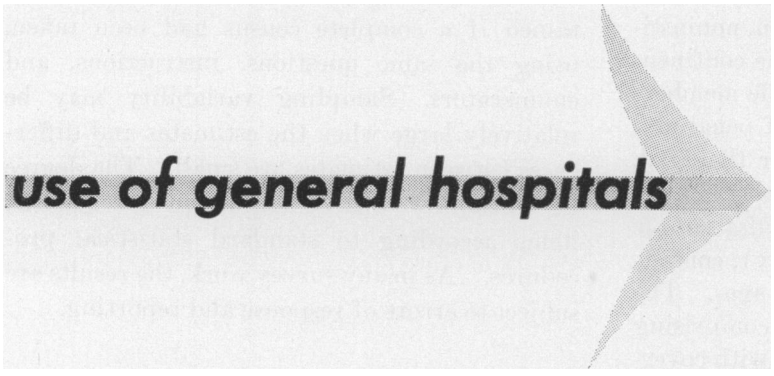

Demographic and Ecologic Factors

MAURICE E. ODOROFF, M.A.
LESLIE MORGAN ABBE, B.S.

Drawn from data compiled in a national household survey, this report gives provisional findings on current levels of general hospital use in relation to personal and geographic characteristics.

PLANNING for general hospitals has included a continuing search for valid standards of need. In 1947 uniform standards for the number of beds needed came into general use with the development of statewide hospital plans under the Hospital Survey and Construction (Hill-Burton) Act. These standards reflected the consensus of judgment of the period. They were largely lacking a base of actual experience in the needs of a population whose characteristics were known (*1*). During the subsequent decade the Nation's general hospital plant has increased by one-fourth, or more than 150,000 beds. At the same time changing techniques in the care and prevention of disease and illness have modified requirements for the physical facilities to insure adequate care. It is now essential to reassess these requirements.

Mr. Odoroff is chief, and Mr. Abbe is assistant chief, Program Evaluation and Reports Branch, Division of Hospital and Medical Facilities, Public Health Service.

As a first step in defining more precisely standards of need for general hospitals, the Public Health Service, through its Division of Hospital and Medical Facilities, has contracted for a survey of the present level of use of general hospitals. The data on use have been matched with data on personal characteristics and geographic and economic factors. Such a study permits identifying the circumstances which accompany varying levels of use and points the way to more intensive studies of real need. It achieves a link with the population served that cannot be had through studies of hospital records alone, since these records cover only those who choose to use the hospital.

Description of Study

The study of general hospital use is based on a sample household survey on a national scale. It was conducted by the Bureau of the Census through supplemental questions asked in its regular monthly current population survey.

This survey provides official Government statistics on total employment and unemployment, as well as periodic data on many other social and economic characteristics of the population (*2*, *3*). The sample used in the survey of hospital use was drawn from the civilian, noninstitutional population living within the continental United States. It did not include members of the armed services or inmates of penal and mental institutions or of homes for the aged, infirm, and needy. It includes about 27,000 households (three-fourths of the regular sample size of the current population survey), consisting of about 90,000 persons of all ages. The sample was spread over 330 areas comprising 638 counties and independent cities, with coverage in each of the 48 States and the District of Columbia. The survey was made in September 1956 after a pretest in Philadelphia in June 1956, which included about 650 households and 2,100 persons.

For each family a history was obtained of hospitalization and outpatient care received by each of its members during the previous 12-month period. The questions asked sought to learn how frequently, how long, for what conditions, and in what hospitals or related facilities such care was obtained. Personal characteristics, such as residence address, sex and race, age, veteran status, and occupation, were identified through the standard inquiries of the regular monthly current population survey.

In addition, economic data were obtained for each household, showing income level, status with respect to hospital insurance coverage, and methods of payment for hospital care received. Particular attention was given to determining the place of care with respect to the type of place of residence (metropolitan, urban, or rural) of the patient. Throughout the study the terminology used follows standard definitions of the Bureau of the Census (*4*).

Certain limitations of the data must be noted. Institutional population is excluded for practical reasons arising from the method of survey. Also, any approach to reporting by household survey for a 12-month prior period of time fails to include a record of persons who used hospital care during the past year, but who died, emigrated, or entered the armed services before the survey date.

The figures reported are estimates based on a sample. Accordingly, they may differ somewhat from the figures that would have been obtained if a complete census had been taken, using the same questions, instructions, and enumerators. Sampling variability may be relatively large when the estimates and differences between estimates are small. The degree of variability will be calculated for selected items according to standard statistical procedures. As in any survey work, the results are subject to errors of response and reporting.

Scope of the Report

Because of the general interest indicated by a number of national groups and others, this report is published as an interim account of results before all data have been tabulated or analyzed. The data appearing are selected highlights. They relate only to levels of hospital use matched against personal characteristics and geographic circumstances of residence and place of care. They will need further study and analysis in relation to other data of the survey. Additional interim reports will cover (*a*) limited data on outpatient visits and the accompanying circumstances, (*b*) income of all families and individuals in the

Table 1. General hospital use, by sex and race

Race	Both sexes	Male	Female
	Annual admissions per 1,000 population		
All persons	101	76	124
White	104	79	128
Nonwhite	72	49	93
	Average stay per admission, in days		
All persons	8. 1	10. 1	6. 8
White	8. 0	9. 9	6. 8
Nonwhite	9. 1	12. 6	7. 3

Table 2. General hospital use, by age

Age groups, in years	Annual admissions per 1,000 population	Average stay per admission, in days
All ages	101	8. 1
Under 14	54	5. 2
14–24	119	5. 5
25–34	162	6. 1
35–44	109	8. 4
45–54	93	9. 9
55–64	104	12. 8
65 and over	125	14. 0

sample in relation to their levels of general hospital use, and (*c*) the proportion of hospital insurance coverage reported for all persons in the sample, matched with various personal, geographic, and economic circumstances. It is planned to publish a comprehensive report of the study as a monograph.

Two basic measures of the level of hospital use in varying circumstances have been compiled from the survey data. These are annual admissions per 1,000 population and average stay in days per admission. In this report, these two measures describe the relation between hospital use and a group of personal characteristics that may be considered demographic factors. They also describe the relation between use and a group of factors pertaining to the nature of the geographic and social setting of the place of residence and the place of care. For the purposes of this study, these factors are classed as ecologic factors.

Table 3. General hospital use among males 14 years old and over, by veteran status and type of hospital

Veteran status and type of hospital	Annual admissions per 1,000 population	Average stay per admission, in days
All males 14 years old and over	83	11. 7
Veterans	84	12. 8
World War II veterans	80	11. 9
In Federal hospitals	10	28. 2
In non-Federal hospitals	70	9. 5
Other veterans	90	14. 3
In Federal hospitals	15	33. 6
In non-Federal hospitals	75	10. 4
Nonveterans	82	11. 0

Demographic Factors

Sex and race result in marked differences in general hospital use for the population surveyed (table 1).

Annual admissions per 1,000 population total 101 for all persons. For females the rate (including maternity cases) is about one-fourth higher; for males, about one-fourth lower. The rates for the nonwhite population of both sexes are substantially lower than those for white persons.

The average stay for all persons is 8.1 days, with differentials by sex about as great as for admissions, but in the opposite direction.

Table 4. General hospital use among persons 14 years old and over, by employment status and industry

Employment status and industry	Annual admissions per 1,000 population	Average stay per admission, in days
All persons 14 years old and over	120	8. 6
In labor force	82	8. 5
Employed	81	8. 4
Agriculture	57	8. 2
Wage and salary workers	56	10. 2
Self-employed workers	56	8. 4
Unpaid family workers	60	5. 5
Nonagricultural industries	84	8. 4
Wage and salary workers	84	8. 5
Mining [1]	138	7. 8
Construction	68	8. 5
Manufacturing	80	8. 5
Transportation, etc	98	11. 1
Trade	83	8. 5
Services	85	7. 6
Private households	57	8. 9
Professional services	107	7. 4
Other services	73	7. 5
Public administration	94	8. 6
Self-employed workers	84	8. 1
Unpaid family workers	113	5. 3
Unemployed	97	10. 6
Not in labor force	174	8. 7
Keeping house	199	6. 4
Going to school	48	7. 3
Unable to work	239	25. 6
Other nonworkers	179	16. 1

[1] Includes forestry and fisheries.

Women are admitted more frequently than men, but stay a shorter time.

Age affects substantially the pattern of admissions and average stay in general hospitals (table 2).

For children under 14 years of age the admission rate of 54 per 1,000 population is only slightly more than one-half the rate for all ages. It rises steadily, by 10-year age groups, to a rate of 162 for ages 25–34 (the principal childbearing age group). The rate then declines to 93 for the age group 45–54 and rises thereafter. For the group aged 65 and over, the rate for the sample study is 125 per 1,000 population.

Average hospital stay for the childhood group is reported at 5.2 days, rising gradually to a maximum of 14.0 days for persons 65 years and older.

Veteran status has little effect on admissions and average stay, according to the record for all males 14 years of age and older (table 3).

Veterans of World War II have an admission rate of 80 per 1,000 population and an average stay of about 12 days, in comparison with a rate for other veterans of 90 admissions and a stay of about 14 days.

Both groups of veterans are receiving care principally in non-Federal hospitals. The typical stay for veterans in Federal hospitals is from 4 to 5 weeks; it is about 10 days in non-Federal hospitals.

Employment status and industry produce substantial differences in admissions, with varying effect on average stay for specific industries and employment groups (table 4).

For all persons 14 years of age and over, annual admissions are at a rate of 120 per 1,000 population. For those in the labor force, the admission rate is 82. The rate drops to 57 for those in agriculture and rises to 97 for the unemployed group and 138 for persons in mining (including forestry and fisheries). For persons not in the labor force (homemakers, students, the disabled, and others), the combined admission rate is 174. Persons classified as unable to work have an admission rate of 239, with an average stay of 26 days.

Table 5. General hospital use, by region and type of residence

Region	Type of residence			
	All residences	Urban	Rural	
			Nonfarm	Farm
	Annual admissions per 1,000 population			
All regions	101	100	112	83
Northeast	96	94	106	80
North Central	99	98	109	87
South	102	107	112	77
West	111	103	130	111
	Average stay per admission, in days			
All regions	8.1	8.7	6.9	7.4
Northeast	9.7	10.5	7.5	8.6
North Central	8.1	8.6	6.7	8.7
South	7.0	7.2	7.0	6.6
West	7.5	8.1	6.6	5.8

Ecologic Factors

Geographic region and type of residence have a considerable effect on admissions and average stay (table 5).

Admissions of persons who live on farms are consistently lower than other admissions. Nationally, the admission rate for farm people is one-sixth less than for the total population. This differential holds for 3 of the 4 broad regions of the country. In each region, the highest level of admissions is for rural nonfarm residents.

Type of residence and place of care, as they reflect accessibility, materially affect levels of hospital use (table 6). To assist in interpreting this complex relation, a third measure has been introduced. Not only does the study identify the place of residence of the patient according to whether it is metropolitan, urban, or rural and compare levels of use for a related array of places of care, but it also identifies the median distance traveled for care from each type of residence to each type of place of care.

Particular effort has been made to discover

Table 6. General hospital use, by residence and place of care

Residence	Place of care						
	All places	Standard metropolitan areas [1]			Urban (nonmetropolitan)		Rural
		Metropolitan area of residence		Other metropolitan areas	Places 10,000–50,000	Places under 10,000	
		Central city	Outside central city				
	Annual admissions per 1,000 population						
All areas	100	39	12	11	20	14	5
Metropolitan areas	97	68	21	5	2	1	[2]
Central city	95	85	5	3	1	1	[2]
Urban fringe	95	46	41	5	2	[2]	1
Rural nonfarm	107	59	33	10	4	2	[2]
Rural farm	83	51	20	5	5	4	[2]
Urban (nonmetropolitan)	115	----	----	18	61	34	2
Places 10,000–50,000	117	----	----	18	93	4	2
Places under 10,000	113	----	----	18	23	69	3
Rural (nonmetropolitan)	100	----	----	18	34	30	18
Nonfarm	113	----	----	20	41	33	20
Farm	81	----	----	16	25	27	14
	Average stay per admission, in days						
All areas	8. 1	9. 2	7. 5	11. 4	6. 6	6. 3	5. 4
Metropolitan areas	9. 1	9. 2	7. 4	12. 5	10. 5	6. 0	4. 9
Central city	10. 1	9. 9	9. 0	17. 6	11. 3	6. 9	4. 4
Urban fringe	8. 3	8. 3	7. 6	12. 0	13. 8	2. 9	5. 2
Rural nonfarm	7. 2	7. 5	6. 0	8. 4	8. 7	7. 2	[2]
Rural farm	6. 8	7. 8	6. 0	4. 6	3. 2	3. 9	[2]
Urban (nonmetropolitan)	6. 9	----	----	10. 9	6. 4	6. 0	5. 1
Places 10,000–50,000	7. 2	----	----	11. 8	6. 3	5. 4	7. 5
Places under 10,000	6. 7	----	----	9. 8	6. 5	6. 1	3. 5
Rural (nonmetropolitan)	7. 1	----	----	11. 1	6. 3	6. 5	5. 4
Nonfarm	6. 8	----	----	10. 3	6. 1	6. 3	6. 0
Farm	7. 5	----	----	12. 6	6. 9	6. 8	4. 2
	Median distance traveled per admission, in miles						
All areas	7. 4	6. 2	6. 1	40. 1	7. 7	8. 6	8. 6
Metropolitan areas	6. 5	6. 2	6. 1	23. 6	21. 6	16. 9	[2]
Central city	5. 6	5. 4	6. 4	55. 0	9. 0	[2]	[2]
Urban fringe	6. 6	6. 8	5. 8	72. 3	[2]	[2]	[2]
Rural nonfarm	10. 1	12. 5	6. 6	17. 9	17. 5	[2]	[2]
Rural farm	11. 5	11. 7	[2]	[2]	[2]	[2]	[2]
Urban (nonmetropolitan)	6. 5	----	----	37. 2	5. 8	5. 8	15. 7
Places 10,000–50,000	5. 9	----	----	18. 4	5. 3	11. 9	[2]
Places under 10,000	7. 5	----	----	53. 8	11. 6	5. 6	[2]
Rural (nonmetropolitan)	13. 3	----	----	47. 2	10. 7	12. 7	8. 2
Nonfarm	10. 5	----	----	36. 5	9. 1	10. 8	7. 8
Farm	18. 1	----	----	59. 4	18. 1	15. 5	9. 2

[1] Includes a central city of at least 50,000 population with contiguous counties socially and economically integrated therewith, as defined by the Bureau of the Census (4).

[2] Insufficient number of cases to justify entry.

NOTE: Discrepancies in totals result from rounding.

the present pattern of use in metropolitan areas, with respect to the large population groups now found in the fringe areas outside the central city. This is a secondary problem in broad planning for general hospital needs on which very little factual evidence has been available. The urban fringe includes both urban places and unincorporated urban areas.

This survey shows the following principal facts about the relation between place of residence and place of care in affecting levels of use:

- The total admission rate by residence varies from 81 for persons living on farms not in metropolitan areas to 117 for persons living in urban places below 50,000 population.
- The residents of metropolitan areas report an admission rate of 97. Persons living in rural nonfarm residences in metropolitan areas report a rate higher than the metropolitan area average, namely, 107. Residents of the urban fringe in metropolitan areas report an admission rate to the central city of only 46 per 1,000 population, or less than one-half of

Table 7. General hospital use, by reason for admission and place of care

Reason for admission	Place of care					
	All places	Standard metropolitan areas [1]		Urban (nonmetropolitan)		Rural
		Central city	Outside central city	Places 10,000–50,000	Places under 10,000	
	Annual admissions per 1,000 population					
All reasons	100	48	14	19	14	5
Surgery	25	13	3	5	3	1
Obstetrics	22	10	3	4	3	1
Pediatrics	16	8	2	3	2	1
Accidents	6	3	1	1	1	(2)
Other	32	14	4	7	5	2
	Average stay per admission, in days					
All reasons	8.1	9.6	7.5	6.6	6.3	5.4
Surgery	10.6	13.0	8.8	8.4	7.2	8.0
Obstetrics	4.5	4.8	4.7	4.2	4.0	4.0
Pediatrics	5.2	6.0	4.3	3.8	4.4	3.2
Accidents	12.1	15.3	10.9	8.4	9.3	4.1
Other	9.3	11.2	9.9	7.6	7.4	6.4
	Median distance traveled per admission, in miles					
All reasons	7.4	7.3	6.3	7.7	8.6	8.6
Surgery	7.8	8.1	6.4	8.1	8.9	6.7
Obstetrics	6.9	6.6	6.1	6.9	8.5	9.5
Pediatrics	7.2	7.3	6.1	7.1	8.3	7.7
Accidents	7.8	7.2	6.9	8.0	10.2	8.3
Other	7.5	7.2	6.3	8.1	8.4	9.2

[1] Includes a central city of at least 50,000 population with contiguous counties socially and economically integrated therewith, as defined by the Bureau of the Census (*4*).

[2] Insufficient number of cases to justify entry.

NOTE: Discrepancies in totals result from rounding.

the total hospital admissions for this residence group. For rural parts of standard metropolitan areas, the admission rate to the central city is 59 for nonfarm residents and 51 for farm residents.

- Residents of urban nonmetropolitan communities have about 18 percent of their total admissions in a metropolitan area. A substantial proportion of admissions for persons living in smaller urban places (under 10,000 population) is in hospitals of larger communities.
- Residents of rural areas (that is, areas where all places are under 2,500 population) report that only 18 percent of their admissions are in hospitals located in rural areas; another 30 percent are in places under 10,000 population.
- The average stay of central city residents in metropolitan areas is greater than the stay of people who come from elsewhere in the area.
- Persons living outside of metropolitan areas report an average stay considerably below that of people who live in metropolitan areas, except when they go to a metropolitan area for care. Such stay for nonmetropolitan residents averages about 11 days in metropolitan hospitals, as compared with 6 days in hospitals nearer home.
- Farm residents cared for in rural hospitals report an average stay of only about 4 days.
- The median distance traveled by each group does not vary greatly from the national average of 7.4 miles, except for persons receiving care in a metropolitan area which is not their place of residence. Such travel amounts to 40 to 50 miles or more.

Reasons for admission in relation to place of care show relatively less diversity in level of use than do places of residence in relation to place of care (table 7).

Surgery accounts for 25 percent of all admissions, and obstetrics for 22 percent.

Average stay for surgery is 10.6 days and for accidents 12.1 days, as compared with about 5 days for obstetric and pediatric services and an average for all reasons of 8.1 days.

Summary

The Public Health Service is investigating the level of use of general hospitals by a known population, for which selected demographic, ecologic, and economic data are collected. For this purpose, the resources of the Bureau of the Census have been employed in connection with household interviews of its current population survey. The sample used comprises about 27,000 families, including about 90,000 persons of all ages, which is three-fourths of the current population survey sample. The study is intended as a first step in defining standards of need for general hospital beds by identifying the circumstances which accompany varying levels of use.

This interim report records provisional findings on levels of general hospital use in relation to (*a*) selected factors of personal characteristics of the population surveyed and (*b*) geographic factors pertaining to location and urban-rural residence of the patients cared for. It also reports on use according to the accessibility of the place of care, as related to the place of residence of the patient, and according to the reason for admission. Special significance attaches to the data describing the level of use provided within the central city of a metropolitan area for patients coming from its urban and rural fringe.

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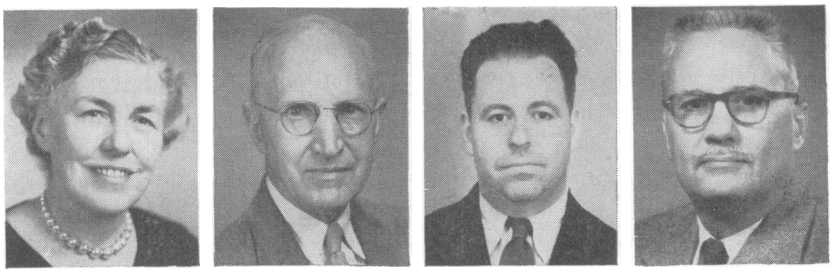

Miss Switzer | Dr. Dauer | Dr. Cohen | Dr. Top

New Members of the PHR Board of Editors

Four new members have joined the Board of Editors of *Public Health Reports.* Replacing Dr. Gaylord W. Anderson, Dr. Halbert L. Dunn, Dr. Martha M. Eliot, and Dr. Basil C. MacLean, the appointees will serve on the 13-member board for 3 years ending in 1959.

Mary E. Switzer, who became director of the Federal Office of Vocational Rehabilitation in 1950, was instrumental in developing the expanded vocational rehabilitation law passed unanimously by Congress in 1954. This legislation has united the public and private nonprofit restoration organizations with the States in attacking disability problems. Miss Switzer, long outstanding in her national and international health work, was presented with a distinguished service award by the Department of Health, Education, and Welfare in April 1956. Previously, she had received the National Rehabilitation Association President's Award. Miss Switzer has also been awarded the honorary degree of doctor of humane letters by Gallaudet College, District of Columbia, and Tufts University, Medford, Mass.

Carl C. Dauer, M.D., M.P.H., has been medical adviser to the National Office of Vital Statistics, Public Health Service, since 1950. He received his medical degree from Western University in 1920, and graduated from the Harvard School of Public Health in 1933. Dr. Dauer began his public health career as director of child hygiene with the Marion County Health Department, Salem, Oreg., in 1930. Subsequently, he served as an instructor and assistant professor in preventive medicine at Tulane University and as director of the bureau of preventable diseases, District of Columbia Department of Health. He has held teaching positions at the Catholic University, Georgetown University, and George Washington University Medical Schools. Dr. Dauer, whose contributions to medical literature have been extensive, is a member of the American Epidemiological Society, the Washington Academy of Sciences, the Public Health Service Psittacosis Board, a fellow in the Epidemiology Section of the American Public Health Association, and a diplomate of the American Board of Preventive Medicine.

Mandel E. Cohen, M.D., is on the staff of the Massachusetts General Hospital in Boston and of the department of neurology at the Harvard Medical School. Concurrently, he serves as consulting neuropsychiatrist for the Army, the Public Health Service, and Los Alamos Medical Center. A graduate of Johns Hopkins Medical School, Dr. Cohen received his training largely at the Boston City Hospital and the Massachusetts General Hospital. He was a member of the Department of Medicine and Psychiatry at the Harvard Medical School in 1945, and the following year joined the staff of Tufts Medical School as research professor of psychiatry. His published works include reports on studies of hysteria, neurocirculatory asthenia, epilepsy, manic-depressive disease, heart disease, and vascular disease of the brain.

Franklin H. Top, M.D., is a faculty member of the State University of Iowa, where, since 1952, he has been director of the department of health and head of hygiene and preventive medicine. In the same period, he has also acted as consulting director of the Iowa State Hygienic Laboratories, Iowa City, as well as consultant in infectious diseases at the hospital of the State University of Iowa. He is also director of the Institute of Agricultural Medicine, established in 1955. After graduation from the University of Pennsylvania Medical School in 1928 and the Johns Hopkins School of Hygiene and Public Health in 1935, Dr. Top began his professional career in the Herman Kiefer Hospital in Detroit, becoming hospital director in 1947. During the 2 years spent as professor of epidemiology and pediatrics at the Universty of Minnesota College of Medical Sciences, Dr. Top edited the History of American Epidemiology by C.-E. A. Winslow and associates, 1952. He is also the author of the standard work, Communicable Diseases, 1941, 1947, 1955.