

Emergency Clinic Visits for Asthma

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MANY RECENT STUDIES have revealed significant changes in the use of urban hospital emergency rooms by the population they serve (1-3). Of particular interest is a report by Greenburg and colleagues (4) who studied emergency room records of four large New York City hospitals. They demonstrated a two-and-one-half- to an eightfold increase in percentage of visits for "asthma" to the emergency rooms of the four hospitals from 1952 to 1962. Their study also revealed that in 1962 visits for asthma to the different hospitals accounted for 5 to 25 percent of emergency room visits for all causes other than obstetrical problems or trauma.

Such findings could be of great significance if several implications of the Greenburg study

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These studies were supported by contract No. U1155 with the Health Research Council of the City of New York and research grant No. AP-00266 from the Division of Air Pollution, Public Health Service.

Dr. Leonard Greenburg, professor, Joseph Reed, instructor, department of preventive and environmental medicine, Albert Einstein College of Medicine, New York, N.Y.; Barbara Joslin, assistant field supervisor, division of epidemiologic research, Cornell University Medical College; and the medical record departments of the three hospitals studied provided technical assistance.

were confirmed. The prevalence of asthma may be increasing, possibly at an extraordinary rate, in New York City. Different areas of the city may be experiencing different rates of increase, and the rate of increase among different ethnic groups also may vary. Obviously, emergency room facilities are being heavily burdened by a great number of asthma patients, and the number is increasing rapidly. Such increases could merely reflect an increasing use of emergency room facilities by the same number of asthma patients in the populations using the hospitals. Nevertheless, the overloading of emergency room facilities continues to be a problem.

Our study was undertaken to clarify the significance of the earlier findings. Two general questions were formulated for examination: First, what are some of the factors involved in this large increase in emergency room visits for asthma, and second, why do the various hospitals differ in their experience with asthma patients?

It has been suggested that patients making more repeat visits for asthma in 1962 might account for the large increase over 1952. A similar difference among patients at the separate hospitals might explain the interhospital variations. We therefore singled out this factor for particular attention.

Methods

We chose for study three of four New York City hospitals—Harlem, Metropolitan, and Kings County—studied by Greenburg. The population served by the emergency room of each was deemed important. Harlem Hospital served a predominantly Negro population (greater than 90 percent), Metropolitan Hos-

pital served a population of Puerto Rican background (approximately 90 percent), and Kings County Hospital served a mixed Negro, Puerto Rican, and non-Spanish-speaking white population.

Geographic distribution was also considered. Both Harlem and Metropolitan Hospitals are located in upper Manhattan, and Kings County Hospital is in Brooklyn, approximately 10 miles distant. Thus Kings County Hospital provided comparison populations of both Negro and Puerto Rican patients in an area distant from the Manhattan populations. Kings County Hospital records also made possible comparison of Negro, Puerto Rican, and non-Spanish-speaking white patients from the same geographic area.

The emergency room records for September, October, and November 1957 and 1962 were reviewed at these hospitals. The record for each patient examined in the emergency rooms usually included name, address, age, sex, major physical findings, diagnosis, treatment, and disposition of the case. Kings County Hospital records also included the race or ethnic group of each adult patient.

The years 1957 and 1962 were chosen for study because these were the most widely separated years for which adequate records were available. September, October, and November were selected because Greenburg (5) and Booth (6) had shown fall to be the season of the most visits for asthma in seven different cities including Metropolitan Hospital in New York.

Obviously, the peak months for visits do not necessarily reflect the experience of a full year and may magnify the increased number of visits previously reported. Since the same periods of the year are used for comparison, however, the relative difference between any two years should not be affected. Furthermore, Booth's data show that a hospital with more visits for asthma than another in the season of highest incidence also has consistently more visits for asthma in the lower incidence seasons. Thus the peak-season months can be used as an index for comparing the experience of different hospitals with asthma patients during the remaining months of the year. In addition, Greenburg and associates (in unpublished data) reported

the examination of records of a full year at the hospitals studied in our survey, and they found that peak-season emergency room experience with asthma patients can also be used as an indicator for comparing different full years at the same hospitals.

For each listed diagnosis of "bronchial asthma," "asthma," and "asthmatic bronchitis" (a rather infrequent diagnosis), the name, address, age, and sex of the patient, with the data on his visit, were recorded on an index card. At Kings County Hospital, race or ethnic group was also included. The total number was defined as the total of all patients recorded in the emergency room journals for the selected period, excluding all visits for obstetrical problems and trauma. These groups were excluded in order to limit the study to medical visits and to eliminate any bias in total visits that might have been introduced by an unusually large number of visits related to trauma or obstetrics at any one hospital.

Results

The number of visits for asthma to the separate emergency clinics (men's, women's, and pediatric) at each hospital was determined and

Table 1. Total number of visits and percentage for asthma to emergency clinics of three hospitals in New York City, September–November 1957 and 1962

Type of clinic and hospital	Total visits ¹		Percent asthma	
	1957	1962	1957	1962
Men:				
Harlem-----	6, 895	7, 050	15. 8	28. 6
Metropolitan---	5, 329	3, 907	5. 8	18. 6
Kings County--	7, 260	10, 220	2. 8	5. 6
Women:				
Harlem-----	8, 095	8, 840	18. 0	24. 8
Metropolitan---	7, 546	5, 647	8. 8	24. 2
Kings County--	10, 110	15, 575	4. 3	7. 1
Total:				
Harlem-----	14, 990	15, 890	17. 1	26. 5
Metropolitan---	12, 875	9, 554	7. 7	21. 9
Kings County--	17, 370	25, 795	3. 7	6. 5
Pediatric:				
Harlem-----	7, 852	7, 102	7. 3	16. 1
Metropolitan---	8, 153	7, 351	4. 7	14. 1
Kings County ² ----				

¹ Excluding obstetrics and trauma.

² Data not available.

Table 2. Number of visits per asthma patient to emergency clinics of three hospitals in New York City, September–November 1957 and 1962

Hospital and racial-ethnic group	Type of clinic	Visits per patient	
		1957	1962
Harlem: predominantly Negro.	Men-----	2.4	3.5
	Women-----	1.9	2.6
	Average-----	2.1	3.0
Metropolitan: predominantly Puerto Rican.	Men-----	1.9	2.1
	Women-----	1.8	1.8
	Average-----	1.8	1.9
Kings County: Combined ethnic groups.	Men-----	1.4	2.0
	Women-----	1.3	1.6
	Average-----	1.4	1.8
Negro-----	Men-----	1.5	2.2
	Women-----	1.4	1.7
	Average-----	1.4	1.9
Puerto Rican-----	Men-----	1.3	1.7
	Women-----	1.3	1.6
	Average-----	1.3	1.7
White-----	Men-----	1.3	1.6
	Women-----	1.2	1.2
	Average-----	1.3	1.3
Harlem: predominantly Negro-----	Pediatric---	1.5	1.4
Metropolitan: predominantly Puerto Rican-----	do-----	1.4	1.5

then compared with the total number of emergency room medical visits during the same period, after which the percentage of visits for asthma was calculated. The average number of visits per asthma patient at each hospital clinic was also calculated for the combined 3-month fall period for each year by dividing the total visits for asthma by the number of persons making the visits. The percentage of visits for asthma and the visits per asthma patient were

then compared between the years and hospitals.

Table 1 shows the marked increase between 1957 and 1962 in the percentage of visits for asthma to the emergency room clinics of each hospital. Total visits to the men's and women's clinics of Harlem Hospital showed an increase from 17 to 27 percent, Metropolitan Hospital from 8 to 22 percent, and Kings County Hospital from 4 to 7 percent during the 5-year period. These increases are all significant at $P < 0.01$.

The average number of visits per asthma patient also increased from 1957 to 1962 (table 2). This increase occurred in the men's emergency clinic of each hospital and in the women's clinics of the Harlem and Kings County Hospitals. The increase in visits per patient was generally not great; the combined hospitals' adult clinics showed an increase of approximately 0.5 visit per patient. In the pediatric emergency clinics at both Harlem and Metropolitan Hospitals and the women's clinic at Metropolitan, no significant increase occurred.

The percentage of visits for asthma to the separate hospitals also differed greatly within a given year (table 1). In both 1957 and 1962, Harlem Hospital had a consistently greater percentage of emergency room visits for asthma than Metropolitan Hospital, and Metropolitan Hospital had a greater percentage than Kings County Hospital. The chi-square test shows these differences to be significant at the 0.01 level for both the men's and women's emergency clinics in both 1957 and 1962.

The number of visits per asthma patient was also generally greater at Harlem Hospital than at Metropolitan and Kings County Hospitals.

Table 3. Total number of emergency room visits¹ and percentage for asthma, by adult racial-ethnic groups at three hospitals in New York City, September–November 1957 and 1962

Hospital and racial-ethnic group	Men		Percent asthma		Women		Percent asthma	
	1957	1962	1957	1962	1957	1962	1957	1962
Harlem: predominantly Negro-----	6,895	7,050	15.8	28.6	8,095	8,840	18.0	24.8
Kings County:								
Negro only-----	3,020	5,500	4.0	7.0	5,330	9,735	5.3	6.7
Puerto Rican only-----	470	770	6.4	12.5	1,520	1,705	6.4	19.4
Metropolitan: predominantly Puerto Rican-----	5,329	3,907	5.8	18.6	7,546	5,647	8.8	24.2

¹ Excluding obstetrics and trauma.

In 1962 the Harlem Hospital emergency clinics for adults experienced an average of 3.0 visits per asthma patient, the Metropolitan Hospital clinics 1.9 visits, and the Kings County Hospital 1.8 visits. The 1957 values were 2.1 for Harlem, 1.8 for Metropolitan, and 1.4 for Kings County. The pediatric emergency clinics at both Harlem and Metropolitan Hospitals had approximately 1.5 visits per asthma patient in both 1957 and 1962 (table 2).

We took advantage of the opportunity offered by Kings County Hospital records to compare the experiences of the racial and ethnic groups and compared the visits for asthma to Harlem Hospital, serving a predominantly Negro population, with the visits of the Negro portion of the Kings County Hospital population. Table 3 shows the difference between these two Negro groups in percentage of total emergency room visits contributed by visits for asthma. The percentage of visits for asthma by the Harlem group in both 1957 and 1962 was approximately four times that of the Kings County group. This difference is significant at the $P < 0.01$ level for both men's and women's clinics in 1957 and 1962.

A comparison of the average number of visits per asthma patient shows that values for the Harlem group were consistently greater. The 1962 adult weighted average was approximately 3.0 visits per patient at Harlem Hospital and 1.9 visits among the Kings County Hospital Negro population. The 1957 values also show

a greater number of visits per asthma patient at Harlem Hospital (table 2).

A similar comparison of Metropolitan Hospital and its predominantly Puerto Rican population with the Puerto Rican segment of Kings County Hospital patients (table 3) shows a significantly greater percentage of visits for asthma at the Metropolitan ($P < 0.01$ for men in 1962 and for women in 1957 and 1962). Men composed the only group showing exception to the greater percentage of visits to the Metropolitan Hospital in 1957, when the percentage at Kings County Hospital was slightly greater. The average number of visits per patient in 1962 also was larger in the Metropolitan Hospital group: approximately 1.9 visits per patient at Metropolitan Hospital compared with 1.7 for the Puerto Rican population at Kings County Hospital. In 1957 the excess number of visits per patient at Metropolitan Hospital compared with Kings County was even greater (table 2).

Significant differences between the three groups served at Kings County Hospital were also evident (table 4). The weighted average of visits for asthma in the Puerto Rican population were 6.4 percent for 1957 and 17.4 percent for 1962, in the Negro patient population 4.8 percent for 1957 and 6.8 percent for 1962, and in the non-Spanish-speaking white population 1.7 percent for 1957 and 2.0 percent for 1962. The chi-square test showed $P < 0.01$ for these differences in 1962 at the clinics for both men

Table 4. Comparison of total number of clinic visits¹ and percentage for asthma between racial-ethnic groups, Kings County Hospital, New York City, September–November 1957 and 1962

Type of clinic	Puerto Rican		Negro		White	
	Number visits	Percent asthma	Number visits	Percent asthma	Number visits	Percent asthma
Men:						
1957.....	470	6.4	3,020	4.0	3,770	1.5
1962.....	770	12.5	5,500	7.0	3,950	1.9
Women:						
1957.....	1,520	6.4	5,330	5.3	3,260	2.0
1962.....	1,705	19.4	9,735	6.7	4,135	2.1
Total:						
1957.....	1,990	6.4	8,350	4.8	7,030	1.7
1962.....	2,475	17.4	15,235	6.8	8,085	2.0

¹ Excluding obstetrics and trauma.

Table 5. Percentage contribution by various factors to 1957-62 increase in visits for asthma to adult clinics at three hospitals in New York City

Factor	Hospital		
	Harlem	Metro- politan	Kings County
Increase in visits for asthma proportionate to increased total visits.....	9.4	1-23.4	30.9
Increased number of visits per asthma patient.....	13.8	116.7	24.1
Increased number of asthma patients.....	76.8	6.7	45.0

¹ These figures show that even though total visits at Metropolitan decreased from 1957 to 1962, the number of visits for asthma increased substantially.

and women. However, the figures for the separate clinics in 1957 and the weighted averages are not significantly different. The average number of visits per asthma patient in both years among the Negro population was slightly greater than for the Puerto Rican patients, whose average number of visits per patient was in turn greater than that for the non-Spanish-speaking white population (table 2). These differences, however, are not uniformly statistically significant.

We found that a large, statistically significant increase occurred in visits, because of asthma attacks, to the emergency rooms of the three hospitals from 1957 to 1962. This finding also showed that part of the increase was due to the greater number of multiple visits by asthma patients in 1962. However, two other factors entered into the 1957-62 increase: The first was the increase in visits for asthma proportionate to the increase in total visits to the emergency room. (This factor alone would not cause the increased percentage of visits for asthma.) The second factor was the increased absolute number of patients making visits for asthma. Each of these factors contributed to the increase to different degrees at the different hospitals.

Table 5 summarizes the contributions of each of these factors to the increased number of visits for asthma in 1962. The major factor at

Harlem Hospital was the increased number of asthma patients. The increased number of visits per asthma patient contributed only about 14 percent of the total 1957-62 increment.

The situation at Metropolitan Hospital was quite different. Despite a marked decrease in total visits, there was an absolute increase and thus a large percentage increase in visits for asthma. The factor almost entirely responsible for this increase was a much larger group of patients with asthma in 1962. A further difference was found at Kings County Hospital, where an increased number of visits per asthma patient accounted for slightly less than half of the total 1957-62 increase, and a larger number of asthma patients accounted for about a fourth of the increase.

Thus at Metropolitan Hospital between 1957 and 1962 a marked rise occurred in the number of patients with asthma, a lesser rise at Kings County, and a minimal increase at Harlem Hospital. Most important at Harlem Hospital was the increased number of multiple visits per asthma patient. Multiple visits were also a major factor at Kings County Hospital.

The differences in percentage of visits for asthma between the three hospitals may also be partially explained by the different number of visits per patient. Table 6 shows the percentage of asthma visits to each hospital, calculated as if the number of visits per patient to each hospital were the same, using the revisit figures for Kings County Hospital as a base. The 1957 interhospital differences persist even after correction, so that Harlem Hospital still shows

Table 6. Percentage of visits for asthma, adjusted for lowest number of visits per asthma patient in Kings County group, combined adult clinics, September-November 1957 and 1962

Hospital	Observed		Adjusted ¹	
	1957	1962	1957	1962
Harlem.....	17.1	26.5	11.5	17.9
Metropolitan.....	7.7	21.9	6.0	21.3
Kings County.....	3.7	6.7	3.7	6.5

¹ Visits per patient in Kings County group: 1.4 in 1957, 1.8 in 1962.

the highest percentage and Kings County the lowest. In 1962 the percentage of visits for asthma was greatest at Metropolitan but still smallest at Kings County. This shows that the predominance of uncorrected visits for asthma to Harlem Hospital in 1962 was due to the excess number of visits per asthma patient to the hospital.

Similar corrections, again using as a base the values for visits per asthma patient in the Kings County group, are summarized in table 7. This shows that some differences between the comparable racial-ethnic groups at the different hospitals are due to more visits per patient among the Manhattan populations. In a comparison between the Metropolitan and Kings County Puerto Rican groups for 1957, the difference in percentage of visits for asthma is shown to be entirely due to more revisits by the Metropolitan group. Other than this one instance, the excess number of visits per patient at Metropolitan and Harlem Hospitals does not fully account for the excess percentage of visits to these hospitals for asthma compared with the Kings County populations. Thus the assumption must be that a higher percentage of asthma patients visited the two Manhattan hospitals.

Adjusting the percentage of visits for asthma among the three racial-ethnic groups at Kings County Hospital by using as a base the visits per patient among the non-Spanish-speaking white group reveals that the between-group

Table 7. Percentage of visits for asthma to Harlem and Metropolitan Hospitals, adjusted for visits per asthma patient in same ethnic group at Kings County Hospital, September–November 1957 and 1962

Racial-ethnic group and hospital	Observed		Adjusted ¹	
	1957	1962	1957	1962
Negro: ²				
Harlem.....	17.1	26.5	11.5	18.6
Kings County.....	4.5	6.9	4.5	6.9
Puerto Rican: ²				
Metropolitan.....	7.7	21.9	5.6	20.4
Kings County.....	6.4	17.5	6.4	17.5

¹ Visits per asthma patient in Kings County group: for Harlem 1.4 in 1957, 1.9 in 1962; for Metropolitan 1.3 in 1957, 1.7 in 1962.

² Combined adults.

Table 8. Percentage of visits for asthma among racial-ethnic groups at Kings County Hospital, adjusted for lowest number of visits per patient in white group, combined adult clinics, September–November 1957 and 1962

Racial-ethnic group	Observed		Adjusted ¹	
	1957	1962	1957	1962
Puerto Rican.....	6.4	17.4	6.4	13.8
Negro.....	4.8	6.8	4.1	4.9
White.....	1.7	2.0	1.7	2.0

¹ Visits per asthma patient in white group: 1.3 in both 1957 and 1962.

differences persist after correction (table 8). Thus the greater percentage of visits for asthma among the Puerto Rican and Negro patients is due to the real excess of asthma among the patients from these groups that visited the Kings County emergency room.

Discussion

The various year-to-year increases, inter-hospital differences, and racial-ethnic group variations in percentage of total visits to hospital emergency rooms for asthma seem to reflect a difference not only in visits per patient but also in the number and percentage of patients with asthma. However, the meaning of these differences is unclear. The increased number of asthma visits from 1957 to 1962 could have been due to an increase in the incidence of asthma in the general populations served by the hospitals studied. It might also have been a result of changing populations in the various areas, changing patterns of using the emergency rooms, or a decrease in the availability of non-emergency-room medical care.

Such trends, if they are the explanation, must have been affecting all three hospitals in the same direction and to about the same degree. Factors within the emergency rooms might have caused an artifactual rise in the number of asthma cases. These could have included drastic changes in diagnostic criteria or staffing or alterations in screening or clinic referral patterns for asthma patients. Questions con-

cerning these factors were asked of the clinical and administrative staffs at the three hospitals. They reported no major changes in these factors and none in other emergency room facilities serving the general populations between 1957 and 1962. The population and emergency room usage factors before 1957 were not examined and could be studied only by a thorough survey of the patient population of each hospital and its pattern of using medical facilities.

Diagnostic criteria were studied by totaling the numbers of respiratory diagnoses that might have been confused or interchanged with the diagnoses of asthma. No differences were found among the relatively small numbers of diagnoses of acute and chronic bronchitis, bronchiectasis, and "chronic lung disease" recorded at the three hospitals in 1957 and 1962.

The differences between the two populations of the same ethnic and racial groups at Harlem, Metropolitan, and Kings County Hospitals might also be explained by different diagnostic criteria, staffing, and referral patterns at the three hospitals. But informal comparison of the three emergency rooms failed to show significant variations in these parameters.

It is more likely that the Manhattan-Brooklyn differences were a result of variations in environment or population. However, whether the environments were different in air pollution, housing conditions, and available medical facilities or whether the populations were different in socioeconomic status and geographic origin (for example, Negroes born in New York City compared with those recently arrived from the South) was not determined.

The obvious differences between the three racial-ethnic groups at the Kings County Hospital suggest, but by no means prove, that a great excess of asthma occurred among the Puerto Rican population in that area, and a lesser but still significant excess among Negroes as compared with the non-Spanish-speaking white group. However, this group could well have had a higher incidence of asthma but probably would have sought medical care from a private physician or local private clinic. Different housing conditions and other socioeconomic parameters probably also were important factors in the observed differences.

Further studies of values, in determining if the increases and variations in asthma visits actually reflect increases and variations in the incidence of the disease in the population, could examine hospitalizations due to asthma and the experience of other medical facilities (for example, local physicians and union or industrial clinics) with asthma. A more definitive description of the widespread incidence of asthma could only be produced by a prospective survey of the general population.

Summary

Visits for asthma to the emergency rooms of three New York City hospitals in September, October, and November 1957 and 1962 have been reviewed and summarized. Between the 2 years a large increase occurred in the absolute number and percentage of visits for asthma to each emergency room. The two Manhattan-located hospitals, Harlem and Metropolitan, showed in each year a significantly higher percentage of visits for asthma than occurred among a comparable racial-ethnic group at the Kings County Hospital in Brooklyn. In addition, among the racial-ethnic groups at Kings County Hospital the Puerto Rican group showed the highest percentage of visits for asthma, the non-Spanish-speaking white group the least, and the Negro group the intermediate.

The increase between 1957 and 1962, as well as the interhospital and intergroup differences, could only be partially accounted for by an excess number of visits per asthma patient during a given year or among the patients of a particular hospital or group. The study group concluded that significant differences occurred among the numbers of patients with asthma in the different years, hospitals, and groups. The implication is that the incidence or severity, or both, of asthma increased between the years and among the hospitals and groups showing more visits for asthma. However, other possible significant factors explaining the observed differences could not be excluded.

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Education Notes

WHO Travel Fellowships. In 1967 the World Health Organization will make short-term fellowships available for "improvement and expansion of health services" in the United States.

The awards, generally will be limited to 2-4-month periods, will cover per diem expenses and transportation. They will not be granted for conducting research projects or attending international meetings.

Preferred applicants are those engaged in full-time public health or educational work in the United States, and their employers will be expected to continue their salaries during the fellowship. Officers and employees of the U.S. Government are not eligible.

Deadline for receipt of applications is January 1, 1967, but fellowships probably will not start before May 1, 1967. Further information and application forms may be obtained from Dr. Howard M. Kline, Public Health Service, Washington, D.C. 20201.

Doctoral Study in Social Sciences. The University of Michigan School of Social Work offers an interdepartmental doctoral program in social work and social science which leads to the doctor of philosophy degree and combines social work with economics, political science, psychology, social psychology, or sociology. Students are prepared for careers in research, teaching, policy development, and administration in social welfare. Applications are accepted

from students in a program leading to a master's degree in social work, from experienced social workers, from students with a master's degree in a social science, or from students with a baccalaureate degree only.

Traineeships from \$1,800 to \$3,600 plus tuition are provided by the National Institute of Mental Health, the Russell Sage Foundation, and other sources. Application deadlines are February 15, 1967, for fellowships and May 1, 1967, for admission.

Detailed information and applications forms are available from Doctoral Program, School of Social Work, University of Michigan, 1065 Frieze Building, Ann Arbor.

Principles of Epidemiology. The Training Branch of the Communicable Disease Center, Public Health Service, will conduct a basic course in epidemiology, January 16-20, 1967, as part of its continuing education program. The course is designed to provide public health workers with an understanding of the use of fundamental epidemiologic techniques in disease prevention. It is offered for physicians, dentists, veterinarians, nurses, laboratory workers, environmental health personnel, and other members of the public health team. Preference will be given to applicants whose professional tasks involve application of epidemiologic procedures.

Further information and application forms may be obtained from the Communicable Disease Center, Atlanta, Ga. 30333, Attention: Chief, Health Professions Training Section, Training Branch.