Access to Primary Care in New Jersey

Geographic Variation of Hospitalizations for Ambulatory Care Sensitive Conditions in 1995 & 1997

Executive Summary

HEALTH RESEARCH & EDUCATIONAL TRUST OF NEW JERSEY

a non-profit affiliate of

THE NEW JERSEY HOSPITAL ASSOCIATION

760 Alexander Road
Princeton, NJ 08543-0001

❖

Principal Investigator:

Firoozeh M. Vali, Ph.D.

January 2001

Supported by a grant from
The Robert Wood Johnson Foundation

ACCESS TO PRIMARY CARE IN NEW JERSEY

Geographic Variation of Hospitalizations for Ambulatory Care Sensitive Conditions in 1995 & 1997

EXECUTIVE SUMMARY

Published By:
Health Research & Educational Trust of New Jersey

A non-profit affiliate of
The New Jersey Hospital Association
760 Alexander Road, Princeton, NJ 08543-0001

Principal Investigator:
Firoozeh M. Vali, Ph.D.

January 2001
Supported by a grant from
the Robert Wood Johnson Foundation

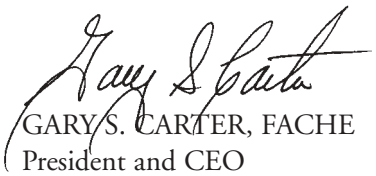
PREFACE

Access to primary healthcare continues to be an important health issue with significant economic ramifications. The unattended medical conditions of individuals without proper access to primary and preventive healthcare often result in more severe episodes. This ultimately leads to the use of more expensive treatment options, including hospital admissions, for illnesses that could have been managed on an outpatient basis. The hospitalization rate for this group of illnesses, known as Ambulatory Care Sensitive (ACS) conditions, such as pneumonia or asthma, is now being used as a proxy to assess performance of the outpatient delivery system in a geographic area. High hospitalization rate for these conditions may indicate inadequate and inaccessible primary care services in that area.

Recognizing the growing number of uninsured populations and their lack of access to healthcare as a societal issue, the Health Research and Educational Trust of New Jersey (HRET), a non-profit research affiliate of the New Jersey Hospital Association (NJHA), conducted an extensive research project titled *Access to Primary Care in New Jersey: Geographic Variation of Hospitalizations for Ambulatory Care Sensitive Conditions in 1995 and 1997.* This two-year study, funded by a grant from the Robert Wood Johnson Foundation, was initiated in 1998, with a goal of providing information needed to improve access of the medically indigent and uninsured populations to primary healthcare services in New Jersey.

The findings of this study are expected to help hospitals assess their community's primary care needs, plan appropriate service interventions and implement necessary programs. They also provide public health planners, policy makers and government officials with an opportunity to evaluate the performance of the outpatient and primary care delivery system in their areas for more precise health planning, prevention and resource allocation.

The Executive Summary of this study is intended to provide readers with a snapshot of the scope and findings of this study. In the near future we plan to provide you with an additional valuable resource — county-specific ACS reports. Together, these tools will bring us closer to the goal that drives all of us in New Jersey's healthcare system — to provide affordable, accessible and quality healthcare to our communities.



GARY S. CARTER, FACHE
President and CEO
New Jersey Hospital Association

ACKNOWLEDGEMENTS

The Health Research and Educational Trust of New Jersey (HRET) would like to extend its deep appreciation to the Robert Wood Johnson Foundation for funding this study. Without its support, this work could not have been accomplished. The project also benefited from the critical comments and professional advice of its advisory panel members. HRET is extremely grateful for their contributions.

ACS ADVISORY PANEL

SAM COSTA
Director
Division of AIDS Prevention and Control
N.J. Department of Health & Senior Services

MARTEY DODOO, MD
Program Manager
Division of Health Care Systems Analysis
N.J. Department of Health & Senior Services

NANCY FIORENTINO, Ph.D.
Program Manager
Division of Health Care Systems Analysis
N.J. Department of Health & Senior Services

MAUREEN CARBERY, Ph.D.
Director of Research
Gateway MCH Consortium, Inc.
Newark Beth Israel Medical Center

ROSE MARY MARTIN, MPH
Research Scientist
Center for Health Statistics
N.J. Department of Health & Senior Services

SHARON POSTEL, Esq.
President
Public Strategies Inc.
Long Branch, N.J.

MARCIA SASS, Sc.D.
Research Scientist
Division of AIDS Prevention and Control
N.J. Department of Health & Senior Services

BERNADETTE WEST, Ph. D
Assistant Professor, School of Public Health
University of Dentistry & Medicine of New Jersey

HRET also would like to acknowledge the contributions of several other individuals whose support was invaluable to the success of this project. Ashish Kumar, Ph.D., PC Consultants, Plainsboro, N.J., performed data processing, rate construction and statistical analyses. John Billings, J.D., associate professor of health policy & management, New York University, was the senior adviser to this initiative. His wealth of knowledge, technical expertise and intellectual insights on the access to care issue helped guide the study. Jim Trimble and the Rutgers University Center for Remote Sensing and Spatial Analysis (CRSSA) generously prepared and provided the maps for this report. Holleran Consulting conducted focus groups.

A special thanks is also extended to Nicole Mortello, senior programmer/analyst, NJHA Department of Information Services, for extracting all the New Jersey hospital discharge data for ACS conditions, and to Rona Remstein and Kimberly Birchenough, the Research Department's staff, for their assistance and support in preparation of this report.

BACKGROUND

Access to primary healthcare continues to be an important health policy and public health issue with significant economic ramifications. Individuals without routine access to primary healthcare do not receive timely care to prevent the onset of an illness, control an acute episode or manage a chronic condition. They're also at greater risk of disability, morbidity and mortality. These individuals primarily belong to ethnic minority groups, are unemployed and have lower levels of education and income, mostly below the poverty line (Billings, 1993, 1994; Bindman et al., 1995). The access issue has been reflected in many recent national and state health plans. In its vision for 2010, the state of New Jersey plans to actively monitor access to primary care services as well as its strong correlates and barriers (New Jersey Department of Health and Senior Services — NJDHSS, 2000).

A variety of personal, cultural, organizational and social factors create obstacles to healthcare access at both individual and system levels (Billings, 1993, 1994; Billings et al., 1993; Bindman et al., 1995; Kumar and West, 1996). These factors include lack of health insurance, location and distance of care sites (clinics and physician offices), lack of transportation, long appointment and office waiting times, complex registration procedures, insufficient provider time, inadequate communication of information and patient education, inappropriate treatment by providers and office staff, differences in language, culture and help-seeking behavior of patients, and lack of cultural sensitivity and competency of providers and healthcare agencies.

Of all these barriers, lack of health insurance is the strongest correlate of access to care. Despite a strong period of economic growth and implementation of several federal and local government initiatives to address the problem, the Census Bureau (2000) continues to report a high number of uninsured Americans (42.6 million in 1999, more than 16 percent of the total population). Healthcare forecasts project that if the current trend persists, by 2005 the uninsured will continue to constitute about 15 percent of all people under age 65. Beyond 2005, depending on how the healthcare landscape might evolve, this number may increase to 16 to 22 percent of the population (Institute for the Future, 2000; NJDHSS, 2000). New Jersey statistics are also consistent with this national trend.

Since almost all Americans over age 65 are covered by Medicare, lack of health insurance is primarily a problem for the working poor under age 65. The unattended problems of individuals who are uninsured and without a regular source of primary care result in more severe episodes of otherwise manageable or preventable disorders and lead to the use of more expensive treatment options, i.e. hospital emergency departments or hospital admissions, instead of outpatient sites and clinics (Brown et al., 1998; Kumar and West, 1996; NJDHSS, 1991; Shi et al., 1999). The costs of care and treatment provided to uninsured individuals in hospitals are often uncompensated. Inefficient use of hospital resources for non-emergency conditions adds to the current financial stress of hospitals, which is already exacerbated by managed care arrangements and Medicare reimbursement cuts. These factors contribute to the increase in overall costs of healthcare.

As these issues become more pronounced in public policy and planning initiatives, it is critical that providers and policy makers develop an understanding of how the medically indigent and uninsured populations utilize the healthcare delivery system. Examination of hospital admission patterns is a viable approach that may provide useful information about potential barriers to access within a healthcare delivery system (Alexander et al., 1999; Billings, 1994).

Among different reasons for hospitalization, access to primary care significantly influences the rate of hospitalizations for ambulatory care sensitive (ACS) conditions (Billings, 1993). These are a group of conditions, such as asthma or pneumonia, where timely and effective outpatient care can reduce the need for hospitalization through prevention, control or management of a disease. Various studies indicate that the sociodemographic composition of an area, especially its residents' level of income, greatly impacts access to primary care, which in turn strongly affects the hospital admis-

sion rates for ACS conditions (Billings et al., 1996; Bindman et al., 1995; Djojonegoro et al., 2000; Newman et al., 1992; Utah DOH, 1999). Billings showed that lack of access to ambulatory care may significantly affect the number of these hospitalizations in low-income areas; as in these areas the ACS rates showed a remarkable increase that averaged more than four times higher than the high-income areas (Billings, et al., 1993). The rates for certain individual ACS conditions in low-income areas were more than six times higher than high-income areas.

The rate of hospitalization for ACS conditions is now being used as a proxy to assess performance of the outpatient delivery system in a geographic area. Analysis of these rates is suggested to help assess barriers to healthcare access, identify areas with high need and establish regional and local priorities for health planning, prevention and resource allocation purposes. The eventual outcome of these efforts will be the design of an equitable high capacity delivery system that provides easy access to ambulatory care and saves the unnecessary cost of avoidable hospitalizations.

OBJECTIVES AND IMPACTS

The goal of this study was to provide information needed to improve access of the medically indigent and uninsured populations to primary care services throughout the state of New Jersey and contain the cost for unnecessary hospitalizations. The specific objectives of the project were to:

1. Systematically analyze geographic variation of hospitalizations for ACS conditions in 1995 and 1997 for New Jersey adults and pediatric residents, using hospital discharge data and a methodological approach called small area variation analysis;
2. Identify the highest rate areas where barriers to primary healthcare access exist;
3. Characterize the ACS conditions that result in the highest rates of hospitalization in different areas and investigate the patterns of their change over time;
4. Determine if barriers to access are the result of demographic and/or socioeconomic characteristics of the area or deficiencies in the healthcare delivery system;
5. Identify areas where additional investigation is needed, investigate the factors that contribute to the problem in these areas, using qualitative methods (focus groups of professionals and consumers) and recommend possible solutions/remedies.

Previous studies have reported that New Jersey's hospital utilization rates for ACS conditions by non-elderly populations are significantly higher than other states, indicating problems in outpatient delivery system and access to primary care. The findings of this study are expected to help hospitals, community agencies and other healthcare providers assess and understand their community's primary care needs and plan appropriate service interventions. They also provide hospitals, public health planners, policy makers and government officials with an opportunity to evaluate the performance of the outpatient delivery system in each area for prevention and resource allocation. Examination of primary care accessibility provides powerful analytical leverage for more precise health planning.

METHODOLOGY

This study was implemented in two phases. Phase I of the study involved analysis of 1995 and 1997 hospital utilization data for ACS conditions for non-elderly (0-64 years of age) and pediatric (0-17 years of age) residents of New Jersey and identification of areas with high ACS rates and serious problems of access to primary care. Patients over 64 years of age were excluded from this study since almost all of them are covered by insurance, chiefly through Medicare.

We employed a methodological approach called small area variation analysis (SAVA), a variant of cluster and cross-sectional analyses in social science research. In SAVA, data from small, usually proximate and often contiguous geographic regions are analyzed to study spatial variations in health status and healthcare utilization, evaluate the patterns of hospitalization in a region and identify areas where barriers to healthcare access exist (Billings,1993, 1994, 1996; Billings and Hasselblad, 1989; Kumar and West, 1996; Vali, 1996; Wennberg and Gittelsohn, 1973). SAVA has also been employed to study the avoidable and preventable hospitalizations for medical and surgical conditions that can be managed through an efficient outpatient delivery system as well as variations in physician practice styles (Wennberg et al., 1998).

In SAVA, population-based hospitalization rates are calculated for each small area (one or a group of zip codes, a neighborhood, a hospital service area, an entire city or county, etc.) and are expressed as admissions per 1,000 residents. Population figures used in the small area studies are further adjusted for sex and age to control for the differences in the demographic composition of areas. SAVA is also used to determine which sociodemographic characteristics of the areas, such as income, level of education, race/ethnicity, are associated with high admission rates.

To identify and group the small areas in this study, we used New Jersey population data at zip code level, based on the Bureau of Census estimates for 1995 and 1997. To be eligible as a small area, each zip code had to have a population of 2,500 residents or more. Depending on the size of populations, two or more smaller zip codes had to be combined to form a small area. In each area, the estimated percentage of households with income less than $15,000 was used as the indicator of poverty level in that area. Population data were obtained from CACI Marketing Systems and Claritas Data Services.

Hospitalization data was based on the New Jersey Uniform Bill-Patient Summary (UB-92) data that is collected by the MIDS system for all inpatients discharged from acute care hospitals in New Jersey. Furthermore, the study used the New York and Pennsylvania UB-92 data to account for admissions of New Jersey residents who sought care in hospitals from these two neighboring states in 1995 and 1997. The database, therefore, included the combined discharge data for New Jersey residents from hospitals in New Jersey, New York and Pennsylvania.

In this study, aggregate utilization rates for ACS conditions were computed for residents of each small area for 1995 and 1997 (separately for adults and pediatric admissions) and were expressed as admissions per 1,000 residents for each ACS condition, ACS diagnostic categories and an overall ACS rate. The rates were age-adjusted based on 1980 census data to allow for comparison of communities with different age compositions. The data for each group was examined spatially across small areas at each point in time (1995 and 1997 separately) and temporally across time for small areas. We first examined ACS variations in large geographic units (state regions and counties) and then systematically "drilled down" to smaller geographic units to zip code level, using an inverted pyramidal approach to analyze variations across zip codes throughout the state and counties.

Simple linear regression models were developed to analyze the association of demographic and socioeconomic factors with high ACS admission rates. Since these variables have been found to be highly correlated, a decision was made to only use level of poverty (defined as percent of population with income less than $15,000). Poverty's stronger relationship with ACS admission rates relative to race and other factors is widely substantiated in the literature. The difference between the observed and expected rates in each model indicates the potential combined influence of any factor except poverty, including other demographic and socioeconomic factors and health system factors, such as physician practice patterns and patients culture, none of which was directly addressed in this study. By evaluating the relationship of ACS admission rates and poverty level, we therefore may be able to draw conclusions about the underlying access barriers for New Jersey's medically indigent populations.

Through qualitative methods, primarily using focus groups of consumers and professional/community leaders, Phase II of the project involved a deeper investigation of problematic areas to assess individual, social, cultural and system-level barriers to primary care access. After the small areas with highest rates across the state were identified and the impact of poverty level was assessed, 10 focus groups with consumers and 11 focus groups with community leaders, public health officials, healthcare administrators, practitioners and primary care physicians were conducted in each of 11 geographic

areas spanning 26 zip codes. The purpose of this phase was to determine if barriers are the result of demographic and/or socioeconomic characteristics or deficiencies in the healthcare delivery system. Holleran Consulting, of York, Pa., conducted the 21 focus groups.

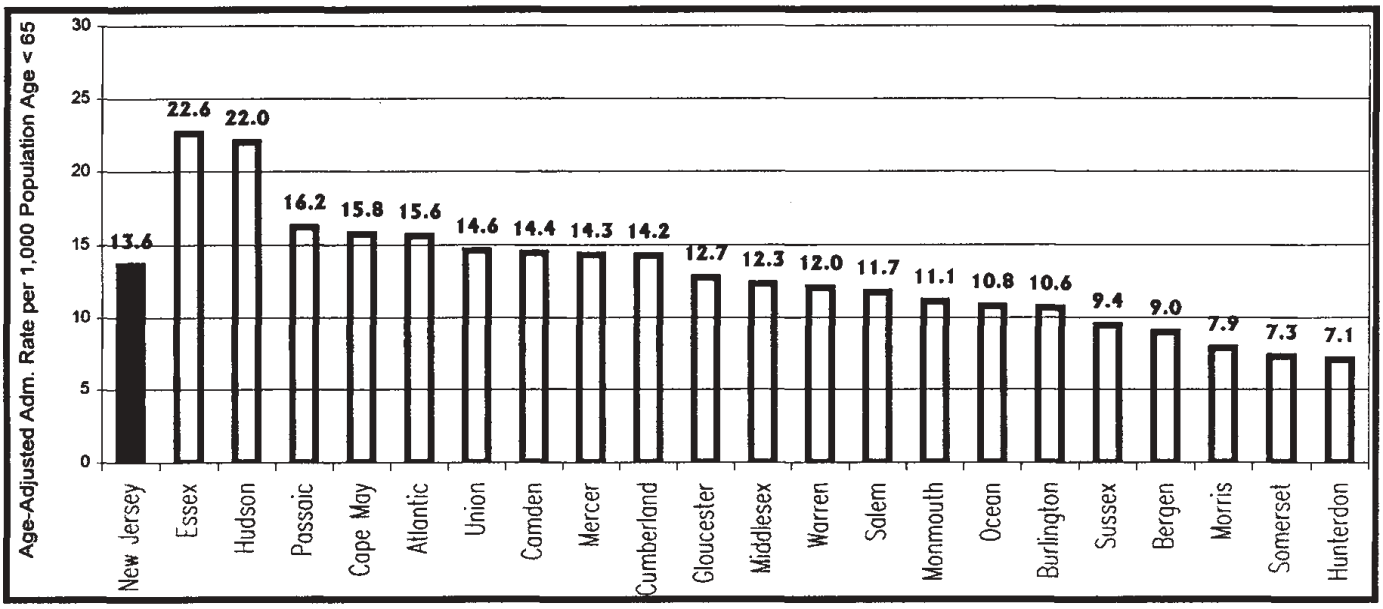
FINDINGS

PHASE I: ANALYSIS OF 1997 POPULATION AND DISCHARGE DATA

Total Admissions (Adults < 65) - The age-adjusted ACS admission rates for New Jersey counties in 1997 are presented in **Exhibit 1.** The statewide average in 1997 was 13.6 per 1,000 population, 12 percent lower than the1995 rate of 15.5. Nine out of 21 counties had admission rates higher than the state average: Essex, Hudson, Passaic, Cape May, Atlantic, Union, Camden, Mercer and Cumberland. All these counties are either considered pockets of poverty or have several known pockets of poverty. As expected, Essex and Hudson counties (22.6 and 22.0 per 1,000, respectively) had significantly higher rates than the other nine counties and were three times higher than the lowest rates (Hunterdon 7.1 and Somerset 7.3). These rates were mapped, Exhibit 1A, as an attempt to better visualize their distribution in different parts of the state.

Examination of the crude, age-specific and age-adjusted ACS admission rates of all New Jersey small areas (single or grouped zip codes) showed a large range between the highest and lowest admission rates and suggested a wide discrepancy in observed rates of small areas. Out of 502 small areas, 122 had a rate higher than the state average of 13.6 per 1,000. About 44 areas had rates higher than 20, and the rates of 18 areas were 30 to 51 per 1,000.

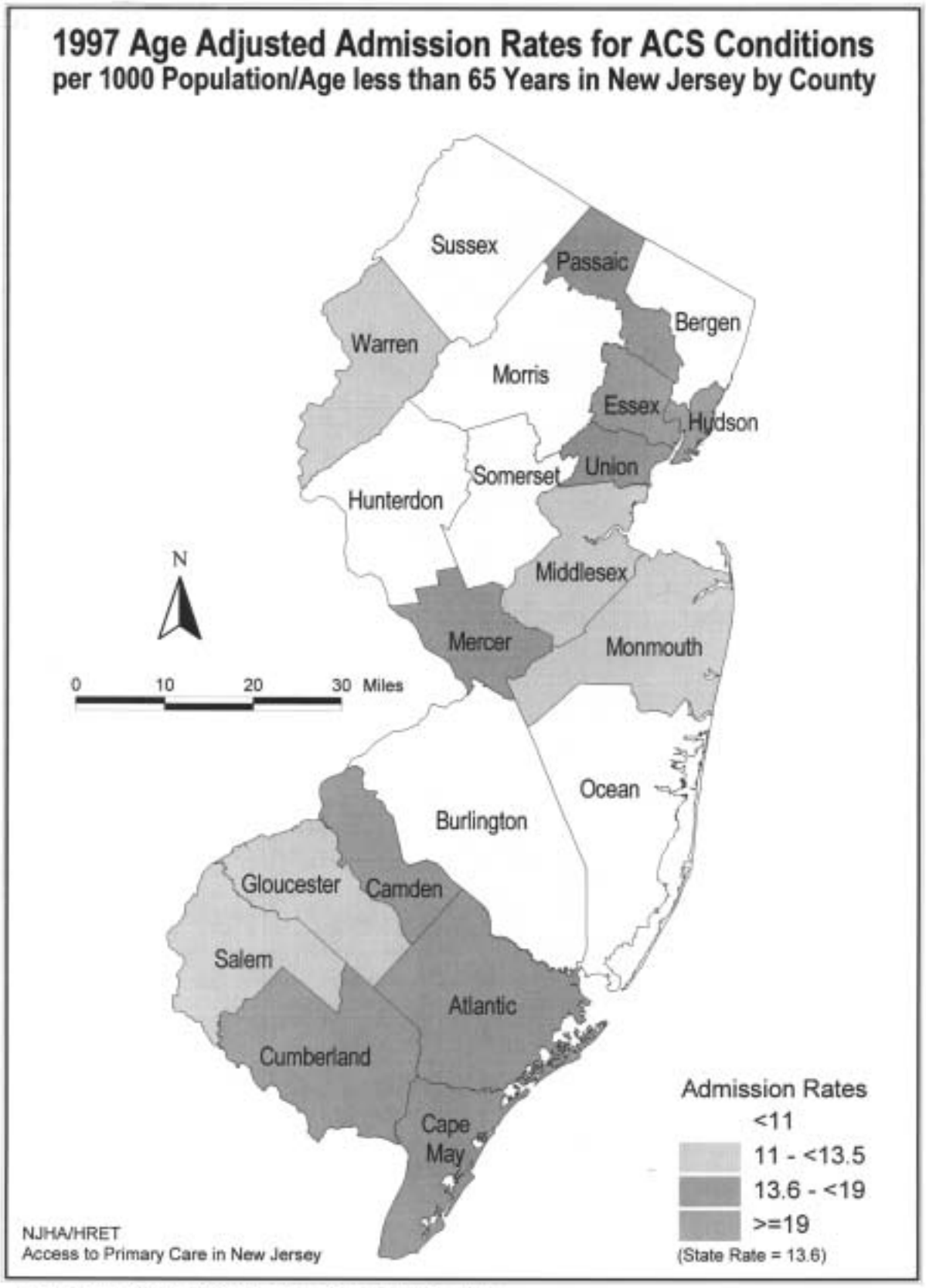
EXHIBIT 1: 1997 AGE-ADJUSTED ADMISSION RATES FOR ACS CONDITIONS PER 1,000 POPULATION / AGE LESS THAN 65 YEARS, NEW JERSEY AND COUNTIES



Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

As shown in **Exhibit 2,** the areas with highest rates were clustered in Newark (7 zip codes); Paterson (2 zip codes); Jersey City (2 zip codes); Camden (3 zip codes); East Orange (1 zip code); Trenton (1 zip code); Wildwood (1 zip code); and Atlantic City (1 zip code). The high rates are mostly in very poor urban or rural areas and clearly show a vis-

Exhibit 1A



Source: NJ, NY & PA UB-92 Discharge Data for NJ Zip Codes

ible dichotomy between suburban and urban/rural rates. Almost all these areas with high rates were studied in more depth during Phase 2 of the study through focus groups of consumers and providers.

Exhibit 3 lists the admission rates for individual ACS conditions in 1997. The three leading causes for ACS admissions in New Jersey, excluding dehydration (as secondary diagnosis), were asthma, bacterial pneumonia and congestive heart failure, 1.88, 1.58, and 1.06 per 1,000, respectively. Other conditions with higher rates were pelvic inflammatory disease, gastroenteritis, diabetes (types A, B, and C combined), dehydration as primary diagnosis, and kidney/urinary

EXHIBIT 2: 1997 CRUDE, AGE-SPECIFIC AND AGE-ADJUSTED ADMISSION RATES FOR ACS CONDITIONS PER 1,000 POPULATION/AGE LESS THAN 65 YEARS – NEW JERSEY ZIP CODES (30) WITH HIGHEST RATES (RANKED BY AGE-ADJUSTED ADMISSION RATES)

GROUPED ZIP CODE	MUNICIPALITY	COUNTY	CRUDE ADMISSION RATE	AGE-SPECIFIC ADMISSION RATE					AGE-ADJUSTED ADMISSION RATE	RANK
				0 - 4	5 - 14	15 - 24	25 - 44	45 - 64		
07802-1	Dover	Morris	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
07102-1	Newark	Essex	50.3	125.5	23.9	12.9	44.7	87.0	51.2	1
07103-1	Newark	Essex	47.5	103.3	26.8	13.7	41.8	84.7	48.8	2
07501-2	Paterson	Passaic	38.6	63.0	13.9	15.7	34.5	88.5	42.8	3
07104-1	Newark	Essex	40.2	106.4	23.3	20.2	28.3	62.7	40.0	4
07108-1	Newark	Essex	38.8	71.2	18.8	17.3	36.3	64.0	39.0	5
08102-1	Camden	Camden	31.9	57.4	13.8	12.4	26.0	84.5	38.0	6
08103-1	Camden	Camden	34.7	66.7	14.8	12.2	32.1	68.9	36.9	7
08104-1	Camden	Camden	31.5	53.8	12.9	16.3	26.6	63.0	33.2	8
07305-1	Jersey City	Hudson	34.0	85.3	15.7	14.7	26.6	53.0	33.1	9
07304-1	Jersey City	Hudson	33.3	94.4	15.7	11.2	26.2	50.4	32.3	10
07107-1	Newark	Essex	32.4	89.4	18.9	14.0	22.9	48.3	31.5	11
07018-1	East Orange	Essex	32.6	70.4	9.3	11.9	26.8	56.6	31.4	12
07114-1	Newark	Essex	29.3	67.4	6.1	9.2	22.0	67.5	31.3	13
08260-1	Wildwood	Cape May	32.9	68.9	22.1	18.2	20.0	50.5	31.1	14
08609-2	Trenton	Mercer	31.4	77.4	14.7	8.8	27.8	50.4	31.0	15
07514-1	Paterson	Passaic	30.3	53.6	12.4	11.9	28.3	52.7	30.2	16
08401-1	Atlantic City	Atlantic	32.0	83.2	13.6	11.6	24.8	47.8	30.2	17
07112-1	Newark	Essex	30.7	58.0	11.9	13.8	28.6	49.6	30.1	18
07017-1	East Orange	Essex	29.7	54.0	13.9	12.6	24.7	51.8	29.3	19
08618-1	Trenton	Mercer	29.7	53.8	13.9	13.7	26.9	46.9	29.0	20
08105-1	Camden	Camden	24.9	48.6	8.7	11.8	17.6	62.4	28.3	21
07106-1	Newark	Essex	26.3	57.9	12.8	15.4	21.3	49.3	28.3	22
08611-1	Trenton	Mercer	26.5	71.1	14.0	18.7	14.1	49.3	27.8	23
07111-1	Irvington	Essex	27.7	57.8	13.1	12.5	21.5	48.4	27.6	24
08901-1	New Brunswick	Middlesex	19.8	72.5	19.6	3.3	19.4	48.4	27.2	25
08861-1	Perth Amboy	Middlesex	27.1	65.4	15.6	16.8	19.4	40.8	26.9	26
07503-1	Paterson	Passaic	25.6	49.2	11.5	12.3	19.9	48.3	26.1	27
07060-1	Plainfield	Union	27.4	84.7	17.4	10.9	21.2	33.2	26.0	28
07088-1	Vauxhall	Union	27.6	38.8	8.7	15.0	23.3	46.1	25.9	29
07522-1	Paterson	Passaic	24.9	48.4	10.6	11.3	23.5	42.5	25.4	30

Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

infection. As evident, these conditions include both chronic and acute ACS conditions. **Exhibit 4** shows the top 10 high rate counties for three of the seven leading individual ACS conditions selected for further analysis. Although hospitals in most counties seem to have admitted patients for similar ACS conditions, the rates are significantly higher in some counties compared to others. In most counties, for example, **asthma** appeared to be among the top three leading conditions, but its rate in Essex (4.70) was more than five times higher than Burlington (.87).

Analysis of each condition at zip code level revealed the problematic areas. Among all ACS conditions leading to hospital admission in 1997, asthma is the most prevalent. Essex County had the highest rate (4.08 per 1,000), more than twice the state average rate of 1.87. It should be noted that four Newark zip codes (07103, 07102, 07108, 07104) had rates about five times as high as the state overall rate and more than twice as high as Essex County. Other highest zip codes were Camden 08102 and 08103 (7.7), Newark 07112 and 07107 (7.2 and 6.9), Paterson 07501(6.9), Camden 08104 and 08105 (5.9 and 5.6), New Brunswick 08901 (5.6), Plainfield 07060 and Atlantic City 08401(both 5.4).

For **bacterial pneumonia,** three Newark areas (07102, 07103 and 07104) had the highest rates: 6.2, 5.3, and 5.1 per 1,000, respectively, and more than 3 to 4 times higher than the state average of 1.58. Following these zip codes, the highest rate areas were Jersey City 07305 and 07304 (4.8 and 4.6), East Orange 07017, Trenton 08618, New Brunswick 08901, Camden 08103, and Paterson 07501 (all 4.5), Wildwood 08260 and Camden 08102 (both 4.4), Paterson 07514 (4.2), and East Orange 07018 and Paterson 07522 (each4.1). These rates were all more than twice the statewide average. Most of these areas also had an overall ACS admission rate above the statewide level and should be viewed as problematic.

The highest rate for **congestive heart failure** was Camden 08102 (6.7 per 1,000), more than six times as high as the statewide average of 1.06. Following Camden 08102, the highest rate zip codes more than three times higher than the state rate were Newark 07102 and 07103 (5.8 and 5.2), Paterson 07501 (4.2), Jersey City 07305 (4.1), Camden 08103 and 08105 (4.0 and 3.9), Newark 07108 (3.9), Camden 08104 and Wildwood 08260 (both 3.7), and Newark 07112 (3.6).

EXHIBIT 3: 1997 AGE-ADJUSTED ADMISSION RATES FOR VARIOUS ACS CONDITIONS IN NEW JERSEY PER 1,000 POPULATION/AGE LESS THAN 65 YEARS (RANKED BY RATE)

ACS CONDITION	AGE-ADJ. ADM. RATE	RANK	ACS CONDITION	AGE-ADJ. ADM. RATE	RANK
Dehydration - Secondary Diagnosis	2.10	1	Cellulitis	0.24	16
Asthma	1.88	2	Grandmal Status	0.19	17
Bacterial Pneumonia	1.58	3	Convulsions - A	0.18	18
Congestive Heart Failure	1.06	4	Skin Graft with Cellulitis	0.13	19
Pelvic Inflammatory Disease	0.95	5	Nutritional Deficiency - Secondary	0.09	20
Gastroenteritis	0.91	6	Pulmonary Tuberculosis	0.04	21
Diabetes (A, B and C Combined)*	0.90	7	Congenital Syphilis	0.02	22
Dehydration - Primary Diagnosis	0.74	8	Iron Deficiency - Secondary Diagnosis	0.02	23
Kidney/Urine Infection	0.66	9	Hypoglycemia	0.01	24
COPD	0.57	10	Immunizations	0.01	25
Convulsion - B	0.54	11	Failure to Thrive	0.01	26
Angina	0.37	12	Other Tuberculosis	0.01	27
Severe ENT Infections	0.33	13	Nutritional Deficiency - Primary Diagnosis	0.00	28
Dental Conditions	0.30	14	Iron Deficiency - Primary Diagnosis	0.00	29
Hypertension	0.26	15			

*Represents sum of rates for Diabetes type A, B and C.
Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

EXHIBIT 4: 1997 AGE-ADJUSTED ADMISSION RATES FOR LEADING ACS CONDITIONS PER 1,000 POPULATION (RANKED BY RATE IN TOP 10 COUNTIES FOR EACH CONDITION)

ACS CONDITION	COUNTY	AGE-ADJ. ADM. RATE	RANK
Asthma	Essex	4.08	1
	Hudson	2.82	2
	Camden	2.42	3
	Atlantic	2.38	4
	Passaic	2.19	5
	Union	2.02	6
	Cape May	1.97	7
	Mercer	1.69	8
	Middlesex	1.67	9
	Burlington	1.60	10
Bacterial Pneumonia	Hudson	2.94	1
	Essex	2.65	2
	Cape May	2.29	3
	Passaic	1.92	4
	Mercer	1.88	5
	Atlantic	1.72	6
	Cumberland	1.68	7
	Union	1.60	8
	Camden	1.47	9
	Middlesex	1.38	10
Congestive Heart Failure	Essex	1.96	1
	Hudson	1.95	2
	Cumberland	1.62	3
	Camden	1.29	4
	Passaic	1.21	5
	Cape May	1.20	6
	Atlantic	1.20	7
	Mercer	1.16	8
	Gloucester	1.09	9
	Burlington	1.05	10

Source: New Jersey, New York and Pennsylvania UB-92 discharge Data for NJ Zip Codes

The next high rate ACS condition is **Pelvic Inflammatory Disease (PID).** This is an infection of the upper female genital tract that is commonly caused by sexual transmission of gonorrhea and/or chlamydia. If untreated, a severely painful pelvic abscess may develop that requires hospitalization for intravenous antibiotic therapy to control sepsis and prevent mortality. The highest rate for PID (Paterson 07501, 6.0 per 1,000) was more than six times as high as the PID state rate of .945. Following Paterson 07501, the highest rate zip codes were Perth Amboy 08861 (3.5), Paterson 07513, 07524 (both 3.3), Lawnside 08045 (3.2), Newark 07103, Paterson 07504, 07514, and 07502 (all 2.9), Paterson 07522 (2.8), and Ocean View 08230, Newark 07106, Clifton 07011, and Wildwood 08260 (all 2.6). The highest rates in Passaic County (an average of 1.90 per 1,000) are about twice the statewide rate. These rates are particularly alarming in Paterson since almost all of its zip codes are among the highest in the state, and about 2 to 6 times higher than the state average. More investigation is needed to identify the causes for such high rates for this condition in the Passaic area.

Secaucus 07094 in Hudson County was found to have the highest rate for **gastroenteritis** admissions of 4.8 per 1,000, about five times as high as the statewide rate of .91. Following Secaucus, the highest rate zip codes were Paterson 07502 (3.1), Wildwood 08260 (2.9), Bayonne 07002 (2.8), West New York 07093 and North Bergen 07047 (both 2.7), Plainfield 07060, and Jersey City 07305 and 07307 (all 2.6).

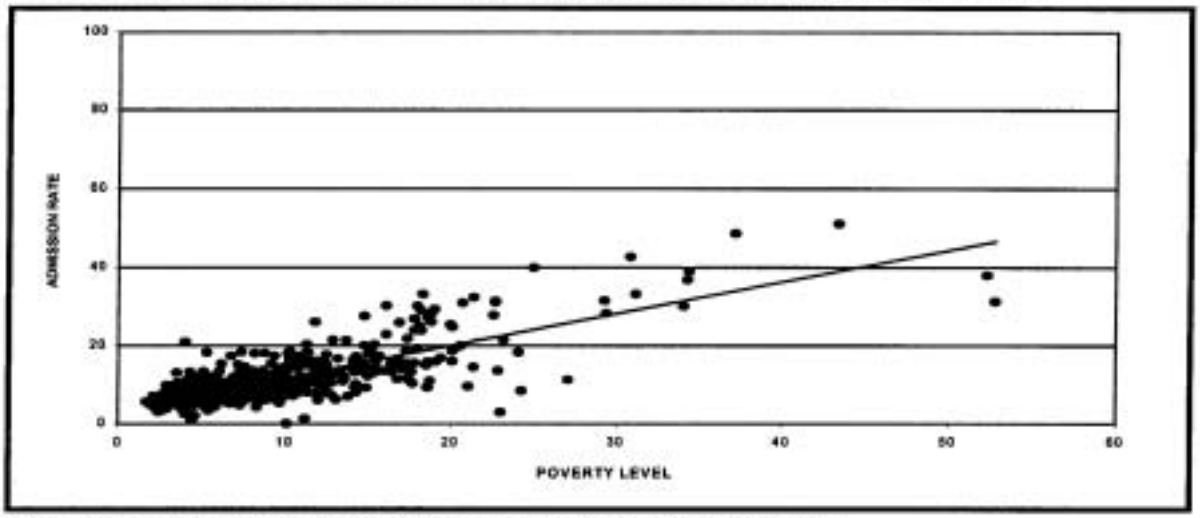
For the purpose of this study, the rates for **diabetes Type A, B and C** were combined. The highest rate zip codes were Newark 07102 (4.9), Sewaren 07077 (4.7), East Orange 07018 (4.6), Paterson 07501 (4.2), Camden 08103 (3.8), Newark 07103 (3.5), Camden 08104, 08105 and Newark 07104, 07108 (all 3.2). Most of these areas also had an overall ACS rate above the statewide level and should be viewed as problematic. The adjusted hospital admission rates of **kidney/urinary infections** in 1997 showed that Sewaren 07077 in Middlesex had the highest rate of 3.0 per 1,000, about five times as high as the state average of .65. Following Sewaren 07077, the highest rate zip codes were Keasbey 08832 in Middlesex and Avalon 08202 in Cape May (both 2.2).

ANALYSIS OF 1997 TOTAL ACS ADMISSIONS BASED ON POVERTY LEVEL OF SMALL AREAS

The literature suggests a strong correlation between hospitalization rates of patients with ACS conditions and their economic/financial status. We examined the impact of poverty level (percentage of households with income below $15,000) on ACS admission rates. Other possible indicators of the area, such as percentage of racial and ethnic groups, were highly correlated with poverty level and were eliminated in this analysis. **Exhibit 5** shows the scatter plot of 1997 age-adjusted ACS admission rates and poverty level with a graph of the fitted regression line superimposed, clearly showing a positive relationship between poverty level and ACS admission rates. The R-Square indicates that 62 percent of variations in the age-adjusted total ACS admission rates in 1997

are explained by variations in the poverty level. Zip codes with exceptionally high poverty level and relatively high admission rates (Newark 07103 and 07104, Jersey City 07305, and Paterson 07501) were examined, indicating that other factors besides poverty level influence their ACS admission rates. Elevated ACS admission rates in areas with high regression residuals are attributable to combined influence of socioeconomic characteristics other than poverty or to deficiencies in their healthcare delivery systems.

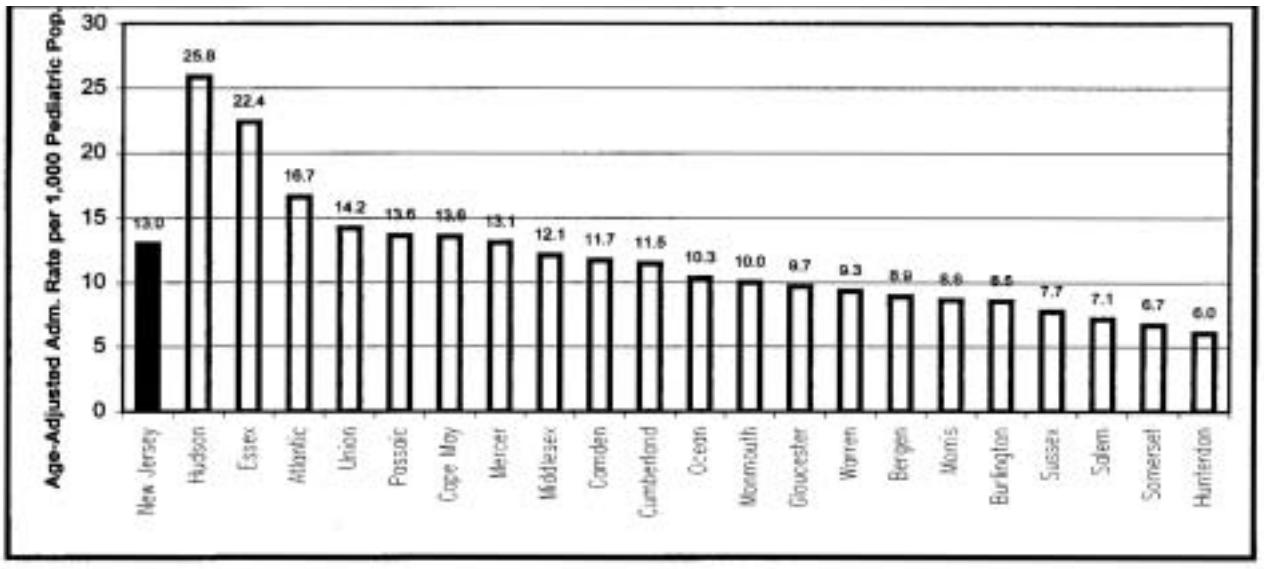
EXHIBIT 5: RELATIONSHIP BETWEEN 1997 AGE-ADJUSTED ACS ADMISSION RATES PER 1,000 POPULATION/AGE LESS THAN 65 YEARS AND POVERTY LEVEL (PERCENTAGE OF HOUSEHOLDS WITH INCOME LESS THAN $15,000), NEW JERSEY ZIP CODES*



NOTE: Each point on exhibit represents either a zip code or a ground zip code.
Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

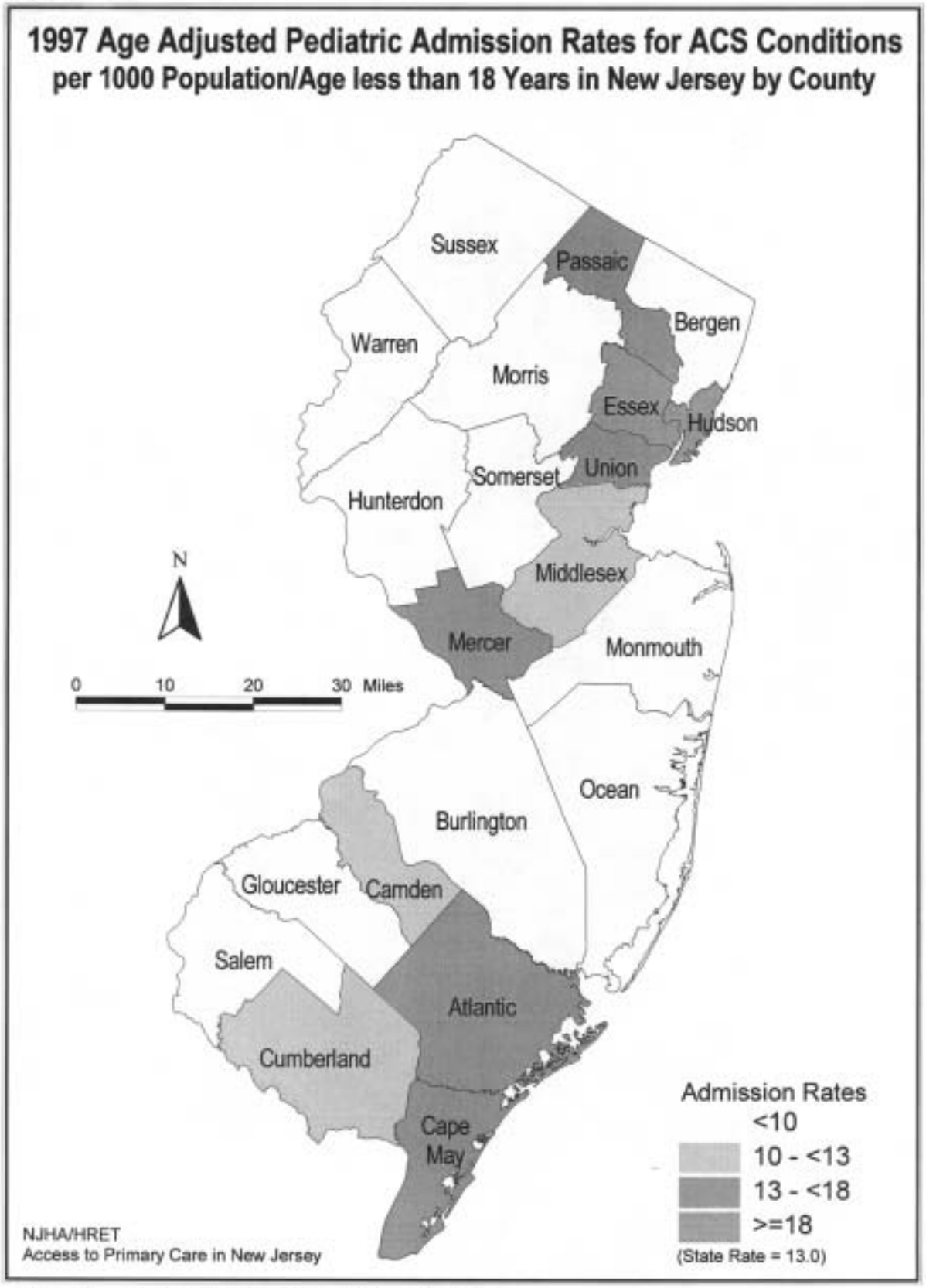
Pediatric Admissions - The overall state rate for pediatric ACS admissions in 1997 was 13.0 per 1,000 population, about 4 percent less than 1995 rate of 13.5 per 1,000. The age-adjusted pediatric ACS admission rates for New Jersey counties in 1997 are presented in **Exhibits 6 and 6A.** Seven of 21 counties had admission rates higher than the state average: Hudson, Essex, Atlantic, Union, Passaic, Cape May and Mercer.

EXHIBIT 6: 1997 AGE-ADJUSTED PEDIATRIC ADMISSION RATES FOR ACS CONDITIONS PER 1,000 POPULATION/AGE LESS THAN 18 YEARS, NEW JERSEY AND COUNTIES



Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

Exhibit 6 A



Source: NJ, NY & PA UB-92 Discharge Data for NJ Zip Codes

EXHIBIT 7:1997 AGE-ADJUSTED PEDIATRIC ADMISSION RATES FOR ACS CONDITIONS PER 1,000 POPULATION/AGE (<18), NEW JERSEY ZIP CODES WITH HIGHEST RATES

GROUPED ZIP CODE	MUNICIPALITY	COUNTY	AGE-ADJ. RATE	RANK
07102-1	Newark	Essex	44.74	1
07103-1	Newark	Essex	43.54	2
07104-1	Newark	Essex	42.70	3
07094-1	Secaucus	Hudson	36.28	4
07107-1	Newark	Essex	34.29	5
07304-1	Jersey City	Hudson	33.51	6
07060-1	Plainfield	Union	31.94	7
07307-1	Jersey City	Hudson	31.63	8
07306-1	Jersey City	Hudson	31.54	9
07108-1	Newark	Essex	31.50	10
08260-1	Wildwood	Cape May	30.53	11
07305-1	Jersey City	Hudson	30.50	12
07105-1	Newark	Essex	30.35	13
08401-1	Atlantic City	Atlantic	29.08	14
08901-1	New Brunswick	Middlesex	28.52	15
08609-2	Trenton	Mercer	27.55	16
08861-1	Perth Amboy	Middlesex	27.19	17
08232-1	Pleasantville	Atlantic	26.77	18
08611-1	Trenton	Mercer	26.72	19
08103-1	Camden	Camden	26.33	20
07087-1	Union City	Hudson	26.10	21
07302-1	Jersey City	Hudson	25.14	22
07106-1	Newark	Essex	25.09	23
07606-2	South Hackensack	Bergen	24.96	24
07501-2	Paterson	Passaic	24.83	25
07018-1	East Orange	Essex	24.69	26
07047-1	North Bergen	Hudson	23.99	27
08102-1	Camden	Camden	23.97	28
07093-1	West New York	Hudson	23.85	29
08618-1	Trenton	Mercer	23.48	30
07017-1	East Orange	Essex	23.34	31

Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

All these counties have a very high poverty level, a very diverse ethnic and racial population mix, a very high number of immigrants and a large number of migrant workers. Hudson's rate (25.8 per 1,000) was significantly higher than other counties, almost twice the state average of 13.0 per 1,000. Overall, the pediatric rates showed a much smaller range than the total 1997 rates, and 122 small areas/zip codes had a rate higher than the state average. **Exhibit 7** lists small areas with highest rates (more than 23 per 1,000). The high rates are mostly in very poor urban or rural areas and show a visible dichotomy between suburban and urban/rural rates.

Pediatric admission rates for individual ACS conditions in 1997 is shown in **Exhibit 8.** Excluding dehydration as secondary diagnosis, asthma, bacterial pneumonia, and gastroenteritis were the three leading causes for New Jersey pediatric ACS admissions in 1997. Other conditions with higher rates (more than .5 per 1,000) were dehydration as primary diagnosis, severe ENT infections, convulsions and kidney/urinary infection.

Exhibit 9 lists the top 10 high rate counties for three of the seven leading individual ACS conditions for pediatric admission in 1997. Similar to total admissions, the rates appear to be much higher in some counties compared to others. For example, the pediatric admission rate for asthma in Essex (7.1 per 1,000) was more than six times higher than Hunterdon (1.0 per

EXHIBIT 8: 1997 AGE-ADJUSTED PEDIATRIC ADMISSION RATES FOR VARIOUS ACS CONDITIONS IN NEW JERSEY PER 1,000 POPULATION/AGE LESS THAN 18 YEARS (RANKED BY RATE)

ACS CONDITION	AGE-ADJ. ADM. RATE	RANK	ACS CONDITION	AGE-ADJ. ADM. RATE	RANK
Asthma	3.04	1	Congenital Syphilis	0.08	15
Bacterial Pneumonia	1.88	2	Iron Deficiency - Secondary Diagnosis	0.06	16
Dehydration - Secondary Diagnosis	1.53	3	Failure to Thrive	0.04	17
Gastroenteritis	1.41	4	Congestive Heart Failure	0.04	18
Dehydration - Primary Diagnosis	1.27	5	Immunizations	0.03	19
Severe ENT Infections	0.69	6	COPD	0.03	20
Convulsions - A	0.57	7	Skin Graft with Cellulitis	0.02	21
Kidney/Urine Infection	0.56	8	Nutritional Deficiency - Secondary	0.02	22
Dental Conditions	0.47	9	Hypertension	0.02	23
Diabetes (A, B and C Combined)	0.35	10	Hypoglycemia	0.02	24
Convulsion - B	0.31	11	Pulmonary Tuberculosis	0.01	25
Pelvic Inflammatory Disease	0.30	12	Iron Deficiency - Primary Diagnosis	0.01	26
Grandmal Status	0.24	13	Other Tuberculosis	0.01	27
Cellulitis	0.13	14	Nutritional Deficiency - Primary Diagnosis	0.00	28
All Conditions	**12.99**				

Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

EXHIBIT 9: 1997 AGE-ADJUSTED PEDIATRIC ADMISSION RATES FOR LEADING ACS CONDITIONS PER 1,000 POPULATION / AGE (<18), (RANKED BY RATE IN TOP 10 COUNTIES FOR EACH CONDITION)

ACS CONDITION	COUNTY	AGE ADJ. AMD. RATE	RANK
Asthma	Essex	7.15	1
	Atlantic	4.81	2
	Hudson	4.55	3
	Camden	3.58	4
	Union	3.20	5
	NJ State	3.04	6
	Passaic	3.01	7
	Middlesex	2.86	8
	Mercer	2.77	9
	Cape May	2.59	10
Bacterial Pneumonia	Hudson	5.15	1
	Essex	3.02	2
	Mercer	2.67	3
	Cape May	2.23	4
	Atlantic	2.08	5
	Passaic	2.08	6
	Cumberland	1.92	7
	NJ State	1.88	8
	Union	1.75	9
	Ocean	1.60	10
Gastroenteritis	Hudson	4.76	1
	Atlantic	2.65	2
	Cape May	2.40	3
	Passaic	1.94	4
	Union	1.75	5
	Essex	1.72	6
	Middlesex	1.59	7
	NJ State	1.41	8
	Mercer	1.37	9
	Cumberland	1.21	10

Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

1,000). With several exceptions, the same 10 counties appeared to have the highest rates for almost all the leading conditions.

Two areas had the highest rates for **asthma** admissions, Newark 07102 (20.3) and 07103 (19.1). The next high rate areas show a sharp decline from these areas. They include Newark 07108 (14.3), 07104 (13.2), New Brunswick 08901 (12.7), Newark 07107 (12.1), Atlantic City 08401 (10.8), Camden 08103 (10.3) and South Hackensack 07606 (10.0).

Zip codes with the highest rates for **bacterial pneumonia** were Secaucus 07094 (8.1 per 1,000), Jersey City 07305 (7.4), Newark 07102 and 07105 (6.8 and 6.7, respectively), Jersey City 07304, 07306 and 07307 (7.3, 6.5, and 6.4, respectively), Trenton 08609 (6.3), Newark 07104 (6.2), and Trenton 08611 (6.0).

Secaucus had the highest rate for **gastroenteritis** (10.9 admissions per 1,000). Zip codes with the next highest rates were Wildwood 08260 (6.6), Plainfield 07060 (6.4), Jersey City 07307 (6.1), North Bergen 07047 (6.0), West New York 07093 (5.7), Jersey City 07306 (5.6), North Arlington 07031 (5.4), and South Hackensack 07606 (5.1). Out of these nine top areas, five areas are in Hudson County.

Zip codes with the highest rates for **dehydration as primary diagnosis** were Newark 07105 (7.2 per 1,000), Sea Girt 08750 (6.3), Newark 07104 (5.7), Kenilworth 07033 (4.8), Newark 07107 (4.6), Secaucus 07094 and Newark 07103 (4.5), Clark 07066 (4.3), and Newark 07102 (4.1). The highest rates for severe ENT infections were South Hackensack 07606 (4.1), Jersey City 07307 (3.7), Garwood 07027 (3.1), and Jersey City 07304 (3.0). The areas with highest rates for convulsions were Highlands 07732 (3.7), Moonachie (3.3), Vauxhall 07088 (3.1), Harrison 07029 (2.7) and Avalon 08202 (2.2). The areas with the highest rates for kidney/urinary infection were Avalon 08202 (6.1), Sewaren 07077 (3.9), Carlstadt 07072 (3.3), Clifton 07014 and Ridgefield Park 07660 (2.7), and Port Monmouth 07758 and Closter 07624 (2.5).

ANALYSIS OF 1997 PEDIATRIC ACS ADMISSIONS BASED ON POVERTY LEVEL OF SMALL AREAS

Similar to total admissions, the scatter plot and the regression line for pediatric admissions clearly showed a positive relationship between poverty level and pediatric admission rates. The R-Square, however, is much weaker than total admissions (62%) and indicates that only 44 percent of variations in the age-adjusted pediatric admission rates are explained by variations in the poverty level. Pediatric admissions in 1997 appeared to be more concentrated and have lower variation. In this model, the influence of poverty is weaker, compared to those examined earlier, suggesting that other demographic and socioeconomic characteristics of populations or deficiencies in their healthcare delivery systems have a stronger power explaining underlying variation of pediatric ACS admissions.

COMPARATIVE ANALYSIS OF 1995 AND 1997 DATA

Overall, the ACS admission rates were lower in 1997 compared to 1995. The statewide average in 1997 was 13.6 per 1,000 population; a 12 percent decline compared to 1995 rate of 15.5. As shown in **Exhibit 10,** nine counties in 1997 had admission rates higher than the state average compared to 10 counties in 1995. The admission rate in Salem County showed a significant decline of 36 percent between 1995 and 1997. Declines in Passaic, Atlantic, Cumberland

EXHIBIT 10: 1995 AND 1997 AGE-ADJUSTED TOTAL AND PEDIATRIC ADMISSION RATES FOR ACS CONDITIONS PER 1,000 POPULATION/AGE LESS THAN 65 YEARS, NEW JERSEY AND COUNTIES

AGE-ADJUSTED TOTAL ADMIS. RATE			
	1995	1997	% CHANGE
New Jersey	**15.5**	**13.6**	**-12.3%**
Essex	26.3	22.6	-14.1%
Hudson	24.6	22.0	-10.6%
Passaic	20.6	16.2	-21.4%
Atlantic	19.7	15.6	-20.8%
Salem	18.3	11.7	-36.1%
Cumberland	17.6	14.2	-19.3%
Cape May	16.7	15.8	-5.4%
Union	16.4	14.6	-11.0%
Mercer	16.3	14.3	-12.3%
Camden	15.6	14.4	-7.7%
Gloucester	14.5	12.7	-12.4%
Warren	14.1	12.0	-14.9%
Monmouth	13.1	11.1	-15.3%
Middlesex	13.2	12.3	-6.8%
Ocean	12.6	10.8	-14.3%
Sussex	11.5	9.4	-18.3%
Bergen	10.1	9.0	-10.9%
Morris	8.8	7.9	-10.2%
Somerset	7.7	7.3	-5.2%
Hunterdon	7.6	7.1	-6.6%
Burlington	7.5	10.6	41.3%

AGE-ADJUSTED PEDIATRIC ADMIS. RATE			
	1995	1997	% CHANGE
New Jersey	**13.5**	**13.0**	**-3.7%**
Hudson	26.8	25.8	-3.7%
Essex	22.6	22.4	-0.9%
Atlantic	19.7	16.7	-15.2%
Passaic	16.8	13.6	-19.0%
Cape May	15.9	13.6	-14.5%
Mercer	13.8	13.1	-5.1%
Union	13.4	14.2	6.0%
Cumberland	13.2	11.5	-12.9%
Salem	12.9	7.1	-45.0%
Middlesex	11.9	12.1	1.7%
Camden	11.6	11.7	0.9%
Ocean	11.5	10.3	-10.4%
Monmouth	10.8	10.0	-7.4%
Gloucester	10.6	9.7	-8.5%
Warren	9.5	9.3	-2.1%
Bergen	9.0	8.9	-1.1%
Sussex	8.6	7.7	-10.5%
Morris	8.3	8.6	3.6%
Hunderton	6.6	6.0	-9.1%
Somerset	6.3	6.7	6.3%
Burlington	5.9	8.5	44.1%

Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

and Essex counties were also relatively high, about 21, 19 and 14 percent, respectively. All these counties are either considered pockets of poverty or have several known pockets of poverty. Despite these improvements, many county-level rates continue to be very high compared to the statewide average and other states.

The total ACS admission rates in all counties showed some level of decline, except for Burlington County. The admission rate in this county changed from 7.5 per 1,000 in 1995 to 10.6 per 1,000 in 1997, a relatively significant increase of 41 percent. Further investigation is needed to identify the causes of this elevated rate, if it may not be attributed to chance due to random fluctuations.

A similar pattern was observed in comparative analysis of pediatric admissions. Overall, the ACS pediatric admission rates were lower in 1997 compared to 1995 but the extent of decrease was much lower and about a third of the 12 percent rate decrease observed for total admissions. Usually more resources in communities are routinely spent on children and target their access problems, therefore, introduction of a change has less of an impact on children's rates. However, the number of counties with

pediatric admission rates higher than the state average increased in 1997. The pediatric admission rate in Salem County in 1997 showed a significant decline of 45 percent compared to 1995. Declines in Passaic, Atlantic, Cape May and Cumberland counties were also relatively high, about 19, 15, 14 and 13 percent, respectively. The rate in Essex County showed a minimal decrease in pediatric admissions, less than 1 percent, while it showed about a 14 percent decrease in total admissions.

The 1997 ACS pediatric admission rates, compared to 1995 rates, increased in six counties: Union, Middlesex, Camden, Sussex, Somerset and Burlington. In 1997, the rate in Union County rose from 13.4 to 14.2 - about a 6 percent increase-and exceeded the statewide average. The pediatric admission rate in Burlington County increased from 5.9 to 8.5 per 1,000, showing a significant increase of 44 percent. Further investigation is needed to identify the possible causes of these elevated rates, if not due solely to random fluctuations.

Exhibit 11 demonstrates 1995 and 1997 age-adjusted admission rates for various ACS conditions. Among the top 12 highest rate conditions (about .5 per 1,000), diabetes, pelvic inflammatory disease and angina showed significant decreases: the highest percentage change of 44, 37, and 23, respectively. On the contrary, CHF and dehydration as primary diagnosis showed significant increases of 9 and 24 percent, respectively. In pediatric admissions, diabetes and gastroenteritis rates showed remarkable decreases, 49 and 21 percent, respectively. Dehydration as primary diagnosis, kidney/urinary infection, and dental conditions, on the other hand, showed significant increases of 35, 14 and 14 percent, respectively.

EXHIBIT 11: 1995 AND 1997 AGE-ADJUSTED TOTAL AND PEDIATRIC ADMISSION RATES FOR VARIOUS ACS CONDITIONS IN NEW JERSEY PER 1,000 POPULATION/AGE LESS THAN 65 YEARS (TOP 10 LISTED)

AGE-ADJUSTED TOTAL ADMIS. RATE				AGE-ADJUSTED PEDIATRIC ADMIS. RATE			
	1995	1997	% CHANGE		1995	1997	% CHANGE
All ACS Conditions	15.46	13.61	-11.9%	All ACS Conditions	13.54	12.99	-4.0%
Asthma	2.17	1.88	-13.5%	Asthma	2.95	3.04	3.2%
Dehydration - Secondary Diagnosis	2.16	2.10	-3.2%	Bacterial Pneumonia	2.07	1.88	-9.1%
Bacterial Pneumonia	1.81	1.58	-13.0%	Gastroenteritis	1.77	1.41	-20.5%
Diabetes (A,B and C Combined)	1.60	0.90	-44.0%	Dehydration - Secondary Diagnosis	1.45	1.53	6.0%
Pelvic Inflammatory Disease	1.51	0.95	-37.6%	Dehydration - Primary Diagnosis	0.94	1.27	34.6%
Gastroenteritis	1.10	0.91	-17.5%	Severe ENT Infections	0.79	0.69	-12.3%
Congestive Heart Failure	0.97	1.06	9.4%	Diabetes (A, B and C Combined)	0.69	0.35	-48.7%
Kidney/Urine Infection	0.66	0.66	-0.4%	Convulsions - A	0.68	0.57	-16.0%
Dehydration - Primary Diagnosis	0.60	0.74	24.2%	Kidney/Urine Infection	0.50	0.56	13.7%
Convulsion - B	0.59	0.54	-9.1%	Dental Conditions	0.42	0.47	14.2%

Source: New Jersey, New York and Pennsylvania UB-92 Discharge Data for NJ Zip Codes

DISCUSSION

Previous studies have reported that New Jersey ACS admission rates for non-elderly populations have been very high, compared to other states. In the Ambulatory Care Access Project, Billings showed that out of 10 states examined in 1989, New Jersey had the highest rate of ACS admissions for low-income non-elderly populations, and the second highest rate for these admissions in high income areas (Billings, et al., 1993; Billings, 1994). Low-income areas were found to have ACS rates more than 3.5 times higher than high-income areas. In the present study, the overall state age-adjusted rate for ACS admissions in 1997 was 13.6 per 1,000 population. Although this rate shows the first drop in the state's overall upward trend (14.7 per 1,000 in 1991 and 1992, as reported by Kumar and

West in 1996 and 15.5 in 1995 as found in this study), compared to other states it is still considered significantly high.

The state's very high ACS admission rate may be attributed to three probable causes, according to Billing's findings reported for the Ambulatory Care Access Project (Billings, 1994). First, physicians in New Jersey relative to other states may have practice styles that are more reliant on hospitalization for management of ACS conditions. Second, New Jersey's previous policies regarding the reimbursement system used to protect hospitals from the financial strains of uncompensated care and, therefore, did not encourage development of a strong outpatient delivery system for low-income residents. The system would indirectly foster greater reliance on hospital use than on preventive and primary care services. It appears that transition to a new reimbursement system within the last 10 years has not created a major impact on ACS admission rates. Third, although ACS admission rates in New Jersey are very high for both low-and high-income areas, the extremely high rates for low-income areas may be a warning sign of serious deficiencies in the state's outpatient delivery system for indigent patients.

Access is a multifaceted and multidimensional problem. If the observed decline in 1997 ACS admission rates cannot be attributed to chance due to random fluctuations, it can be reflective of many different factors that might have changed the service utilization patterns of medically indigent populations or practice style and behavior of providers in managing these patients. Empirical evidence suggests that having a stable source of care increases the likelihood that care will be continuous and less costly (Cohen and Cunningham, 1995). The shift to managed care for indigent populations, therefore, should provide this access and relieve the hospitals' burden for providing care, which despite charity care funds remains to a great extent uncompensated.

In late 1995, the population using Assistance to Families with Dependent Children (AFDC) in New Jersey was mandated to be enrolled in Medicaid managed care as an initial step for enrolling all Medicaid eligibles. Comparative analysis of the data for the years 1995 and 1997 in this study was partly performed to examine whether the enrollment of the Medicaid population in managed care had any impact on primary care services. The observed decline of 1997 rates could be attributed to the shift to Medicaid managed care, but in two opposing ways. While it may support the underlying assumption for improved access to primary care services under a managed care environment, it could otherwise be indicative of managed care organizations' tight policy on hospital admissions or denying authorization requests for admissions. Although the rates have generally dropped, the rates are still significantly high compared to other states.

Many other factors may explain the observed decline in ACS admission rates, including the overall policy shift from curative care to preventive healthcare and the emphasis on access to primary care in the community, and/or managed care organizations tightening admission thresholds for some diagnoses and denying reimbursements. Another possible contributing factor for this two-year decline in ACS rates could be hospital-based programs that facilitate access to primary care services for indigent and uninsured populations. During 1994 and 1995, many New Jersey hospitals conducted extensive needs assessments of their communities and initiated programs to address the identified needs. The role of patient and provider-related factors, what they expect and how they behave, plus demographic and racial structure of areas, demands on the safety net, and environmental factors may also help explain these rate changes. It is also critical to know what is going on within the system, the geographic areas experiencing the greatest increases or decreases and what is happening in the system that affects children differently from adults.

At this point, we do not have sufficient data to determine the impact of the above factors or possibly others on access to care, or to assess if the observed changes are stabilized changes or are transient and are happening by pure chance due to random fluctuations over time. A series of longitudinal data for longer periods of time is needed for a more accurate assessment of the independent or combined impact of these factors. Also needed is collection of sufficient data to study ambulatory care resources for low-income populations or to compare the state's Medicaid program with other state programs (such as physicians participation and payment levels). The large disparity and high ACS admission rates for low-income areas of the state suggest merit for further assessment of needs and outcomes, particularly considering the projected increasing racial and ethnic diversity of the state.

PHASE II: QUALITATIVE ANALYSES, FOCUS GROUP STUDY OF PROBLEMATIC AREAS

During Phase II, 21 focus groups were conducted separately with healthcare providers and consumers in areas identified with the highest ACS rates. The following seven themes were highlighted in discussion of these groups on barriers and reasons for which indigent consumers are not properly accessing primary care in their areas.

1. **Hassles Associated with the Healthcare Delivery System** - Consumers expressed concern over the lack of sufficient numbers of physicians accepting Medicaid patients. They have to wait months to schedule an appointment and then forget that it has been scheduled. When they are seen, they are given prescriptions they cannot afford to fill; co-payment is perceived to be cost-prohibitive. The NJ FamilyCare program requires a complex application process and is especially difficult for illiterate and non-English-speaking individuals. Newborns experience delays in entering the healthcare system due to the slow and bureaucratic Medicaid and HMO process. Physicians expressed frustration in the complicated insurance regulations that are mandated and disgust in not receiving prompt reimbursements.
2. **Prevention is not a Priority** - Feeling overwhelmed with the challenges of daily living, indigent respondents do not seek medical care until a crisis emerges. They use the emergency room because it is conveniently located, open 24 hours a day, and no charge is incurred if they are classified as "charity care." Due to lack of education, indigent consumers are unaware of the benefits and importance of primary/preventive care. Many working poor are discouraged by their employers from making and keeping daytime appointments with physicians' offices. In addition, immigrant and undocumented aliens and migrant workers are often cited as those most in need of healthcare, but they fear being "discovered" by government officials if care is obtained. They, therefore, will postpone seeking care and only go to the emergency room when in dire need of medical care.
3. **Inconvenience Associated with Physicians' Hours and Locations** - Physicians' office hours are typically limited to weekdays. With welfare reform now in place, many indigent persons are working during this time period and cannot leave work for a medical appointment without ramifications. Clinics have more available days and hours but not all individuals qualify for care at clinics. Hospital emergency rooms are often much more conveniently accessible than physicians' offices.
4. **Language Barriers** - New Jersey has a very diverse racial and ethnic population mix. Those with language barriers do not feel they can communicate with English-speaking physicians in outpatient settings and believe the emergency room is a better place to seek care since interpreters may be more readily available.
5. **Transportation Barriers** - Transportation options are often limited for people living in rural settings, seniors and those with disabilities and diseases. Some options provide only one-way transportation, and cab fare is viewed as being prohibitively expensive.
6. **Childcare Barriers** - Childcare barriers exist for mothers with preschool children. Since weather conditions and other barriers often prohibit bringing children to doctors' appointments, these mothers without child care are not able to seek timely care and forego their own medical care. Many childcare providers are grandparents who neglect preventive care due to child-rearing responsibilities and physical difficulties associated with traveling with young children.
7. **Negative Attitudes of Healthcare Providers** - Consumers are intimidated or "turned off" by physicians who lack cultural sensitivity and/or seem judgmental or uninterested in their patients. Some ethnic respondents feel they are discriminated against and treated in a condescending manner. The "autoassignment" of physicians in the HMO system is especially bothersome to patients as they feel like a number instead of an individual. Patients are unaware that they have the option to call their insurance company to request a change of physician if they are unhappy.

EXHIBIT 12: SUMMARY OF BARRIERS BY TYPE

System-Related	Consumer-Related	Provider-Related
Lack of full prescription coverage	Personal motivation– Prevention is not a priority	Insufficient number of providers accepting Medicaid
Complexity of NJ FamilyCare application process	Missed appointments	Limited office hours – lack of evening and weekend hours
Immigration laws – consumer fear of "discovery"	Language barriers	Long waits to schedule appointments
Limited public transportation routes and options	Lack of transportation	Long waits to see providers
Autoassignment of physicians in public insurance programs	Lack of childcare services	

RECOMMENDATIONS

New Jersey's statewide ACS admission rate is elevated in comparison with other states, and many of the county-level rates are also higher than New Jersey's average rates. The findings of this study showed many New Jersey residents, especially those who are uninsured or underinsured, have a significant problem with access to primary care. Since ACS admission rates are strongly associated with a community's poverty level, any efforts to improve the primary healthcare system should focus on an array of factors related to the demographic, socioeconomic, cultural and system-level barriers specific to areas with major access problems.

During Phase 2 of this study, consumers and professionals who work or reside in the problematic access areas were asked to share their feedback on the specific barriers to accessing care in their communities and possible solutions to those barriers. Based on the conclusions of other studies and suggestions received in our study, the following is a selected list of recommendations developed for consideration of state government, hospitals and public health officials as an effort to improve access to primary care services by New Jersey residents.

SYSTEM IMPROVEMENTS

1. Design multidisciplinary clinics allowing adults and children to be seen at the same setting.
2. Add more non-English-speaking staff to hospital clinics and other primary care settings.
3. Utilize nurse practitioners and/or physician assistants in primary care settings to enhance provider hours.
4. Offer more appointment slots to reduce waiting periods. Allow for "same day" appointments.
5. Provide consumers easy phone access to healthcare providers.
6. Add evening and weekend office hours to clinicians' practices that serve the Medicaid and "working poor" populations.
7. Create more neighborhood-based and work site-based health clinics and mobile units. Consider setting up primary care clinics within school, church, other community-based organizational settings and large work sites of low-income employers.
8. Establish contracts with Medicaid managed care providers to allow patients to fill prescriptions at clinic or hospital pharmacies to improve medication compliance.

9. Provide more training for hospital or community outreach workers stationed in the emergency department, outpatient clinics, admission or cashier areas to assist patients' enrollment in NJ FamilyCare.
10. Monitor all hospital admissions and emergency department visits for ACS conditions.

EDUCATION INITIATIVES

11. Distribute a comprehensive directory of health resources/services and providers by a trained person/volunteer in the emergency department to consumers, to assist patients with selecting a primary care provider in their community.
12. Continue to provide patient education classes on proper control, self-management, use of medications, diet and signs and symptoms of chronic conditions, such as asthma, diabetes, congestive heart failure and other leading causes of adult or pediatric ACS hospitalizations.
13. Create educational materials in languages besides English and Spanish to provide better health education to New Jersey's ethnically diverse population, especially on managing the leading ACS conditions.
14. Include cultural competency training for physicians, nurses and other healthcare workers through yearly hospital in-services. The training programs should be aimed at improving performance of providers and reducing the underlying distrust of consumers.

BIBLIOGRAPHY

Alexander, J.A., Lee, S.D., Griffith, J.R., Mick, S.S., Lin, X. and Banaszak-Holl, J. 1999. Do market-level hospital and physician resources affect small area variation in hospital use? Medical Care Research and Review, 56(1), 94.

Billings, J. 1993. Findings from Small Area Analysis of Ambulatory Care Sensitive (ACS) Conditions, Hudson-Bergen counties, 1989-1990, Local Advisory Board II, Farleigh Dickenson University, Hackensack, NJ.

Billings, J. 1994. Findings on "ACS" Admission Rates and Other Small Area Analysis Results, Lab VI. Brick, NJ: Jersey Coast Health Planning.

Billings, J., and Hasselblad, V. 1989. Use of Small Area Analysis to Assess Performance of the Outpatient Delivery System in New York City, New York Health Systems Agency.

Billings, J., Zeitel, L., Lukomnik, J., et al. 1993. Impact of Socioeconomic Status of Hospital Use in New York City, Health Affairs. Spring: 162-173.

Billings. J., Anderson, G.M. & Newman, L.S. 1996. Recent Findings on Preventable Hospitalizations, Health Affairs, 15, (3, fall): 239-249.

Bindman, A.B., Grumbach, K., Osmond, D., et al. 1995. Preventable hospitalizations and access to health care. JAMA, 274. (4), 305-311.

Brown, M.E., Bindman, A.B., et al. 1998. Monitoring the consequences of uninsurance: A review of methodologies. Medical Care Research & Review, 55 (2), 177.

Cohen, J.W. and Cunningham, P.J. 1995. Medicaid physician fee levels and children's access to care. Health Affairs, 14, (1): 255-262n.

Djojonegoro, B.M., Aday, L.A., Williams, A.F. et al. 2000. Area income as a predictor of preventable hospitalizations in the Harris County Hospital District, Houston. Texas Medicine, 96 (1): 58-62.

Gadomski, A., Jenkins, P., et al. 1998. Impact of Medicaid primary care provider and preventive care on pediatric hospitalization. Pediatrics, 1 (101) 3: 460.

Giuffrida, A., Gravelle, H., Roland, M., et al. 1998. Can we use ambulatory sensitive admission rates as primary care quality indicators? Evidence from England. Abstract Book Association for Health Services Research, 15: 104-105.

Health Visions, Inc. 1995. A Study of Avoidable and Preventable Hospitalization in Region V; Small Area Analysis Approach, Health Vision, Inc. Pennsauken, NJ.

Institute for the Future. 2000. Health and healthcare 2010: the forecast, the challenge. Jossey-Bass Publishers, San Francisco, CA.

Kumar, A. and West, B. 1996. Access to Primary Care Central New Jersey: A Small Area Analysis of Avoidable Hospitalizations During Years 1991 and 1992. Lawrenceville, NJ: Mid-State Health Advisory Corporation, Local Advisory Board IV, Rider University.

New Jersey Department of Health and Senior Services (NJDHSS). 1991. Healthy New Jersey 2000: A Public Health Agenda for the 1990's New Jersey Department of Health, Trenton, NJ.

New Jersey Department of Health and Senior Services (NJDHSS). 2000. A Health Agenda for the First Decade of the New Millennium. Healthy New Jersey 2010, Vol. 1.

Newman L.S., Blank, A.E. and Billings, J. 1992. Health profiles of New York City communities. Journal of Ambulatory Care Management, 15 (4): 63-76.

O'Sullivan M.J. and Volicer, B. 1996. Preventable Hospitalizations: A tool for planning and marketing ambulatory health care services. Journal of Ambulatory Care Management, 84-95.

Shi, L., Samuels, M.E., Pease, M., Bailey, W.P., Corley, E.H., et al. 1999. Patient characteristics associated with hospitalizations for ambulatory care sensitive conditions in South Caroline. Southern Medical Journal, 92 (10): 989-98.

U.S. Department of Commerce. Bureau of Census. 1999 and 2000. Statistical Abstrat of the United States. Washington, D.C.: U.S. Government Printing Office.

Utah Department of Health. 1999. Small area analysis of hospitalizations for ambulatory care sensitive (ACS) conditions in Utah, 1992-1996. Office of Health Data Analysis & Bureau of Surveillance and Analysis.

Vali, Firoozeh M. 1996. Asthma: Use of health services by adults and children. Paper presented at the New Jersey Public Health Association 1996 Annual Meeting, Woodbridge, NJ. Also appeared in Essex and Union LAB, Needs Assessment for Region III . Planning Report No. 11, Chapter 8.

Wennberg, J.E. and Gittelsohn, A. 1973. Small area variations in healthcare delivery. Science, 182: 1102-1108.

Wennberg, J.E., Mulley, A.G. Hanley, D. et al. 1988. As assessment of prostatectomy for benign urinary tract obstruction: geographic variations and evaluation of medical care outcomes. JAMA, 259: 327-31.

760 Alexander Road
PO Box 1
Princeton, NJ 08543-0001
www.njha.com