DEPARTMENT
OF HEALTH
The City of New York

Health Profile of Cancer, Asthma, and Childhood Lead Poisoning In Greenpoint / Williamsburg

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EXECUTIVE SUMMARY

This is the first of two reports. It summarizes data on cancer, asthma, and childhood lead poisoning among citizens living in Greenpoint/ Williamsburg. It was carried out as part of Phase I of the Greenpoint/Williamsburg Community Environmental Benefits Program. Phase I requires that existing health data be gathered and analyzed. The diseases discussed here were chosen based on citizens' concerns and on general scientific knowledge that they may be the result of environmental exposures --although there may be other causes as well. The report was compiled by New York City Department of Health (NYCDOH) with assistance from the CUNY Medical School.

Information on cancer and asthma was analyzed in order to determine whether there were unusually high rates of these diseases in Greenpoint/Williamsburg compared to other neighborhoods in New York City. Cases of childhood lead poisoning were mapped by address.

Results showed that the incidence of most types of cancer in Greenpoint/Williamsburg was similar to or lower than that of the City as a whole. The incidence of cancers of the colon, pancreas, lymph system, bladder, breast (among women) and prostate (among men) and of all cancers combined (among men and women) was among the lowest in the City. However, the incidence of certain types of leukemia in children and male adults, and stomach cancer among adult males and females was among the highest. Asthma hospital discharge rates were similar to City averages in some parts of the district, but elevated in sections with lower median family income (Williamsburg/Bushwick). Two hundred and two cases of childhood lead poisoning were reported to NYCDOH between 1979 and 1990 in Greenpoint/ Williamsburg. Cases were generally concentrated in the very northern, southeastern and southwestern part of the District.

Additional analysis is currently underway which will examine the following: 1) the incidence of birth defects in Greenpoint/ Williamsburg compared to the incidence in the rest of, the City and in other health districts; 2) the incidence of cancer and birth defects in Greenpoint/ Williamsburg by census tract; 3) asthma among Woodhull patients by census tract; 4) case investigations of childhood lead poisoning in Greenpoint/ Williamsburg. The results from these analyses will be presented in a future report. The purpose of the analysis by census tract is to evaluate whether there are any 'pockets' or 'clusters' of disease within the community. If any unusual disease clusters are detected, further investigation directed toward assessing possible common causes of these diseases could be warranted.

This report does not examine the relationship between disease rates and environmental pollution in Greenpoint/ Williamsburg. In accordance with Phase I of the Work Plan, only existing health data was to be compiled and analyzed. Existing data sources on cancer and asthma contained no information on individual causes of disease or environmental exposures. Therefore, the likelihood that environmental exposures in the community were associated with disease could not be assessed.

ACKNOWLEDGEMENTS

BACKGROUND AND OBJECTIVES

This health profile was compiled as part of the Greenpoint/
Williamsburg Environmental Benefits Program. The program is part
of the response to a Consent Order with the New York State
Department of Environmental Conservation resulting from permit
violations at the Newtown Creek Water Pollution Control Plant.
This facility is operated by the New York City Department of
Environmental Protection (DEP).

As part of Phase I of the program, which is to compile and
review existing environmental and health data, the New York City
Department of Health (NYCDOH) analyzed existing health data
pertaining to residents of Community Board One, the Greenpoint/
Williamsburg Health District.

The objectives of this phase of the project are:

- to identify diseases which might be related to the
  environment and were of concern to the citizens of
  Greenpoint/Williamsburg and obtain available
  information about them;

- to examine patterns of disease in Greenpoint/
  Williamsburg and compare them with those of other New
  York City neighborhoods and the City as a whole; and

- to explore whether there are any clusters of unusually
  high incidence of disease within Greenpoint/
  Williamsburg. By incidence we mean number of new cases
  of disease within a certain time period. A cluster
  means a situation where there appears to be an
  unusually large number of cases in a small area.

This project was carried out to provide information on
patterns of disease in Greenpoint/Williamsburg. Such information
can be useful in determining whether public health measures or
further study of the health effects of environmental exposures
would be warranted, and, if so, to suggest diseases and exposures
issues to be examined by the study.

This report does not examine the relationship between
disease rates and environmental pollution in Greenpoint/
Williamsburg because existing data sources on cancer and asthma
contained no information on individual causes of disease or
environmental exposures. (In accordance with Phase I of the Work
Plan, existing health data were required to be compiled and
analyzed.) Therefore, the likelihood that disease was associated
with environmental exposures in the community could not be
assessed. However, by examining geographic patterns of disease,
it is sometimes possible to obtain clues about environmental
factors that may be causing disease.

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METHODS

1.   Criteria for Selection of Diseases for Review

Four conditions were chosen for analysis as part of Phase I of the project: selected cancers, asthma, birth defects, and lead poisoning. This report presents analysis of cancer incidence, asthma, and childhood lead poisoning. Additional analyses will be contained in a future report.

These conditions were selected because:

• Citizens were concerned that there might be a high incidence of these in the community and that they could be related to factors in the environment.

• They have been linked with environmental or occupational exposures (although they can also be caused by a variety of genetic and lifestyle factors).

• Data on their occurrence already existed and was available to the NYCDOH.

2. Background Information on the Conditions Included in this Study

This section contains information on the three conditions (cancer, asthma, and lead poisoning) selected for this report. A description of risk factors for each condition is presented below and also summarized in Tables 1 and 2. A risk factor is an exposure or personal attribute or characteristic that increases the chances of a person to develop a particular health problem.

A. Cancer

Cancer is really a group of different diseases, sharing a common characteristic: the uncontrolled growth (or proliferation) of cells. It has been estimated that 80 percent or more of all cancers are caused by conditions outside of a person (e.g. non-genetic factors). These include factors present in the human environment, such as air and water pollution and work place exposures, as well as lifestyle factors, such as food, alcohol, and cigarette smoke (see Table 1). Sometimes, cancer may result from a combination of exposures. For example, a person who works with or near asbestos has an increased chance of developing cancer, as does a person who smokes. However, if a person works

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with asbestos and also smokes, the risk of cancer is especially great, with the effect of the combination of the two being much larger than the simple addition of the two separate effects.

Many of the above mentioned risk factors for cancer were identified through population-based studies. In examining groups of people with similar exposures (e.g., workers exposed to asbestos), it is possible to detect certain patterns of disease associated with particular exposures. Population-based studies, in conjunction with laboratory studies, provided critical information on understanding the epidemiology of certain types of cancer.

B. Asthma and Other Respiratory Diseases

Numerous types of non-malignant (non-cancerous) lung diseases have been associated with exposure to air pollution in communities and work places. These diseases include asthma, chronic obstructive lung disease (COPD), bronchitis, and allergic alveolitis. This report focusses on asthma. Once a person has developed asthma, exposures in the home, work place, and general environment can trigger an asthma 'attack'. Exposures that have been associated with asthma include: certain foods, drugs, pollen, fur, formaldehyde, dust, and combustion products from the burning of fuel and other materials.

C. Lead Poisoning

The New York City Health Code requires that all cases of lead poisoning be reported to the Health Department. Reports of lead poisonings are made to NYCDOH by laboratories, physicians, and health care facilities.

At the time data for this study was gathered a case of lead poisoning was defined as a blood lead level of 25 micrograms per deciliter (mcg/dl) or greater. The criteria for defining a case of lead poisoning have changed over time as new scientific information has been gathered showing adverse effects at lower and lower levels. As evidence of these changes, lead poisoning was defined as a blood lead level of 40 mcg/dl or greater between 1975 and 1980, 30 mcg/dl from 1981 to 1984, and 25 mcg/dl until November 1992. In recognition of recent studies documenting adverse health effects in children at blood lead levels as low as 10 mcg/dl, the US Centers for Disease Control recommended in 1991 that the goals of all lead poisoning prevention activities should be to reduce blood lead levels to below this level. In accordance with these guidelines, NYCDOH's reporting requirements are now at 10 mcg/dl or above.

According to environmental investigations conducted by NYCDOH Bureau of Lead Poisoning Control, the vast majority of lead poisoning cases in children result from the ingestion of lead-containing paint chips and dust from deteriorating paint in the home. However, there are other potential sources of lead exposure, such as lead emissions from factories and lead dust from demolition or renovation of lead-painted structures. Lead from these sources can be deposited on surfaces (especially soil), where children may play and swallow or inhale lead dust. In the past, exhaust from cars that used lead-containing gasoline was of particular concern. However, since the change in federal regulation on leaded gasoline, this source of exposure has become much less important. Small amounts of lead can also be found in water, food, air, and certain pottery and glazes.

3.   Sources of Data

The sources of information on patterns of illness and asthma among Greenpoint/Williamsburg residents are described below. It should be noted that, with the exception of childhood lead poisoning, most of these sources only provide information about illnesses; there was no information available for this report on possible or actual exposures to environmental hazards.

A. Cancer Incidence

The New York City Department of Health (NYCDOH) obtained cancer incidence data (that is, new cases of cancer) from the Cancer Registry of the New York State Department of Health (NYSDOH). All medical facilities must report new cases of cancer to the Registry. The completeness and accuracy of the Registry's information is dependant upon these reports. Surveys conducted by the NYSDOH's Bureau of Cancer Epidemiology have concluded that cancer reporting for the City is more than 95 percent complete.

Data were obtained for all new cases of cancer which occurred between 1978 and 1987 among people living in Greenpoint/ Williamsburg at the time of diagnosis. These years were selected for analysis because they are the years for which the Registry's case listing is complete. Cancer cases occurring in New York City began being reported to the Registry in 1973. However, it took several years before reporting became institutionalized. There is usually also a lag time of several years before complete information on new cases is available. At the time of our data request, information on cancer cases occurring after 1987 was not considered to be complete.

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Population data (numbers of boys, girls, men, and women living in the City and in each health district) with which numbers of cancer cases were compared were obtained from the 1980 Census.

B. Asthma Hospitalizations

Information on persons with asthma was obtained from the New York State Department of Health Statewide Planning and Research Cooperative System (SPARCS). SPARCS contains information on persons who were discharged from hospitals in New York State. This system does not include information on individuals who do not seek medical treatment or who go to a private physician, clinic or emergency room for treatment. Unfortunately, there is no system for keeping track of all persons with asthma.

The New York City Health and Hospitals Corporation, Office of Strategic Planning, analyzed asthma discharge information from the SPARCS database for the period 1985 through 1988 for all hospitalizations in New York City. This analysis was made available to the NYCDOH and incorporated into this study.

C. Lead Poisoning Cases

Information on lead poisoned children living in Greenpoint/Williamsburg was obtained from the NYCDOH Bureau of Lead Poisoning for the years 1979 to 1990.

5. Analysis

Information on cancer, lead poisoning, and asthma is presented in the following manner:

1) number of cases of cancer and lead poisoning occurring in Greenpoint /Williamsburg

2) incidence rates for cancer in Greenpoint/ Williamsburg, compared to incidence rates of New York City as whole and to incidence rates of other health districts

3) hospital discharge rates for patients from Greenpoint/ Williamsburg zip codes hospitalized due to asthma compared to asthma discharge rates City-wide

4) childhood lead poisoning cases in Greenpoint/ Williamsburg mapped by address.

In a future report, incidence rates for birth defects in Greenpoint/Williamsburg will be compared to incidence rates in the rest of the City combined and to incidence rates of other health districts. In addition, data on cancer and birth defects in Greenpoint/ Williamsburg and asthma among Woodhull patients from Greenpoint/ Williamsburg will be analyzed and mapped by census tract. Finally, analysis on cases of childhood lead poisoning in Greenpoint/ Williamsburg will also be presented.

A. Cancer Incidence

Cancer incidence is the number of new cases of cancer that occur during a specific time period (for example, each year) among a specific population (for example, people living in Greenpoint/ Williamsburg). By knowing the number of new cases of cancer that occur among a certain number of people, the cancer incidence rate can be calculated. Cancer incidence rates are usually expressed in terms of the number of new cancers per 100,000 population. With incidence rates, cancer occurrence among different groups of people can be compared in order to determine whether certain groups have unusually high cancer incidence.

Cancer incidence was analyzed separately for children and adults, because there are very different patterns in terms of the types and rates of cancer between the two groups. Among children, most types of cancer are extremely rare. The most common childhood cancers are leukemias, nervous system cancers, and lymphomas; these were selected for analysis. Among adults, the following types of cancers were analyzed: pharynx, stomach, colon, pancreas, lung, prostate, bladder, kidney, liver, nervous system, breast, lymphatic system and leukemia. For each case of cancer, information on the patient's age, sex, race and ethnicity, type of cancer, year of diagnosis, and census tract and health district of residence at the time of diagnosis was obtained.

To determine whether the incidence of cancer was unusually high in Greenpoint/Williamsburg, two types of comparisons were done: with cancer incidence in New York City as a whole, and with all other health districts in New York City.

To compare the incidence of cancer in Greenpoint/ Williamsburg with the incidence in all of the City, the numbers of cases of each type of cancer occurring there were added up (the actual or "observed" cases). Then, the number of cancer cases which would have been expected to have occurred in the Greenpoint/Williamsburg health district if residents of this neighborhood had exactly the same risk (or rate of incidence) of cancer as the residents of the City, taking their age, sex, and race into account (the "expected" cases), were computed. This

was done separately for each gender group, and for adults and children (ages 0-14), because certain types of cancer are more common in men than in women (e.g. colon cancer), or in women than in men (e.g. breast cancer, which occurs very rarely in men) In addition, the chances of developing cancer generally increase as people age.

The expected number of cases was compared with the actual or observed number by dividing the observed number by the expected number. The result of this comparison is called the relative risk (RR). A relative risk estimates a person's chances or risk of developing cancer among one group of people, compared with a person's chances of developing cancer among another group of people. In this study, it is the risk of developing cancer experienced by Greenpoint/Williamsburg residents, compared with the risk of all New Yorkers. If the relative risk is near 1.00, it means that the actual and expected numbers of cancers are the same, and that the risk of getting a particular type of cancer among residents of Greenpoint/Williamsburg is similar to the risk among residents of New York City as a whole. If the relative risk is less than 1.00, it means that the actual number is lower than expected. If the relative risk is higher than 1.00 it means that the actual number of cases in Greenpoint/ Williamsburg is higher than expected, compared with the cases of the whole City.

Epidemiologic studies in which two or more communities are compared can provide only estimates of relative risk, rather than an exact measurement of the true excess or risk. Although certain differences among communities (e.g., race, sex, and age) can be taken into account when calculating risk estimates, others, e.g., genetic makeup and individual exposures that also determine a person's risk of cancer, cannot be controlled. Therefore, when we compare the rate of disease in one community with the rate of disease in another community, some portion of the difference is due to chance.

In studies involving relatively small populations, such as in Greenpoint/Williamsburg, these risk estimates are also less precise than they are among very large populations, because cancer is a relatively rare disease. Even for the most common types, incidence rates are low. For example, among men, about 72 new cases of lung cancer and 22 new cases of prostate cancer per 100,000 men occur each year in the United States. In a small population, no cases or only one case may occur, and it is difficult to draw conclusions from such small numbers.

Statisticians have derived a way of accounting for the 'inexactness' of risk estimates with confidence intervals. Confidence intervals are a range of values, within which we can say with a certain degree of confidence or certainty the true relative risk lies. The wider the range of values, the more confident we can be that the true relative risk lies somewhere

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between the upper and lower points of the confidence interval. The smaller a population and the rarer a disease, the wider a confidence interval for a certain relative risk will be. Rates for a rare disease may vary greatly between two communities, yet the difference may, statistically speaking, not be significant. In other words, the difference may not signify the presence of a special risk factor in one and the absence of the same risk factor in the other community.

For example, when we calculate the relative risk for a cancer as 1.18, with a 95% confidence interval of 0.94-1.45, we mean that the best single estimate for the relative risk is 1.18, and we are 95 percent sure that the true number is between 0.94 and 1.45. Since the relative risk of 1.00 is included within the 95% confidence interval of 0.94-1.45 (signifying neither an increased nor decreased relative risk), we cannot rule out the possibility that the relative risk for that particular type of cancer is no different than the City as a whole. On the other hand, because the 95% confidence interval for stomach cancer among men is 1.09-1.55, the lower bound being higher than 1.0, we are 95 percent confident that the relative risk for this stomach cancer among males in Greenpoint/Williamsburg is higher than that of the City.

To compare the cancer incidence in Greenpoint/Williamsburg with that of the 29 other health districts in the City, the observed and expected numbers of cases in each health district were determined. The relative risk for each health district compared to the City as a whole was calculated. Then, all the health districts including Greenpoint/Williamsburg were ranked, depending on how they compared with the City as a whole. The district that had the highest risk for a certain cancer compared to the City, was ranked first (as #1) for that particular cancer. The district that had the lowest risk was ranked last (as #30).

B. Asthma

The rate of asthma hospitalization per 1,000 population was calculated for every zip code in New York City. This made it possible to compare asthma hospitalization rates for the zip codes in Greenpoint/Williamsburg with the rates in other zip codes. It should be noted, however, that there is not a direct correspondence between the Greenpoint/Williamsburg Health District and zip code boundaries. Specifically, there are only two zip codes which fall completely within the boundaries of Greenpoint/Williamsburg (11211 and 11222) and two which are only partially within this district (11206 and 11237). The geographic boundaries are shown in Figure 1.

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For the purpose of ranking, asthma discharge rates were divided into five equal groups, from top fifth, or highest 20% to bottom fifth, or lowest 20%. Previous studies have found a correlation between increasing hospital discharge rates and decreasing income. Therefore, in this study, median income (the income level at which half of the population has a lower income and half has a higher income) was also calculated for each zip code. Median income levels were also divided into five equal groups or quintiles.

C. Lead Poisoning

For this analysis, all cases of childhood lead poisoning reported to NYCDOH from Greenpoint/Williamsburg during the years 1979-1990 were identified and mapped by address.

In a second step, we will examine the results of environmental investigations conducted by the NYCDOH Bureau of Lead Poisoning Control of each case. These investigations are primarily focused on determining whether there is peeling lead-based paint in the child's residence or other location where the child spends time.

1. Cancer in Children

Information on childhood cancers for the ten year period from 1978 - 1987 is shown in Tables 3A and 3B. Among the types of childhood cancer which were analyzed, a total of 26 cancers occurred in girls and 44 cancers occurred in boys living in Greenpoint/Williamsburg between 1978 and 1987. The most common type of cancer was acute lymphocytic leukemia (ALL) (12 boys and 6 girls). This is also the most common type of childhood cancer in the City, State, and Country. In fact, 30 percent of all childhood cancer cases are leukemia, with ALL comprising about 80 percent of these.

Among boys living in Greenpoint/Williamsburg, several types of cancer ranked near the highest among all City health districts, and the relative risk for the community appeared to be at least 50 percent greater than for the City as a whole. These types of cancer were: nervous system cancers (9 cases; ranked #3 among 30 health districts); ALL (12 cases; ranked #2); and acute myelogenous leukemia (AML)(3 cases; ranked #4). The relative risk for all types of leukemia combined was 1.76, or approximately 76 percent higher than the rate for New York City as a whole. The relative risk for all types of leukemias among girls was slightly elevated. This entire excess came from four cases in the category of other/unspecified leukemia.

2. Cancer in Adults

The incidence of cancers in adults living in Greenpoint/ Williamsburg is shown in Tables Four and Five. The number of cancers varied, depending on the type. In men, the most common types were: lung, prostate, and colon cancer. In women, the most common types were breast, colon, and lung cancer. These patterns are very similar to patterns in the rest of the City, State, and Country.

Among men, for most types of cancer, the incidence rates were similar to those of New York City as a whole. This is indicated by the value of the relative risk -- most of the values for different types of cancers were very close to 1.00. The cancers with the lowest relative risk (RR) were cancers of the prostate (RR=0.73; ranked #30 out of 30 health districts) and the bladder (RR=0.75; also ranked #30). Among all thirty health districts, Greenpoint/Williamsburg also ranked among the lowest for cancers of the lymphatic system (RR=0.84; ranked #29) and colon (RR=0.89; ranked #28). When all cancers reported to the Cancer Registry were combined and compared, men from Greenpoint/ Williamsburg also ranked low (RR=0.93; ranked #28).

The cancers with the highest relative risk (RR) among men were stomach cancer (RR-1.30, 95% confidence interval 1.09-1.55; ranked #1); chronic myelogenous leukemia (CML) (RR=1.43 95% confidence interval 0.80-2.36; ranked #2); acute myelogenous leukemia (AML) (RR=1.37, 95% confidence interval 0.88-2.04; also ranked #2); and lung cancer (RR 1.12, confidence interval 1.02-1.22; ranked #8). The overall relative risk for leukemia among men was 1.08, with a 95% confidence interval of 0.83-1.36, ranked #8.

From looking at the 95% confidence intervals around each relative risk, it can be learned that although a relative risk for a certain cancer may be among the highest in the City, it still does not differ significantly from the risk of the City as a whole and from the relative risks of all other health districts. In fact, only the confidence intervals around the relative risks for stomach cancer and lung cancer do not include the relative risk of 1.00 and therefore, only for stomach and lung cancer, we can be 95 percent certain, that the elevation for stomach and lung cancer are of statistical significance.

Among women, most of the relative risks were also either slightly above or below 1.00 (range: 0.70 to 1.18). The cancers with the lowest relative risks were cancers of the pharynx or throat (RR=0.70; ranked #30); colon (RR=0.74; ranked #30); breast (RR=0.75; ranked #30); and nervous system (RR=0.81; ranked #27). When all cancers were combined, women in Greenpoint/Williamsburg also ranked low (RR=0.88; ranked #29). The highest relative risks among women were for stomach cancer (RR=1.18, 95% confidence interval 0.94-1.45; ranked #1) and pancreatic cancer (RR=1.17, 95% confidence interval 0.94-1.43; ranked #3). However, although women ranked highest for stomach and pancreatic cancer, the confidence intervals around the relative risks for these cancers include the relative risk of 1.00, and therefore it can be said that rates for stomach and pancreatic cancer in Greenpoint/ Williamsburg do, statistically speaking, not differ significantly from the rates in the City as a whole and from the rates in all other health districts.

3. Asthma

Figures 2 and 3 and Table 5 show the asthma discharge rates by zip code and median income for Greenpoint/Williamsburg and the City as a whole. Asthma discharge rates in Greenpoint/Williamsburg varied in different parts of the Community (as measured by zip codes). The discharge rate for zip code 11222 was in the middle quintile, therefore close to the City's average. The discharge rate for 11211 was in the second highest quintile (top 40%). The two zip codes 11206 and 11237 that are only partially overlapping with Greenpoint/ Williamsburg were both in the top quintile (top 20%) of the City.

4. Lead Poisoning Cases

        Between the years 1979 - 1990, 202 cases of childhood lead
poisoning in Greenpoint/Williamsburg were reported to the New
York City Department of Health. The cases are mapped by
addresses in Figure 4. The map shows cases in both, the southern
and northern parts of the district.

DISCUSSION AND NEXT STEPS

The following summarizes the findings and next steps in this phase of the project:

1.   Cancer

There is no consistent pattern of cancer incidence in Greenpoint/Williamsburg compared to the rest of New York City. For most types of cancer, the rates in Greenpoint/Williamsburg are lower than in the City as a whole. These include all cancers combined among men and women; cancers of the prostate, bladder, lymphatic system, and colon among men; and cancers of the pharynx or throat, colon, breast, and nervous system among women. The highest cancer rates were for stomach cancer, certain types of leukemia (in men), and pancreatic cancer (in women). For children, there were elevated rates of nervous system cancers, certain leukemias, and all leukemias combined among boys. The rate for the group of unspecified and other leukemias was elevated among girls.

Although this study was not designed to examine causes of cancer, the finding of elevated rates of certain cancers leads to consideration of the known or suspected risk factors for those cancers. One of the biggest known risk factors for stomach cancer is eating certain types of food. People who eat diets high in smoked and salted food have higher rates of stomach cancer. People who eat a lot of greens and other vegetables have lower rates of stomach cancer. Since many ethnic groups have unique dietary patterns, and foods, such as smoked and cured meat, eaten by certain groups are associated with stomach cancer, it has been found that stomach cancer rates are higher in certain ethnic groups. In addition, alcohol abuse, cigarettes, and chewing tobacco are associated with stomach cancer. There is also some evidence that stomach cancer occurs more frequently in people who work with or near asbestos, as well as in people who are exposed to certain types of cutting oils and pesticides.

Leukemias are thought to be caused by a wide range of genetic, immunologic, and environmental factors. Some leukemias have been associated with radiation exposure. Others were linked to exposure to certain organic chemicals.

Additional analysis is underway that will look at cancer patterns within Greenpoint/Williamsburg. The cases will be mapped by census tract to determine if there are clusters (groups of cases of the same type of cancer) occurring within small areas. Clusters may yield clues about where to look for possible causes.

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2.   Asthma

        On the whole, there is no evidence to suggest that Hospital
discharge rates for patients hospitalized with asthma are either
higher or lower in Greenpoint /Williamsburg than in the rest of
the City.   However, within Greenpoint/Williamsburg, there were
some zip codes with elevated rates.   These zip codes are shared
with the Bushwick health districts.   Although discharge rates for
asthma hospitalization were elevated in these zip codes, there is
no adequate information available to determine if residents of
Greenpoint/Williamsburg are at increased risk of asthma
associated with environmental exposures.   Hospital discharge data
analyzed for this report may only indicate the most severe cases.

        Numerous studies throughout the United States found that
asthma hospitalizations are more likely to occur in communities
with lower socio-economic status, where there is limited access
to medical care.   It is therefore not surprising that the
analyses presented here found that higher asthma discharge rates
were associated with lower median income.   Further census tract
analysis of asthma discharge data from Woodhull Medical Center
will help to determine weather there are clusters.

3.   Lead Poisoning

        This mapping of childhood lead poisoning showed that cases
occurred throughout Greenpoint/Williamsburg.   No particular
clusters were revealed.   As stated previously, peeling lead-based
paint is the predominant source of lead exposure in children.
Further analysis is being conducted on the results of
environmental investigations conducted by the NYCDOH Bureau of
Lead Poisoning Control of each case.   These investigations are
primarily focussed on determining whether there is peeling lead-
based paint in the child's residence or other location where the
child spends time.

Limitations

        This preliminary analysis also makes clear several
limitations in trying to use these data to draw direct links
between disease and specific exposures.   Among the problems that
must be considered in evaluating the findings of this report are:

A.   Migration: Each of these sources of data contains
      information on people who lived in Greenpoint/Williamsburg
      at the time they became ill or went to the hospital.   People
      who may have been exposed in the community and then moved
      out of the community and become ill cannot be accounted for
      with this analysis.   Also, data do not distinguish between

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people who may have been exposed before and those who may have been exposed after they moved into the community.

B. Lack of exposure data: As pointed out in the discussion of the background to this report, none of the data that were gathered provided any information about individual exposures. In other words, the potential exposures among individuals who had developed cancer and asthma is unknown. Therefore, it is impossible to draw conclusions about the causes of disease. The presence of an elevated relative risk does not prove the existence of a relationship between the environment and the cancer. It only suggests where to look for additional clues. As an example, a finding of 'excess' leukemias may lead to a focus on identifying possible leukemogens (leukemia-causing agents) present in the environment of people who developed the disease. At least this approach narrows down the search from any and all disease causing risk factors to only those that may be associated with leukemia.

C. Small numbers: Some types of cancers and other conditions are very rare. If a cancer is very rare and the population relatively small, the expected number of cases will be very small. It is very difficult to draw conclusions based on small numbers. For example, there was only one case of chronic myelogenous leukemia(CML) in boys and none in girls. the expected number was 0.3 for boys and 0.1 for girls. Theoretically, if the risk of this disease in Greenpoint/ Williamsburg were three times higher than the City average, it might still result in only one case in the area. On the other hand, with only one case in the area, it is not possible to tell if the case is due to environmental exposure or some other cause.

D. Comparison of disease incidence rates: The main approach used in this study was to compare the rate of cancer (and other diseases) with the rate in other geographical locations (e.g. the rest of the City). This method of comparison is the standard tool currently used by health researchers to study patterns of disease in populations. It is extremely limited, however, in understanding the causes of disease. For one thing, it provides no information about individual exposures. It is possible that people living in the comparison locations faced similar exposures to cancer- and other disease- causing agents, and therefore had similar rates of disease.

E. Difficulties in establishing causes of multifactorial diseases: Information on exposures would be very hard to collect after the fact because most diseases have multiple causes. Many factors, including cigarette smoke, diet, and occupational exposures are likely to play a role in the

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development of cancers, for example. There is no medical
test available that can tell us why a person developed
cancer. Also, exposures may have occurred a long time ago.

Conclusion

This analysis is a first step in looking at the occurrence of
selected conditions in Greenpoint/Williamsburg compared to the
rest of the City. Further analyses by census tract within the
district are currently underway, as indicated throughout this
report. Examining geographic patterns of diseases may provide
clues about where to look for possible causes. For example, if
several people living near each other are found to have developed
a particular type of cancer or respiratory illness, this may
suggest the need for further investigation of whether these
people shared any exposures that led to their illness.

TABLE 1

SELECTED CANCER RISK FACTORS

DISEASE	ENVIRONMENTAL	LIFESTYLE	GENETIC/OTHER
Pharynx (Mouth)		Smoking Tobacco chewing Alcohol Poor nutrition	
Stomach	Radiation Nitrosamines Occupational exposure to asbestos	Cigarettes Alcohol Diet: smoked & salted foods; lack of fruits and vegetables	
Colon	Asbestos	Diet: high fat alcohol, lack of fiber	Women with history of uterine or breast cancer Past bowel disease Familial predisposition
Pancreas	Exposure to laboratory chemicals	Diet: high fat sugar, animal protein Alcohol	Family history
Lung	Asbestos Certain hydrocarbons Diesel exhaust Radon Metals (arsenic, nickel)	Cigarette smoke Low vitamin A	Family history Enzyme deficiencies? Immunodeficiency state
Prostate		Diet: high fat consumption	
Bladder	Hair dyes Fabric dyes Chemicals used in foam & resin processes	Cigarette smoke Coffee	Obesity
Kidney	Coke oven emissions	Cigarette smoke Obesity	
Liver	Cadmium Carbon tetrachloride	Alcohol	History of Cirrhosis Past hepatitis Hereditary metabolic diseases
Brain & Nervous System	Radiation Vinyl chloride		Family history Birth order
Breast	Radiation	Diet: high fat consumption	Very early menarche Late menopause Family history
Blood and lymphatic system	Radiation Benzene		Certain chromosomal anomalies Immunodeficiencies Certain viruses

TABLE 2

SELECTED RISK FACTORS FOR NONCANCEROUS CONDITIONS

DISEASE	ENVIRONMENTAL	LIFESTYLE	GENETIC/OTHER
Asthma	Sulfur & nitrogen Oxides Paints Solvents Formaldehyde Feathers, Skin, Hair Pollen	Smoking Certain drugs	Familial predisposition
Childhood lead poisoning	Lead paint in home	Diet: lack of iron in food, lack of food exacerbate lead poisoning	
Adult lead poisoning	Steel & building repair and demolition Welding Soldering	Hobbies: Stained glass Riflery Ceramics	
Birth defects, Prematurity Low birth weight	Mercury PCBs Radiation Certain infections	Tobacco Alcohol Certain drugs	Genetic disorders Metabolic disorders

TABLE 3A

CANCER IN MALE CHILDREN (AGES 0-14)
IN THE GREENPOINT/WILLIAMSBURG HEALTH DISTRICT*
RELATIVE RISKS, CONFIDENCE INTERVALS, AND RANKINGS**

1978-1987

SITE	OBSERVED CASES	EXPECTED CASES	RELATIVE RISK	95% CONFIDENCE INTERVAL	RANK
Nervous System	9	5.7	1.57	0.72- 2.99	3
Lymphatic System	3	4.2	0.72	0.15- 2.09	24
Acute Lymphocytic Leukemia (ALL)	12	7.6	1.59	0.82- 2.76	2
Chronic Lymphocytic Leukemia (CLL)	0	0.1	0.00	0.00-73.70	-
Acute Myelogenous Leukemia (AML)	3	1.1	2.73	0.56- 7.90	2
Chronic Myelogenous Leukemia (CML)	1	0.3	3.32	0.08-18.57	4
Other/Unspecified Leukemias	2	1.2	1.66	0.20- 6.02	3
Total Leukemias	18	10.2	1.77	1.05- 2.79	1
All Cancers+	44	29.7	1.48	1.08- 1.97	2

*   Data from the New York State Cancer Registry

**   Ranking of relative risks for each type of cancer in
     Greenpoint/ Williamsburg among 30 New York Health Districts.

+   Includes leukemias

     Please see text for explanations of the terms "observed",
     "expected", "relative risk", and "confidence interval".

TABLE 3B

CANCER IN FEMALE CHILDREN (AGES 0-14)
IN THE GREENPOINT/WILLIAMSBURG HEALTH DISTRICT*
RELATIVE RISKS, CONFIDENCE INTERVALS, AND RANKINGS**

1978-1987

SITE	OBSERVED CASES	EXPECTED CASES	RELATIVE RISK	95% CONFIDENCE INTERVAL	RANK
Nervous System	5	5.5	0.91	0.30- 2.12	18
Lymphatic System	1	1.9	0.52	0.01- 2.93	22
Acute Lymphocytic Leukemia (ALL)	6	5.2	1.16	0.42- 2.51	9
Chronic Lymphocytic Leukemia (CLL)	0	0.0	0.00	- -	-
Acute Myelogenous Leukemia (AML)	0	1.0	0.00	0.00- 3.80	-
Chronic Myelogenous Leukemia (CML)	0	0.1	0.00	0.00-33.54	-
Other/Unspecified Leukemias	4	1.0	4.10	1.09-10.2	1
Total Leukemias	10	7.2	1.38	0.66- 2.54	7
All Cancers+	26	24.9	1.05	0.68- 1.53	15

*   Data from the New York State Cancer Registry

**   Ranking of relative risks for each type of cancer in
     Greenpoint/ Williamsburg among 30 New York Health Districts.

+   Includes Leukemias

     Please see text for explanations of the terms "observed",
     "expected", "relative risk", and "confidence interval".

TABLE 4A

CANCER IN MALE ADULTS (AGES 15 AND UP)
; THE GREENPOINT/WILLIAMSBURG HEALTH DISTRICT, 1978-1987*
RELATIVE RISKS, CONFIDENCE INTERVALS, AND RANKINGS**

SITE	OBSERVED CASES	EXPECTED CASES	RELATIVE RISK	95% CONFIDENCE INTERVAL	RANK
Pharynx	116	102.3	1.13	0.94-1.36	11
Stomach	130	99.7	1.30	1.09-1.55	1
Colon	247	277.4	0.89	0.78-1.00	28
Pancreas	61	75.4	0.81	0.62-1.04	28
Lung	503	450.8	1.12	1.02-1.22	8
Prostate	280	385.8	0.73	0.64-0.82	30
Bladder	134	178.1	0.75	0.63-0.89	30
Kidney	59	62.7	0.94	0.71-1.20	19
Liver	28	32.7	0.86	0.57-1.24	23
Nervous System	42	35.3	1.19	0.86-1.61	2
Lymphatic System	100	118.8	0.84	0.68-1.02	29
Acute Lymphocytic Leukemia (ALL)	4	4.8	0.83	0.23-2.13	21
Chronic Lymphocytic Leukemia (CLL)	15	18.1	0.83	0.46-1.37	22
Acute Myelogenous Leukemia (AML)	24	17.5	1.37	0.88-2.04	2
Chronic Myelogenous Leukemia (CML)	15	10.5	1.43	0.80-2.36	3
Other/Unspecified Leukemias	11	13.2	0.83	0.42-1.45	21
Total Leukemias	69	64.3	1.08	0.83-1.36	8
All Cancers+	2285	2453.2	0.93	0.89-0.97	28

*   Data from the New York State Cancer Registry

**   Ranking of relative risks for each type of cancer in
      Greenpoint/ Williamsburg among 30 New York Health Districts.

+   Includes leukemias

     Please see text for explanations of the terms "observed",
     "expected", "relative risk", and "confidence interval".

TABLE 4B

CANCER IN FEMALE ADULTS (AGES 15 AND UP)
IN GREENPOINT/WILLIAMSBURG, 1978-1987*
RELATIVE RISKS, CONFIDENCE INTERVALS, AND RANKINGS**

SITE	OBSERVED CASES	EXPECTED CASES	RELATIVE RISK	95% CONFIDENCE INTERVAL	RANK
Pharynx	30	43.0	0.70	0.47-1.00	30
Stomach	89	75.7	1.18	0.94-1.45	1
Colon	213	287.5	0.74	0.64-0.85	30
Pancreas	93	79.5	1.17	0.94-1.43	3
Lung	200	223.4	0.90	0.76-1.03	24
Bladder	58	66.9	0.87	0.66-1.12	25
Kidney	37	37.7	0.98	0.69-1.35	14
Liver	19	18.1	1.05	0.63-1.64	14
Nervous System	24	29.5	0.81	0.52-1.21	27
Breast	515	653.5	0.75	0.72-0.86	30
Lymphatic System	93	100.2	0.93	0.75-1.14	24
Acute Lymphocytic Leukemia (ALL)	4	4.4	0.92	0.25-2.33	19
Chronic Lymphocytic Leukemia (CLL)	13	14.0	0.93	0.49-1.59	20
Acute Myelogenous Leukemia (AML)	16	18.2	0.88	0.50-1.43	21
Chronic Myelogenous Leukemia (CML)	9	7.9	1.14	0.52-2.16	10
Other/Unspecified Leukemias	13	12.0	1.08	0.58-1.81	12
Total Leukemias	55	56.5	0.97	0.73-1.27	19
All Cancers+	2349	2656.0	0.88	0.85-0.92	29

*   Data from the New York State Cancer Registry

**   Ranking of relative risks for each type of cancer in
     Greenpoint/ Williamsburg among 30 New York Health Districts.

+   Includes Leukemias

     Please see text for explanations of the terms "observed",
   "expected", "relative risk", and "confidence interval".

TABLE 5

ASTHMA DISCHARGE RATES FROM HOSPITALS 1988
ZIP CODES 11206, 11211, 11222, AND 11237

ZIP CODE	DISCHARGE RATES Per 1000 Residents	MEDIAN INCOME In Dollars
All Zip Codes Combined	1.68 – 2.73	23.915 – 29.905
11206	4.71 – 16.53	0 – 15.819
11211	2.75 – 4.70	0 – 15.819
11222	1.68 – 2.73	15.820 – 23.914
11237	4.71 – 16.53	0 – 15.819

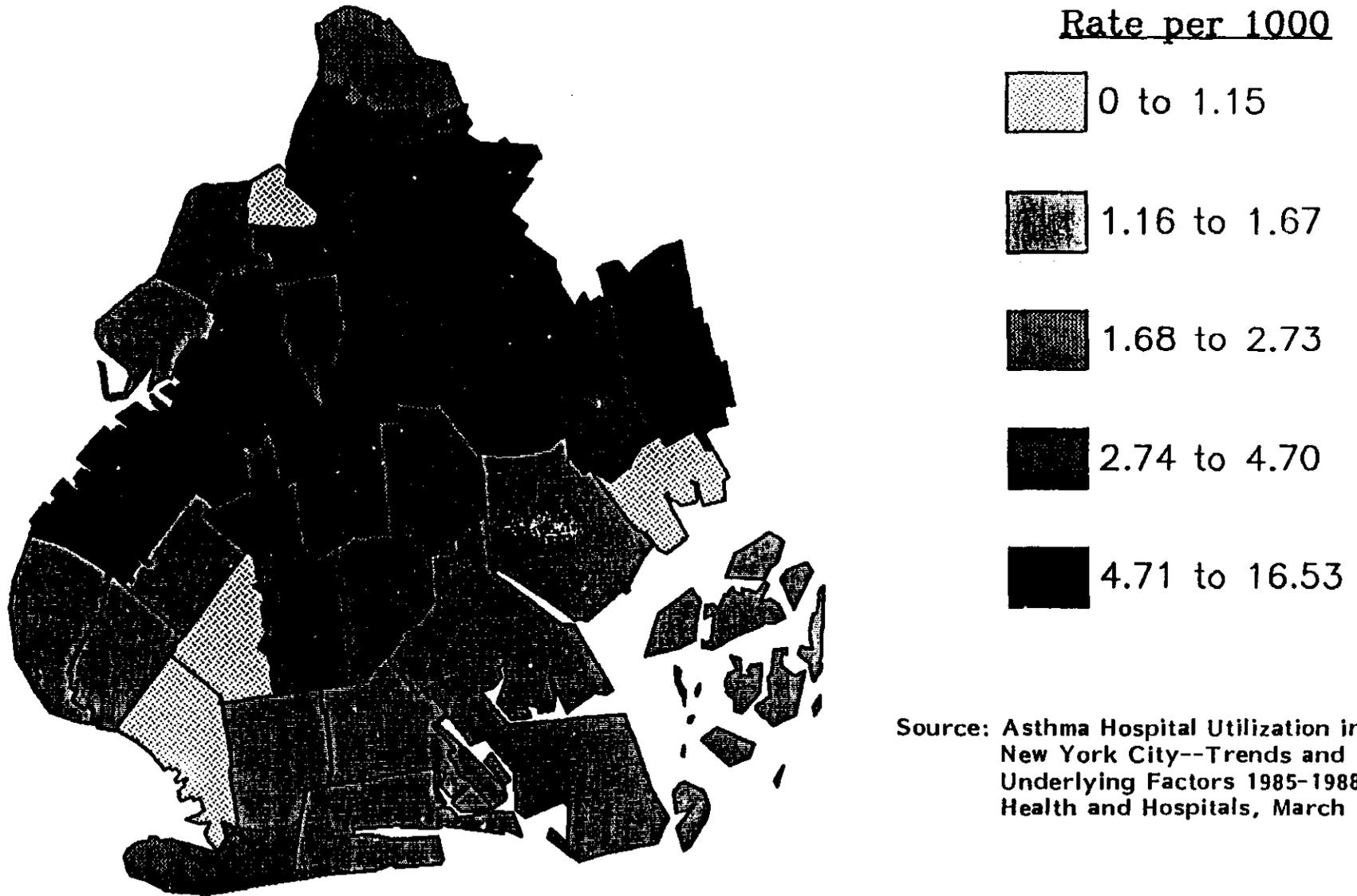# Figure 1

ZIP CODES IN GREENPOINT/WILLIAMSBURG
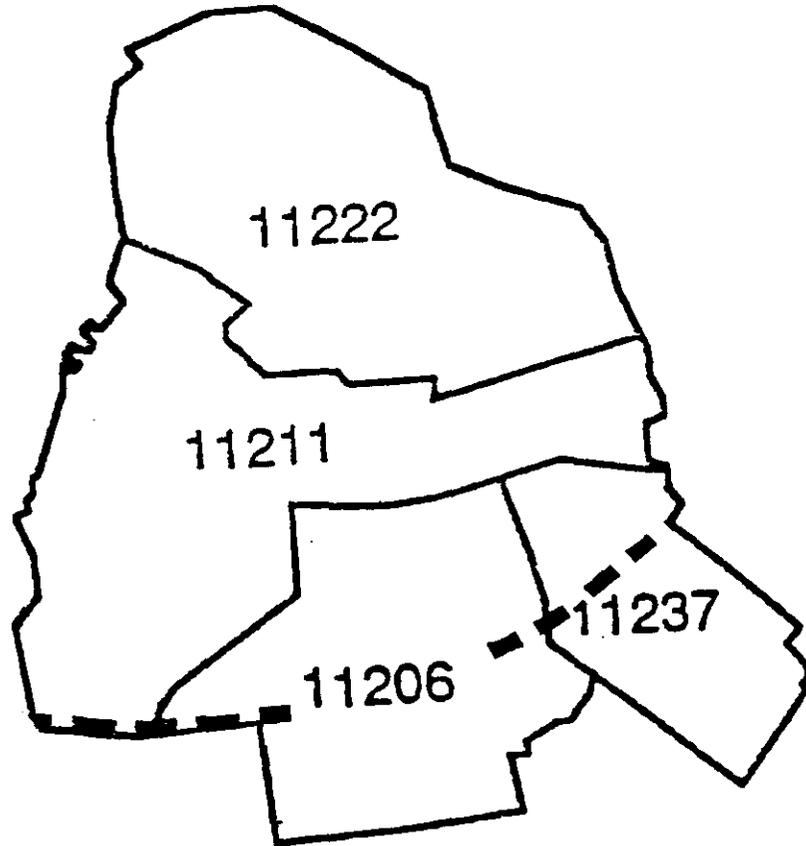
▬ ▬ ▬ ▬   Southern border of the Community (Flushing Avenue)

Figure 2

Crude Asthma Discharge Rates 1988
Brooklyn Zip Code Areas

Rate per 1000

☐ 0 to 1.15

▨ 1.16 to 1.67

▨ 1.68 to 2.73

■ 2.74 to 4.70

■ 4.71 to 16.53

Source: Asthma Hospital Utilization in
New York City--Trends and
Underlying Factors 1985-1988
Health and Hospitals, March 1991

Figure 3

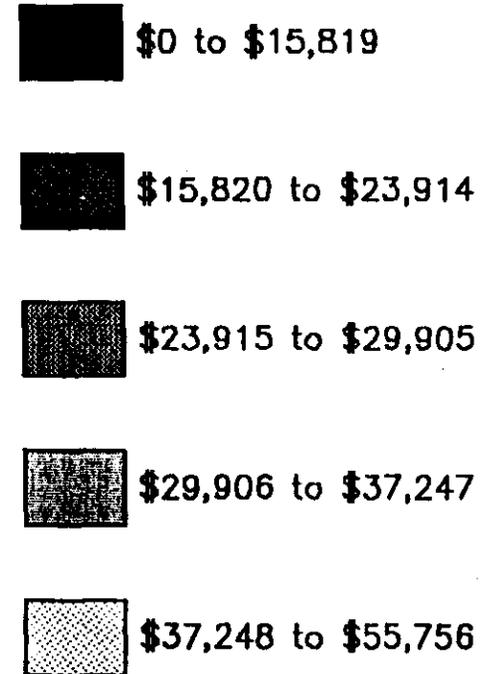# Median Family Income 1988

Brooklyn Zip Code Areas

Income in Dollars

- $0 to $15,819
- $15,820 to $23,914
- $23,915 to $29,905
- $29,906 to $37,247
- $37,248 to $55,756

Source: Asthma Hospital Utilization in
New York City--Trends and
Underlying Factors 1985-1988
Health and Hospitals, March 1991

Figure 4

CHILDHOOD LEAD POISONING IN GREENPOINT/WILLIAMSBURG, 1979–1990

(202 Cases)

Source: New York City Department of Health, Bureau of Lead Poisoning