher income neighborhoods;
- The relationship between the level of access to primary and preventive care in various neighborhoods and the health of their residents;
- Whether there are significant levels of preventable hospitalizations that can be attributed to a lack of access to primary and preventive care.

The New York City Department of Health and Mental Hygiene (DOHMH) has instituted ambitious and innovative screening, treatment, and public education programs to improve New Yorkers' health, and has sought to reduce health disparities by focusing many of these programs on residents of low-income communities. We found, however, that although City and State efforts to combat health disparities have proven effective in reducing childhood asthma hospitalizations and infant mortality, disparities have widened in recent years between the poorest neighborhoods and the rest of the city for cancer and heart disease, and have widened dramatically between lower and higher income neighborhoods for diabetes. These trends highlight the need to redouble efforts in public health education, disease surveillance, and research into the underlying causes of disparities, and to increase targeted interventions and access to and utilization of primary and preventive care, especially in the lowest income communities.

Data analyzed

For each year, 1990 to 2005, hospitalization and/or mortality rates for diabetes, cancer, heart disease, childhood asthma hospitalization, and infant mortality were reviewed for each of the 42 New York City neighborhoods as defined by the United Hospital Fund (UHF). Hospitalization and mortality data by UHF neighborhood was provided by DOHMH. For 1995 and annually for 2000 to 2005, the 42 neighborhoods were ranked by median household income as measured by the 2000 U.S. Census and divided into six groups of seven neighborhoods each. The six groups were ranked by income. Hospitalization and mortality rates for the neighborhoods comprising each sixth were averaged, after adjusting for differences in their populations, to produce population-weighted rates for each sixth.

In addition, ambulatory care sensitive (ACS) condition hospital admission rates for diabetes, congestive heart failure and pediatric asthma-bronchitis were reviewed for the 42 neighborhoods for 1995, 2000 and 2005 and also compared by sixth. An ACS condition admission is defined as an admission of a patient up to age 64 that is considered to have been potentially avoidable with effective primary care and early treatment.

A more detailed explanation of our methodology can be found in Appendix A.

Findings

Below is a summary of our major findings and recommendations. Childhood asthma hospitalizations and infant mortality, the two areas where disparities have narrowed, are summarized first, followed by diabetes, heart disease and cancer, where disparities widened. Appendix B lists the postal Zip Code areas that are included in each neighborhood, the median household income as reported in the 2000 U.S. Census for each neighborhood, and identifies the neighborhoods in each income sixth. Hospitalization rates by neighborhood income sixth are listed in Appendix C, mortality rates by sixth in Appendix D, and ACS condition admission rates by sixth in Appendix E. Rates by neighborhood annually from 1990 to 2005 are in Supplemental Information A (hospitalization rates) and B (mortality rates), viewable at OPM Reports, www.comptroller.nyc.gov.

Diabetes hospitalization rates

- **From 1990 to 2005, the number of diabetes hospitalizations in New York City increased by 82.9 percent.** From 1990 to 1995, diabetes hospitalizations increased by 40 percent citywide, from 12,605 to 17,649. Thereafter, the number of diabetes hospitalizations continued to rise, although at a slower rate. By 2005, there were 23,052 diabetes hospitalizations, a 30 percent increase from 1995.
- **From 1990 to 2005, diabetes hospitalization rates more than doubled in six neighborhoods, five of which were low-income:** in Hunts Point-Mott Haven, High Bridge-Morrisania, Crotona-Tremont, and East Harlem, the four poorest neighborhoods in the city, and in Fordham-Bronx Park, the eighth poorest, and in Lower Manhattan.
- **From 1995 to 2005, the largest increases in diabetes hospitalization rates occurred in lower income neighborhoods;** rate increases for the three lowest sixths ranged from 29 to 42 percent, but for the top three sixths, they ranged between 0.5 percent (top sixth) and 18.0 percent (3rd sixth). **By 2005, there were 686.6 diabetes hospitalizations per 100,000 people in the bottom sixth, 5.5 times the number in the top sixth, up from 3.9 times in 1995.**
- **As of 2005, there was no indication that diabetes hospitalization rates in low-income neighborhoods were leveling off.** Every year from 2000 to 2005 the hospitalization rate increased in the three poorest sixths.
- **From 1995 to 2005, diabetes ambulatory care sensitive (ACS) condition admissions rates—which are preventable hospitalizations—increased the most in lower income neighborhoods.** The increases ranged from 36 percent to 46 percent for the bottom three sixths and from six percent to 22 percent for the top three sixths, with the top sixth recording the smallest increase.
- **Effective primary and preventive care could avoid thousands of diabetes hospitalizations each year.** In 2005, in the bottom two sixths there were 11,273 diabetes hospitalizations in New York City. In the same two sixths, there were 4,624 diabetes ACS condition admissions.
- **High diabetes hospitalization rates are financially costly.** The total number of diabetes hospitalizations in the bottom two sixths increased from 8,156 in 1995 to 11,273 in 2005. In 2005, the cost of the 3,117 additional hospitalizations in the bottom two sixths was at least \$36.8 million, much of it paid by the public through Medicaid or hospital charity pools. Since this amount is only the Medicare-reimbursed cost and not the amount hospitals charged, the actual cost is likely considerably higher.

Diabetes deaths

- **From 1990 to 1995, there were large percentage increases in diabetes deaths.** There were 991 diabetes deaths in New York City in 1990 and 1,713 in 1995, a 73 percent increase. **The greatest increases occurred in the lowest income communities.** For example, the number of diabetes deaths in Hunts Point-Mott Haven, the poorest neighborhood in the city, more than tripled from 12 to 38.
- **Although from 1995 to 2000 diabetes mortality rates and total numbers of diabetes deaths continued to rise, the increases were smaller than they were from 1990 to 1995.** The smallest increases during this period generally occurred in the wealthiest neighborhoods. **Total numbers of diabetes deaths leveled off from 2000 to 2005;** there were 1,827 diabetes deaths in New York City in 2000 and 1,813 in 2005.

Heart disease hospitalizations and deaths

- **From 1990 to 2005 the heart disease hospitalization rate increased in 34 of the 42 New York City neighborhoods.** The largest increases, in excess of 40 percent, were in eight mostly low-income neighborhoods and especially in Brooklyn—an increase of 94.4 percent was observed in East New York, 78.5 percent in Bedford Stuyvesant-Crown Heights and 56.2 percent in Flatbush-East Flatbush.
- **From 1995 to 2005, heart disease hospitalization rates increased citywide, but income analysis shows that the largest increases were in the two bottom sixths—30 percent for the bottom sixth, 17 percent for the 5th sixth.** The smallest increase, approximately eight percent, was for the top sixth. In 2005, the bottom sixth heart disease hospitalization rate was 1.97 times the rate in the top sixth, up from 1.28 times in 1995.
- **By a substantial margin, the bottom sixth had the largest increase in heart disease hospitalizations, 30 percent, and it also had the smallest decline in heart disease mortality rates, only 10 percent.** The wealthier sixths had greater decreases in heart disease mortality rates than the lowest income neighborhoods—between 15 percent and 20 percent.
- **Staten Island heart disease mortality rates are among the highest in the city.** In 2005, only six of the 42 New York City neighborhoods reported more than 350 heart disease deaths per 100,000 population, including all four Staten Island neighborhoods, along with Rockaway and Bedford Stuyvesant-Crown Heights. In 2005, heart disease mortality rates for the Staten Island neighborhoods exceeded the average for the city’s top income sixth of 258.7 per 100,000 as well as for the bottom income sixth of 306.3 per 100,000.

Childhood asthma

- **From 1990 to 1995, the largest increases in childhood asthma hospitalization rates were observed in low-income neighborhoods.** The number of hospitalizations increased by at least 400 per 100,000 population in six of the 42 New York City neighborhoods, including the four poorest neighborhoods, the sixth poorest, and the eighth poorest. By 1995, the childhood asthma hospitalization rate exceeded 1,500 per 100,000 in five neighborhoods, all low income, up from two in 1990. The largest increase during this period, of 699.7 per 100,000, occurred in East Harlem, and drove the neighborhood rate from an already extraordinary 2,541.5 per 100,000 population to 3,241.2 per 100,000, the highest in the city.

In virtually all other neighborhoods the number of hospitalizations per 100,000 increased by less than 300 and in more than half the neighborhoods the increase was less than 200 or there was a decrease; in nine neighborhoods, including the five wealthiest, the childhood asthma hospitalization rate countered the citywide trend and declined.

- **Between 1995 and 2005, childhood asthma hospitalization rates plummeted; the largest decreases were in low-income neighborhoods.** The total number of childhood hospitalizations citywide decreased from 16,658 in 1995 to 10,499 in 2000 and 9,400 in 2005, a total decrease of 43.6 percent. The number of hospitalizations per 100,000 fell by an average of 849.6 per 100,000 in the poorest neighborhood income sixth, compared to 465.0 in the next poorest sixth and 298.2 in the 4th sixth. Hospitalizations declined 114.7 per 100,000 in the top sixth. The largest decrease was in East Harlem, of 2,181.3, from 3,241.2 per 100,000 population in 1995 to 1,059.9 in 2005.

Low-income neighborhoods accounted for the vast majority of the total decrease. In the 14 neighborhoods in the bottom two sixths, there were 3,458 fewer childhood asthma hospitalizations in 2005 than in 1995 while in all other neighborhoods there were 454 fewer hospitalizations.

- **Success in slashing childhood asthma hospitalization rates occurred after the creation of the New York City Asthma Initiative in 1994 by DOHMH and a coalition of 300 community groups, medical providers, non-profits, and others.** By far the largest decreases in childhood asthma hospitalization rates since 1995 took place between 1995 and 2000, after ambitious new multi-faceted programs to address the growing crisis in asthma were implemented and began to show results. In most low-income neighborhoods, the sharpest decreases were observed in 1998. For example, in Hunts Point-Mott Haven, the city's poorest neighborhood, the number of childhood asthma hospitalizations per 100,000 population plummeted from 2,019.6 in 1997 to 1,391.9 in 1998.
- **Despite this progress, there still are enormous disparities in childhood asthma hospitalization rates and total numbers of hospitalizations.** In 2005, there was an average of 939.5 hospitalizations per 100,000 population in the bottom sixth of the 42 New York City neighborhoods compared to 226.8 in the top sixth and 323.1 in the 2nd sixth. Furthermore, the sharp decline in childhood asthma hospitalizations **does not mean that the prevalence of asthma similarly declined.** The decrease in hospitalizations indicates that childhood asthma is being better managed. Nationally, the U.S. Centers for Disease Control reports that asthma prevalence among children remains at historically high levels.

Cancer hospitalizations and deaths

- **From 1990 to 2005, the cancer hospitalization rate decreased in all 42 neighborhoods except Hunts Point-Mott Haven (the poorest) and East New York (the eighth poorest).** The smallest decreases, of less than 10 percent, were in predominantly low-income neighborhoods such as High Bridge-Morrisania (-5.3 percent) and Bedford Stuyvesant-Crown Heights (-6.0 percent). The rate declined by 15 to 45 percent in nearly all other neighborhoods.
- **From 1995 to 2005, the cancer hospitalization rate increased for the bottom sixth.** For all other income sixths, cancer hospitalizations rates decreased by between five percent and 17 percent.

- **From 1995 to 2005, the cancer mortality rate also increased only for the bottom sixth**, by approximately five percent. It decreased in all other sixths, and the top sixth had the largest decrease, approximately 12 percent.

Infant mortality

- **From 1990 to 2005, the number of infant deaths per 1,000 live births decreased dramatically in New York City. The largest decreases were in low-income communities.** During this period, the infant mortality rate decreased by at least 60 percent in ten neighborhoods, including Sunset Park (84.9 percent), East Harlem (72.7 percent), Greenpoint (68.6 percent), Highbridge-Morrisania (68.3 percent), and Central Harlem-Morningside Heights (64.7 percent).

In 1990, there were 13 neighborhoods with a rate of at least 13.0 deaths per 1,000 births, by 1995 there were five, and by 2000 there were none. From 1990 to 2005, Central Harlem, East Harlem, High Bridge-Morrisania, Bedford Stuyvesant-Crown Heights and Downtown Brooklyn-Brooklyn Heights-Park Slope were the only neighborhoods to record double-digit decreases in the number of infant deaths per 1,000 live births.

- **Comparing by income, from 1995 to 2005, the greatest infant mortality rate percentage decline was 38.5 percent, for the bottom sixth of the 42 neighborhoods.** In terms of numbers of infant deaths per 1,000, the largest decline was 4.43, also for the bottom sixth. In 2005, the rate for the bottom three sixths was the lowest since at least 1995.
- Despite this remarkable progress, **infant mortality rates in low-income neighborhoods remain substantially higher than the rates in more affluent areas.** In 2005, the bottom sixth rate of approximately 7.2 deaths per 1,000 live births was still approximately 44 percent higher than the rate in the top sixth of 4.2 per 1,000.
- A complex range of factors reduced infant mortality rates. **Clearly, however, programs implemented in the 1980s that expanded the availability of prenatal care for expectant mothers in low-income communities played a major role**, such as the Prenatal Care Assistance Program, which combines higher Medicaid income eligibility with enhanced provider reimbursement. In low-income neighborhoods, in addition to lower infant mortality rates, there were sharp decreases in the rate of mothers who did not receive prenatal care or received it late.

Primary and preventive care

Neighborhoods in the bottom sixth have the fewest primary care physicians per capita. In 2004, there were 73.7 primary care physicians per 100,000 people in the bottom sixth, compared to 107.6 in the 2nd and 197.9 in the top sixths. The bottom sixth also had the highest rates of hospitalization and/or mortality for diabetes, cancer, heart disease, childhood asthma, and the highest infant mortality rate.

Another important indicator of primary and preventive care availability is the rate of residents without health insurance. People are less likely to seek medical attention in a timely manner if they do not have health insurance, even if doctors are available in the community. Eight of the 17 UHF neighborhoods with uninsured rates higher than the citywide rate were in the bottom two sixths.

Summary tables

Table 1 shows percentage changes in hospitalization, mortality and ambulatory care sensitive condition admission rates from 1995 to 2005 by median household income sixth. Table 2 shows the rates by sixth in 2005. Each sixth is comprised of seven of 42 neighborhoods defined by the United Hospital Fund. See Appendix B for a listing of the Zip Codes included in each neighborhood and the median household income for each neighborhood. Neighborhood median household income ranges (2000 U.S. Census) by sixth are as follows:

Bottom 6th	\$17,031 to \$25,574
5 th Sixth	\$26,331 to \$31,781
4 th Sixth	\$33,998 to \$40,703
3 rd Sixth	\$41,335 to \$45,020
2 nd Sixth	\$45,288 to \$56,907
Top 6th	\$57,597 to \$73,816

Table 1. Percentage change in NYC hospitalizations, deaths, and ambulatory care sensitive (ACS) hospital admissions per 100,000 population, by neighborhood income, 1995 to 2005. Each sixth comprises seven UHF neighborhoods.

	Sixth					
	Bottom	5 th	4 th	3 rd	2 nd	Top
Cancer hosp	+5.9%	-7.7%	-11.6%	-11.6%	-10.8%	-12.8%
Cancer death	+3.3%	-17.7%	-11.1%	-17.0%	-12.0%	-5.2%
Diabetes hosp	+42.3%	+29.6%	+32.3%	+17.9%	+15.6%	+0.5%
Diabetes death	+3.4%	+19.7%	+14.9%	+12.5%	-4.7%	+6.3%
Diabetes ACS admissions	+35.8%	+43.1%	+45.5%	+21.7%	+25.1%	+5.6%
Heart disease hosp	+30.2%	+17.1%	+10.4%	+10.5%	+10.1%	+7.5%
Heart disease death	-10.5%	-20.9%	-21.8%	-22.8%	-15.9%	-20.4%
Congestive heart failure ACS admissions	+19.7%	+17.4%	+19.2%	+24.4%	+9.4%	-7.8%
Childhood asthma hosp*	-47.4%	-55.3%	-39.7%	-43.8%	-53.1%	-35.1%
Infant mortality**	-38.5%	-30.7%	-25.0%	-11.5%	-37.5%	+2.8%

*All rates are age-adjusted except asthma. **Until the first birthday, per 1,000 live births

Table 2. Hospitalizations and deaths per 100,000 population, 2005. Each sixth comprises seven UHF neighborhoods.

	Sixth					
	Bottom	5 th	4 th	3 rd	2 nd	Top
Cancer hosp	636.6	533.3	502.6	497.7	527.6	516.8
Cancer deaths	210.1	150.5	146.7	144.1	153.1	175.7
Diabetes hosp	686.6	341.7	303.7	238.7	251.5	125.2
Diabetes death	51.2	25.4	23.9	19.3	18.2	14.8
Diabetes ACS admissions	227.0	120.1	100.3	87.4	97.4	38.0
Heart disease hosp	2,125.3	1,559.8	1,336.4	1,373.2	1,333.7	1,078.7
Heart disease death	306.4	298.2	284.0	273.2	274.0	258.8
Congestive heart failure ACS admissions	248.8	134.6	103.2	97.4	97.9	48.0
Childhood asthma hosp*	939.5	366.5	445.4	348.6	323.1	226.8
Infant mortality**	7.2	5.3	5.7	5.7	4.3	4.1

*All rates are age adjusted except asthma. **Until the first birthday, per 1,000 live births

Recommendations

The Office of the Comptroller recommends:

Increasing the availability and utilization of primary and preventive care

- **Act as soon as possible to restructure Medicaid reimbursement formulas to better support and expand primary and preventive care.** Although New York State’s Medicaid spending per person in poverty is among the highest in the nation, New York nevertheless has under-invested in primary care. The Spitzer administration plans to revise Medicaid reimbursement formulas to create an incentive to increase primary care capacity and to devote a greater share of each Medicaid dollar to primary and preventive care. Implementation of such plans is critical if such care is to be preserved and expanded.
- **Medicaid and private insurers reimburse health care providers for primary care case management, self management, and information technology, which are not currently paid.** These have been shown to be highly effective in improving medical outcomes and, ultimately, reducing costs.
- **Reinvest a portion of any savings from upcoming hospital closures and mergers in community-based health providers.** Five New York City hospital emergency rooms are slated for closure in accordance with recommendations of the New York State Commission on Healthcare Facilities in the 21st Century (the “Berger Commission”). These emergency rooms have been a source of primary care for thousands of New Yorkers. In all, 14 New York City emergency rooms will have closed since 2002. Because they are close to the communities they serve and are often trusted by residents who might otherwise not obtain health care, community-based programs can be especially effective.
- **To supplement existing primary care, open health clinics in drug stores, supermarkets, and “big box” stores that are directly accessible to residents of low-income neighborhoods. The clinics could be operated by or in partnership with the New York City Health and Hospitals Corporation.** Retail clinics, found nationally in supermarkets, pharmacies, and “big box” stores, are an emerging niche in the healthcare delivery system. Designed to provide quick, convenient, relatively low cost care for common ailments, these clinics are generally staffed by nurse practitioners or doctors. In addition to operating during regular business hours, retail clinics are open evenings and weekends when office or clinic-based primary medical care is often not available outside of the emergency room. The clinics generally use a posted price list, allowing individuals who are uninsured or underinsured to know ahead of time exactly what the fees will be. Most accept private health insurance, credit cards or cash payment.

In New York City, retail clinics currently operate in four Duane Reade locations and one CVS location. Some retail clinic operators have announced ambitious plans for national expansion in the coming years. Duane Reade, for example, informed the Office of the Comptroller that it is planning to open 40 to 50 more clinics in New York City. Drug store clinics are proving popular in California and Florida, among other states.

Partnerships between retail clinics and existing providers, including hospitals, primary care clinics, and private practitioners that offer strong primary care services—and that have the capacity to share relevant patient information electronically—are essential to ensure adequate continuity of care. In some states,

such as New Jersey, a local health system operates retail clinics, which helps ensure continuity of care. A similar arrangement could be made with the New York City Health and Hospitals Corporation, which has extensive experience treating the uninsured and under-insured and which accepts Medicaid and Medicare.

Government oversight can ensure that retail clinics deliver quality care with an emphasis on the patient having a regular medical home. This includes referring the patient back to, or helping them seek, a regular provider who ensures continuity and other elements of effective care. Many of the clinics employ electronic health records systems; promoting their use facilitates the exchange of critical patient treatment information between regular primary care physicians and clinic medical providers, further strengthening continuity. State and City government should work with other stakeholders to put policies into place that promote these goals while recognizing that retail clinics are one means to increase access to affordable primary care, especially in neighborhoods where the prevalence of diabetes, cancer, heart disease and other serious health conditions are disproportionately high. In addition, drugstore chains should be encouraged to open more stores, with clinics, in neighborhoods in the bottom income sixth.

By working with major drugstore chains and other retailers which have stores in, or directly accessible to, low-income New York City neighborhoods, there is a promising opportunity to create a public-private partnership and open a new access point for primary care in underserved neighborhoods.

Combating diabetes and childhood asthma

- **Redouble the City’s fight against diabetes.** To be sure, current efforts to combat diabetes are ambitious. The City Department of Health and Mental Hygiene Diabetes Prevention and Control Program is attacking the disease through prevention, improvement of quality of care, education, and surveillance. Nevertheless, in 2005 diabetes hospitalization rates reached record levels in the bottom three income sixths. This is, indeed, a public health crisis.

Among the programs that should be expanded are public education campaigns aimed at reducing obesity and promoting healthy lifestyles. Additional investments in community health centers to help diabetes patients better manage their disease and in schools to help prevent children from developing “adult onset” diabetes are also essential. The City has expanded public dissemination of information regarding diabetes and obesity, most recently through issuance of a report in July 2007, *Diabetes and Obesity in New York City*. There also should be regular, periodic public report cards focusing exclusively on diabetes and obesity on the city and neighborhood level.

- **Create a statewide Diabetes Prevention and Management Task Force, as recommended by the Public Health Association of New York City.** At a forum on New York City diabetes policy this past January, Nicholas Freudenberg, President of the Public Health Association and Distinguished Professor of Public Health at Hunter College, called current public, nonprofit and business efforts to combat diabetes “for the most part fragmented and piecemeal” and he urged a “more comprehensive approach to diabetes prevention and management.” The Task Force would involve representatives from all stakeholders, including but not limited to health departments, providers, schools, senior centers, and insurers.

- **More vigorously address the known underlying causes of asthma, including air pollution and dilapidated housing.** For example, one of the known asthma triggers, household mold, is exacerbated by chronic plumbing leaks which can cause moisture to build up in walls and mold to spread. It can be ameliorated by repairing and rehabilitating leaking plumbing systems.
- **Expand physical education in the schools and meet State physical education requirements.** The New York State Education Department reports that in New York City, 24 percent of elementary school students are obese. The New York City Department of Health and Mental Hygiene reports that in 2004, 27 percent of children enrolled in Head Start programs were obese and 15 percent were overweight. Nevertheless, many, if not most, New York City public schools fall far short of meeting State Education Department physical education requirements: not counting recess, schools must provide physical education daily in grades K to 3, at least three times a week in grades 4 to 6, and at least three times per week in one semester and two times a week in the other semester in grades 7 to 12.

I. New York City Health Disparities Trends, 1990 to 2005 Detailed Findings

A. Where Disparities Widened

Diabetes: Hospitalizations, ACS Condition Admissions, Deaths¹

In recent years, there has been a dramatic increase in the incidence of diabetes, particularly Type 2 or adult onset diabetes, in the United States. In New York City, the Department of Health and Mental Hygiene reports that the percentage of adults with self-reported diabetes increased from 3.7 percent in 1994-1995 to 9.0 percent in 2003. The causes most commonly cited for both the national and New York City increases include a higher incidence of overweight and obesity, exacerbated by dietary changes including more processed foods and inadequate physical exercise.

Diabetes hospitalizations

Diabetes patients typically are hospitalized because they suffer from one or more of the serious complications associated with the disease, such as heart disease, stroke, blindness, kidney disease, or nervous system damage. Inadequate management of diabetes exacerbates such complications.

From 1990 to 2005, the total number of diabetes hospitalizations in New York City increased by 82.9 percent. From 1990 to 1995, the citywide number increased by 40 percent, from 12,605 to 17,649. Thereafter, the number of diabetes hospitalizations continued to rise, although at a slower rate. By 2005, the number had reached 23,052, a 30 percent increase from 1995.²

From 1990 to 2005, diabetes hospitalization rates more than doubled in five low-income neighborhoods: Hunts Point-Mott Haven, Highbridge-Morrisania, Crotona-Tremont, and East Harlem, which were the four poorest neighborhoods in the city, and in Fordham-Bronx Park, the eighth poorest. Also, the rate increased by 126 percent in Lower Manhattan.³

Table 3. Percentage increase in diabetes hospitalizations per 100,000, 1990 to 1995.

Neighborhood	Percentage increase in rate
Hunts Point-Mott Haven	138.1%
High Bridge-Morrisania	101.2
Crotona-Tremont	134.8
East Harlem	104.8
Fordham-Bronx Park	144.2

¹ Includes diabetes mellitus with complications and without complications and where diabetes was the principal diagnosis.

² 2005 hospitalization data may be slightly undercounted because of delays in reporting all hospitalizations to the New York State SPARCS (Statewide Planning and Research Cooperative System) database. One expert consulted by the Office of the Comptroller said that, based on an analysis of 2005 data for a number of New York City hospitals, 2005 hospitalization data is likely undercounted by one to two percent compared to earlier years. Experts who regularly work with these data also noted that hospitalization data might never be completely reported.

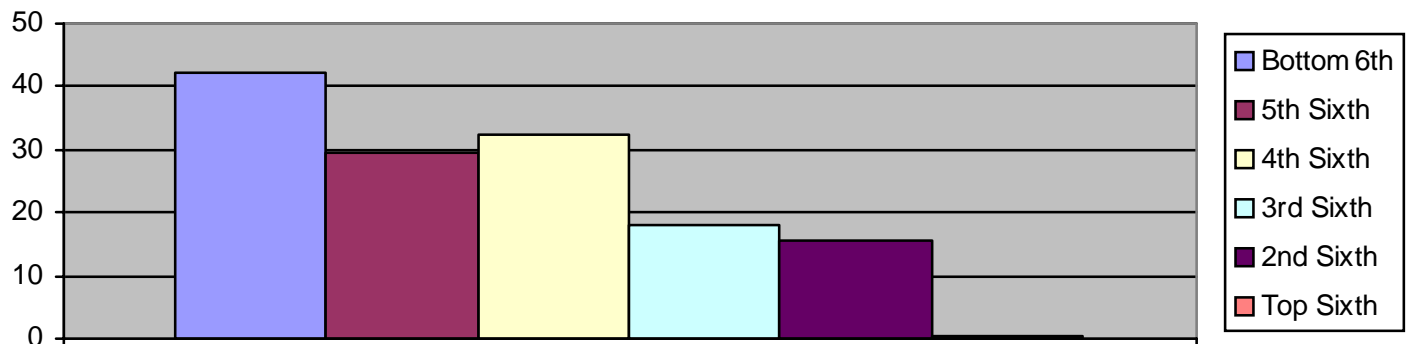
³ It should be noted that the numbers of hospitalizations in wealthier neighborhoods such as Lower Manhattan are consistently only a fraction of the number in lower income neighborhoods. There were 25 diabetes hospitalizations in Lower Manhattan in 1990 and 61 in 2005, compared to, for example, Highbridge-Morrisania, which had 499 hospitalizations in 1990 and 1,036 in 2005. Caution should therefore be exercised when considering year-to-year percentage fluctuations in hospitalization rates in wealthier areas with relatively few hospitalizations.

Supplementary Information A, available at www.comptroller.nyc.gov, OPM Reports, gives the diabetes hospitalization rate by neighborhood for each year 1990 to 2005. Although there was some year-to-year volatility in diabetes hospitalization rates, it is clear that from 1990 through 2005 diabetes hospitalization rates rose steadily in nearly all low and moderate income neighborhoods. **Thus, in 30 of 42 neighborhoods, the highest diabetes hospitalization rate since 1990 was observed in 2003, 2004, or 2005;** only two of these neighborhoods were in the top two sixths. Rate increases in the Bronx, in particular, show little sign of ending; in five of the seven neighborhoods comprising the Bronx, the highest rate was observed in 2005.

In 1990 there were eight neighborhoods with a rate of at least 300 diabetes hospitalizations per 100,000 population. By 1995 there were 11, by 2000 there were 15, and in 2005 there were 17. In 1990 all of these were low-income neighborhoods, but by 2005 these had been joined by more moderate-income such as Fordham-Bronx Park, Pelham-Throgs Neck, Sunset Park, East Flatbush-Flatbush, and Washington Heights-Inwood.

Comparison of hospitalization rates by sixth for 1995 and 2005 shows that **diabetes hospitalization rates increased in low-income neighborhoods the most.** As seen in Chart 1, the greatest increases in diabetes hospitalization rates occurred in the bottom three sixths.⁴ See Appendix C, Table C1, for rates by sixth and percentage increases from 1995 to 2005.

Chart 1. Percentage increase in NYC diabetes hospitalization rate by neighborhood income, 1995 to 2005. Each sixth comprises seven UHF neighborhoods.



Source for neighborhood rates used to calculate neighborhood income sixth rates: NYC DOHMH

The actual increases in the number of diabetes hospitalizations represented by these percentage increases are quite striking. By sixth, the number of hospitalizations per 100,000 increased as shown below:

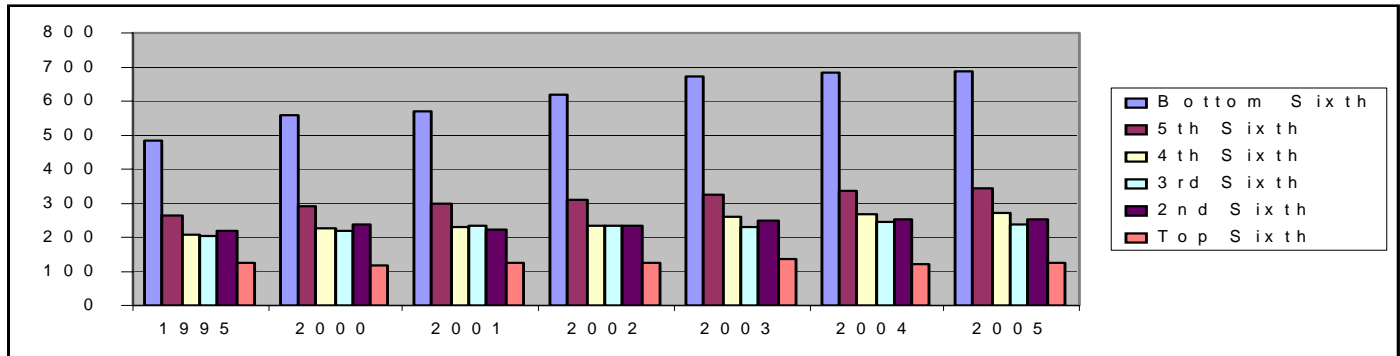
Bottom sixth	204.2
5 th sixth	78.0
4 th sixth	66.5
3 rd sixth	36.2
2 nd sixth	24.0
Top sixth	0.6

The trend toward higher diabetes hospitalization rates in lower income communities does not appear to be abating. As seen in Appendix C, Table C1, **for the bottom three sixths the hospitalization rate increased each year between 2000 and 2005.** From 2000 to 2005, the number of hospitalizations increased by at least 20 percent in 11 neighborhoods, including four of the seven neighborhoods in the bottom sixth and eight of 14 in the bottom two-sixths. Especially noteworthy was the 41.2 percent increase in Hunts Point-Mott Haven and the 50.7 percent increase in Fordham-Bronx Park.

⁴ Rates for sixths were not computed for years prior to 1995.

Diabetes hospitalization income disparities have widened greatly. Chart 2 illustrates the expansion of hospitalization rate income disparities between 1995 and 2005, especially between the bottom sixth and the rest of the city. In 1995, the bottom sixth rate was 3.5 times higher than the top sixth rate, in 2000 it was 4.8 times higher, and by 2005 it was 5.5 times higher.

Chart 2. NYC diabetes hospitalizations per 100,000 population by neighborhood income. Each sixth comprises seven UHF neighborhoods.



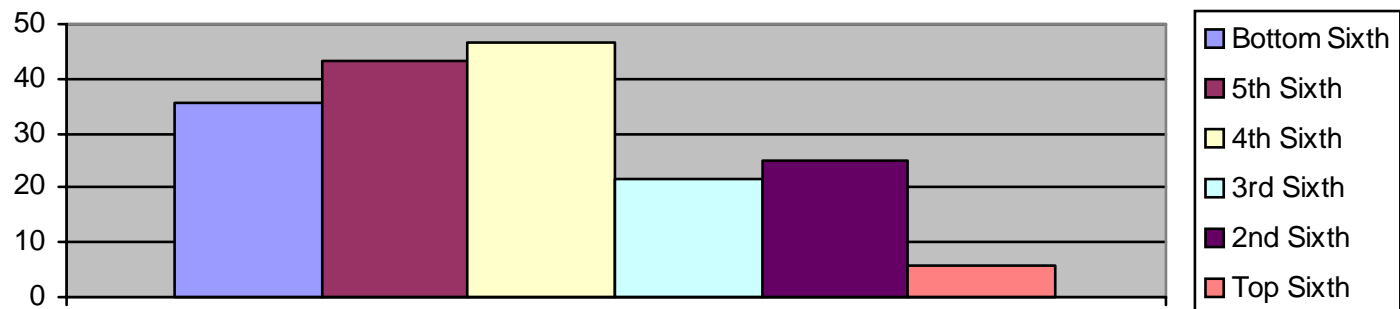
See Table C1 in Appendix C for the rates in the chart above

Diabetes ACS condition admissions

Thousands of diabetes hospitalizations are potentially avoidable each year. Much of the human and financial cost of diabetes hospitalization could be avoided with primary and preventive care. In 2005, in the bottom two sixths there were a total of 11,273 diabetes hospitalizations and 4,624 ACS condition diabetes admissions, which, by definition, could have been prevented had there been effective primary care.⁵

As with total diabetes hospitalizations, **the largest increases in ACS diabetes admissions between 1995 and 2005 occurred in the bottom three sixths.**

Chart 3. Percentage increase in diabetes ACS condition admissions rate by neighborhood income, 1995 to 2005.



Source of neighborhood rates used to calculate sixth rates: Infoshare

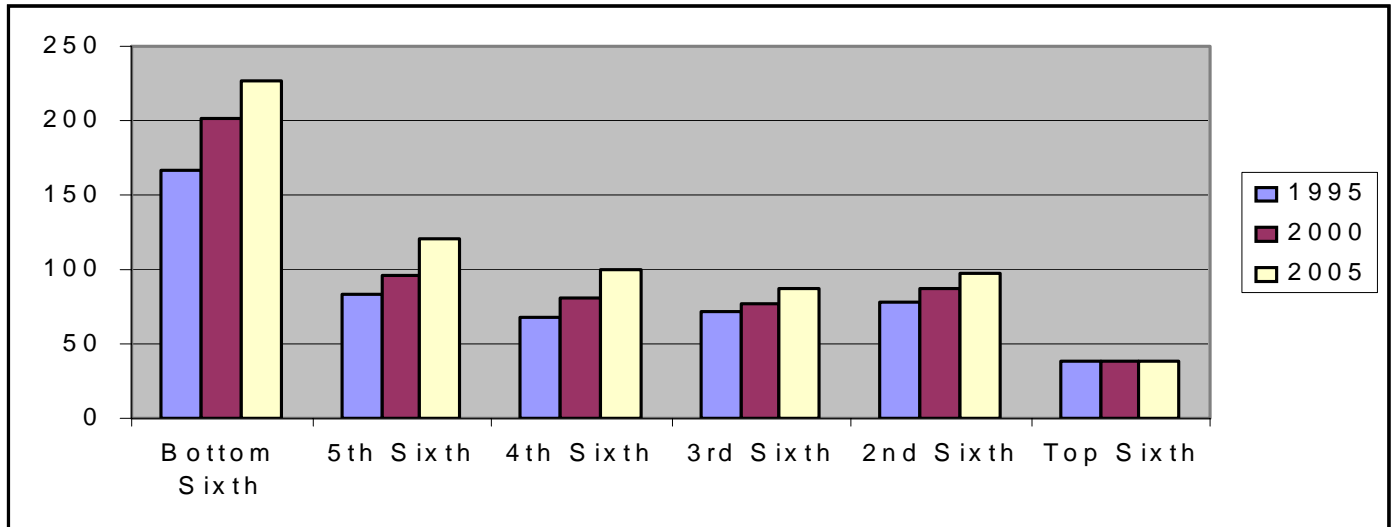
Although the overall increase for the bottom sixth was less than for the next two sixths, it should be noted that four of the seven neighborhoods in the bottom sixth had increases of at least 60 percent, well above the 36 percent increase for the sixth overall. An 11 percent decrease in Williamsburg-Bushwick offset large increases in most of the other neighborhoods in this sixth.⁶ (See Appendix E, Table E1, for rates for all sixths.)

⁵ As explained earlier, hospital admissions are ambulatory care sensitive (ACS) condition admissions for patients up to age 64 that could have been prevented with effective primary care.

⁶ Further research could seek to determine the role of demographic change in reducing the rate in Williamsburg-Bushwick, particularly in Williamsburg, which has undergone significant “gentrification” in recent years.

In 1995, 2000 and 2005, ACS condition diabetes admission rates in the bottom sixth very substantially exceeded rates in the rest of the city. This can be seen in Chart 4.

Chart 4. NYC diabetes ACS admissions per 100,000 population, 1995, 2000, and 2005 by neighborhood income. Each sixth comprises seven UHF neighborhoods.



Source of neighborhood rates used to calculate sixth rates: Infoshare. See Table E1 in Appendix E for the rates in the chart above.

Diabetes deaths

Since 1990, the number of New York City diabetes deaths has soared. The largest increases occurred prior to 1995. There were 991 diabetes deaths in New York City in 1990 and 1,713 in 1995, an increase of 72.8 percent. By 2000 there were 1,827 and in 2005 there were 1,813.⁷ See Supplemental Information C at www.comptroller.nyc.gov, OPM Reports, for the number of diabetes deaths citywide and by neighborhood for each year 1990 to 2005. Citywide, there were large annual increases in diabetes deaths from 1990 to 1994 followed by a slight decline in 1995. From 1996 to 1998 the number of deaths each year fell to a few hundred less than in 1995, but this number was still substantially greater than from 1991 to 1993. In 1999, diabetes deaths resurged and, in 2000, surpassed 1,800. Since 2000, the number of diabetes deaths citywide has remained relatively stable at this higher level.

From 1990 to 1995, there were especially large increases in diabetes mortality rates in the lowest income communities. From 1990 to 1995, the diabetes mortality rate more than doubled in 12 of the 42 UHF neighborhoods, including in five of the seven neighborhoods in the bottom sixth, which are shown in Table 4. The large increases in diabetes mortality rates in the lowest income neighborhoods mirrored the dramatic increases in hospitalization rates in these same neighborhoods during this same period.

In terms of numbers of deaths per 100,000 population, Table 4 (last column) shows the largest increase from 1990 to 1995 occurred in Hunts Point-Mott Haven, the lowest-income neighborhood in the city, and the second highest was in East Harlem, which had the fourth lowest income. The increase in the number of deaths per 100,000 population in the four lowest-income neighborhoods and Central Harlem-Morningside Heights surpassed the increases in any other neighborhood in the city. Supplemental Information B at www.comptroller.nyc.gov, OPM Reports, has diabetes mortality rates by neighborhood for each year 1990 to 2005.

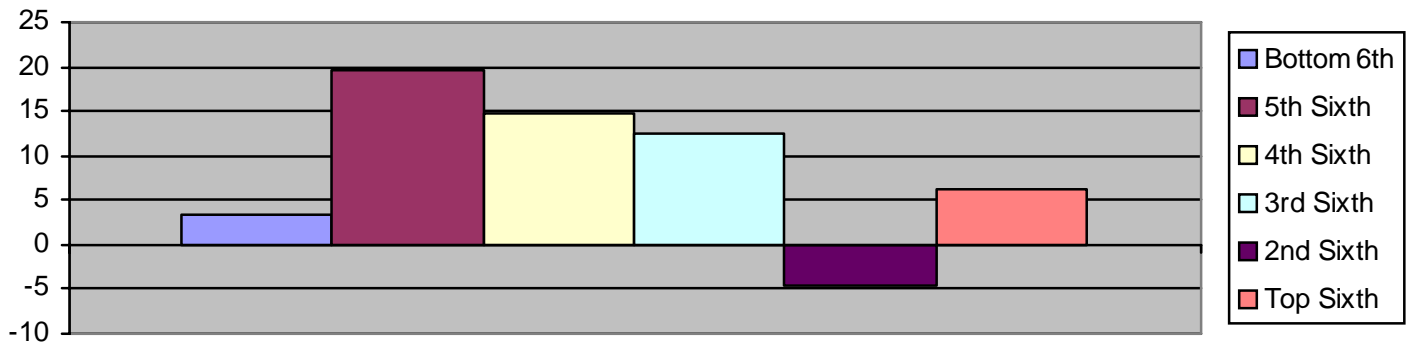
⁷ Diabetes deaths are those in which the underlying cause of death was given as diabetes. However, since diabetes is often a factor in deaths for heart disease and other diseases and conditions, diabetes mortality rates considerably understate the impact of diabetes on mortality rates generally.

Table 4. Diabetes deaths per 100,000 population and total numbers of deaths in 2005 for neighborhoods comprising the bottom income sixth in 2000.

UHF Neighborhood	1990	1995	2000	2005	Total number of deaths, 2005	1990-1995 percentage change in rate	1990-1995 change in deaths per 100,000
Hunts Point-Mott Haven	17.5	52.3	65.9	66.3	49	278.8%	48.8
High Bridge-Morrisania	23.0	54.7	62.5	51.0	55	121.7	28.0
Crotona-Tremont	24.1	50.5	73.5	53.8	56	123.2	29.7
East Harlem	19.3	54.2	45.8	53.2	50	175.6	33.9
Williamsburg-Bushwick	30.9	43.9	48.0	46.0	55	48.9	15.0
Central Harlem-Morningside Heights	24.2	52.0	39.7	55.2	76	128.1	31.0
East New York	40.8	41.8	40.0	38.8	40	-4.9 ⁸	-2.0

Analysis by income sixth shows that from 1995 to 2005 the largest increases in diabetes mortality rates occurred in the 5th through 3rd sixths. Rates for these sixths increased by 12 percent to 20 percent.

Chart 5. Percentage change in NYC diabetes mortality rate by neighborhood income, 1995 to 2005.



Source for neighborhood rates used to calculate sixth rates: NYC DOHMH

The 1995 to 2005 change in numbers of deaths per 100,000 by income sixth was as follows:

Bottom sixth	+1.7
5 th sixth	+4.2
4 th sixth	+3.1
3 rd sixth	+2.1
2 nd sixth	-0.9
Top sixth	+0.9

Increases for the bottom sixth were smaller than in the next three sixths, but as shown in Table 4, in bottom sixth neighborhoods the numbers of diabetes deaths per 100,000 population had soared between 1990 and 1995. The increase in the rate for the top sixth was affected by a 130.6 percent increase in Lower Manhattan.⁹ (See Appendix D, Table D1 for all rates for all sixths.)

⁸ It should be noted that that the 1990 rate was much higher than the rate in the other neighborhoods.

⁹ Since the numbers of diabetes deaths in Lower Manhattan in 1995 was very low—there were five deaths that year—the 16 deaths in 2005 produced a very large percentage increase in the diabetes mortality rate in this neighborhood.

Analysis by sixth shows that, as with diabetes hospitalizations, in 2005 the diabetes mortality rate was much higher in low-income neighborhoods than elsewhere. The bottom sixth rate was 3.5 times the top sixth rate.

From 1990 to 2005, the diabetes mortality rate increased by at least 175 percent in the following five neighborhoods.

Table 5. Diabetes mortality rates.

UHF Neighborhood	1990	1995	2000	2005	1990-2005
Rockaway	7.8	11.6	18.2	34.7	344.9%
Lower Manhattan	13.5	20.3	11.4	46.8	246.7%
Hunts Point-Mott Haven	17.5	52.3	65.9	66.3	278.8%
East Flatbush-Flatbush	17.3	22.7	23.9	47.9	176.9%
East Harlem	19.3	59.2	42.4	53.2	175.6%

Discussion: Diabetes

The human cost of soaring diabetes hospitalization rates

Diabetes hospitalization and mortality rates increased citywide, but by far the largest increases have been in low-income communities. Table 6 shows the huge human cost in terms of the increase in diabetes hospitalizations in the neighborhoods comprising the bottom sixth in 2000. In these seven neighborhoods, there were 3,106 more diabetes hospitalizations in 2005 than 1990.

Table 6. Number of diabetes hospitalizations (discharges), seven poorest neighborhoods.

	1990	1995	2000	2005	1990-2005
Hunts Point-Mott Haven	310	432	517	730	+135.5%
Highbridge-Morrisania	499	600	765	1,036	+107.6%
Crotona-Tremont	404	648	861	1,051	+160.2%
East Harlem	335	507	638	723	+115.8%
Williamsburg-Bushwick	576	915	1,016	1,040	+80.5%
Central Harlem-Morningside Heights	468	568	595	714	+52.6%
East New York	378	515	665	782	+106.9%
TOTAL	2,970	4,185	5,057	6,076	+104.6%

High diabetes hospitalization rates are financially costly.

The cost of treating diabetes is staggering. A study released in June 2007 found that one out of eight federal health care dollars—\$80 billion—goes to provide care for people with diabetes.¹⁰ Based on an average cost per diabetes hospitalization in New York City of \$11,591,¹¹ in 2005 the cost of diabetes hospitalizations in

¹⁰ Marsha Gold, et. al., "Study of Federal Spending on Diabetes: An Opportunity for Change," Mathematica Policy Research, Inc., June 2007.

¹¹ Fahs M. Das D. Weiss R. and Caron M., *Economic Costs of Diabetes in NYC: A Preliminary Framework*, CUNY Forum on Diabetes Policy in NYC: Comprehensive Approaches to Prevention and Management, New York, 2007. This figure is for those patients having a primary diagnosis of diabetes or a diabetes-related condition. Average hospital charges and "costs" were calculated using average Medicare reimbursement rates (DRGs) and were based on an average length of stay of six days. These figures were adjusted, using the urban component of the medical care services price index to be in current (2007) dollars.

the neighborhood in the bottom sixth shown in Table 6 was \$70.4 million.¹² Diabetes hospitalizations are disproportionately concentrated in lower income neighborhoods, and since relatively few residents of these neighborhoods have private health insurance, the government in most instances picks up the enormous cost of diabetes hospitalizations through Medicaid and State charity care pools. Hospitalizations prevented many deaths from diabetes, but augmenting primary care would have cost much less.

Since 1995, diabetes mortality rates have not increased as much as diabetes hospitalization rates. The increase in hospitalizations may have kept more diabetes patients alive. Data suggests that rising hospitalization rates did indeed suppress the increase in diabetes deaths, especially in the lowest income neighborhoods. From 1995 to 2005, the diabetes hospitalization rate in the bottom sixth increased by 42.3 percent, the largest increase of any sixth, but the diabetes mortality rate increased only 3.4 percent. Without the large increase in hospitalizations, the mortality rate in the bottom sixth likely would have been higher. On the other hand, it would have been much more cost effective to have spent scarce public resources on efforts to reduce the incidence of diabetes and keep people healthier rather than treating them in the hospital at a cost of thousands of dollars per admission.

Heart Disease Hospitalizations, Congestive Heart Failure ACS Admissions, Heart Disease Deaths

Heart disease hospitalizations¹³

Since 1990, the number of heart disease hospitalizations in New York City has increased substantially, from 86,747 in 1990 to 93,698 in 1995, 101,306 in 2000 and 108,440 in 2005.

From 1990 to 2005 the heart disease hospitalization rate increased in 34 of 42 neighborhoods. The largest increases, in excess of 40 percent, were in eight mostly low-income neighborhoods and the largest increases were in Brooklyn—94.4 percent in East New York, 78.5 percent in Bedford Stuyvesant-Crown Heights and 56.2 percent in Flatbush-East Flatbush.

The number of neighborhoods with heart disease hospitalization rates in excess of 1,500 per 100,000 population increased from seven in 1990 to 11 in 1995, 13 in 2000, and 18 in 2005. In 2005 there were six neighborhoods, all low income, where the rate exceeded 2000 per 100,000. Until 1996, there were none. In 2005, the highest rate in the city, 2,337.6, was in Central Harlem.

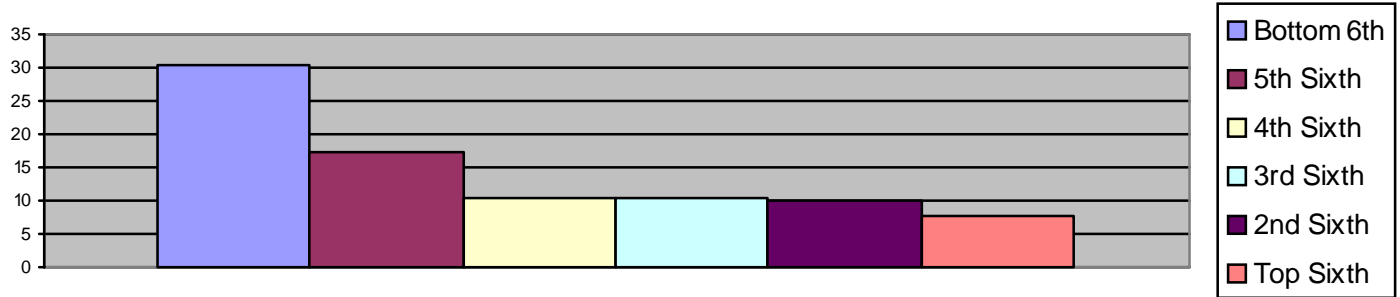
Increases in heart disease hospitalization rates do not appear to be ending: for 30 of 42 neighborhoods, the highest rate from 1990 to 2005 was between 2000 and 2005 and for 23 neighborhoods, including all but one of the bottom sixth neighborhoods, the highest rate was in 2004 or 2005.

¹² If the hospitals' charges of approximately \$36,000 per discharge, as opposed to Medicare reimbursed costs, are applied instead, the figure rises to \$222 million.

¹³ Includes hospitalization for heart valve disorders, acute myocardial infarction, cardiac arrest and ventricular fibrillation, peri-endo and myocarditis cardiomyopathy, coronary atherosclerosis, pulmonary heart disease, conduction disorders, cardiac dysrhythmias, congestive heart failure nonhypertensive, and other and undefined heart disease.

Analysis by neighborhood income sixths, 1995 to 2005, shows that heart disease hospitalization rates increased in low-income neighborhoods the most. As shown in Chart 6, by substantial margins the greatest increases occurred in the bottom two sixths. In 2005, the bottom sixth heart disease hospitalization rate was 1.97 times the rate in the top sixth, up from 1.28 times in 1995.

Chart 6. Percentage change in heart disease hospitalization rates by neighborhood income, 1995 to 2005. Each sixth comprises seven UHF neighborhoods.



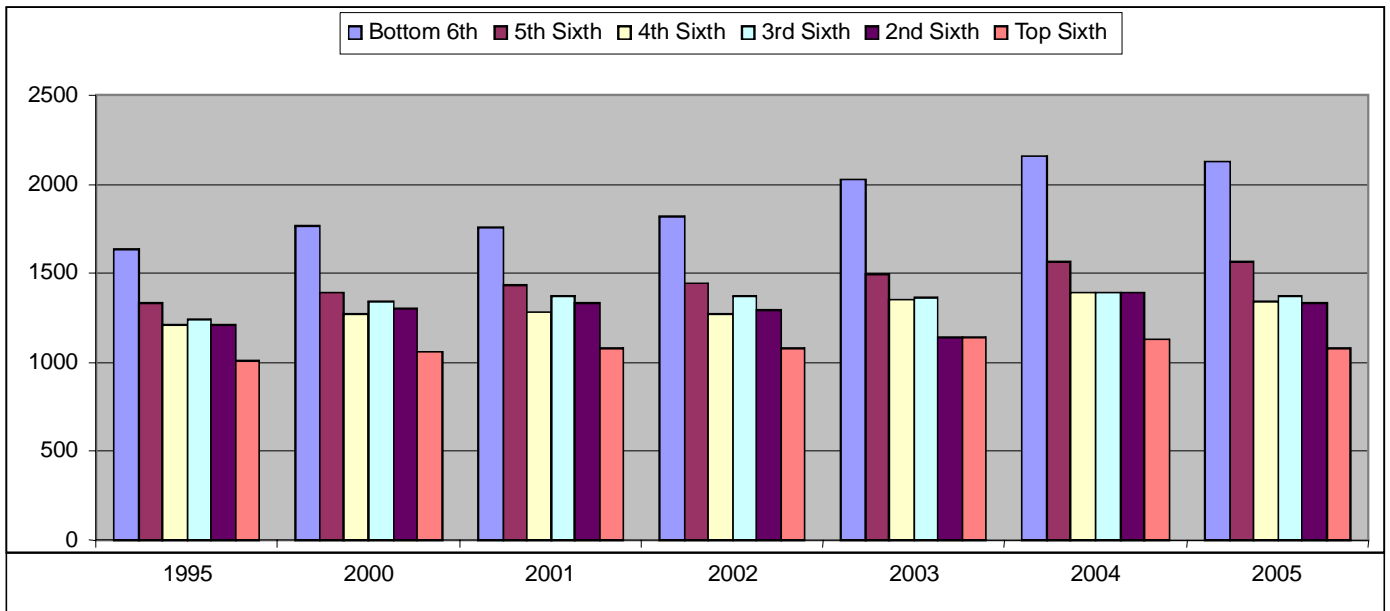
Source for neighborhood rates used to calculate neighborhood income sixth rates: NYC DOHMH

The increases in the number of heart disease hospitalizations per 100,000 represented by these percentage increases were remarkable. From 1995 to 2005, the number of hospitalizations per 100,000 increased as shown below:

Bottom sixth	492.9
5 th sixth	225.3
4 th sixth	125.7
3 rd sixth	130.9
2 nd sixth	122.0
Top sixth	75.4

Income disparities in heart disease hospitalization rates have widened. Chart 7 shows the expansion in heart disease hospitalizations disparities from 1995 to 2005, especially between the bottom sixth and the rest of the city. Most of the increase in heart disease hospitalization rates in the bottom two sixths occurred recently, between 2000 and 2005.

Chart 7. Heart disease hospitalizations per 100,000 population, 1995 and annually 2000 to 2005 by neighborhood income. Each sixth comprises seven UHF neighborhoods.



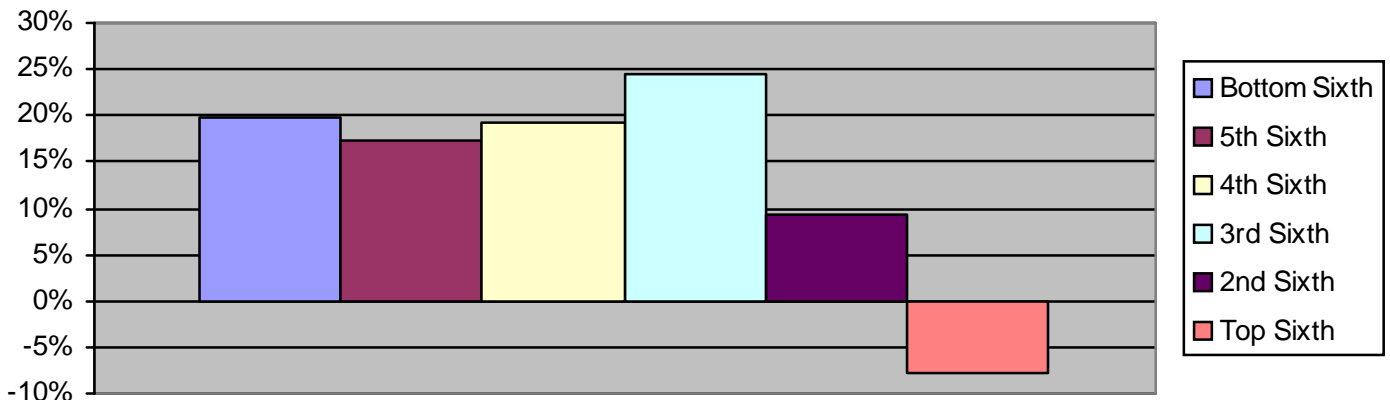
See Table C2 in Appendix C for the rates in the chart above.

Congestive heart failure ACS condition admissions

Congestive heart failure (CHF) is a condition when the heart can no longer pump enough blood to the rest of the body. It is a chronic condition often associated with coronary heart disease and hypertension (high blood pressure). The CHF ACS condition admissions rate is a useful indicator of the overall coronary health of the residents of a community. Citywide, from 1995 to 2005, there was a 17 percent increase in the number of CHF ambulatory care sensitive condition admissions, from 8,359 to 9,784.

From 1995 to 2005, CHF admission rates increased substantially in the bottom four sixths but increased only moderately in the 2nd sixth and decreased in the top sixth.

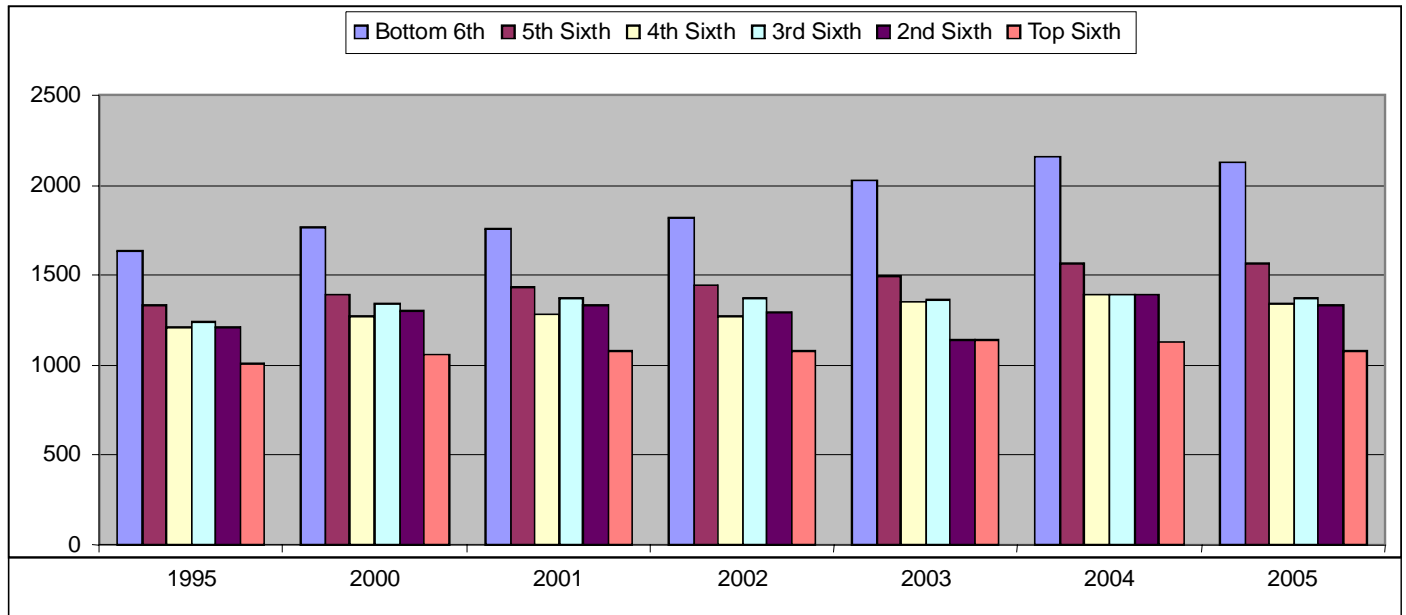
Chart 8. Change in NYC congestive heart failure ACS admission rate by neighborhood income, 1995 to 2005.



Source of neighborhood rates used to calculate sixth rates: Infoshare.

CHF ACS rates in the bottom sixth have been much higher than in the rest of the City. Chart 9 illustrates the large and widening gap between the CHF ACS rate for the bottom sixth and the rest of the city. As with all heart disease hospitalizations, the rate in the bottom sixth is nearly double the rate in the 5th sixth and five times the rate in the top sixth.

Chart 9. NYC congestive heart failure ACS admissions per 100,000 population by neighborhood income. Each sixth comprises seven UHF neighborhoods.

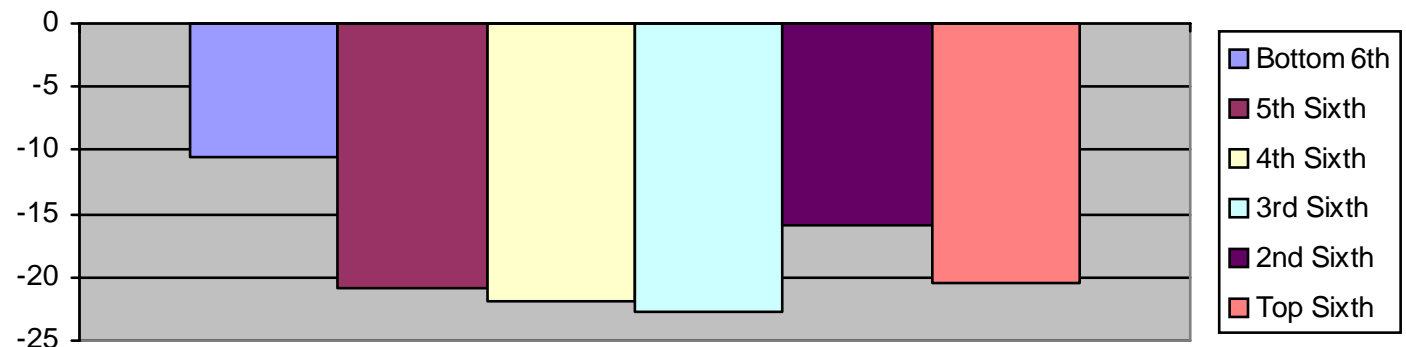


Source for neighborhood rates used to calculate sixth rates: Infoshare.

Heart disease mortality

From 1995 to 2005, the bottom sixth had the smallest decrease in the heart disease mortality rate, approximately 10 percent. Moreover, during this period, the total number of heart disease deaths increased in three of the seven neighborhoods in the bottom sixth—Hunts Point-Haven, Crotona-Tremont, and East New York—even as the total number of heart disease deaths citywide decreased 20 percent to 22,613.

Chart 10. Percentage decline in NYC heart disease mortality rates by neighborhood income, 1995 to 2005.



Source for neighborhood rates used to calculate sixth rates: NYC DOHMH.

In terms of number of deaths per 100,000, the decreases per sixth were as follows:

Bottom sixth	-36.1
5 th sixth	-78.8
4 th sixth	-79.3
3 rd sixth	-80.4
2 nd sixth	-51.7
Top sixth	-66.3

Staten Island heart disease mortality rates are among the highest in the city. In 2005, only six of the 42 New York City neighborhoods had more than 350 heart disease deaths per 100,000 population, including all four Staten Island neighborhoods, along with Rockaway and Bedford-Stuyvesant. In 2005, heart disease mortality rates for the Staten Island neighborhoods exceeded the average for the top income sixth of 258.7 per 100,000 as well as for the bottom income sixth of 306.3 per 100,000.

Discussion: Heart Disease

There are a number of possible explanations that could be further investigated for the disproportionately large increases that have occurred in heart disease hospitalization rates in low-income communities and especially in Brooklyn.

- The number of residents of these neighborhoods whose heart disease was inadequately diagnosed and treated, making hospitalization more likely, may have increased. In addition, due to lack of adequate primary care and/or insurance coverage or inability to afford co-pays, they also may have been less likely than residents of wealthier neighborhoods to have benefited from drugs that reduce cholesterol and high blood pressure.
- Although the primary cause of hospitalization may have been recorded as heart disease, heart disease is a common complication of diabetes and the increase in the incidence of Type 2 diabetes in lower income communities may have played a role in the increase in heart disease hospitalizations in these same communities.

The comparatively large 30 percent increase in the heart disease hospitalization rate in the bottom sixth is consonant with the relatively small ten percent reduction in the heart disease mortality rate in the same sixth. In other words, compared to the other sixths, more residents of the bottom sixth are being hospitalized for heart disease and fewer residents are surviving.

Additional possible reasons for the comparatively small decrease in heart disease mortality rates in the bottom sixth include:

- According to a study recently published in the *New England Journal of Medicine*,¹⁴ nationally, the heart disease mortality rate was halved between 1980 and 2000. Forty-seven percent of the decrease was attributed to improved treatment of the disease, primarily drug interventions. As noted above with regard to heart disease hospitalizations, residents of low-income neighborhoods may have been less likely to have benefited from these drugs.
- Residents of low-income neighborhoods may also have been less likely to have made many of the lifestyle changes that the study found accounted for most of the rest of the decrease in the heart disease mortality rate. Less availability of a variety of affordable fresh fruits and vegetables than in other neighborhoods and fewer opportunities to obtain adequate physical exercise may have been contributing factors. Similar to diabetes and as discussed previously, obesity also contributes to heart disease. And as the *New England Journal of Medicine* study concluded, some of the gains in heart disease morbidity

¹⁴ Earl S. Ford, M.D., M.P.H., et. al., "Explaining the Decrease in U.S. Deaths from Coronary Disease, 1980-2000," *New England Journal of Medicine*, June 7, 2007.

the researchers documented were offset by increasing obesity and higher rates of diabetes. These factors may have played a greater role in low-income communities than elsewhere. In 2003, NYCDOH reported that one-in-six New Yorkers is obese and in some lower income neighborhoods such as Central and East Harlem, the South Bronx and Bedford Stuyvesant-Crown Heights, one-in-four is obese.¹⁵

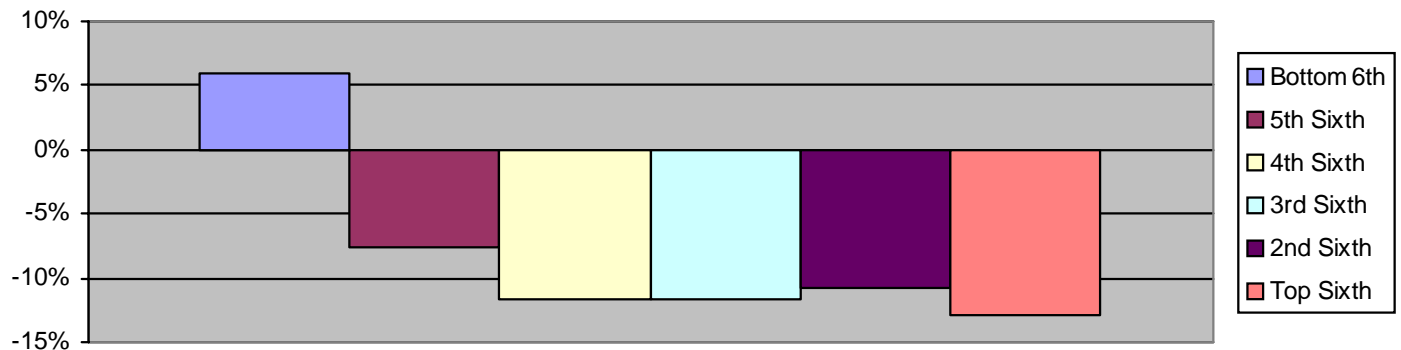
Cancer Hospitalizations and Deaths

Cancer hospitalizations

From 1990 to 2005, the cancer hospitalization rate decreased in all 42 neighborhoods except Hunts Point-Mott Haven (the poorest) and East New York (the eighth poorest). The smallest decreases, of less than 10 percent, were in seven predominantly low-income neighborhoods such as High Bridge-Morrisania (-5.3 percent), Bedford Stuyvesant-Crown Heights (-6.0 percent) and Central Harlem (-9.5 percent). The rate declined by 15 percent to 45 percent in nearly all other neighborhoods.

From 1995 to 2005, analysis by neighborhood income sixths found that cancer hospitalization rates decreased in all but the bottom sixth, as Chart 11 illustrates.

Chart 11. Change in NYC cancer hospitalization rates by neighborhood income, 1995 to 2005. Each sixth comprises seven UHF neighborhoods.



Source of neighborhood rates used to calculate sixth rates: NYC DOHMH

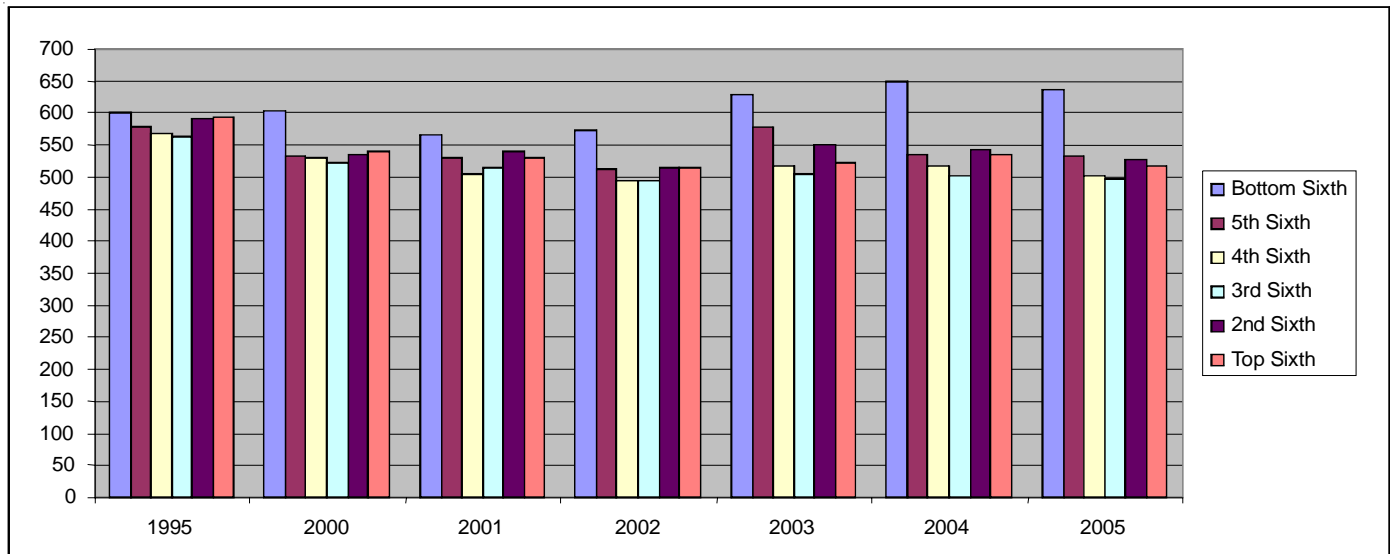
The actual changes in the number of hospitalizations per 100,000 population represented by the percentages in Chart 11 are shown below:

Bottom sixth	+35.4
5 th sixth	-44.3
4 th sixth	-66.1
3 rd sixth	-65.3
2 nd sixth	-64.1
Top sixth	-75.9

Cancer hospitalization rate income disparities widened. Chart 12 shows rate disparities among sixths for 1995 and annually for 2000 to 2005. Income disparities between the bottom sixth and the rest of the City especially grew.

¹⁵ NYC Department of Health and Mental Hygiene, *Vital Signs*, July 2003.

Chart 12. New York City cancer hospitalizations per 100,000 population by neighborhood income. Each sixth comprises seven UHF neighborhoods.



See Table C3 in Appendix C for the rates in the chart above

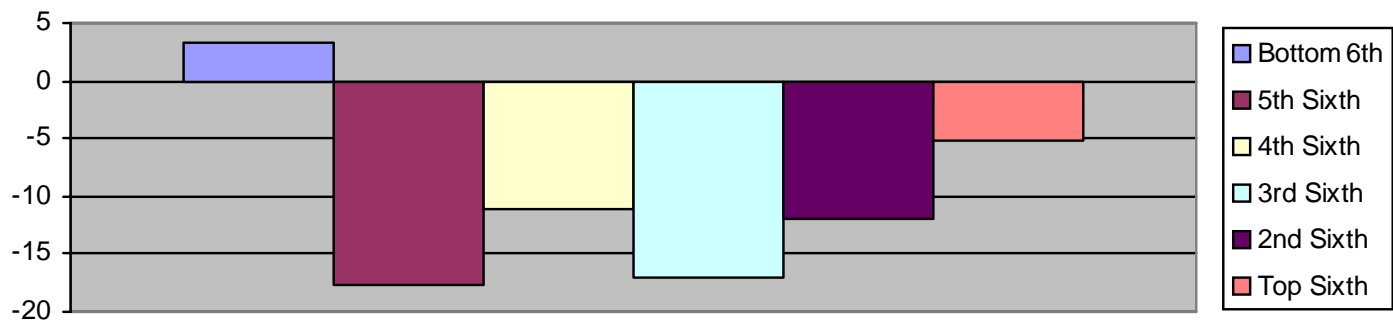
The number of neighborhoods with high cancer hospitalization rates (at least 600 per 100,000) has declined dramatically. There were 37 neighborhoods with rates of at least 600 per 100,000 in 1990, 17 in 1995, and six in both 2000 and 2005. **But at the same time, high cancer hospitalization rates have become more concentrated among the poorest neighborhoods.** With the exception of East New York, which is in the 5th sixth, all of the neighborhoods that continue to have rates of 600 or more are in the bottom sixth.

Cancer mortality

From 1995 to 2005, the number of cancer deaths in New York City declined 9.7 percent, from 15,136 to 13,666.

From 1995 to 2005, the New York City cancer mortality rate decreased in all but the bottom sixth. Chart 13 illustrates.

Chart 13. Percentage change in NYC cancer mortality rate by neighborhood income, 1995 to 2005. Each sixth comprises seven UHF neighborhoods.



Source of neighborhood rates used to calculate sixth rates: NYC DOHMH

Disparities widened substantially between the bottom sixth and the rest of the city. Four of the eight neighborhoods where the cancer mortality rate increased were in the bottom sixth: Hunts Point-Mott Haven (11.2 percent), Highbridge-Morrisania (3.7 percent), Williamsburg-Bushwick (5.2 percent) and East New York (22.8 percent).

The actual changes in the number of cancer deaths per 100,000 population represented by the percentages in Chart 13 ranged from an increase of 6.7 in the bottom sixth to a decrease of 32.4 in the 5th sixth.

In 2005, the bottom sixth had the highest mortality rate. Mortality rate disparities were small among the other sixths, although the top sixth had the second highest rate, as shown below:

Bottom sixth	210.1
5 th sixth	150.5
4 th sixth	146.7
3 rd sixth	144.1
2 nd sixth	153.1
Top sixth	175.7

The comparatively high cancer mortality rate for the top sixth can be attributed to high rates in Staten Island—Willowbrook (191.2) and South Beach, Staten Island (198.7)—and Lower Manhattan (199.6)—which were comparable to the rates in low-income neighborhoods such as Hunts Point-Mott Haven (198.0), Williamsburg-Bushwick (196.9), and East Harlem (205.8).

Discussion: Cancer

The hospitalization and mortality rate decreases in the 5th through 2nd sixths are an encouraging indication that increasing numbers of New Yorkers in a range of income categories are detecting cancer earlier and that cancer hospitalization is effective. For example, the *Second Year Progress Report* for the DOHMH health policy agenda, Take Care New York, reports that there has been a substantial increase in colonoscopy screenings in the city’s 11 Health and Hospitals Corporation hospitals. Between 2003 and 2005 the number increased from approximately 2,000 to nearly 5,000. DOHMH reported that as colonoscopy screening rates have increased, racial disparities in colonoscopy screening rates have decreased, thanks in part to funding provided through the New York City Council to pay for colonoscopies for uninsured people at HHC hospitals and voluntary hospitals.¹⁶

However, it remains a cause for concern that cancer hospitalization and mortality rates increased in the bottom sixth and the top sixth, contrary to the declines seen in the rest of the city. High cancer rates recorded on Staten Island are also a cause for concern. Since 2002, smoking rates have declined everywhere in the city except Staten Island, DOHMH has reported.

Greater access to and utilization of primary care will be required to address continuing disparities, inasmuch as provision of primary care has been associated with earlier detection of a range of cancers, include skin, breast, colon and cervical cancer.

¹⁶ More recently, DOHMH reports that in 2005, 60 percent of New Yorkers 50 and over had a colonoscopy in the past 10 years, up from 43 percent in 2003. The rate increased from 32 percent to 50 percent for those under 100 percent of the poverty level, and racial disparities in colonoscopy rates have nearly disappeared. DOHMH press release, June 6, 2007.

A. Where Disparities Narrowed

Childhood Asthma Hospitalizations and Pediatric Asthma/Bronchitis ACS Condition Admissions

Childhood asthma hospitalizations

From 1990 to 1995, the total number of New York City childhood (age 0-17) asthma hospitalizations increased very substantially, from 12,333 to 16,658. The largest increases were in low-income neighborhoods. The number of hospitalizations per 100,000 population (the “hospitalization rate”) increased by at least 400 per 100,000 population in six of 42 neighborhoods, including the four poorest neighborhoods, the sixth poorest, and the eighth poorest. In virtually all other neighborhoods, the number of hospitalizations per 100,000 increased by less than 300 and in more than half the neighborhoods the increase was less than 200 or there was a decrease; in nine neighborhoods, including the five wealthiest, the childhood asthma hospitalization rate countered the citywide trend and declined.

The largest neighborhood increase, 699.7 per 100,000, drove the number of hospitalizations in East Harlem from an already extraordinary 2,541.5 to 3,241.2 per 100,000 population, the highest rate in the city. (See Supplemental Information A at OPM Reports, www.comptroller.nyc.gov, for neighborhood rates for all years, 1990 to 2005.)¹⁷

On a percentage basis, from 1990 to 1995, increases in the hospitalization rate of at least 40 percent occurred in moderate and middle as well as low-income neighborhoods. A number of low-income neighborhoods that had comparatively modest hospitalization rate increases of between 15 percent and 40 percent, such as a 27.5 percent increase in East Harlem, already had high rates in 1990; for example, the 1990 rate of 2,541.5 per 100,000 in East Harlem was the highest in the city by a substantial margin.

Between 1995 and 2005, childhood asthma hospitalization rates plummeted. The largest decreases were observed in lower income neighborhoods. The total number of childhood hospitalizations citywide decreased from 16,658 in 1995 to 10,499 in 2000 and 9,400 in 2005. The number of hospitalizations per 100,000 fell by at least 700 in five of 42 neighborhoods, all of which were among the poorest seven of 42 neighborhoods in 2000. The largest decrease, 1,664.6, was in East Harlem, from 3,241.2 per 100,000 population in 1995 to 1,576.6 in 2000. In terms of total numbers of hospitalizations, low-income neighborhoods have accounted for the bulk of the decrease. From 1995, the total number of hospitalizations in the 14 neighborhoods in the bottom two sixths fell 3,458, from 10,063 to 6,555, compared to a decline of 454 hospitalizations, from 5,268 to 4,814, for the rest of the city.

On a percentage basis, from 1995 to 2005, the largest reductions in the childhood asthma hospitalization rate were concentrated among low and moderate income neighborhoods. The rate declined by at least 50 percent in 16 of the 42 neighborhoods, and eight of these were in the poorest third. The greatest concentration of large decreases in excess of 50 percent was in the next to the lowest sixth, including Sunset Park (73.4 percent decrease), Washington Heights-Inwood (68.2 percent decrease), Greenpoint (64.3 percent decrease), and Coney Island (61.4 percent decrease). Two relatively affluent neighborhoods also recorded decreases of at

¹⁷ Supplemental Information A shows that between 1990 to 1995, the highest asthma hospitalization rate occurred in 1992 for two neighborhoods, in 1993 for 21 neighborhoods, in 1994 for two neighborhoods, and in 1995 for 17 neighborhoods. It did not occur in 1990 or 1991 for any neighborhoods.

least 50 percent, specifically a 59.7 percent decrease in Chelsea-Clinton and a 67.6 percent decrease in Downtown Brooklyn-Brooklyn Heights-Park Slope.

Table 7 shows percentage changes in the childhood asthma hospitalization rate from 1990 to 2005 for the poorest one third of neighborhoods in 2000. As shown, the hospitalization rate rose substantially in nearly all 14 of these neighborhoods from 1990 to 1995 and in nearly all of these neighborhoods there was a large decrease from 1995 to 2000. Rates continued to decrease from 2000 to 2005, although, as Table 7 shows, at a slower pace than before.

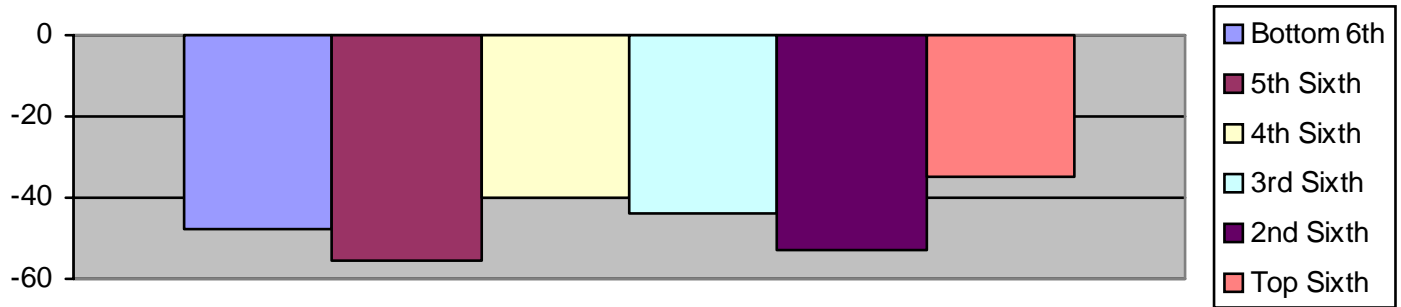
Table 7. Percentage change in childhood asthma hospitalization rates for the 14 neighborhoods comprising the bottom two income sixths in 2000. Neighborhoods are shown in ascending income order.

UHF Neighborhood	1990-1995	1995-2000	2000-2005	1990-2005	2005 rate	1990 vs. 2005 rate
Hunts Point-Mott Haven	+50.3%	-55.7%	-3.5%	-35.8%	891.6	-497.6
Highbridge-Morrisania	+34.3%	-41.6%	-0.2%	-21.7%	1,005.2	-278.7
Crotona-Tremont	+66.0%	-48.6%	-8.9%	-6.7%	929.9	-69.8
East Harlem	+27.5%	-51.4%	-32.8%	-58.3%	1,059.9	-1,481.6
Williamsburg-Bushwick	+17.6%	-33.8%	+7.0%	-16.7%	950.1	-386.3
Central Harlem	+25.7%	-41.9%	-12.6%	-36.2%	1,020.6	-573.3
East New York	+37.2%	-34.7%	-2.4%	-12.6%	755.0	-108.8
Fordham-Bronx Park	+60.5%	-44.3%	-3.5%	-13.8%	785.5	-127.7
Bedford Stuyvesant-Crown Heights	+27.1%	-36.4%	-19.5%	-34.9%	705.3	-378.5
Greenpoint	+18.1%	-59.0%	-12.8%	-57.8%	172.5	-234.1
Washington Heights-Inwood	+7.2%	-51.3%	-34.7%	-65.9%	293.3	-566.3
Sunset Park	-19.4%	-61.3%	-31.2%	-78.6%	198.9	-728.8
Coney Island	+13.6%	-51.7%	-20.2%	-56.4%	150.8	-195.4
Borough Park	-14.7%	-48.9%	-14.9%	-62.9%	98.6	-167.3

As seen in Supplemental Information A (see www.comptroller.nyc.gov, OPM Reports) from 1990 to 2005 among all 42 neighborhoods there was a decrease of at least 400 childhood asthma hospitalizations per 100,000 population in Hunts Point-Mott Haven, East Harlem, Central Harlem, Washington Heights-Inwood, Sunset Park, Union Square-Lower East Side, Downtown Brooklyn-Park Slope, Gramercy Park-Murray Hill, and Lower Manhattan.

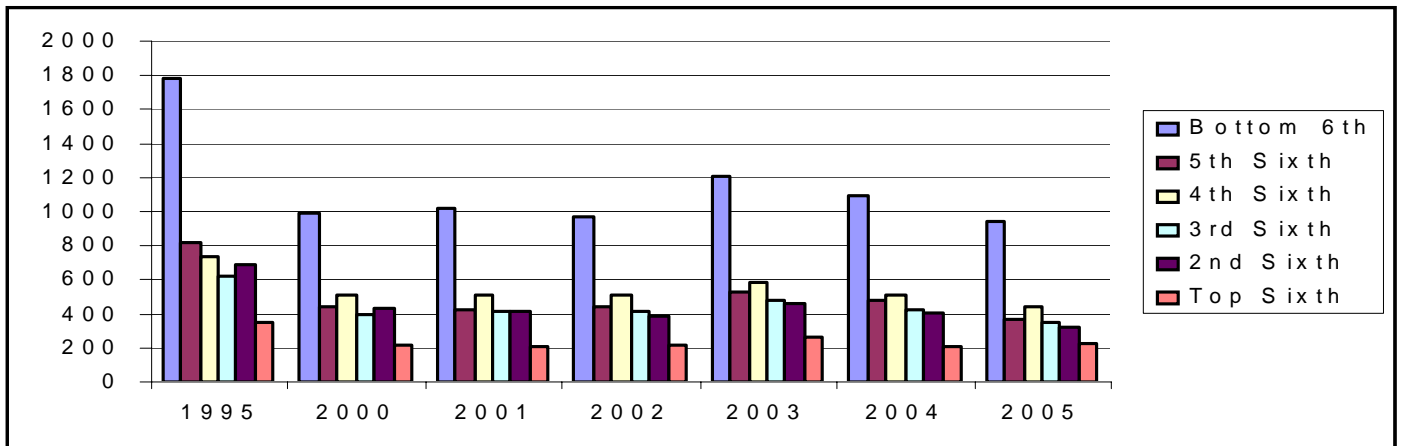
Analysis by income sixth for 1995 to 2005 shows there were large percentage decreases in childhood asthma hospitalization rates throughout the city. As shown in Chart 14, the largest percentage decrease in the rate was for the 5th sixth and the second largest was for 2nd sixth.

Chart 14. Percentage change in NYC childhood asthma hospitalization rates by neighborhood income, 1995-2005. Each sixth comprises seven UHF neighborhoods.



The largest decreases in the number of childhood asthma hospitalizations per 100,000 represented by the percentage decreases in Chart 14 were in the bottom two sixths. As can be seen in Chart 2, from 1995 to 2005, the number of hospitalizations per 100,000 decreased the most—by 847.7—in the bottom sixth, followed by 453.6 in the 5th sixth. In the higher sixths, the decreases per 100,000 were smaller—365.9 in the 2nd sixth and 122.5 in the top sixth.

Chart 15. Number of childhood asthma hospitalizations per 100,000 population by neighborhood income. Each sixth comprises seven UHF neighborhoods.



See Table C4 in Appendix C for the rates in the above chart.

In most low-income neighborhoods, the largest one year decrease in hospitalization rates since 1990 were observed in 1998. As Table 8 illustrates, among the poorest one third of neighborhoods, the hospitalization rate fell by as much as 43.8 percent from 1997 to 1998. Despite some significant year-to-year fluctuations, after 1998 rates remained substantially below the high levels observed earlier in the 1990s. For 19 of the 42 UHF New York City neighborhoods, the lowest childhood asthma hospitalization rates since 1990 were observed in 2005.

Table 8. Childhood asthma hospitalizations per 100,000 population for the 14 neighborhoods comprising the bottom two income sixths. Neighborhoods are shown in ascending income order.

UHF Neighborhood	1997	1998	Decrease	Percentage decrease
Hunts Point-Mott Haven	2,019.6	1,391.9	-627.7	-31.0%
Highbridge-Morrisania	1,713	1,144.9	-568.1	-33.2
Crotona-Tremont	1,501.2	843.3	-657.9	-43.8
East Harlem	2,621.9	2,231.5	-390.4	-14.8
Williamsburg-Bushwick	1,158.2	804.7	-353.2	-30.6
Central Harlem	1,852.0	1,384.7	-467.3	-25.2
East New York	1,109.6	898.2	-211.4	-19.0
Fordham-Bronx Park	1,396.9	847.7	-549.2	-39.3
Bedford Stuyvesant-Crown Heights	1,255.7	804.7	-451.0	-35.9
Greenpoint	368.4	222.0	-146.4	-39.7
Washington Heights-Inwood	825.8	486.2	-339.6	-41.1
Sunset Park	633.8	420.8	-213.0	-33.6
Coney Island	330.0	230.4	-99.6	-30.1
Borough Park	224.6	146.0	78.6	-34.9

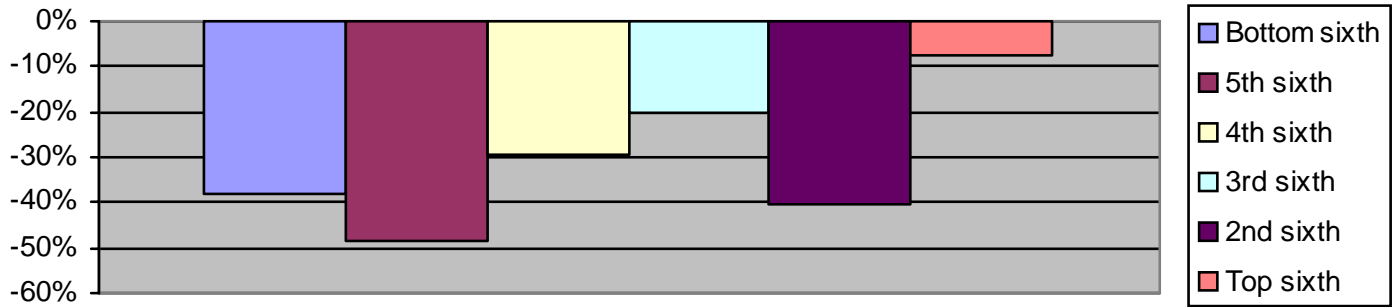
The decrease in childhood asthma hospitalization rates since the mid-1990s in low-income neighborhoods has saved millions of dollars. Table 9 shows the total numbers of childhood hospitalizations in the seven neighborhoods that comprised the bottom sixth in 2000. In 2005, there were 953 fewer hospitalizations than in 1990 and 2,801 fewer than in 1995. According to the New York State Department of Health, in 2004 the average asthma hospitalization in the state cost \$9,870, an 87 percent increase from 1995 despite a reduction in the average length of stay, and the total billing cost for New York State was approximately \$384 million. Assuming this average cost applied to childhood asthma hospitalizations, the reduction in childhood asthma hospitalizations since 1995 in the neighborhoods comprising the bottom sixth is saving at least \$27 million a year.

Table 9. Total number of childhood asthma hospitalizations, bottom income sixth neighborhoods.

UHF Neighborhood	1990	1995	2000	2005
Hunts Point-Mott Haven	546	860	398	384
Highbridge-Morrisania	734	1,060	662	661
Crotona-Tremont	638	1,117	604	658
East Harlem	746	965	476	320
Williamsburg-Bushwick	740	865	569	609
Central Harlem	550	736	453	396
East New York	468	667	452	441
TOTAL	4,422	6,270	3,614	3,469

Trends in pediatric bronchitis and asthma ACS condition admissions of children up to four years old paralleled trends in asthma childhood hospitalizations. The largest percentage reduction in rates occurred in the bottom two sixths. Chart 16 illustrates this reduction.

Chart 16. Change in pediatric bronchitis/asthma ACS rate (admissions per 1,000 0-4 year olds), by neighborhood income, 1995 to 2005. Each sixth comprises seven UHF neighborhoods.



Source for neighborhood rates used to calculate rates for sixths: Infoshare.

Discussion: childhood asthma

The reduction in childhood asthma hospitalization rates in New York City has been remarkable. From 1995 to 2005 there was a 46.9 percent decrease in the city’s childhood asthma hospitalization rate, from 831.6 to 440.9 per 100,000 population. The New York City decrease far exceeded the national decrease; from 1995 to 2004 there was a 17.1 percent decrease in the childhood asthma hospitalization rate nationally.¹⁸

Government efforts to reduce asthma disparities played a major role in achieving the large reductions in childhood asthma hospitalization rates. New York City’s efforts began in earnest in 1994 when the Department of Health and Mental Hygiene, together with a coalition of 300 community groups, medical providers, academics, non-profits, service providers, and individuals, undertook a multi-faceted childhood asthma initiative. As Tables 3 and 4 and Supplemental Information A show, by far the largest declines in childhood asthma hospitalizations since 1995 occurred between 1995 and 2000, after the asthma initiative was implemented.

Among the efforts that were launched were:

- Creation of the New York City Asthma Initiative, which oversees the New York City Asthma Partnership (NYCAP). NYCAP brings together representatives from schools, daycare, health care institutions, pharmacies, community based organizations, government, and others who make recommendations to improve citywide policies and systems that affect people with asthma. NYCAP addresses the environment, asthma education, data and research, health care delivery, and issues affecting children in schools, childcare, and recreation programs.
- Establishment of the East & Central Harlem and the South Bronx District Public Health Offices to interact with schools and medical providers.
- Development and distribution of treatment guidelines to physicians and the use of asthma action plans for patients.
- The development of a screening system to identify and assist children with asthma symptoms entering Head Start preschools and to help them obtain proper treatment. Approximately 98 percent of families are

¹⁸ Available national data is for hospitalizations (discharges) per 10,000 children age 0-17 and the most recent available data is for 2004. The rate was 32.7 in 1995 and 27.1 in 2004. Source: U.S. Centers for Disease Control, *Advance Data From Vital and Health Statistics*, December 12, 2006, “The State of Childhood Asthma, United States, 1980-2005.” Rates for intervening years were: 1996, 29.8; 1997, 32.4; 1998, 24.4; 1999, 28.1; 2000, 29.6; 2001, 26.2; 2002, 26.8; 2003, 31.2.

now “screened” and over 70 percent of children who are positive for asthma have been provided with written Asthma Action Plans; half of these children have appropriate medications (use of inhaled corticosteroids for children with persistent asthma).

There are important caveats to this success, however. First, childhood asthma is being more successfully managed, but its prevalence is not necessarily declining. Indeed, according to the Department of Health and Mental Hygiene, the number of people with asthma has increased over the past two decades. In 2006, the U.S. Centers for Disease Control reported that, nationally, asthma rates among children remain at historically high levels following dramatic increases from 1980 until the late 1990s. And the impact of asthma on children and families remains severe. Nineteen percent of New York schoolchildren with asthma missed more than a week of school, day care, or pre-school in the past year due to asthma, for example.

Second, childhood asthma hospitalization rates in some low-income neighborhoods remain several times the rates in wealthier communities. Thus, although the East Harlem rate plunged from 3,241 per 100,000 in 1995 to 1,060 in 2005, it is still the highest rate in the city and was more than quadruple the rate of 230.6 per 100,000 population in the adjoining Upper East Side neighborhood.

And third, comparing 1990 with 2005, it becomes clear that childhood asthma hospitalization rates did not decline dramatically in *all* low and moderate income neighborhoods, even where 1995 to 2005 reductions were substantial. In fact, the rate increased slightly in Rockaway and in Ridgewood during this period and there was only a comparatively small, seven percent (or 69.8 childhood hospitalizations per 100,000) decrease in Crotona-Tremont, resulting in a neighborhood a rate of 929.9 per 100,000 in 2005, the fourth highest in the city. And the relatively modest 16.7 percent decrease in Williamsburg-Bushwick (of 191.2 hospitalizations per 100,000) resulted in a rate of 950.1, the city’s third highest.

Infant Mortality, Late or Non-Existent Prenatal Care

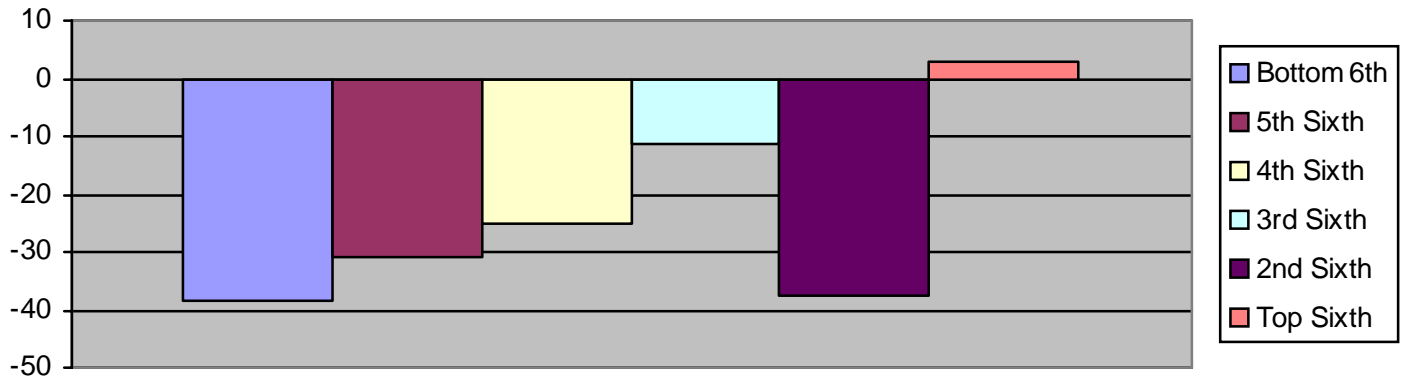
Infant mortality

The New York City infant mortality rate¹⁹ has steadily declined since at least 1990, when it stood at 11.6 per 1,000 live births, to 6.0 per 1,000 live births in 2005. The number of infant deaths fell from 1,620 in 1990 to 731 in 2005.

There were large infant mortality rate reductions from 1995 to 2005, with the largest decreases occurring in low-income neighborhoods. Rates per 1,000 live births were computed for income sixths beginning with 1995. Since 1995, the largest decline was 38.5 percent, in the bottom sixth. (See Appendix D, Table D4, for rates for all sixths.)

¹⁹Deaths under one year of age per 1,000 live births.

Chart 17. Percentage change in NYC infant mortality rates by median household income by neighborhood income, 1995 to 2005. Each sixth comprises seven UHF neighborhoods.



Source for neighborhood rates used to calculate rates for neighborhood income sixths: NYC DOHMH

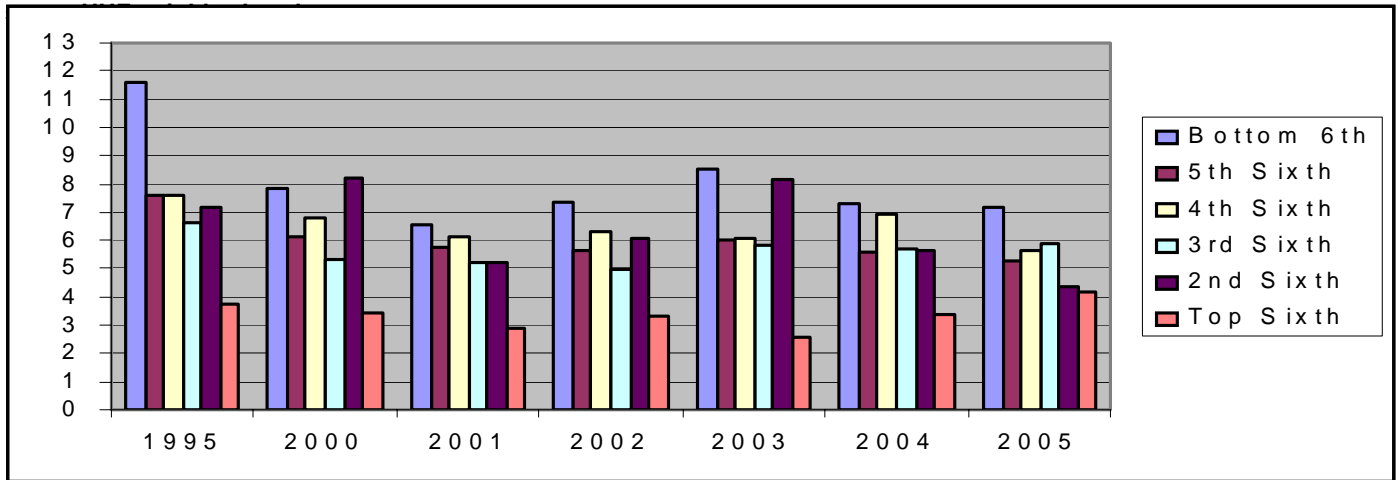
There also were large rate reductions from 1990 to 1995, with large decreases in low-income neighborhoods. Aggregate rates by sixth were not computed for years before 1995. However, Table 10 compares infant mortality rates from 1990 to 2005 among the neighborhoods that comprised the bottom two sixths in 2000. From 1990 to 1995, there were large reductions in Central Harlem (12.9), Bedford Stuyvesant-Crown Heights (8.3) and High Bridge-Morrisania (7.6). And as the last column shows, from 1990 to 2005, there were large double digit reductions in infant deaths per 1,000 live births in Central Harlem, East Harlem, High Bridge-Morrisania and Bedford Stuyvesant-Crown Heights. These four and the Downtown Brooklyn-Brooklyn Heights-Park Slope neighborhoods were the only neighborhoods that had double digit reductions. (See Supplemental Information B at OPM Reports, www.comptroller.nyc.gov, for rates for all neighborhoods.)

Table 10. NYC infant deaths per 1,000 population, 1990, 1995, 2000 and 2005. Bottom two income sixths.

UHF Neighborhood	1990	1995	2000	2005	Percentage by which rate declined, 1990-2005	Decrease in deaths per 1,000, 1990-2005
Hunts Point-Mott Haven	13.6	10.5	8.4	7.1	47.8%	6.5
High Bridge-Morrisania	16.7	9.4	7.8	5.3	68.3	11.4
Crotona-Tremont	14.0	10.7	7.1	7.1	49.3	6.9
East Harlem	13.9	13.7	9.5	3.8	72.7	10.1
Williamsburg-Bushwick	15.4	11.2	6.2	6.9	55.2	8.5
Central Harlem-Morningside Heights	26.6	13.7	9.0	9.4	64.7	17.2
East New York	13.9	14.0	8.9	10.1	27.3	3.8
Fordham-Bronx Park	13.3	7.0	8.2	5.6	57.9	7.7
Bedford Stuyvesant-Crown Heights	20.1	11.8	10.8	9.6	52.2	10.5
Greenpoint	10.2	5.9	5.6	3.2	68.6	7.0
Washington Heights-Inwood	8.2	5.9	5.1	4.7	42.7	3.5
Sunset Park	9.3	8.2	2.5	1.4	84.9	7.9
Coney Island-Sheepshead Bay	9.9	7.0	5.8	4.1	58.6	5.8
Borough Park	7.4	6.5	3.1	4.5	39.1	2.9

Income disparities for infant mortality have been greatly reduced. Chart 18 shows an especially large reduction between 1995 and 2000 for the bottom sixth, from 11.733 to 7.958 deaths per 1,000 births. Although rates for the bottom two sixths rebounded slightly in 2003, between 2003 and 2005 rates decreased once again.

Chart 18. NYC infant mortality per 1,000 live births, 1995, 2000 to 2005 by neighborhood income. Each sixth comprises

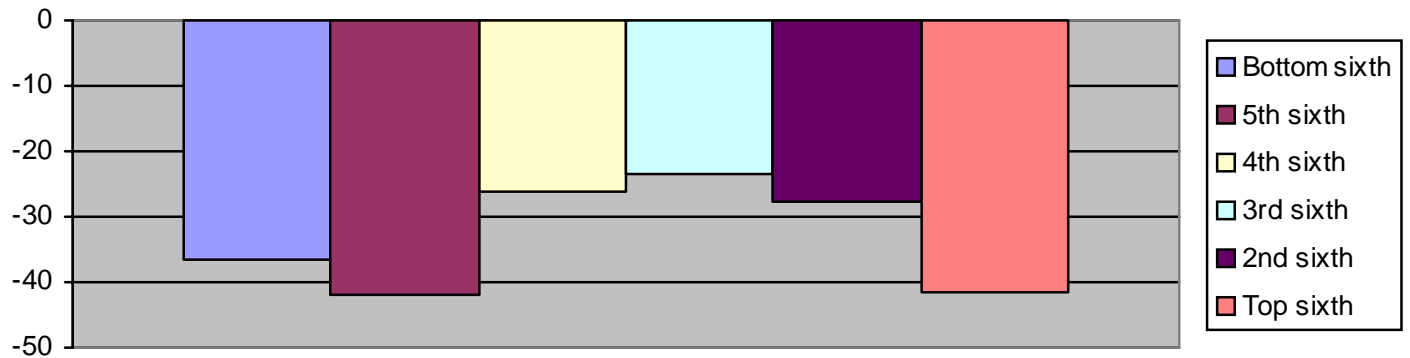


See Table D4 in Appendix D for the rates in the chart above.

Late or non-existent prenatal care

From 1995 to 2005, there were large reductions in the number of live births per 1,000 where the mother had either late prenatal care or no prenatal care at all. The percent reduction in the number of births with late or non-existent prenatal care was greatest in the bottom two sixths and in the top sixth.

Chart 19. Percentage decrease in the rate of live births with no or late prenatal care by neighborhood income, 1995 to 2005. Each sixth comprises seven UHF neighborhoods.



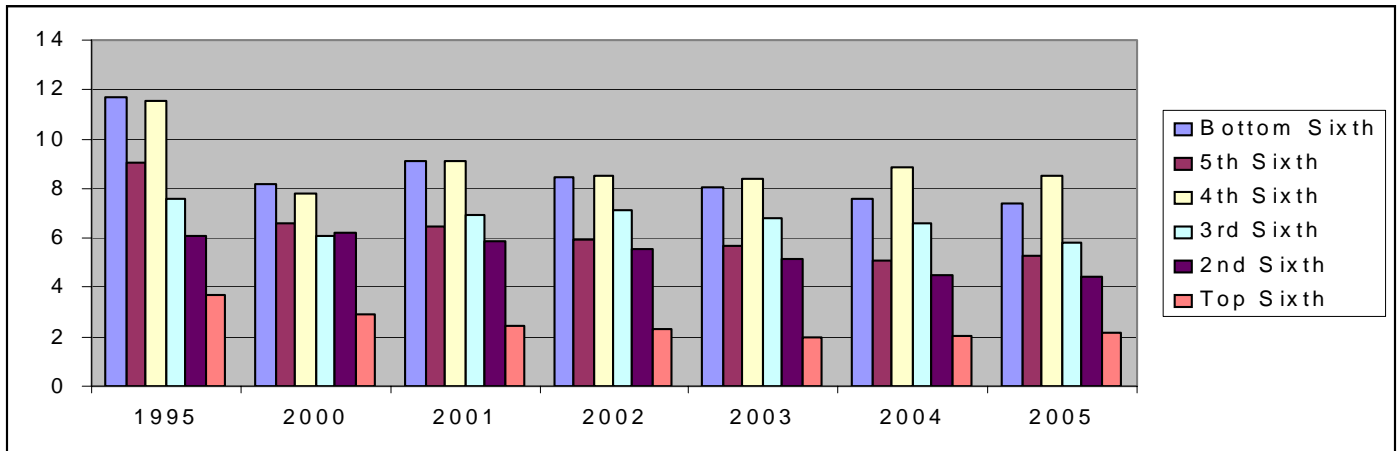
Source of neighborhood rates used to calculate rates for sixths: NYC DOHMH.

The actual decreases in the number of births per 1,000 live births where the mother had late or non-existent prenatal care represented by these percentage decreases are as follows. The lower the income, the larger the decrease.

Bottom sixth	-4.3
5 th sixth	-3.8
4 th sixth	-3.0
3 rd sixth	-1.8
2 nd sixth	-1.7
Top sixth	-1.5

Chart 20 shows how the disparity between the bottom three sixths and the rest of the city has narrowed since 1995.

Chart 20. Number of live births per 1,000 with no or late prenatal care by neighborhood income. Each sixth comprises seven UHF neighborhoods.



Discussion: infant mortality

Reductions in infant mortality since 1990 have been largest in low-income neighborhoods. Central Harlem-Morningside Heights had the largest decline, from 26.6 to 9.5 per 1,000 live births, followed by East Harlem, which had a very substantial decrease from 18.9 to 3.8 deaths per 1,000 births. Despite this remarkable progress, large disparities persist. The bottom sixth infant mortality rate of 7.15 remains approximately 41 percent higher than the top sixth rate and 39 percent above the second sixth rate.

Reasons for the decline in the city’s infant mortality rate are complex. Because of advances in technology, more infants are surviving past their first birthday. Recently completed research by the Institute of Medicine (IOM) of the National Academy of Science indicates that advances in neonatal intensive care have greatly improved survival rates for premature infants. For example, a new drug introduced in 1990 helps prevent deaths of premature babies from sudden respiratory failures.

Clearly, however, concerted efforts by government and non-profit organizations to reduce infant mortality disparities during the 1980’s have played a major role. New York City DOHMH efforts to reduce disparities in infant mortality have included two major neighborhood targeted programs, the Nurse Family Partnership and the Newborn Home Visiting Program, as well as administrative coordination and support for five Regional Perinatal Forums, and facilitating the Citywide Perinatal Forum. Citywide, DOHMH oversees education and programming to help mothers stop smoking, promote drug and alcohol treatment, and provide family planning education to avoid unwanted pregnancies. The agency also oversees the Breastfeeding Initiative to promote infant health, the Prenatal Care Assistance Program (an extension of Medicaid) and the City Council-funded Infant Mortality Reduction Initiative.

Additional initiatives targeted at infant mortality include the federally funded Healthy Start initiative and free or low cost health insurance for those meeting income and immigration status requirements. Many community based organizations, public officials, advocates, hospitals, and providers are actively engaged in community-based and citywide efforts to prevent infant and maternal mortality. For example, the Visiting Nurse Service, the New York City Health and Hospitals Corporation, and the borough-based Perinatal Forums are very active in efforts to reduce infant mortality.

Additional contributors to declining infant mortality rates have included:

- Expanded eligibility for Medicaid, which has helped increase access to care and greater usage of prenatal care. Of the 122,725 births in New York City in 2005, approximately 52 percent (63,370) were covered by Medicaid.
- The decline in the rate of teenage pregnancy. Studies have shown a positive correlation between teen pregnancies and low birth weight babies, a leading risk factor in infant mortality. Between 1996 and 2005, the number of births to NYC teens decreased by 34 percent, contributing to the reductions recorded in infant mortality.

DOHMH has undertaken a number of initiatives to achieve this result, including making available for teens in foster care and homeless shelters the Department’s Nurse Family Partnership program. DOHMH has also established the Healthy Teens Initiative to ensure adolescents’ awareness of and access to comprehensive sexual and reproductive health services.

In addition, since 2002 the Comptroller has chaired the New York City Task Force on Adolescent Pregnancy, Parenting and Prevention, with participation of over 400 agencies, advocates and service providers. Task Force members have helped issue reports on teen pregnancy that influenced public policy and programs. In addition, the public debate on this issue that was stimulated by Task Force meetings and reports has contributed significantly to success in reducing the teen pregnancy rate.

II. Availability and Utilization of Primary and Preventive Care

A positive correlation between the availability and utilization of primary and preventive health care in a neighborhood and the health of the neighborhood’s residents has been firmly established in numerous research studies. Simply stated, providing primary and preventive care saves lives and money and is key to reducing disparities.

Lack of primary care capacity

Table 11 shows that in 2004, neighborhoods in the bottom sixth had the fewest primary care physicians per 100,000 people. The rate was moderately higher for the 5th through 3rd sixths and substantially higher for the 2nd and top sixths.

Table 11. Number of primary care physicians per 100,000 population (rate) and total number of primary physicians and all physicians, 2004.

	Primary care MD rate	Total number of primary care MDs	Total physicians
Bottom sixth	73.7 ²⁰	839	1,989
5 th sixth	84.5	1,529	3,944
4 th sixth	78.1	1,352	3,466
3 rd sixth	86.8	1,231	3,399
2 nd sixth	107.6	963	3,182
Top sixth	197.9	1,859	8,037

Source: Infoshare

²⁰ The bottom sixth rate would have been significantly lower except that it was skewed higher by the rate of 240.8 per 100,000 population in East Harlem, which reflects the presence of several hospitals, including Mt. Sinai Medical Center, one of the largest hospitals in the city. It is not clear whether all of these physicians are in active practices and serve neighborhood residents.

In 2004, six neighborhoods had especially low rates of primary care physicians—fewer than 50 physicians per 100,000 population. These neighborhoods and their income rank among the 42 UHF neighborhoods were:

Hunts Point-Mott Haven (42)
East New York (36)
Bedford Stuyvesant-Crown Heights (34)
Greenpoint (33)
Kingsbridge-Riverdale (13)
Southeast Queens (9)

All but Kingsbridge-Riverdale and Southeast Queens were in the bottom two sixths.

In addition, the New York State Department of Education has designated numerous census tracts in many of New York City's low-income neighborhoods as Primary Care Physician Shortage Areas; virtually all Shortage Areas in New York City are in low-income communities.²¹ As documented and explained above, neighborhoods with the lowest availability of primary care physicians tended to have the highest hospitalization and/or mortality rates in diabetes, childhood asthma, heart disease and cancer, as well as the highest infant mortality rates.

Recent and anticipated hospital closures raise the prospect of even fewer primary care doctors being available to low-income people. A report issued jointly in September 2006 by the New York City Health and Hospitals Corporation and the Primary Care Development Corporation found that 32 percent of the city's primary care physicians available to low-income residents are based in hospitals, "making access to care for low-income New Yorkers highly vulnerable to hospital closures."²² Five New York City hospital closures were recommended by the New York State Commission on Health Care Facilities in the 21st Century (the "Berger Commission") last December and appear imminent. These hospitals are, in effect, the primary care provider for thousands of low-income people through both their outpatient clinics and emergency rooms. If all five of their emergency rooms close, 14 New York City hospital emergency rooms will have closed since 2002.

When a hospital closes, its outpatient clinics are also threatened with closure. In some communities, these clinics are the primary and obstetrical care providers for large numbers of low-income patients. Thus, for example, Kingsbrook Jewish Medical Center has operated five clinics, including primary care and WIC (Women-Infant-Children) outpatient clinics, in low-income neighborhoods that were previously run by St. Mary's Hospital, which closed in 2005. Now Kingsbrook is closing four of the clinics because, according to the hospital, reimbursement rates are too low.

Health care coverage and financial access

Another important factor affecting the utilization of primary care resources in a neighborhood is whether the residents can afford the primary care that is available. Persons who do not have health insurance are more likely to delay seeking necessary medical help or not to seek it at all.

The DOHMH Community Health Survey periodically surveys residents about their health insurance status. Neighborhoods with relatively high percentages of privately insured residents generally speaking have

²¹ State Education Department, *Regents-Designated Physician Shortage Areas in New York State, Supplementary Bulletin for 2007*.

²² Nancy Lager, MPH, MSUP, et. al., *A Primary Care Capacity Shortage in New York City & The Potential Impact of Hospital Closures*, September 2006.

the healthiest populations as measured by the hospitalization and mortality rate indicators reviewed by the Office of the Comptroller. In contrast, residents of many neighborhoods with higher-than-city-average uninsured rates tend to be less healthy, including Williamsburg-Bushwick, East Harlem, Greenpoint, Bedford Stuyvesant-Crown Heights, East New York, High Bridge-Morrisania, Fordham-Bronx Park and Crotona-Tremont. Table 12 lists the 17 UHF neighborhoods where at least 30 percent of the residents lacked health insurance; citywide, 29 percent were uninsured. Eight of the neighborhoods in Table 12 are in the bottom two income sixths.

Table 12. UHF Neighborhoods Where At Least 30 Percent of Residents Are Uninsured

	Uninsured percentage	Percentage of hospital discharges that were Medicaid-covered
Western Queens	47	14.7
Sunset Park	42	20.6
Williamsburg-Bushwick	39	31.5
Long Island City-Astoria	38	15.7
Southwest Queens	37	16.2
East Harlem	37	35.6
Hunts Point-Mott Haven	36	36.9
Greenpoint	35	18.3
Bedford Stuyvesant-Crown Heights	34	27.4
Flatbush	34	21.2
Washington Heights-Inwood	33	25.6
East New York	33	27.7
Jamaica	33	18.8
Flushing	32	10.0
High Bridge-Morrisania	31	35.2
Fordham-Bronx Park	31	29.3
Crotona-Tremont	30	34.6

Source: NYC DOHMH Community Health Profiles, based on compilation of three years of results from the DOHMH Community Health Survey.

In a number of neighborhoods in Table 12 with high rates of diabetes, heart disease, childhood asthma hospitalization and infant mortality, at least 35 percent of the surveyed population self-reported to DOHMH that they were enrolled in Medicaid, specifically Hunts Point-Mott Haven, High Bridge-Morrisania, and East Harlem. Yet enrollment in Medicaid is no assurance that primary care will be readily available. Some physicians limit their Medicaid practices, and health clinics where Medicaid enrollees can obtain primary care can be overcrowded or require a long wait for an appointment. A survey issued in 2006 by the Center for Studying Health System Change found that the percentage of physicians nationally accepting no new Medicaid patients has steadily increased from 19.4 percent in 1996-97 to 20.9 percent in 2000-2001 and 21.0 percent in 2005-2005.²³ The percentages were even higher in large metropolitan areas of over 200,000 population: 21.3 percent, 23.1 percent and 23.6 percent. Low Medicaid payment rates and high administrative burdens were major reasons physicians gave for not accepting Medicaid patients.

Even when primary care is available, there are a number of factors that can suppress its utilization by nearby residents, including language and cultural barriers, mistrust and fear of the health care system, and low “health literacy,” which refers to the ability to read, comprehend, and act on medical instructions.

²³ P. Cunningham, J. May, *Medicaid Patients Increasingly Concentrated Among Physicians, Tracking Report No. 16*, Center for Studying Health Care Change, August 2006.

An approach to expanding primary care

Retail clinics, found in supermarkets, pharmacies, and “big box” stores, are an emerging niche in the healthcare delivery system. Designed to provide quick, convenient, relatively low cost care for common ailments, the clinics are generally staffed by nurse practitioners or doctors. Although retail clinics are a recent innovation, the California Health Foundation notes that over time they could come to be an accepted part of the standard healthcare delivery system.²⁴

In addition to operating during regular business hours, retail clinics are open during evenings and on weekends when office or clinic-based primary medical care is often not available outside of the emergency room. To be sure, retail clinics do not provide proactive case management or outcomes tracking. Retail clinics limit treatment to a set list of about 25 to 35 conditions ranging from a sore throat to an ear infection to pink-eye. They also administer certain vaccinations, conduct general check-ups, and screen blood pressure and blood sugar, which is important for detecting and treating diabetes and heart disease. While such clinics are new to the United States, in other countries people often visit the pharmacy for initial treatment of minor ailments.

A study conducted by Forrester Research found that among consumers who had used a retail clinic, convenience was the major factor—with more than half saying they will visit again.²⁵ Instead of waiting for hours to be seen in a hospital emergency room or urgent care center or, worse yet, departing without treatment because of the wait, people living or working near a retail clinic could expect faster attention; the retail clinics try to keep the average wait time to 15 minutes. Moreover, while taking an hour or two off to go to the doctor is financially difficult if not impossible for many hourly-wage workers, going to a nearby retail clinic during a lunch hour, in the evening, or on a weekend is a realistic option. Thus individuals with few other care options might seek out medical attention for themselves or a family member sooner or more often, increasing the likelihood that conditions will be diagnosed before they become more serious and more costly to treat.

Another advantage to retail clinics is their use of a posted price list. Whereas a mature medical practice receives about 85 percent of its revenue from health insurance reimbursements, at least one retail clinic estimated that about half of its patients pay by credit card or cash. Determining the fee structure in advance at a hospital or a doctor’s office can be difficult. For individuals who are uninsured or under-insured, the retail clinics’ use of a posted price list lets them know ahead of time exactly what the fees will be and make decisions accordingly. Most retail clinics in other states also accept private health insurance, Medicaid and Medicare.

Of course, the fee structure of a retail clinic may be unaffordable to some of the uninsured. A Harris Interactive study found that interest in using a walk-in retail clinic was highest among those with incomes below \$50,000 and over \$100,000.²⁶ Nevertheless, these clinics provide another primary care option where such choices are scarce.

The clinics are intended to supplement, not supplant existing primary care. All of the retail clinic chains clearly state that they are not in the business of providing ongoing primary care. Their policy is to maintain

²⁴ Mary Kate Scott, *Health Care in the Express Lane: The Emergence of Retail Clinics*, California Health Foundation, July 2006.

²⁵ Bradford J. Holmes and Julie Hanson, *Retail Health Clinics: Convenience Trumps Service and Quality*, Forrester Research, Inc., January 26, 2007.

²⁶ Mary Kate Scott, *Health Care in the Express Lane*, p. 23.

relationships with and actively refer patients for primary care and patients they cannot treat to nearby physicians and hospitals. For that reason, retail clinics have referral relationships with primary care doctors and nearby hospitals for patients who need ongoing treatment or care that is beyond the scope of the clinic's practice. One drug store chain reports that they sometimes make a physician appointment while the patient is visiting the clinic. Many of the clinics employ electronic health record systems and, as their use increases throughout the medical community, information exchange will become easier.

In parts of some states, such as New Jersey and California, a local health system operates retail clinics, which helps ensure continuity of care. The New York City Health and Hospitals Corporation, which has extensive experience treating patients with Medicaid and Medicare, as well as the uninsured and under-insured, could operate or partner with these clinics within New York City.

III. Conclusions and Recommendations

Health disparities arise from a complex interaction of economic, social and environmental factors. Program and policy solutions need to reflect that complexity. Fortunately, in recent years the City of New York has grown to recognize the seriousness and complexity of the health disparities problem and to respond with a very wide array of innovative and focused programs. Clearly, New York City has assumed a leadership role among the nation's cities in advancing public health and taking steps to reduce health disparities.

The most publicized of these initiatives include prohibiting smoking in restaurants and bars and banning trans fats in restaurant food. Among the numerous less widely publicized efforts are the City's new A1C hemoglobin registry²⁷ and the Asthma Training Institute. The New York State Department of Health has also been very active in this field, and the State Health Department Center for Community Health has funded a wide variety of programs to reduce health disparities, from cultural competency training for health care providers to cancer screening.

Perhaps even more important for reducing health disparities, though, are steps New York State is taking toward universal health coverage. The State has begun to focus intensively on enrolling the more than one million people who are eligible, but not enrolled, in Medicaid, Child Health Plus and Family Health Plus. The State has also sought to raise the household income eligibility levels for Child Health Plus from 250 percent to 400 percent of the federal poverty line for a family of four, which would result in additional coverage for approximately 20,000 to 30,000 New York City children.²⁸ Unfortunately, on August 17, 2007 the federal government issued new regulations requiring that until a state enrolls 95 percent of those eligible for the State Child Health Insurance Program (SCHIP) in households earning less than 200 percent of the poverty line, they cannot provide coverage to children in families earning more than 250 percent of the poverty line. It would be virtually impossible for any state to meet this stringent requirement and, based on the new regulations, the U.S. Department of Health and Human Services has denied New York's request to expand Child Health Plus eligibility. Governor Spitzer is now working with members of New York's Congressional delegation in an effort to legislatively roll back the regulation and the Governor has announced the State will challenge the new regulation in court.

²⁷ A1C levels are used to monitor and adjust treatment plans for diabetics. The goal is typically an A1C level less than 7.0%.

²⁸ This would increase the household income eligibility cutoff from \$51,625 to \$86,600. While \$86,000 would be considered a healthy middle class income in many parts of the country, in New York City's more expensive environment a family of four with those annual earnings struggles to stretch every dollar. For example, to achieve the equivalent of the national average purchasing power of \$86,600, a Queens family would have to earn \$121,092 annually.

The State is also working on transforming health care into more of a patient-centered system that emphasizes primary and preventive care, starting by restructuring the Medicaid reimbursement system to encourage the delivery of primary care as opposed to encouraging a higher volume of services and inpatient care and to reward higher quality care. As noted in the Comptroller’s December, 2006 report on the recommendations of the New York State Commission on Health Care Facilities in the 21st Century, *Emergency Room Care: Will It Be There?*, high profits for medical services such as cardiac catheterization, cancer centers and cardiac and orthopedic surgery centers have led hospitals to expand capacity in these areas. While some of these profits are used to cross-subsidize unprofitable services such as primary care, a major overhaul will be needed to shift incentives away from specialty care and towards preventive and primary care, including the management of chronic diseases. It will also be necessary to encourage more doctors to practice as primary care doctors and to practice in State Education Department-designated primary care physician shortage areas.

Our recommendations are as follows:

Increasing the availability and utilization of primary and preventive care

- **Move quickly to restructure insurance reimbursement formulas to better support and expand primary and preventive care.** Although New York spends more on Medicaid than any other state, as discussed in a report released in 2006, *Laying the Foundation—Health System Reform in New York State and the Primary Care Imperative*,²⁹ New York State has under-invested in primary care in both the office-based and clinical settings. The Spitzer administration seeks to revise Medicaid reimbursement formulas to redress this imbalance and create an incentive to increase primary care capacity. In a speech delivered in June 2007, State Health Commissioner Dr. Richard Daines said that in reforming the Medicaid reimbursement system, New York will move “from a system that rewards volume of services and favors inpatient care to a system that rewards quality, improved outcomes, and encourages the delivery of preventive care.”³⁰ The Primary Care Coalition³¹ calls payment reform “singularly the most important of all the measures required to address the primary care agenda in New York State.”

The positive impact on health by expanding primary care—of providing more people with a “medical home” where they receive regular treatment—was highlighted in a recent survey by the Commonwealth Fund, *Closing the Divide: How Medical Homes Promote Equity in Health Care*. The Fund’s 2006 Health Care Quality Survey found that adults who have “medical homes” not only have enhanced access to care but also receive better quality care. The survey also found that, among minorities with insurance coverage and a medical home, racial and ethnic differences in access to and quality of care are reduced.

For diabetics, for example, increased primary and preventive health can include stepped up blood sugar, blood pressure and cholesterol monitoring, and regular examinations of the feet and other extremities to watch for symptoms of poor circulation, a common diabetes complication.

²⁹ Sara Rosenbaum, J.D., et. al., *Laying the Foundation—Health System Reform in New York State and the Primary Care Imperative*, prepared with support from the Community Health Care Association of New York State, the Primary Care Development Corporation and the New York State Area Health Education Center System, June 2006.

³⁰ June 15, 2007, at the Sixth Annual Urban Health Conference sponsored by Generations+/Northern Manhattan Health Network and the New York City Health and Hospitals Corporation.

³¹ Community Health Care Association of New York State, Primary Care Development Corporation, New York State Area Health Education Center System, and the New York Chapter of the American College of Physicians.

- **Devote additional resources to expand and improve primary and preventive care.** Additional funding is needed for clinics that serve large numbers of low-income uninsured and publicly insured patients, including Diagnostic & Treatment Centers and hospital based outpatient clinics. As explained in *Laying the Foundation*, the “financial base” of these clinics “is eroding, both because Medicaid rates have stagnated and because the state’s indigent care pool is unable to compensate for this erosion.”³²

Five New York City hospital emergency rooms are expected to be closed in accordance with recommendations of the State Commission on Healthcare Facilities in the 21st Century (the “Berger Commission”). Assuming all five are closed, 14 emergency rooms will have closed in the city since 2002. These closures permanently eliminate a source of already scarce primary care for thousands of people. The Berger Commission itself recommended that “all New York residents have a primary care ‘home.’” Therefore, **a portion of the savings from the anticipated new closures should be reinvested in community-based health programs.**

Another potential funding source is a portion of F-SHRP (Federal-State Health Reform Partnership) monies to be provided over five years to New York State contingent upon, among other requirements, the full implementation of the Berger Commission recommendations. Although more than half of the total of \$1.5 billion in F-SHRP money is to be directed toward hospital debt repayment, severance and pensions, \$75 million is to be set aside for ambulatory and primary care.

- **To supplement existing primary care, encourage the opening of retail health clinics in drug stores, supermarkets and “big box” stores in, or directly accessible to, low-income neighborhoods. The clinics could be operated by or in partnership with the New York City Health and Hospitals Corporation.** While these clinics, described earlier, can be found in suburban and urban areas in many states, only five currently operate in New York City; clinics are located at four Duane Reade locations in Manhattan and CVS has one on Staten Island. CVS and other drug store chains with New York City outlets, such as Rite Aid and Walgreen’s, have clinics in some of their stores outside New York. Many of the retail clinic operators have announced ambitious plans for expansion in the coming years. Duane Reade, for example, plans to lease space for 40 to 50 additional clinics in its New York City stores.³³ CVS hopes to add 150 clinics statewide. These drugstore chains, which collectively operate hundreds of pharmacies throughout the five boroughs, have substantial untapped capacity to increase the number of retail clinics in New York City, including at store locations in or convenient to low-income neighborhoods.

Retail clinics should seek out partners—hospitals, primary care clinics, and private practitioners—that already offer a robust primary care model, that can offer the continuity needed, and that have the capacity for electronic information exchange.

The New York City Health and Hospitals Corporation (HHC), which has extensive experience treating patients with Medicaid and Medicare, as well as the uninsured and under-insured, could operate or partner with these clinics within New York City. In addition, HHC both runs a Medicaid Managed Care plan and directly provides health care. Because managed care is now mandatory for Medicaid recipients in New York State, a partnership with HHC would make the clinics part of its network, facilitating

³² According to *Laying the Foundation*, the indigent care pool “pays hospital-based clinics only about 40 cents to 50 cents for every dollar of free care, while pool funding allocated to D & TCs [Diagnostic & Treatment Centers] represents only about 20 cents of every dollar of care furnished.”

³³ Telephone conversation with the Office of the New York City Comptroller, August 29, 2007.

reimbursement. Thus by HHC's working with drug store chains, all of which have stores in low-income New York City neighborhoods, there is an exciting opportunity to create a public-private partnership and open a new access point for primary care in medically underserved neighborhoods.

Government oversight can ensure that retail clinics deliver quality care with an emphasis on the patient's having a regular medical home. State and City government should work with other stakeholders to put policies into place that promote those goals while recognizing that retail clinics are one means to increase access to affordable primary care, especially in neighborhoods where the prevalence of diabetes, heart disease, cancer and other serious health conditions are disproportionately high.

In addition, drug store chains should open more stores, with clinics, in low-income neighborhoods, particularly neighborhoods in the bottom income sixth with few chain drug stores such as East New York and Crotona-Tremont.

- **Medicaid and private insurers should reimburse providers for case management, self management, and information technology, which are not currently paid.** These have been shown to be highly effective in improving medical outcomes for persons with chronic illnesses and conditions, avoiding hospitalization and, ultimately, reducing costs. Case management is the effort needed to assure that the patient is receiving the care needed and to coordinate services among all providers. With self-management, patients not only are counseled what to do, but are assured a central role in determining their care, which fosters self-responsibility.

Combating diabetes and childhood asthma

- **Redouble current diabetes fighting efforts and expand public education campaigns aimed at reducing obesity and promoting healthy lifestyles.** To be sure, current City efforts to combat diabetes are ambitious. The Department of Health and Mental Hygiene Diabetes Prevention and Control Program is attacking the disease through prevention, improvement of quality of care, education, and surveillance. For example, the department's Diabetes Quality Improvement Collaborative works with clinics and hospitals in high-risk neighborhoods to improve care and treatment of people with diabetics, and the Primary Care Information Project is helping primary care providers in the South Bronx adopt electronic health records that make it easier to track and manage diabetes and will expand to other neighborhoods. The Department also has implemented programs such as the Healthy Bodegas Initiative and the Health Bucks program to increase the accessibility of healthy food, and the Shape Up New York family fitness program at parks, community centers and housing projects.

Nonetheless, as of 2005, the diabetes hospitalization rate for the three poorest sixths was the highest since at least 1995, and diabetes mortality rates, which in the bottom two sixths peaked in 2003, nevertheless remain well above the rates in 1995.

- **Create a statewide Diabetes Prevention and Management Task Force, as recommended by the Public Health Association of New York City.** At a forum on New York City diabetes policy in January 2007, Nicholas Freudenberg, President of the Public Health Association and Distinguished Professor of Public Health at Hunter College of the City University of New York, called current public, nonprofit and business efforts to combat diabetes "for the most part fragmented and piecemeal" and urged a "more comprehensive approach to diabetes prevention and management." The Task Force would involve representatives from all stakeholders, including but not limited to health departments, providers, schools, senior centers, and insurers.

One objective of the Task Force would be to ensure that everyone being treated for diabetes is part of a coordinated treatment program that involves counseling, including regular reminders to check blood sugar levels and the condition of their feet (a common complication of diabetes is poor circulation). Special outreach efforts are needed to reach persons who are not affiliated with an organization, such as a senior center or an after-school program, but who are at high risk for diabetes, to ensure that they are tested and receive any necessary treatment. Professor Freudenberg points to the coordination of efforts beginning in the 1980s to combat AIDS/HIV as a model for a coordinated diabetes prevention and management program.

- **Expand physical education in the schools to meet State requirements.** The New York State Education Department reports that in New York City, 24 percent of elementary school students are obese. According to the New York City Department of Health and Mental Hygiene, in 2004, 27 percent of children enrolled in Head Start programs in the city were obese and 15 percent were overweight. Nevertheless, most city public schools do not meet State physical education requirements: Not counting recess, schools must provide physical education daily in grades K to 3, at least three times a week in grades 4 to 6, and at least three times per week in one semester and two times a week in the other semester in grades 7 to 12. In many, if not most, elementary schools, physical education classes are held only once a week and some schools do not even have a gym. In many middle schools physical education is also provided only once a week.
- **Step up the battle against the underlying causes of asthma.** The City continues to expand its programs to improve asthma management and bring down hospitalization rates. For example, in May 2007 the City announced that it would open a new storefront asthma center in East Harlem, which will provide walk-in asthma screenings, referrals, and a training facility for medical providers. But more prevention will be the key to reducing the prevalence of asthma—not just asthma hospitalization rates. Outdoor and indoor environmental factors contribute to asthma by creating inflammation in the lungs. Some triggers can be reduced or eliminated:

Air pollution. Air pollutants, including sulfur dioxide, nitrogen oxide, particulate matter, and ground level ozone, can trigger asthma attacks. Ground level ozone is produced when motor vehicle emissions react with oxygen and sunlight. Particulate matter comes from factories and diesel engines. Nitrogen oxide is emitted from tailpipes and power plants.

The connection between air pollution and asthma was highlighted recently when the *New York Daily News* collected air pollution samples from sites across the city and found that the highest concentrations of ultra-fine particles produced by motor vehicles were in the Bronx, with one of the highest concentrations found in Hunts Point, an area with one of the highest childhood asthma hospitalization rates in the city.³⁴

Unhealthy housing. For example, one of the known asthma triggers, household mold, is exacerbated when chronic plumbing leaks allow moisture to build up within walls, causing mold to develop. A study published in 2005 found that the presence of mold odor more than doubled the chance that a child would develop asthma.³⁵ Mold can be ameliorated by repairing and rehabilitating plumbing systems. In addition, there also needs to be wider use of more environmentally-friendly pest management practices that reduce the need for harmful pesticides in homes. ■

³⁴ Jordan Lite, "Hard to breathe easy, City's worst asthma zones sniffed out," *Daily News*, June 17, 2007.

³⁵ J. Jaakkola, *Environmental Health Perspectives*, March 2005; vol. 113: pp 357-361.

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Appendix A

Methodology

For each year, 1990 to 2005, hospitalization and/or mortality rates for diabetes, cancer, heart disease, childhood asthma hospitalization, and infant mortality were reviewed for each of the 42 New York City neighborhoods as defined by the United Hospital Fund (UHF). For 1995 and for each year 2000 to 2005 rates of late or no prenatal care for the 42 neighborhoods were also reviewed. This data was provided by New York City DOHMH. Rates for diabetes, heart disease and cancer had been age adjusted.

In addition, for 1995 and annually for 2000 to 2005, the 42 neighborhoods were ranked by median household income as measured by the 2000 U.S. Census and divided into six groups of seven neighborhoods each. The six groups were then ranked by income. Hospitalization and mortality rates and late or no prenatal care rates for the neighborhoods comprising each sixth were averaged, after adjusting for differences in their populations, to produce population-weighted rates for each sixth.

The ranges of neighborhood median household income (2000 U.S. Census) for each sixth are as follows:

Bottom	\$17,031 to \$25,574
5 th Sixth	\$26,331 to \$31,781
4 th Sixth	\$33,998 to \$40,703
3 rd Sixth	\$41,335 to \$45,020
2 nd Sixth	\$45,288 to \$56,907
Top	\$57,597 to \$73,816

In addition, ambulatory care sensitive (ACS) condition hospital admission rates for diabetes, congestive heart failure and pediatric asthma-bronchitis were reviewed for the 42 neighborhoods for 1995, 2000 and 2005 and also compared by sixth. An ACS condition admission is defined as an admission of a patient up to age 64 that is considered to have been avoidable with effective primary care and early treatment.

Hospitalization rate comparisons

Hospitalizations per 100,000 people (“hospitalization rates”) and the total numbers of hospitalizations for each the 42 UHF neighborhoods were compared for 1990, 1995, 2000, and annually for 2000 to 2005 for diabetes, heart disease, cancer and childhood asthma. The DOHMH source for hospitalizations was the Statewide Planning and Research Cooperative System (SPARCS). It should be noted that SPARCS data counts the number of hospital discharges, not the number of individuals who were hospitalized in a year. Some individuals may have been hospitalized more than once.

Mortality rate comparisons

Age-adjusted deaths per 100,000 population and total numbers of deaths were analyzed by UHF neighborhood and neighborhood income sixths for diabetes, heart disease and cancer in the same manner as hospitalization rates and total numbers of hospitalizations. Infant mortality rates were deaths until the first birthday per 1,000 live births and also were compared among UHF neighborhoods and sixths.

Ambulatory care sensitive (ACS) condition admission comparisons

Ambulatory care sensitive conditions admissions data was obtained from Infoshare¹ for diabetes, pediatric bronchitis/asthma and congestive heart failure and analyzed by sixth in the same manner as hospitalizations and deaths. Infoshare compiles its ACS statistics based on the listing of conditions produced by the Health Systems Agency of New York City for its studies of hospital utilization.

¹ The Infoshare Community Data System is sponsored by Community Studies of New York, Inc., a non-profit corporation based in New York City.

Appendix B

UHF Neighborhood Zip Codes, Median Household Income and Income Sixths (2000 U.S.Census)

UHF Neighborhood	Zip Code Area	Income sixth	Median Household Income, Dollars
BRONX			
Hunts Point–Mott Haven	10454, 10455, 10459, 10474	6 th	17036
High Bridge–Morrisania	10451, 10452, 10456	6 th	18960
Crotona–Tremont	10453, 10457, 10460	6 th	20015
Fordham–Bronx Park	10458, 10467, 10468	5 th	26331
Pelham–Throgs Neck	10461, 10462, 10464, 10465, 10472, 10473	4 th	33998
Northeast Bronx	10466, 10469, 10470, 10475	4 th	39658
Kingsbridge–Riverdale	10463, 10471	2 nd	45975
BROOKLYN			
Williamsburg–Bushwick	11206, 11221, 11237	6 th	21160
East New York	11207, 11208	5 th	25574
Bedford Stuyvesant–Crown Hts.	11212, 11213, 11216, 11233, 11238	5 th	26514
Greenpoint	11211, 11222	5 th	27205
Sunset Park	11220, 11232	5 th	29754
Coney Island–Sheepshead Bay	11223, 11224, 11229, 11235	5 th	31375
Borough Park	11204, 11218, 11219, 11230	5 th	31781
East Flatbush–Flatbush	11203, 11210, 11225, 11226	4 th	34194
Bensonhurst–Bay Ridge	11209, 11214, 11228	4 th	40307
Canarsie–Flatlands	11234, 11236, 11239	3 rd	44113
Downtown–Heights–Slope	11201, 11205, 11215, 11217, 11231	2 nd	48476
MANHATTAN			
East Harlem	10029, 10035	6 th	20111
Central Harlem–Morningside Hts.	10026, 10027, 10030, 10037, 10039	6 th	21755
Washington Heights–Inwood	10031, 10032, 10033, 10034, 10040	5 th	27693
Union Square–Lower East Side	10002, 10003, 10009	3 rd	41335
Chelsea–Clinton	10001, 10011, 10018, 10019, 10020, 10036	2 nd	52977
Greenwich Village–Soho	10012, 10013, 10014	1 st	57597
Upper West Side	10023, 10024, 10025	1 st	65038
Lower Manhattan	10004, 10005, 10006, 10007, 10038, 10280	1 st	68355
Gramercy Park – Murray Hill	10010, 10016, 10017, 10022	1 st	69575
Upper East Side	10021, 10028, 10044, 10128	1 st	73816
QUEENS			
Rockaway	11691, 11692, 11693, 11694, 11695, 11697	4 th	35000
Long Island City–Astoria	11101, 11102, 11103, 11104, 11105, 11106	4 th	36078
West Queens	11368, 11369, 11370, 11372, 11373, 11377, 11378	4 th	38487
Jamaica	11412, 11423, 11432, 11433, 11434, 11435, 11436	3 rd	42106
Ridgewood–Forest Hills	11374, 11375, 11379, 11385	3 rd	43833
Southwest Queens	11414, 11415, 11416, 11417, 11418, 11419, 11420, 11421	3 rd	44672

UHF Neighborhood	Zip Code Area	Income sixth	Median Household Income, Dollars
QUEENS (cont.)			
Flushing–Clearview	11354, 11355, 11356, 11357, 11358, 11359, 11360	3 rd	45020
Fresh Meadows	11365, 11366, 11367	2 nd	49959
Southeast Queens	11004, 11005, 11411, 11413, 11422, 11426, 11427, 11428, 11429	2 nd	56405
Bayside–Little Neck	11361, 11362, 11363, 11364	2 nd	56907
STATEN ISLAND			
Port Richmond	10302, 10303, 10310	3 rd	43902
Stapleton–St. George	10301, 10304, 10305	2 nd	45288
Willowbrook	10314	1 st	59560
South Beach–Tottenville	10306, 10307, 10308, 10309, 10312	1 st	62250

Appendix C

Hospitalization rates by neighborhood income sixths, 1995 and 2000-2005 Each sixth contains seven UHF neighborhoods

Table C1. Diabetes hospitalizations per 100,000 population, age-adjusted

Sixth	Year							Percentage change in rate		
	1995	2000	2001	2002	2003	2004	2005	1995-2000	2000-2005	1995-2005
Bottom	482.47	557.80	568.12	620.68	670.15	684.39	686.63	15.6	23.1	42.3
5 th	263.72	289.14	298.43	309.21	324.31	335.39	341.73	9.6	18.2	29.6
4 th	206.19	228.13	231.51	234.31	261.48	269.68	272.69	10.6	19.5	32.3
3 rd	202.46	217.19	233.49	235.7	230.89	243.89	238.71	7.3	9.9	17.9
2 nd	217.52	237.26	223.93	234.19	248.97	251.54	251.53	9.1	6.0	15.6
Top	124.61	116.4	125.41	122.79	137.38	122.23	125.24	-6.6	7.6	0.5

Table C2. Heart disease hospitalizations per 100,000 population, age-adjusted

Sixth	Year							Percentage change in rate		
	1995	2000	2001	2002	2003	2004	2005	1995-2000	2000-2005	1995-2005
Bottom	1632.38	1761.54	1758.33	1819.39	2022.93	2158.93	2125.27	7.91	20.65	30.19
5 th	1331.48	1388.63	1436.04	1438.21	1489.95	1557.82	1559.83	4.29	12.32	17.15
4 th	1210.68	1265.69	1280.60	1272.94	1349.46	1388.57	1336.37	4.54	5.58	10.38
3 rd	1242.87	1345.48	1368.10	1367.31	1359.07	1392.47	1373.16	8.25	2.06	10.48
2 nd	1211.71	1299.23	1329.30	1286.56	1136.77	1387.04	1333.69	7.22	2.65	10.07
Top	1003.29	1054.41	1080.32	1080.44	1140.35	1130.68	1078.69	5.09	2.30	7.51

Table C3. Cancer hospitalizations per 100,000 population, age-adjusted

Sixth	Year							Percentage change in rate		
	1995	2000	2001	2002	2003	2004	2005	1995-2000	2000-2005	1995-2005
Bottom	601.13	603.97	565.18	573.04	630.17	648.19	636.58	0.5	5.4	5.9
5 th	577.56	533.76	529.50	511.52	577.84	534.67	533.29	-7.6	-0.09	-7.6
4 th	568.73	529.63	505.18	495.31	518.00	517.70	502.61	-6.9	-5.1	-11.6
3 rd	563.06	523.60	515.89	495.53	505.40	502.81	497.75	-7	-4.94	-11.6
2 nd	591.73	534.99	539.65	515.12	551.25	543.03	527.58	-9.6	-1.38	-10.8
Top	592.74	539.19	531.15	515.20	522.71	534.69	516.78	-9.0	-4.16	-12.8

Table C4. Childhood asthma hospitalizations per 100,000 population

Sixth	Year							Percentage change in rate		
	1995	2000	2001	2002	2003	2004	2005	1995-2000	2000-2005	1995-2005
Bottom	1787.16	990.64	1017.71	974.80	1211.24	1093.27	939.47	-44.6	-5.2	-47.4
5 th	820.09	445.76	427.28	445.11	529.98	478.39	366.51	-45.6	-17.8	-55.3
4 th	739.27	509.23	511.24	505.33	580.20	507.60	445.42	-31.1	-12.5	-39.7
3 rd	620.38	394.55	410.47	411.09	480.97	426.90	348.58	-36.4	-11.6	-43.8
2 nd	689.01	433.23	415.04	390.88	458.42	408.68	323.06	-37.1	-25.4	-53.1
Top	349.32	219.20	210.19	213.32	262.55	210.99	226.81	-37.2	3.5	-35.1

Appendix D

Mortality rates by neighborhood income, 1995 and 2000-2005

Each sixth contains seven UHF neighborhoods.

Table D1. Diabetes deaths per 100,000 population, age-adjusted

Sixth	Year							Percentage change in rate		
	1995	2000	2001	2002	2003	2004	2005	1995-2000	2000-2005	1995-2005
Bottom	49.5	54.3	47.5	46.1	55.8	49.3	51.2	9.68	-5.68	3.44
5 th	21.3	27.4	25.1	23.3	27.1	24.4	25.5	29.02	-7.24	19.67
4 th	20.8	19.3	20.8	21.2	21.6	21.1	23.9	-7.10	23.68	14.89
3 rd	17.1	20.2	18.2	20	23.2	18.7	19.3	17.95	-4.62	12.51
2 nd	19.1	25.1	25.1	22.5	20.6	18.9	18.2	31.53	-27.53	-4.67
Top	13.9	12.7	12.6	13.4	13.1	13	14.8	-8.75	16.54	6.35

Table D2. Heart disease deaths per 100,000 population, age-adjusted

Sixth	Year							Percentage change in rate		
	1995	2000	2001	2002	2003	2004	2005	1995-2000	2000-2005	1995-2005
Bottom	342.5	315.3	315.2	304.3	304.3	313.9	306.4	-7.95	-2.82	-10.54
5 th	377.1	308.3	300.9	315.1	309.6	292.9	298.2	-18.24	-3.24	-20.90
4 th	363.3	327.9	316.9	325.1	313.4	293.9	284.0	-9.73	-13.40	-21.83
3 rd	353.6	308.5	300.2	301.7	296.7	277.3	273.2	-12.75	-11.46	-22.75
2 nd	325.7	307.2	297.8	294.3	284.2	266.6	274.0	-5.68	-10.81	-15.87
Top	325.0	270.2	268.1	271.0	264.9	249.3	258.7	-16.86	-4.25	-20.39

Table D3. Cancer deaths per 100,000 population, age-adjusted

Sixth	Year							Percentage change in rate		
	1995	2000	2001	2002	2003	2004	2005	1995-2000	2000-2005	1995-2005
Bottom	203.3	210.4	215.9	201.8	198.9	203.9	210.1	3.47	-0.17	3.30
5 th	182.8	172.7	171.4	164.8	163.8	155.5	150.5	-5.55	-12.85	-17.69
4 th	165.1	152.6	160.2	150.0	155.5	148.7	146.7	-7.54	-3.85	-11.11
3 rd	173.5	157.1	153.3	148.2	150.8	156.5	144.1	-9.44	-8.30	-16.96
2 nd	173.9	162.5	165.4	158.8	156.4	159.6	153.1	-6.56	-5.78	-11.96
Top	185.3	169.2	167.6	176.4	176.5	167.1	175.7	-8.70	3.87	-5.16

Table D4. Infant mortality per 1,000 live births

Sixth	Year							Percentage change in rate		
	1995	2000	2001	2002	2003	2004	2005	1995-2000	2000-2005	1995-2005
Bottom	11.7	7.9	6.8	7.437	8.448	7.228	7.2	-32.16	-9.32	-38.49
5 th	7.6	6.2	5.8	5.649	6.044	5.662	5.3	-18.58	-14.91	-30.72
4 th	7.6	6.7	5.9	6.363	6.108	6.996	5.7	-11.15	-15.56	-24.98
3 rd	6.4	5.3	4.9	4.768	5.639	5.568	5.7	-18.17	8.20	-11.46
2 nd	6.9	8.1	5.2	6.659	na	5.633	4.3	16.71	-46.42	-37.46
Top	4.0	3.4	2.9	na	na	3.359	4.1	-15.92	22.21	2.75

Appendix E

Ambulatory care sensitive (ACS) condition admissions by neighborhood income sixth, 1995-2005

Table E1. Diabetes admissions per 100,000 population

	1995	2000	2005	1995-2005
Bottom	167.2	201.4	227.0	+35.8%
5th	84.0	96.7	120.1	+43.1%
4th	68.5	80.8	100.3	+45.5%
3rd	71.8	77.5	87.4	+21.7%
2nd	77.8	86.8	97.4	+25.1%
Top	36.0	38.0	38.0	-5.6%

Table E2. Congestive heart failure admissions per 100,000 population

	1995	2000	2005	1995-2005
Bottom	207.8	215.7	248.8	+19.7%
5th	114.7	112.9	134.6	+17.4%
4th	86.5	91.0	103.2	+19.2%
3rd	78.3	85.1	97.4	+24.4%
2nd	89.5	90.8	97.9	+9.4%
Top	52.0	48.3	48.0	-7.8%

Table E3. Pediatric bronchitis/asthma, ages 0-4, admissions per 1,000 population

	1995	2000	2005	1995-2005
Bottom	49.3	31.6	29.3	-38.1%
5th	23.8	15.4	12.3	-48.5%
4th	20.4	18.2	14.4	-29.6%
3rd	17.3	16.2	13.7	-20.4%
2nd	18.7	13.8	11.2	-40.4%
Top	9.2	7.7	8.5	-7.7%