

The Status of Hospital Discharge Data in Denmark, Scotland, West Germany, and the United States

Study of comparability of cross-national hospital discharge data. Descriptions of discharge reporting systems with emphasis on coverage, types of data collected, procedures and definitions used in data collection and analysis, and statistics routinely available. Discussion of health services system characteristics likely to affect rates of hospital use.

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SYMBOLS

Data not available-----	---
Category not applicable-----	...
Quantity zero-----	-
Quantity more than 0 but less than 0.05-----	0.0
Figure does not meet standards of reliability or precision-----	*

THE STATUS OF HOSPITAL DISCHARGE DATA IN DENMARK, SCOTLAND, WEST GERMANY, AND THE UNITED STATES

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INTRODUCTION

Interest in the health services systems of foreign countries has increased in recent years. These systems are valuable sources of information on alternative approaches to health care delivery problems in the United States. Numerous studies of other health services systems have been undertaken, and much research that could explore and evaluate the differences in the systems has been suggested. A major requirement for further research is the availability of comparable and accurate data. Government agencies in most developed countries routinely collect a wide array of statistics on health services that might supply the necessary data base, but many questions about the comparability of these statistics remain unanswered.

This report examines the status of one type of routinely collected health data: hospital utilization statistics. These data were chosen for analysis for several reasons. Hospitals play a central role in most health services systems, they deal with the most serious health disorders, and they generally absorb the largest share of total health expenditures. Also, countries usually collect a considerable amount of hospital data, and cross-national comparisons of hospital statistics are common.

In most developed countries there are three types of data systems that collect hospital utilization statistics: discharge reporting systems,

aggregate hospital reports, and household surveys. Discharge reporting systems collect abstracts of information about the characteristics of individual discharges, usually including age, sex, and diagnosis. The discharge reporting systems that cover general hospitals are examined in the most detail in this report, but some information is given on discharge reporting systems that cover special types of hospitals or patients. Aggregate hospital reports and household surveys are also briefly reviewed here. Aggregate hospital reports contain information about a hospital's total number of discharges and bed days but not about individual patients. Household surveys usually focus on levels of health or ambulatory care use, but they often collect some information about hospital use.

This report is the second in a series of three on the status of cross-national hospital discharge data. The first report describes discharge reporting systems in Australia, Canada, England and Wales, Finland, France, and Sweden.¹ The reporting systems in the six countries were similar enough to be promising data sources for cross-national research, but important differences were also discovered. For instance, variations in the systems' coverage and in definitions and procedures used for data analysis would have to be taken into account before data comparisons could be made.

This report expands on the first report in two ways. First, to learn more about the range and frequency of the similarities and differences in discharge reporting systems, the reporting systems in three additional countries—Denmark, Scotland, and West Germany—are examined. Second, to facilitate comparisons of the U.S. hospital statistics with those of other countries, characteristics of the U.S. National Hospital Discharge Survey are discussed. A detailed description of the National Hospital Discharge Survey has been published² and is not repeated here, but the comparability of the U.S. survey with reporting systems in other countries is explored.

In the third report of the series hospital utilization data from all nine countries and the United States will be compared. Estimates will be made of the effects of differences in discharge reporting systems on the data produced. Each country's hospital utilization statistics will be adjusted to take these effects into account.

The discharge reporting systems of Denmark, Scotland, and West Germany were chosen primarily because these countries display various health services system characteristics that may affect the development and operation of discharge reporting systems. For instance, a country with a centralized public health services system is likely to have less difficulty organizing a nationwide discharge reporting system than is a country with a more diverse health service. England and Wales, with its centralized National Health Service, was one of the first countries to begin operating a reporting system and has succeeded in collecting comparable countrywide data. Scotland takes part in the National Health Service with England and Wales, but the Scottish Health Service is administered separately, and Scotland has created its own discharge reporting system. Whether this discharge reporting system differs from the one in England and Wales was thought to merit investigation.

Denmark has a largely public but decentralized health services system. Most hospitals are owned and operated by individual counties rather than by a single national health service. This form of organization could make it more difficult to create and maintain a nationwide discharge reporting system. In Sweden decentralization has led to problems; in Finland it has not.

As in Denmark, most Swedish and Finnish hospitals are owned by local government units. In Sweden the counties own the hospitals and determine the form of the discharge reporting systems. Some counties have established a comprehensive reporting system for all their hospitals; others collect data only from some of their hospitals. As a result, uniform national discharge data are not available from these reporting systems. In contrast, Finland has created a national discharge reporting system to which all hospitals report similar data. This difference has aroused interest about Denmark and its ability to obtain uniform national discharge data.

West Germany's health services system is also decentralized; the States rather than the Federal Government are largely responsible for providing health services. Moreover West Germany contains a substantial number of private hospitals, which, in other countries, are often excluded from or fail to participate in government discharge reporting systems. The result can be seriously biased data, as is the case in France. However West Germany has a health insurance system. Discharge reporting systems have been linked to health insurance systems in Australia and Canada, and in spite of health services decentralization and the large number of private hospitals in both countries, their reporting systems collect comprehensive discharge data. This report investigates whether West Germany uses its health insurance system in this way or adopts other approaches to data collection.

All three countries were also selected for study because they contain research colleagues with whom the authors had previously established working relationships. The modest funding available for the study precluded travel to the countries for data-gathering purposes and limited the authors to published and unpublished materials that could be acquired from various agencies and to correspondence with research colleagues in the three countries. Many of them recommended others knowledgeable in hospital statistics, who provided further assistance with the study.

The major contributors to the study are listed in appendix I. They supplied comprehensive replies to the original questions, patiently answered followup queries, and provided

valuable comments on drafts of the report. They also helped to obtain copies of recent hospital statistics publications from each country. The statistical publications and personal communications were the main sources of information for the report, but a review of other relevant literature concerning the availability, comparability, and quality of the hospital data was also conducted. Information about the U.S. National Hospital Discharge Survey was obtained from the Division of Health Care Statistics of the U.S. National Center for Health Statistics as well as from published descriptions of the survey.

The report is divided into several sections. The first section provides demographic and hospital system data on the three countries and includes a comparison of these data with similar

U.S. data. In subsequent sections the hospital statistical systems in Denmark, Scotland, and West Germany are described. These sections contain detailed descriptions of discharge reporting systems that cover general hospitals and brief reviews of discharge reporting systems for special types of hospitals or patients, annual hospital reports of aggregated hospital utilization data, and national household surveys that include data about hospital use. In later sections the U.S. National Hospital Discharge Survey is compared with the discharge reporting systems of the three countries, and selected aspects of health service systems that can be expected to affect hospital utilization are discussed. The closing section provides a summary and conclusions.

COMPARISON OF CHARACTERISTICS OF THE COUNTRIES^a

THE COUNTRIES

Table A shows that Denmark's population and area are the smallest of the three countries. Its area is about the size of the New Hampshire and Massachusetts combined; Massachusetts alone contains a larger population. Scotland's area is similar to that of South Carolina; the country also contains fewer inhabitants than does Massachusetts. Although West Germany's area is about the size of Oregon, it has almost three times the population of California. It is by far the most densely populated of the countries, but Denmark and Scotland also average considerably more persons per square kilometer than does the United States. The percent of population in urban areas is apparently highest in the United States and lowest in West Germany, but the countries define urban areas differently.

Table B shows the age and sex distributions of the countries' populations. While they are generally similar, some differences exist. Compared with the United States, each of the other three countries has a smaller percent of persons

age 15-44 years and a higher percent ages 45-64 years and 65 years and over. West Germany has the highest percent of persons age 65 years and over and the lowest percent under age 5 years. The proportion of females is highest in West Germany and lowest in Denmark.

Table C shows selected mortality statistics for each country. The infant mortality statistics vary markedly, with Denmark's infant mortality rate significantly lower than the other countries' rates. Denmark also reports the longest life expectancy at birth for males. Danish males can expect to live almost 2 years longer than males in the United States. However U.S. females can expect to live slightly longer than Danish females, and over 2 years longer than females in Scotland and West Germany.

The United States reports the lowest death rates, but this would be expected because the percent of the population under age 45 is highest in the United States. Scotland has the highest death rates, even though it has a larger percent of population under age 45 than does West Germany. Heart disease accounts for a greater proportion of all deaths in the United States than it does in the other three countries, but malignant neoplasms account for a greater proportion of all deaths in Denmark than in the other countries.

^aSimilar information about Australia, Canada, England and Wales, Finland, France, and Sweden can be found in reference 1, pages 4-8.

Table A. Spatial distribution of populations by country

Population distribution and year	Country			
	Denmark	Scotland	West Germany	United States
Population—1977	5,088,000	5,196,000	61,714,000	216,817,000
Area in square kilometers.....	43,096	78,772	248,577	9,363,123
Persons per square kilometer—1977	118	66	247	23
Percent of population in urban areas—1970	67	71	162	74

¹1969.

SOURCES: References 3 and 4.

Table B. Percent distribution of populations by age and sex, according to country

Age and sex	Country			
	Denmark 1976	Scotland 1976	West Germany 1976	United States 1977
	Percent distribution			
All ages.....	100.0	100.0	100.0	100.0
Male.....	49.5	48.1	47.6	48.6
Female.....	50.5	51.9	52.4	51.4
<u>Under 5 years</u>				
Male.....	3.6	3.5	2.6	3.6
Female.....	3.5	3.3	2.5	3.4
<u>5-14 years</u>				
Male.....	7.9	8.8	8.1	8.6
Female.....	7.5	8.4	7.7	8.2
<u>15-44 years</u>				
Male.....	21.4	20.0	21.8	22.4
Female.....	20.5	20.0	20.6	22.7
<u>45-64 years</u>				
Male.....	10.8	10.6	9.6	9.7
Female.....	11.3	11.9	12.3	10.5
<u>65 years and over</u>				
Male.....	5.8	5.1	5.5	4.4
Female.....	7.8	8.3	9.3	6.4

SOURCE: Reference 3.

Table C. Selected mortality indexes by country

Mortality index	Country			
	Denmark	Scotland	West Germany	United States
	Rate per 1,000 live births			
Infant mortality ¹	8.9	16.1	17.4	14.1
	Years at birth			
Average life expectancy: ²				
Male.....	71.1	68.3	68.3	69.3
Female.....	76.8	74.6	74.8	77.1
	Rate per 1,000 population			
Selected cause of death: ³				
All causes.....	10.6	12.5	12.1	8.8
Malignant neoplasms.....	2.5	2.6	2.5	1.8
Heart disease.....	3.8	4.0	3.5	3.3

¹1977 data for Denmark, Scotland, and the United States, 1976 data for West Germany.

²1977 data for Scotland and the United States, 1975-76 data for Denmark, 1974-76 data for West Germany.

³1977 data for the United States, 1976 data for Denmark and Scotland, 1975 for West Germany.

SOURCES: References 3, 5, and 6.

THE HOSPITAL SYSTEMS

Table D presents information about the hospital systems of each country. Public ownership refers to hospitals owned by the local, State, or national government, and private ownership refers both to nonprofit and profitmaking hospitals. Private ownership of hospital facilities is most marked in the United States. However the majority of these hospitals are community hospitals, owned and operated by nonprofit groups. Most U.S. public hospitals are owned by State or local authorities. West Germany has the same proportions of public and private hospitals as does the United States, but West German public hospitals contain more beds than do the private hospitals. As in the United States, most West German public hospitals are owned by State or local authorities, and most private hospitals are not profitmaking. Almost all hospitals in Scotland and Denmark are public institutions. No statistics were available on the private hospitals in Scotland, but it is known that they account for less than 5 percent of all Scottish hospital beds. In Denmark about 7 percent of all hospital

beds are in private hospitals. The public hospitals in Denmark are almost all owned and operated by the counties, while in Scotland the public hospitals are part of the National Health Service.

The statistics in table D on short-term and long-term hospitals are not strictly comparable. In the United States short-term hospitals are defined as hospitals that have an average length of stay of less than 30 days, and long-term hospitals are those with an average length of stay of 30 days or more. In Denmark hospitals are not categorized by length of stay, but since the length of stay of each individual hospital is reported, it is possible to regroup the hospitals into short-term and long-term categories based on the U.S. definitions. In West Germany hospitals are referred to as either acute care or special care hospitals depending on the type of services provided in them. In general the acute care hospitals have average lengths of stay of less than 30 days, and the special hospitals have average lengths of stay of over 30 days, but this is not always the case. Nevertheless acute care hospitals are reported as short-term hospitals and special care hospitals are reported as long-term hospitals in table D. In

Table D. Number of hospitals, beds, and beds per 1,000 population by ownership, type of hospital, and country

Ownership and type of hospital	Country			
	Denmark 1977	Scotland ¹ 1977-78	West Germany 1977	United States 1978
Number of hospitals				
Total	135	349	3,416	7,159
<u>Ownership</u>				
Public.....	115	349	1,258	2,607
Private.....	20	---	2,158	4,552
<u>Type</u>				
Short-term	105	181	2,185	6,595
Long-term	30	168	1,231	564
Number of hospital beds				
Total	43,436	53,987	722,953	1,350,097
<u>Ownership</u>				
Public.....	40,373	53,987	380,083	540,253
Private.....	3,063	---	342,870	809,844
<u>Type</u>				
Short-term	31,431	26,073	487,566	1,100,368
Long-term	12,005	27,914	235,387	249,729
Beds per 1,000 population				
Total	8.5	10.4	11.7	6.2
<u>Ownership</u>				
Public.....	7.9	10.4	6.2	2.5
Private.....	0.6	---	5.5	3.7
<u>Type</u>				
Short-term	6.2	5.0	7.9	5.0
Long-term	2.4	5.4	3.8	1.1

¹Data are for National Health Service hospitals, excluding hospitals for the mentally deficient. Private hospitals account for less than 5 percent of all hospital beds.

SOURCES: References 6-9.

Scotland hospitals are not grouped by length of stay, and length of stay data are not available for hospitals; they are only available for specialties. The Scottish hospitals with half or more of their beds in specialties that have average lengths of stay of less than 30 days are called short-term hospitals in table D, and the hospitals with more than half their beds in specialties that have aver-

age lengths of stay of 30 days or more are called long-term hospitals.

Over three-fourths of all U.S. hospital beds are in short-term hospitals. Denmark and West Germany are not too different; at least two-thirds of their hospital beds are in short-term hospitals. In contrast, over one-half of the Scottish beds are in long-term hospitals. Although

the U.S. total bed-to-population ratio is lower than the other countries¹, Scotland reports the same number of short-term hospital beds-per-population as does the United States. West Germany has the highest total bed-to-population ratio and the highest number of short-term beds per population.

Table E shows the distribution of hospital beds in hospitals of different sizes and types. The definitions of short-term and long-term hospitals are the same as for table D. The long-term hospitals, many of which are psychiatric hospitals, tend to be larger than the short-term hospitals. This is particularly true in the United States, where hospitals containing 1,000 beds or more account for less than 5 percent of the short-term hospital beds but over 40 percent of the long-term hospital beds. More short-term hospital beds in the United States are in hospitals with 200-499 beds than in any other size category.

This size category also accounts for a larger percent of short-term hospital beds than any other category in Scotland and West Germany. In Denmark, though, over half of the short-term hospital beds are in hospitals with 500 beds or more. Another contrast is that Scotland has a larger percent of beds in hospitals with less than 100 beds than do the other countries.

Table F presents utilization statistics for short-term hospitals, which are defined the same as for table D with the exception of the Scottish hospitals. Since no utilization statistics were available by hospital, the Scottish statistics were obtained by subtracting the statistics on specialties with average lengths of stay of 30 days or more from the totals for all Scottish Health Service hospitals. This procedure probably excludes some patients and beds that are included in the other countries' statistics since some short-term hospitals include departments for

Table E. Percent distribution of hospital beds by type and size of hospital, according to country

Type of hospital and bed size	Country				
	Denmark 1977	Scotland ¹ 1977-78	West Germany 1977	United States 1978	
<u>Short-term hospitals</u>		Percent distribution			
All sizes	100.0	100.0	100.0	100.0	
0-24 beds.....	0.2	2.8	0.6	0.6	
25-49 beds.....	0.7	5.5	1.9	4.2	
50-99 beds.....	3.3	7.2	4.5	10.4	
100-199 beds.....	16.9	12.9	15.9	19.2	
200-499 beds.....	24.9	36.7	43.9	41.0	
500-999 beds.....	28.0	30.4	18.8	20.1	
1,000 beds or more.....	26.0	4.5	14.4	4.4	
<u>Long-term hospitals</u>					
All sizes	100.0	100.0	100.0	100.0	
0-24 beds.....	0.2	1.1	0.6	0.1	
25-49 beds.....	0.0	5.5	2.9	0.6	
50-99 beds.....	3.5	11.9	9.1	3.0	
100-199 beds.....	13.9	11.9	20.8	6.6	
200-499 beds.....	13.1	22.4	25.4	15.0	
500-999 beds.....	32.9	33.6	15.4	32.7	
1,000 beds or more.....	36.4	13.7	27.5	42.0	

¹Data are for National Health Service hospitals, excluding hospitals for the mentally deficient.

SOURCES: References 7-10.

Table F. Selected short-term hospital utilization statistics by country

Short-term hospital utilization statistic	Country			
	Denmark 1977	Scotland ¹ 1977-78	West Germany 1977	United States 1978
Discharges per 1,000 population.....	176	125	150	170
Bed days per 1,000 population.....	1,749	1,205	2,382	1,351
Mean length of stay in days.....	10	10	16	8
Bed occupancy rate in percent.....	78	67	83	73
Discharges per bed per year.....	29	25	19	34

¹Data are for all National Health Service hospitals with the following specialties excluded: mental illness, mental deficiency, geriatrics, young chronic sick, tuberculosis, rehabilitation, convalescence, and general practice long-stay.

SOURCES: References 6, 8, 9, 11.

long-term care.^b On the whole, though, the statistics refer to similar patients and hospital facilities in each country.

The United States stands out on two measures: It has the lowest mean length of stay of the countries and the highest average number of discharges per bed. West Germany presents the greatest contrast to the United States. It has the lowest number of discharges per bed and a mean

length of stay twice that in the United States. In addition, the bed-day-per-population ratio and the bed occupancy rate are higher in West Germany than in the other countries. Denmark has the highest discharge-per-population ratio, and Scotland has the lowest. Scotland also has the lowest bed-day-per-population ratio and bed occupancy rate of the countries.

DENMARK

Many separate hospital discharge reporting systems have begun operation in Denmark during the last 10 years. However all collect similar data and use uniform procedures and definitions. The reporting systems supply data to national inpatient registers. One register receives information on somatic inpatients, that is, inpatients with physical illnesses and injuries. A second register obtains data on all psychiatric inpatients. Additional hospital utilization data are available from questionnaires collected annually from all Danish hospitals. Household surveys are not a source of hospital data. No national health survey has been undertaken in Denmark for several decades.

^bIn a subsequent report, the statistics from each country will be adjusted to take such differences into account.

GENERAL HOSPITAL DISCHARGE REPORTING SYSTEMS

In the 1960's a small number of Danish hospitals started pilot projects to collect hospital discharge data. The next step was taken by the Danish National Health Service, an advisory body composed primarily of physicians, nurses, and pharmacists that has a major influence on health policymaking in Denmark. In 1968 the National Health Service set up a working group to explore the possibility of creating a discharge reporting system for use in all the country's hospitals.¹² The working group developed an inpatient registration system called M 70, which five hospitals adopted in 1970. In 1971 two other inpatient registration systems were established: the Århus system in Århus Municipal Hospital, and the Funen system in Odense Hospital. The three systems grew rapidly. By 1973 registration systems covered all the hospitals in 10 of the

country's 16 hospital areas^c and some of the hospitals in 2 other areas. Two-thirds of all general hospital admissions were reported at that time.¹³ By 1979 all but five of the country's hospitals were involved in a registration system, and over 98 percent of all admissions were covered by one.^{9,14}

The National Health Service and the Association of County Councils established a coordinating group in 1972 to ensure that comparable data were collected by all the registration systems. The group included representatives from the three general hospital registration systems, the psychiatric inpatient register, the Association of County Councils, and the Rigshospitalet, which is a university hospital run by the State. The group agreed on a uniform set of items to be collected by each registration system and developed official definitions and classifications for use in all systems. The registration systems continue to differ in some ways, but the differences are now mostly technical in nature.¹² Since 1976 the National Health Service has required hospitals to send it magnetic tapes containing certain basic information about every inpatient once a year. The tapes are used to form the National Patient Register of somatic hospital discharges.

The national and local registers were begun to facilitate clinical and epidemiological research by increasing access to the information in hospital records, and to collect useful data for medical and administrative decisionmaking within hospitals and for hospital planning on local, regional, and national levels. It was also hoped that cost data could be linked to registration data so that more meaningful analyses of hospital costs could be made. The National Patient Register is just beginning full operations, but data from it are already being used for hospital planning and medical research.¹⁴

Methods of Data Collection

Two systems of data collection are used in Danish hospitals: online and batch.¹⁴ Hospitals with online systems add admission data to com-

puterized patient records at the time of admission; they add information concerning surgical procedures when the procedures are performed; and they add discharge data, including diagnoses, when the patient is discharged. Hospitals with batch systems use a specially designed reporting form as the front page of the patient's medical record. They transfer information from the form to magnetic tape at the end of each month for all patients discharged during that month. In both systems information is abstracted from the medical record and items are coded by medical secretaries in the hospitals, who approximately correspond to medical record administrators in the United States. Ambiguous cases are referred to hospital doctors for clarification.

Additional data processing is done several ways in the 14 Danish counties. Rigshospitalet and the counties of Vejle and Funen each have a computer. Frederiksborg and Roskilde counties process data together, as do Sønderjylland and Ribe counties. The counties of Northern Jutland, Århus, and Viborg have joined a further development of the Århus system, now run by a public computer center, Kommunedata. Some counties that use the batch system also have data processed by Kommunedata. Datacentralen, a computer center established in 1959 by the Danish State, counties, and cities, processes batch system data from the municipality of Copenhagen and from some other hospitals.¹⁴

Each hospital prepares computer tapes for the National Patient Register and uses the same set format. The tapes, which contain information on each hospital discharge in a calendar year, are sent to the National Health Service around April 1 of the next year.

Coverage

At the beginning of 1979 the inpatient registers for somatic patients covered the discharges in all publicly owned somatic hospitals and in all but 5 of the 16 private somatic hospitals.¹⁴ Together the 5 hospitals contained only 702 beds, or 2 percent of all somatic beds in the country. One with 320 beds, St. Joseph's Hospital in Copenhagen, closed September 1, 1979. Another with 105 beds, Fysiurgisk Hospital in

^cThe hospital areas are the 14 Danish counties and the 2 municipalities of Copenhagen and Frederiksberg.

Hornbaek, plans to transfer its functions to Rigshospitalet and take part in its registration system. The three remaining hospitals treat long-staying patients; two of them specialize in the treatment of rheumatism.

Psychiatric hospitals send patient data to a special register and are not covered by the other registration systems. However hospitals with long-staying patients are covered by the systems. Six long-term hospitals and four specialized hospitals in which the average length of stay exceeds 30 days are included in the systems. Together these hospitals contain 1,553 beds—4.8 percent of all somatic beds—and they account for 0.5 percent of the discharges and 5.3 percent of the bed days in somatic hospitals.⁹

All patients discharged from the hospitals included in the systems are reported, excepting those treated in psychiatric departments, who are reported to the Psychiatric Register. Maternity patients and newborns are reported in the same way as other discharges, except that some obstetric departments collect additional information. While women with normal pregnancies may choose to deliver their babies at home, in 1977 only 0.6 percent of births took place outside hospitals and clinics.¹⁵

Items Collected

The National Patient Register contains various items about each inpatient discharged from a somatic hospital.¹²⁻¹⁴ Identification items include hospital and hospital department codes taken from the Danish National Health Service Hospital Classification list. The patient's 10-digit Central Persons Register (CPR) number is also reported. All residents of Denmark have a CPR number, which indicates the person's birth date, sex, and serial number. The health insurance system uses CPR numbers to register consumption of all medical care services.¹⁶ The potential therefore exists for connecting the records of separate admissions and other uses of medical care. Some work has been done to link a patient's total contacts with a hospital service for a single disease, but these efforts are limited at present.¹⁷

National Patient Register information about the use of hospital services includes the hour and

date of admission, and an optional item, the date of referral. The place from which the patient was admitted is recorded (home, other hospital department, other hospital, nursing home, old age home, emergency department, other, born in the hospital, or not known). The kind of admission is also reported (acute, through outpatient department for preliminary examination, other cases through outpatient department, other cases called from waiting list, called according to decision on previous discharge, or born in the hospital). The type of patient is given, that is, inpatient (patient who receives 24-hour treatment), day patient (part-time patient who does not normally spend nights in the hospital), or night patient (part-time patient who does not normally spend days in the hospital). The date of discharge is recorded, as is the place to which the patient was discharged (home, other department, other hospital, nursing home, old age home, convalescent home, other, death, or not known). Whether the patient was discharged alive or dead, and if dead whether an autopsy was performed, are additional items. If the patient was discharged to another hospital or department, the number from the National Health Service Hospital Classification list is recorded. Kinds of aftercare (followed in the same hospital outpatient department, in another hospital's outpatient department, by patient's own doctor, other, none, death, and not known) are reported, and there is an optional item concerning any posthospitalization treatment that has been arranged in an institution (same department, other department, other hospital, nursing home, old age home, convalescent home, other institution, no other institutional care, death, or not known).

Inpatient characteristics reported to the National Patient Register, besides birth date and sex (which are part of the CPR number), include marital status, municipality of residence, and a considerable amount of medical data. A number of diagnoses can be reported for each patient, and several items of information are supplied concerning each diagnosis. First, any modification of the diagnosis is recorded (none, observation case-diagnosis not proven, observation case-diagnosis disproven, late effects, earlier, recurrent, treated or under treatment, and operated). An almost unlimited number of operations can

be recorded for each diagnosis, provided the entries do not fill space allotted for other diagnoses, and it is possible to indicate whether two or more operations were part of a complex surgical procedure. If a patient underwent an operation in a department other than the one to which he or she was admitted, the number of the operating department may also be given. Finally, there is an item on whether the patient was involved in an accident, and if so, the type of accident (no, traffic accident, occupational accident, sports accident, home accident, other accident including attempted homicide, and optional categories of suicide attempt, and uncertain whether accident or suicide attempt).

Diagnoses are coded using an adaptation of the eighth revision of the International Classification of Diseases, in which codes have been expanded to five digits. A sixth digit may be added for greater detail, and this is sometimes done by specialized departments. In each case the doctor decides which diagnosis should be listed as the most important or primary one. The doctor also decides the order of importance of operations for each diagnosis. An adaptation of a Swedish four-digit classification system is used to code operations. Fifth and sixth digits can be added for greater detail and to indicate operation complications. Included in the classification system are codes for certain extensive examinations and nonsurgical forms of treatment, such as complicated X-ray examinations, biopsies, and cystoscopies.

Definitions and Procedures

Utilization statistics from the National Patient Register include data for long-term and short-term patients. In addition to long-term hospital patients, long-staying patients within general hospitals, such as those in physiotherapy, convalescent, and long-term care departments, are reported to the register.

The bed-day statistics obtained from the register concern the number of days of hospitalization of patients discharged during the year. The day of admission is counted as a bed day, but the day of discharge is not. If the hospital stay lasts less than 24 hours, it is counted as 1 bed day in length.

Deaths are counted as discharges in calculating utilization statistics, but they can be separately identified. Transfers between emergency departments or intensive care units and other hospital departments are counted as part of a single admission, but all other transfers between hospital departments are considered discharges and new admissions. However, transfers can be linked through the use of the CPR number.

The average length of stay is obtained by dividing the total number of days in the hospital for a given group of discharges by the number of hospital stays in the group. The occupancy rate at a point in time is computed by dividing the number of occupied beds by the official number of beds registered in the hospital and multiplying by 100. When the occupancy rate for a certain period of time is desired, the number of bed days used during the period is divided by the number of registered beds multiplied by the number of days in the period, and the resulting figure is multiplied by 100. In some cases all the registered beds are not in use, so the number of available beds is used instead of the number of registered beds. Patient turnover is calculated by dividing the number of patients admitted during a certain period by the average number of beds available in the hospital during that period.

Information Published or Available

Some data from the various local inpatient registration systems have been available since 1966. Until 1978 the National Health Service published summary statistics from these systems in its annual *Medical Report II: Report on Hospital and Other Institutions for the Treatment of the Sick in Denmark*.¹⁸ One example of the tables included in the report is the number of discharges by main diagnosis (100 diagnostic categories), age (14 or under, 15-69, 70 and over), sex, and county; another is the number of operations in each of 16 categories of operations by hospital and hospital department.

The National Health Service began a new series of publications in 1972, called *Medical Statistics Reports*. By 1976 most of the hospital data published in *Medical Report II* were also published in the *Medical Statistics Reports* series, so the decision was made to terminate *Medical Report II*. National data from the registration

systems have not yet been published in *Medical Statistics Report*. One 1978 publication did contain statistics from the registration systems in three local hospital areas: Copenhagen, Storstrøms, and Ringkøbing.¹⁹

The National Health Service sends unpublished statistical tables from the National Patient Register to hospital authorities around the country, but national statistics have not yet become available. Individual registration systems also produce unpublished statistical tables. Each system provides its users with diagnostic and surgical files prepared cumulatively for each trimester and for each year.¹²

OTHER DISCHARGE REPORTING SYSTEMS

Denmark's Psychiatric Register began operation before the general hospitals' registration systems did. Nationwide registration of persons with mental retardation and certain neurological and psychiatric diseases began in the 1920's. Additional psychiatric disorders began to be reported in 1938, and since 1953 all admissions to and discharges from state mental hospitals have been registered. In 1969 the registration system was computerized, and by 1970 all psychiatric institutions were reporting to it.²⁰

The Institute of Psychiatric Demography in Århus is responsible for operating the Psychiatric Register. It maintains a computer file on all patients that have received psychiatric treatment, and when a patient is admitted to a psychiatric facility, the institute sends the facility copies of all information from the patient's previous psychiatric admissions. The institute regularly prepares diagnostic files for participating hospitals and compiles annual reports for the hospitals and the National Health Service.¹² The institute also undertakes special research projects concerning the distribution of psychiatric disorders in certain areas and the use of psychiatric services.²¹⁻²³

Data Collection

The Psychiatric Register receives information several times during the course of a patient's hospitalization. An initial report that includes

the patient's name, address, marital status, and other personal data is sent to the institute when a patient is admitted. If the patient remains in the hospital for 3 months, a second report, containing the diagnosis, is sent to the institute. The institute also receives a copy of the hospital's discharge letter to the patient's general practitioner that contains a summary of the case history. A discharge form is also completed, generally by a hospital medical secretary, and it is sent to the institute.²⁰

The register covers all inpatients in public or private psychiatric hospital facilities. In addition, psychiatric units in general hospitals—including the psychiatric departments for children and adolescents—report their inpatients. The register also covers neurosis sanatoria and institutions for alcoholics.

Items Available

The discharge forms sent to the Psychiatric Register²⁰ include an item that identifies the hospital in which the patient was treated. The patient is identified by his or her CPR number. The date and type of admission are recorded (civil commitment, voluntary commitment, judicial observation, or sentence for custody or treatment), as is the place from which admitted (residence, general hospital psychiatric ward, psychiatric hospital, sanatorium, child psychiatric ward, somatic ward, or none of the above). Whether the patient was referred from one of the hospital's outpatient clinics is also noted.

The date and type of discharge are reported (alive, died in the hospital, or died during temporary absence), as well as the place to which the patient was discharged (residence, general hospital psychiatric ward, psychiatric hospital, sanatorium, somatic ward, child psychiatric ward, or none of the above). Referral to the hospital's outpatient clinic is recorded separately. Whether the patient has ever received treatment in a general hospital psychiatric ward, a psychiatric hospital, a sanatorium, a child psychiatric unit, or other psychiatric unit is noted, as is whether the patient is a twin.

A main and three auxiliary diagnoses can be reported; the patient's doctor determines the main diagnosis. The same Danish adaption of the International Classification of Diseases that is

used in somatic hospitals is used to code the diagnoses.

Several tables, routinely produced from the Psychiatric Register,²⁰ consist of information about a detailed list of diagnoses. These lists are available for each hospital and for groups of hospitals (mental hospitals, general hospital psychiatric wards, and sanatoria). The tables give the number of first admissions and all admissions for each diagnosis by sex. The number of admissions with each diagnosis listed as the main diagnosis is reported by sex, as is the number of admissions with each diagnosis listed as either the main or a secondary diagnosis. Other tables show 15 main diagnostic categories. The numbers of admissions by sex and age are given for each diagnostic category in one table; in another the numbers of discharges by sex and length of stay are reported for each diagnostic category.

The tables are sent annually to the National Health Service. They were published in *Medical Report II* until it ceased publication in 1978. The last edition of the report contains data pertaining to psychiatric patients hospitalized in fiscal year 1974-75. In 1979 similar tables containing data about psychiatric patients hospitalized in 1975-76 were published separately in the *Medical Statistics Reports* series.²⁴

A 1978 publication in the *Medical Statistics Reports* series also covers Psychiatric Register data.²⁵ It reports numbers and rates of inpatients in psychiatric treatment facilities on April 1, 1976 (the date when psychiatric state hospitals were transferred to the local county administrations). The data were presented by residence in local hospital areas; by type of institution and residence; by age (age 0-14 years, 15-24, 25-44, 45-64, and age 65 years and over) and residence; and by diagnosis, length of stay, and residence.

Unpublished data from the Psychiatric Register are sent to individual hospitals quarterly and annually. The hospitals receive a list of diagnoses that includes the name, CPR number, and other information on each patient.²⁰

AGGREGATE HOSPITAL REPORTS

In addition to reporting data to the National Patient Register, Danish hospital staffs complete annual questionnaires for the National Health

Service. The questionnaires request information about hospital facilities, costs, personnel, and utilization. General hospitals began using the questionnaires in 1960, and now all Danish hospitals use them. Data for a calendar year are reported, and the completed questionnaires are forwarded to the National Health Service by March 1 of the following year.

The hospital utilization questionnaire⁹ requires the name of the hospital and department, the National Health Service hospital, department, and specialty code numbers, and the total number of patients treated in the hospital. Separate data are reported for two groups of patients: 24-hour patients and part-time patients (part-time patients are those who receive only day or night care). The numbers of patients in each group who were in the hospital on the first day of the year and on the last day of the year are recorded. The numbers of admissions, discharges, and deaths in each group are also given. A separate count is made of the number of patients in each group who had been in the hospital for the entire calendar year or longer. The total number of bed days used by each group of patients during the year is reported, along with the number of registered beds. Outpatient visits are also counted: The form requires the total number, the number of acute visits, and the number of nonacute visits in the year.

The National Health Service uses the same formulas and definitions to calculate utilization statistics from the completed questionnaires as it does for the analysis of National Patient Register data, except that bed days used during the year rather than bed days of discharges are computed. The statistics were published in *Medical Report II* until it was discontinued. Now they are available in publications titled "Output Statistics for the Hospital System,"⁹ which are a regular part of the *Medical Statistics Reports* series.

The publications list all Danish hospitals and departments within hospitals. The following are reported for each department: beds, admissions, discharges, deaths, patients present at the end of the year, bed days, average daily number of patients, occupancy rate, and average length of stay. The numbers of acute, nonacute, and total outpatient visits to each department are also given. A second list presents similar data by

hospital region for 15 somatic specialties and for psychiatry and child psychiatry. In addition, the numbers of admissions, discharges, deaths, and patients present at the end of the year are reported separately for part-time patients by hospital and department. Summary tables show utilization statistics for each hospital region and type of hospital.

HOUSEHOLD SURVEYS

No major household health survey has been undertaken in Denmark in recent years. The need for periodic surveys has been recognized, especially for those that would gather data about illness and patterns of contact with primary health services.²⁶ However no plans to initiate such surveys have been made.¹⁴

The only nationwide health survey that has been done in Denmark is the two-part Morbidity Survey of the 1950's. The first part, the 1951-54 Sickness Survey, obtained information on a sample of 87,000 adults living at home. Interviewers were asked detailed questions about the diseases they had experienced and about such social characteristics as age, sex, marital status,

housing situation, income, and occupation. They also reported any hospitalizations that had occurred during a monthlong period, as well as the hospital's name and address, the admission date, and the illness or injury for which they were admitted. In 1960 the survey results were published in *The Sickness Survey of Denmark*.²⁷

The second part of the Morbidity Survey, the 1952-53 Hospital Survey, gathered information on a sample of 33,000 adults who had been admitted to public medical and surgical hospitals. Patients in the State-run university hospital or specialized departments of other hospitals were excluded. Each admission in the sample was reported in part by a doctor, nurse, or secretary, and in part by the research staff. Utilization data included the time spent in the hospital, waiting time before admission, previous admissions, and followup care. The reported social characteristics of the patients included age, sex, marital status, occupation, income group, and payment status. Medical data consisted of diagnoses, operations, nursing treatment during hospitalization, laboratory tests, X-ray examinations, and condition on discharge. In 1959 the results of the survey were published in *The Hospital Survey of Denmark*.²⁸

SCOTLAND

Discharge reporting systems in Scotland cover all inpatients treated by the Scottish Health Service. Three reporting systems are used: one for maternity inpatients, one for psychiatric inpatients, and one for other hospital inpatients. Also, summary statistics on all types of Scottish Health Service inpatients are collected twice a year. In addition, Scotland is included with England and Wales in the General Household Survey, which obtains hospital utilization information.

GENERAL HOSPITAL DISCHARGE REPORTING SYSTEM

Hospital statistics were first collected in Scotland in the 1940's. A nationwide Cancer

Registration that received data on hospital patients was established in 1945, and certain counties conducted studies of hospital-treated illness under the sponsorship of the Nuffield Provincial Hospitals Trust.²⁹ Not until the Scottish Health Service began, however, were plans made for a comprehensive reporting system.

The National Health Service (Scotland) Act of 1947 divided Scotland into five regions; in each a Regional Hospital Board administered hospital and specialist services. The Department of Health, which became the Scottish Home and Health Department in 1962, provided central administration. In 1950 the regional boards and the Department of Health established a plan to collect national hospital discharge statistics. In 1951 the Northern Region began to collect discharge data from its general and maternity hospitals, but various constraints prevented the

other regions from introducing the system. Over the next few years, individual hospitals in the other regions adopted the reporting system, but not until 1961 were the Scottish Hospital In-Patients Statistics (SHIPS) collected throughout the country. At that point maternity hospitals were excluded from the reporting system, but a separate reporting system for obstetrical inpatients was introduced in 1969.²⁹

In 1974 the Scottish Health Service was reorganized. Fifteen health areas were created, each administered by a health board. The newly formed Common Services Agency took over many of the staff functions of the Home and Health Department, and the Information Services Division of the new agency became responsible for the collection and analysis of SHIPS.

Initially the main purpose of SHIPS was to provide hospital use information for the health service's regional and central administrators. Administrators were especially concerned with hospital use since hospitals were the most costly part of the health service. It was expected that the collection of individual patient records would allow more flexibility in the analysis of hospital use than was possible with aggregate hospital reports, and that information obtained from the analysis would be very valuable to administrators who must decide how to best use health resources and plan for the future.^{29,30}

In addition, SHIPS data were expected to provide important epidemiological information. Data on the conditions for which hospital patients were treated and on patients' demographic characteristics helped to outline some of the more serious morbidity patterns in the community. The data had to be interpreted with care because only a portion of total morbidity was reported, and cases of treatment rather than individual persons were reported. However the data were still considered useful additions to other sources of epidemiological information.³¹

After a few years, the potential value of SHIPS to individual hospital managers and clinicians became apparent. In 1968-69 the Scottish Consultant Review of In-Patient Statistics (SCRIPS) were introduced. SCRIPS are annual returns that report each physician's inpatient workload and supply comparative data on other workloads in the country as a whole. The in-

tended purpose of SCRIPS was to provide physicians with a basis for self-assessment of their patient care practices. This was expected to result in more effective and efficient treatment practices. In addition, receiving individual reports could stimulate clinicians' interest in hospital data collection and lead them to improve the data's accuracy and timeliness.³²

The quality of the data has been an ongoing concern. Detailed studies have been done of the extent and type of errors in the data,^{33,34} and much attention has been given to possible ways of improving the data collection process, including upgrading recordkeeping within the hospitals.³⁵ At present, validity checks in the computer system can remove reports of impossible or highly unlikely events, such as hysterectomies in males or senile dementia in children.

Much use is made of the data. The Scottish Home and Health Department and health board administrators utilize the data to plan and monitor the health service. Many physicians consult the SCRIPS and request additional ad hoc analyses from the Information Services Division, and university researchers have increasingly requested special types of data.

Methods of Data Collection

When an inpatient is discharged from a Scottish Health Service hospital or hospital department, discharge form SMR 1 is completed. While the physician in charge of the case is officially responsible for seeing that the form is accurately completed, medical records and clerical staff abstract the patient data, usually with little guidance from the physician.³⁰ The records staffs are employed by the health boards; the Information Services Division has no direct managerial control. Often, completing the discharge forms is only one of the records staff's many responsibilities, and delays and backlogs develop. The hospital staff codes all the information required on the forms except for the inpatient's occupation, which is coded centrally.³⁴

In most cases the hospitals send the discharge forms to the area health boards, and the boards forward them to the Information Services Division for processing at the national computer center. Two health boards process their own

data. Two other computer centers, one in Edinburgh and one in Glasgow, analyze data for the large hospitals in each of those areas. The local data centers perform the same validity check as is used in national processing and must submit the basic set of standardized data to the national computer center. However they are free to collect whatever additional data they wish.³⁴ The national center transfers all discharge data onto computer tapes, performs the validity and feasibility checks, and produces the routine output. The tapes are retained in order to meet special requests for tabulations.

Coverage

SHIPS only cover patients treated by the Scottish Health Service, but more than 95 percent of all hospital beds in the country are part of the service. Scottish Health Service maternity and psychiatric patients are not covered by SHIPS regardless of whether they are treated in specialized hospitals or specialized wards of general hospitals. Data concerning these patients are collected but are sent to separate reporting systems and are processed and tabulated separately.

All other inpatients should be reported whether they are in general or specialized hospitals or units. The Information Services Division (ISD) has no way to be certain that a form is completed for every discharge, but comparisons between the number of discharge forms received by ISD and the total number of discharges reported on the annual aggregate hospital returns have found an unexplained difference of less than 1 percent in number of discharges reported.³¹

Long-term-care hospitals and units are part of the health service and therefore are included in the reporting system. Since no separate set of institutions similar to U.S. nursing homes exists in Scotland, almost all long-term inpatient care is provided by the health service hospitals.³⁶ The following long-term specialties are covered by the reporting system: rehabilitation and physical medicine units whose patients average 30-day hospital stays, respiratory tuberculosis units with 46-day average stays, geriatric assessment units with 62-day average stays, geriatric long-

term units with 345-day average stays, and wards for younger chronic patients with 478-day average stays.³⁷

Items Collected

The SMR 1 form³⁷ used to collect hospital statistics contains several identification items, including the hospital code number and the patient's case reference number. Many hospitals assign a single case number to a patient for all his or her admissions, but some assign numbers to admissions in sequence or use some other system, so that patients admitted more than once obtain different case numbers each time they are in the hospital.³⁸ The patient's last name, first name initial, and last name at birth are also recorded.

Hospital utilization items collected include the date the patient was placed on the waiting list for admission, and the date, source, and type of admission. The date of the principal operation is recorded, as is the date of discharge, whether the patient was discharged alive or dead, the type of bed the patient occupied prior to discharge, and the hospital division or unit from which the patient was discharged or transferred. The physician in charge of the patient's case is also identified.

Social and demographic items collected include age, birth date, marital status, and residence. Residence has been recorded by postal area since 1974, but much difficulty has been encountered in the use of these codes. The occupation of each patient is recorded as well. If the patient is a married woman, the husband's occupation is also recorded. If the patient is a child, the father's occupation is recorded. Often the husband's or father's occupation is not reported. In other cases the information given is imprecise, but the information is mainly used to assign patients to a social class, and it has been found to be adequate for statistical purposes.³⁰

The medical items include the principal diagnosis, three other diagnoses, and the external cause of injury ("E") codes. The principal diagnosis is defined as the main condition treated or investigated during the admission. If no diagnosis is made, the main symptom or problem is

recorded.³⁷ Since January 1, 1980, the ninth revision of the International Classification of Diseases³⁹ has been used to code diagnoses. A principal operation and one other operation can be reported, and the operations are coded using England's Office of Population Censuses and Surveys codes. Both operations and diagnoses can be coded to four digits.

Definitions and Procedures

The statistics routinely produced from the SHIPS data include both long-term and short-term patients. Patients treated in the long-term specialties account for only about 4 percent of the discharges reported to SHIPS, but since they use 37 percent of the total bed days, they have a considerable impact on the statistics. Special analyses are often done of general hospital use by patients age 65 years and over who are the major users of the long-term specialties.⁴⁰

The bed-day statistics refer to days used by the patients discharged during the yearlong reporting period. Until 1979 admission and discharge days were each counted as bed days, but now only the admission day is counted as a bed day.⁴¹

The number of discharges includes the number of deaths and transfers. Admissions ended by regular discharges, by deaths, and by transfers are often referred to as "spells" in the hospital; data on each type of spell can be obtained separately if desired. Transfers between hospitals and between different specialties within a single hospital are counted as discharges and new admissions. In 1976 approximately 8 percent of all spells were interhospital transfers and 3 percent were intrahospital transfers.³⁷ Transfers and repeat hospitalizations of the same patient can be linked through use of the following identifying data collected on the discharge forms: name, sex, birth date, and sometimes hospital case number.³⁸ However the routine statistics are for spells, not patients.

Discharge and bed-day rates are calculated per 1,000,000 population or per 100,000 population.^{37,40} Until 1974 discharge rates referred to the population of the patient's area of treatment, but since 1975 they have referred to the

patient's area of residence. The average length of stay is obtained by dividing the number of bed days by the number of spells of treatment.

Information Published or Available

The data collected by SHIPS have been published annually since 1961 in *Scottish Hospital In-Patient Statistics*.³⁷ Tables in the publication present statistics on the total number of discharges and discharge rates, bed days, bed-use rates, mean length of stay, mean waiting time, and number of surgical operations. These statistics are cross-tabulated by various items of information, including sex, diagnosis, age group (age 0-4 years, 5-14, 15-24, 25-44, 45-64, 65-74, and age 75 years and over), health board area, source of admission (emergency, from the waiting list, booked case, or admission from other sources), condition at discharge (dead or alive), place to which discharged (home, convalescent hospital, other hospital, Local Authority or other care, transfer within the hospital, died, or irregular discharge), hospital division or unit at discharge, and number and type of operations. Five-year trend data are also given on number of discharges and mean length of stay by sex and diagnosis.

The annual publication *Scottish Health Statistics*⁴⁰ also presents data from the reporting system. The tabulations are less extensive, but the most recent publication contains tables on the discharge rate by diagnosis over a 7-year period; the discharge rate by diagnosis and health board area; the number of discharges and mean stay by sex, diagnosis, and age (0-4 years, 5-14, 15-44, 45-64, and 65 years and over); and the number of discharges and beds used by area of treatment and area of residence.

Unpublished tables are routinely sent to each hospital and health board concerning the hospital's activity and the activity of the hospitals in the board's area, respectively. While the tables contain information similar to that which is published, it is analyzed for each hospital and its divisions or units. The number of discharges is tabulated by age, sex, condition at discharge, source of admission, area of residence, and diagnosis. The mean length of stay is given by sex, age, and diagnosis; regional and national mean

stays are provided for comparison. The number and percent of discharges who were admitted from the waiting list and the mean waiting time are reported by sex and diagnosis, along with regional and national waiting times for each subcategory. The health district of residence of discharged patients is given for the hospital as a whole and for each hospital department.^{30,31}

In addition, each hospital receives a diagnostic index consisting of information on all its discharges; the patients are listed by diagnosis. For each patient, the birth date, sex, other diagnoses, physician, month admitted, area of residence, marital status, occupation, social class, source of admission, days on waiting list, days in the hospital, unit from which discharged, condition at discharge, and operations are reported.³¹ An operation index is also provided.

The SCRIPS returns, which are sent to each physician and detail his or her activity, are also compiled from the SHIPS data. One SCRIPS table reports the distribution of cases the physician treated during the year, categorized by diagnosis. The number of cases, percent of all cases in the specialty, median stay, median waiting time, percent of cases admitted as emergencies, percent of cases discharged to home, percent operated upon, and number of fatalities are given by sex for each diagnostic category. Except for the number of fatalities, statistics are given in each category for all cases treated in the same specialty in Scotland as a whole. A second table, sent to surgeons, reports the distribution of cases by type of surgical procedure and gives the same statistics for cases in each procedure category (except the percent operated). The percent of cases with an admission-to-operation interval of less than 3 days and the median operation-to-discharge hospital stay are also included. Again, all the statistics are given by sex, and statistics for all cases operated upon in the same specialty in Scotland as a whole are reported in each category, except fatalities. A diagnostic index is also provided to physicians that lists all the physician's discharges by diagnosis and reports the birth date, sex, up to four diagnoses, external cause of injuries, month of admission, health board of residence, marital status, source of admission, type of admission, days on the waiting list, days of stay, unit from

which discharged, disposition, up to two operations, and the case number of each discharge.

OTHER DISCHARGE REPORTING SYSTEMS

Data about Scottish psychiatric and maternity patients are collected by virtually independent discharge reporting systems.^d The mental health reporting system, begun in 1963, covers patients in mental hospitals, general hospital psychiatric units, and mental deficiency hospitals in the Scottish Health Service. The maternity reporting system began to cover health service patients in maternity hospitals and maternity wards of general hospitals in 1969. The mental health system has achieved 100-percent coverage of hospitalized psychiatric patients, and the maternity system covered 99.6 percent of inpatient deliveries in 1977.⁴¹ Less than 1 percent of all deliveries in Scotland take place at home. Data are collected on home deliveries in two areas of the country, but the data are not included in the published maternity statistics.

The two specialized reporting systems operate in much the same fashion as does the general hospital reporting system. Information abstracted from the medical record is entered onto a discharge form for each patient discharged from a participating hospital or unit. The psychiatric services also complete admission forms on each patient. The medical records or clerical staff codes the forms and forwards them either to the area health board or to the Information Services Division (ISD) of the Common Services Agency. Most psychiatric hospitals send their forms directly to ISD, but two health boards, Grampian and Tayside, computer process their own psychiatric data. Maternity data are usually sent first to the health boards and then to ISD.

Most items collected on the mental health and maternity discharge reporting forms are the

^dIt is not strictly correct to refer to the psychiatric reporting system as a discharge system, since it is based on reporting both at the time of admission and discharge, and the main emphasis is on the admission reports.

same as those collected on the general hospital reporting forms.³⁴ The hospital and specialty are identified on all the forms, and the patient's case reference number, name, initials, and birth surname are requested by all. The admission and discharge dates are reported, as is the type of discharge. Social and demographic items on all the forms include birth date, area of residence, and occupation. Common medical items include diagnoses and condition at discharge.

The maternity forms require additional information including the mother's marital status and marriage date, religion, number of previous pregnancies and their outcome, operations, and clinician. Detailed data on the pregnancy, labor, and delivery are requested, and the sex and birth weight of the child are reported.⁴² Mental health forms require additional information that concerns the patient's diagnoses on admission and legal status at admission and discharge.³⁴

For the most part, the two specialized reporting systems use the same definitions and formulas as does the general hospital system. Some additional statistics are calculated for psychiatric patients, such as the number of admissions, admissions per 100,000 population, number of residents, and residents per 100,000 population. The term "resident" refers to patients present in the psychiatric facility on December 31 of a particular year. The psychiatric system also uses the term "transfer-in" for an admission that results from an inpatient moving from one psychiatric hospital to another.⁴⁰

Since the early 1970's data from the mental health reporting system have been published annually in *Scottish Mental Health In-Patient Statistics*.⁴³ The publication containing 1974 data and those that have appeared subsequently are composed of 16 types of tables; most are in sets of 4. The set consists of one table that presents information on all patients in psychiatric hospitals and units, and three separate tables that present the same information for mental hospital patients, psychiatric unit patients, and mental deficiency hospital patients. The information in all the tables is reported separately for males and females.

In addition to sex, the publication reports admissions by age (0-14 years, 15-24, 25-34, 35-44, . . . , 75-84, and 85 years and over), diag-

nosis (detailed and short lists), legal category of admission, health board of treatment, and source of referral (psychiatric outpatient clinic; psychiatric day unit; domiciliary visit; nonpsychiatric clinic or ward; general practitioner; self, relatives, or friends; prison or judicial; Local Authority agency; transfer from other psychiatric inpatient care; or other sources such as ministers, voluntary agencies, and the like). The number and percent of all admissions that are readmissions are also reported. Statistics on residents in the hospital at the end of the year are reported by age, diagnosis, health board of treatment, and duration of stay (less than 1 week, 1 week to 1 month, 1-2 months, 2-3 months, 3-6 months, 6-9 months, 9-12 months, 12-18 months, 18 months to 2 years, 2-5 years, 5-10 years, 10-15 years, 15-20 years, and 20 years or more). Discharges are reported by age, diagnosis, duration of stay, and disposal on discharge (died, left on own accord, home, hostel, transferred to mental hospital, transferred to mental deficiency hospital, transferred to psychiatric unit, transferred to geriatric care, transferred to other inpatient care, penal institution, other, and not known). Time-series data covering an 8-year period are presented on admissions, residents, and discharges.

Scottish Health Statistics also presents data from the mental health reporting system. Though less extensive than data in *Scottish Mental Health In-Patient Statistics*, the data in *Scottish Health Statistics* are usually more up-to-date. *Scottish Health Statistics, 1977*,⁴⁰ published in 1978, contains tables of provisional data from 1977. The data are separated into two sets of tables: one for mental hospitals and psychiatric units together, and the other for mental deficiency hospitals. Reported statistics include the number and rate of admissions, percent readmissions, number and rate of residents, number of discharges, and mean length of stay. Variables used to cross-tabulate the statistics include sex, age, diagnosis, health board of residence, type and category of admission, and type of disposal at discharge. Time-series data covering 1965 to 1977 are also presented.

No separate publication is produced from the data collected by the maternity reporting system, but some statistics from the system are

included in *Scottish Health Statistics*. In *Scottish Health Statistics, 1977*,⁴⁰ 1976 statistics are reported for mothers and newborns. One table presents the number and mean stay of maternity admissions by type of admission (antenatal; postnatal; delivery; and other, mainly abortion) and age (less than 20 years, 20-24, 25-29, . . . , 40-44, and 45 years and over). Another table gives the number of discharges, mean length of stay, and percent distribution of maternity discharges in length-of-stay categories (less than 3 days, 3-7, 8-14, 15-28, and 29 days and over) by type of admission (abortion; antenatal; delivery, in labor; delivery, not in labor; postnatal; transfers; and others, not pregnant) and type of unit (specialist or general practitioner). The number of maternity discharges, percent discharged from obstetric consultant units versus obstetric general practice units, and mean stay of discharges are reported by area of residence. The number of deliveries is presented, along with the percent of different modes of delivery (spontaneous, forceps, vacuum extraction, breech, cesarean, and other), the number and percent that were induced, and among induced deliveries, the method used (arm, oxytocins, arm and oxytocins, and others), all according to health board of treatment. The outcome of pregnancy, whether a still or live birth, and birth weight in grams (under 500, 500-1,000, 1,000-1,500, . . . , 4,000-4,500, and over 4,500) are tabulated by area of residence. Finally, the number and rate per 1,000 live births of perinatal deaths are given by birth weight and area of residence.

Like the general hospital reporting systems, the specialized reporting systems produce unpublished tabulations, which are sent to the health boards and hospitals in the systems. In addition, psychiatric clinicians receive returns on the activity of their hospitals.

AGGREGATE HOSPITAL REPORTS

Besides individual discharge reports, all Scottish Health Service hospitals complete aggregate statistical reports of their workloads. The hospitals complete the so-called ISD(S)1 forms and send them to their health boards. In some areas

the forms are submitted to the health boards weekly; in others, monthly. Twice a year the health boards forward magnetic tapes that contain most of the data from the forms to the Information Services Division (ISD) of the Common Services Agency. The ISD compiles two annual summaries, one for the year ending March 31 and one for the year ending September 30.⁴⁴

The forms contain information about the total number of available bed days, and from this information ISD calculates the average daily number of beds that were staffed and available for the reception of patients. Since 1976, when form ISD(S)1 was introduced, the calculation of the average daily number of beds has included borrowed, temporary, and lent beds. (Previously such beds were not taken into account; therefore, adjustments must be made when statistics are compared over time.) Also reported is the number of allocated staffed bed days, which is the sum of the daily number of beds allocated to a specialty that were staffed and available for the reception of the patients during the year.

The number of total occupied bed days is given, which is the sum of the number of beds in a specialty occupied at the time of the daily bed count on each day during the year. The bed count generally takes place between midnight and 8 a.m. Since 1976 total occupied bed days has also included borrowed, temporary, and lent bed days. The category also includes patients on temporary leave from the hospital at the time of the bed count. It should be noted that total occupied bed days is not equivalent to total bed days of discharges, which is obtained from the discharge reporting systems. Unlike total occupied bed days, total bed days of discharges includes bed days used in a previous year or years if a discharge's hospitalization extended through more than one reporting period, and it excludes the bed days of patients still in the hospital at the end of the reporting period.

The number of inpatients discharged is reported on ISD(S)1; this form includes deaths, transfers between hospitals, and transfers between specialties within hospitals, as well as routine discharges. Intrahospital transfers from one specialty to another have been counted as discharges only since 1976 and are also reported separately. Patients, such as day patients or

night patients, who are not hospitalized for full 24-hour periods are not counted as discharges.

Statistics calculated from the collected data include the average duration of stay, percent occupancy, turnover interval, and throughput. The average duration of stay is obtained by dividing the total occupied bed days by the number of discharged inpatients. The inclusion of intrahospital transfers in the number of discharges led to a slight reduction in the average stays reported since 1976. Percent occupancy is the total occupied bed days multiplied by 100 and divided by the number of available staffed beds. Turnover interval is the number of available staffed bed days minus the total occupied bed days divided by the number of inpatients discharged. Throughput is the number of discharged inpatients multiplied by 365 and divided by the number of available staffed bed days.

Data from the ISD(S)1 forms are reported in the following annual publications: *Hospital Utilisation Statistics*,¹¹ *Scottish Health Statistics*,⁴⁰ and *Hospital Bed Resources*.⁷ One set of tables in *Hospital Utilisation Statistics* gives statistics for Scotland as a whole and for each health board by specialty. Almost 50 different specialties are listed, including such medical and surgical specialties as cardiology, urology, and thoracic surgery, and obstetric, psychiatric, and long-term specialties. The tables present the number of approved beds; the number of persons on the waiting list; the number of allocated, borrowed, lent, temporary, all available, and total occupied bed days; the number of discharges and deaths; and the number of intrahospital transfers into and out of the specialty. A second set of tables shows the average number of allocated staffed beds, the number on the waiting list per allocated staffed bed, the number of allocated staffed beds per 100,000 population, throughput, mean stay, turnover interval, and the number of discharges per 100,000 population for each specialty by health board. Separate sets of tables with similar formats report on inpatients in joint-user hospitals, which are Local Authority institutions that make beds available to health boards, and on inpatients in contractual hospitals, which are institutions operated by voluntary bodies in which the health boards use beds. Data are also presented on outpatient visits to health service hospitals.

Many of the same statistics are included in *Scottish Health Statistics*, again tabulated by specialty and health board. *Hospital Bed Resources* contains information on available staffed beds and bed complements of all Scottish hospitals and the total bed stock in each health district of the country.

HOUSEHOLD SURVEY

Scotland has been included in the General Household Survey since the survey began in 1971. The ongoing survey is conducted by the Social Survey Division of the Office of Population Censuses and Surveys (OPCS), which is located in England. It covers five main subject areas: population, housing, employment, education, and health. The data from the survey are expected to supply government agencies with information that will assist resource allocation decisions. The survey results have routinely been sent to about a dozen government departments, and researchers outside the government have shown increasing interest in them.

Data Collection

The survey data are collected from a large sample of households in Great Britain. In 1977, 15,315 households were included.⁴⁵ Interviews are conducted with all adult household members, who also furnish information about their children under age 16. Institutionalized individuals are excluded from the study. The sample is drawn in a two-stage process, first sampling electoral wards and then selecting addresses within each ward from the Electoral Register. The samples are stratified by type of area (metropolitan or nonmetropolitan), by socioeconomic group of the head of the household, and by the proportion of householders who are owner-occupiers.

Items Available

A great deal of information is collected about the social and demographic characteristics of the individuals in households covered by the survey. Age, sex, marital status, length of time at

present address, type of housing, skin color, country of birth, family size, type of employment, income, education level, and region are investigated. Information about the utilization of ambulatory and inpatient health services is also collected, as are data on the incidence of acute and chronic sickness. The information on hospitalization includes a question about inpatient care during the 3 months prior to the interview and the length of stay in the hospital. If a person is currently on a waiting list for hospital admission, the length of the wait is reported.

The OPCS has published the survey results in a series titled *General Household Survey*.⁴⁵ In

1979, data collected in 1977 were published as the seventh number in this series. In recent years the information in the publication on hospitalizations has been limited to tables of the number of medical and surgical inpatient visits per 1,000 persons in a 3-month reference period, and the average number of inpatient nights per visit, both given by age group and sex. The published data are for Great Britain as a whole, though sometimes statistics for England and Wales are reported separately. Unpublished statistics on Scotland are available and can be obtained, subject to certain restrictions, in the form of either tables or magnetic data tapes.

WEST GERMANY

In West Germany hospital discharge data are available from a variety of sources. Sickness insurance funds collect information about their members' hospitalizations. One small West German State, Schleswig-Holstein, operates a discharge reporting system in its acute care hospitals. In another State, Northrhine-Westphalia, a psychiatric hospital reporting system has been organized. In addition, army hospitals have a special reporting system. Official hospital statistics for the country as a whole are collected by means of aggregate hospital reports by the Federal Statistical Office in cooperation with State statistical offices. The Federal Statistical Office also operates the Microcensus, an ongoing national household survey that collects some information about hospitalization.

GENERAL HOSPITAL DISCHARGE REPORTING SYSTEMS

The sickness insurance funds' data systems and the Schleswig-Holstein reporting system are the main sources of national and regional diagnostic data for patients treated in general hospitals. The sickness insurance funds and their hospital data systems are discussed first in this section, followed by a description of the Schleswig-Holstein system.

Sickness Insurance Funds

Compulsory health insurance was established in Germany in 1883. At that time a number of voluntary sickness benefit societies already existed in the country. While the insurance law required certain workers to join a society or fund and established regulations concerning the operation of the funds, it allowed the funds to remain independent entities. The insurance system has since expanded, but continues to be administered by autonomous funds.

In 1976 there were 1,425 sickness insurance funds in operation.⁴⁶ The funds are governed by boards of directors, whose members equally represent employers and workers. The State governments and the Federal Ministry of Labor and Social Affairs supervise the funds, which cover approximately 96 percent of the population.⁴⁷ Membership in a fund is compulsory for most workers, including all manual and salaried workers whose income is below a certain level, a level that changes periodically. Other workers can join funds as voluntary members. The families of workers are not, in a strict sense, members of the funds, but insurance coverage does extend to them.

There are eight types of sickness insurance funds: Local Sickness Funds, Company Sickness Funds, Guild Sickness Funds, Agricultural Sickness Funds, Seaman's Sickness Funds, Miner's

Sickness Funds, Compensation Sickness Funds for Workers, and Compensation Sickness Funds for Employees. Over half of the insured workers in West Germany belong to the first of these, the Local Sickness Funds.⁴⁸ Workers usually join the Local Sickness Fund in their area, unless they are employed by a large business that has its own fund, belong to a guild with a fund, or are involved in an occupation that operates a fund. Many of the funds are organized into associations at the State and Federal levels by type of fund; such as State and Federal associations of the Local Sickness Funds.

The sickness insurance funds collect reports of the hospital use of members and their families. Reports are made of all insured hospitalizations, whether the patients are treated in the acute care hospitals or in the special care hospitals, which primarily treat long-staying patients. The data are not separated by type of hospital. Additional information, including the age, sex, and diagnoses of insured hospital patients, is collected by the funds on a sample basis. The diagnoses are coded according to the International Classification of Diseases.⁴⁹

The individual sickness insurance funds send the collected data to the State sickness fund associations, which forward the data to the Federal associations. The various Federal associations supply the data to the Ministry of Labor and Social Affairs, which adds it to its Sozialdatenbank (social data bank). Some hospital-use statistics from the data bank are published regularly, for instance in *Survey of Social Security*;⁵⁰ unpublished data are available for special studies.

The different Federal associations of the sickness insurance funds also publish annual reports. These reports contain more detailed information about hospital use than does the *Survey of Social Security* but are less comprehensive, since each association's report only covers the hospitalizations of its members and their families. An example of an association report is the publication of the Federation of Local Sickness Funds on types and causes of illness, and deaths.⁵¹ The 1979 edition of this publication contains 1977 statistics from 267 Local Sickness Funds that represent 90 percent of all the fund members. The participating funds reported

data from a 20-percent sample of the hospital cases that they handled. The data are presented separately for various membership categories (compulsory members, voluntary members, pensioners, and members' families). The number of hospital cases and bed days, average number of days per case, and number of cases and bed days per 10,000 members are shown for each membership category, by sex and diagnosis. The same statistics are given for each membership category except families of members and are divided by sex, diagnosis, and age (14 years or under, 15-19, 20-24, . . . , 60-64, and 65 years and over). The same statistics are also reported for compulsory members and are divided by sex, age, and cause of illness (work accident excluding road accident; road accident; occupational disease; traffic accident excluding road accident; sports accident; other accident; murder, assault, battery; suicide, suicide attempt, self-inflicted injury; and military service injury).

A major advantage of the sickness insurance fund diagnostic statistics is that the size of population to which they refer is known. The number of persons with compulsory membership in a fund is established annually and is available by age. The number of persons in the members' families is determined every 4 years.⁴⁶ Thus a denominator exists for epidemiological statistics.

Schleswig-Holstein

In addition to sickness insurance fund hospital statistics, discharge data have been collected by the State Statistical Office in Schleswig-Holstein since 1969. Schleswig-Holstein is one of West Germany's 10 States. It is located in the northern part of the country, bordering Denmark, and contains 2.5 million people, 4 percent of the country's population.⁵²

The Schleswig-Holstein reporting system receives data only from acute care hospitals. In the first year of operation, 34 hospitals participated in the system, and they accounted for 45.6 percent of all patients treated in the State's acute care hospitals that year. Almost every year since, additional hospitals have joined the system. By 1977, 53 hospitals, accounting for 70.1 percent of the State's acute care hospital

patients, participated. While participation is voluntary, all the acute care hospitals in the State are expected to take part in the system in the near future.⁵³

The reporting system was established to provide needed data for health planning and hospital management, and as a possible basis for epidemiological research. It was thought that the collected information would greatly assist the management of public programs concerning health, especially those to design health care delivery systems that fit needs of the population. Individual hospital's procedures, coverage, and efficiency were also expected to be better understood by means of the collected data. The system has served as a model for other State and Federal Government officials who are interested in establishing comprehensive hospital data systems elsewhere in West Germany.

The data from the system have been found to have certain disadvantages. A current epidemiological study of the relationship between leukemia and a complex of nuclear power plants serves as one example. The study is hampered because persons with leukemia often receive treatment in hospitals, especially university hospitals, that have not been participating in the reporting system. Furthermore, since the statistics count cases rather than persons, advances in the treatment of leukemia that have reduced the death rate and that have led to repeated brief periods of hospitalization have resulted in hospital statistics that appear to show increased morbidity where no real increase exists.⁵⁴ The reporting system's inability to obtain accurate utilization rates of cases per population will be a major problem until complete coverage of the acute care hospitals is reached. Even then the residents of Schleswig-Holstein who are treated in other States' hospitals will be excluded from the system, and the residents of other States treated in Schleswig-Holstein will be included, which will complicate epidemiological studies. The fact that the statistics refer to cases rather than to persons is a problem common to most discharge reporting systems and will remain a problem unless a system of record linkage is developed.

Methods of data collection.—Information is collected continuously in the Schleswig-Holstein

reporting system. When a patient is admitted to a participating hospital, his or her data sheet is begun. Further information is added when the patient is discharged. A physician usually codes the sheets; occasionally other hospital personnel provide assistance.⁵⁴

The data sheets can be sent directly to the State Statistical Office, but many hospitals have data processing equipment and transfer the information from the sheets to punch cards or magnetic tapes. Thus the State office receives data in various forms. The office produces a single data set from all the material sent to it, processes the data by computer, and performs consistency checks (for instance, checking sex-specific diseases to ensure that they are reported for the proper sex). Sets of tables, some of which are published annually, are then produced by computer. Unpublished tables are returned free of charge to the participating hospital.

Several proposals have been made to increase the system's scope. For example, about half of the hospitals that participate in the reporting system, including almost all the public hospitals, are also associated with a data processing system that emphasizes financial management and insurance claims. This system is maintained at the Schleswig-Holstein Data Center, which is where the State Statistical Office maintains its data bank. If the specialized data processing system were slightly broadened, its data could be added to the State's diagnostic statistics. Another plan involves a new reporting form, suggested by the State Statistical Office, that would combine diagnostic data with hospital data from other sources and would allow the information to be readily transformed into machine readable form.⁵⁴

Coverage.—As mentioned earlier, the Schleswig-Holstein reporting system only covers the State's acute care hospitals. The special hospitals, which primarily treat long-staying patients, do not participate. All types of acute care hospitals may join the system, and by 1976 all the public hospitals owned by the State or its cities were participating, along with all denominational hospitals and some of the other private hospitals.⁵⁵ The participating hospitals may not totally represent all acute care hospitals in the State, but patients' average length of stay in the

participating hospitals is the same as in all Schleswig-Holstein acute care hospitals.^{8,56} As more hospitals join the reporting system, any existing biases will be corrected.

The participating hospitals report all their discharges. Therefore patients in psychiatric wards are covered as are other long-staying patients, such as those in tuberculosis units who averaged 93-day stays in 1976.⁵⁶ Maternity patients are reported in the same way as other inpatients, and separate data sheets are also completed for infants born in the hospital.

The data collected by the reporting system cannot be considered representative of hospitalization in West Germany as a whole. Schleswig-Holstein has one of the lowest bed-to-population ratios in the country, and Schleswig-Holstein acute care hospitals have a lower average discharge rate, bed-day rate, mean length of stay, and occupancy rate than do all other West German acute care hospitals.⁸

Items collected.—The data sheet used in the discharge reporting system contains several identification items. The hospital and the specialty department in which the patient is treated are identified by numbers. A patient admission number is also given. The patient's accommodation (one-bed room, two-bed room, room with more than two beds) is reported. If the reason for the hospital stay was not the treatment of an established diagnosis but rather an opinion about the patient's condition (an admission by order of a third party, usually the courts or insurance authorities) this is noted. The type of payment for the hospitalization is also reported (self-payment; payment by an insurance fund, and if so, what kind of fund; payment by welfare; or other type of payment).

Items concerning hospital utilization include the admission and discharge dates. The kind of admission is coded as newborn, transfer from another department, transfer from another hospital, or other. The kinds of discharges include discharge to home, transfer to another department, transfer to another hospital, transfer to a nursing home, died and autopsy performed, and died and autopsy not performed.

Social and demographic items are the patient's age, sex, and residence. The day and month of birth are reported for children under

1 year of age; for others only the year of birth is required. The district of residence should always be reported. The community of residence is an optional item and usually is not reported. Special note is made of patients who are out-of-State residents.

Three diagnoses can be reported and are coded to three or four digits using the eighth revision of the International Classification of Diseases. The primary diagnosis, defined as the main illness for which the patient was treated, is recorded first. The doctor in charge of the hospital ward decides which is the main diagnosis when there are more than one. Each diagnosis is described as either a final diagnosis, a provisional diagnosis, or a "state after." "State after" means that the treatment was not for the illness itself, which no longer existed, but for a condition that occurred after or was due to the illness.

Definitions and procedures.—The collected data do not differentiate short-staying and long-staying patients. Most long-staying patients in the State are treated in the special hospitals, however, and data are not collected in these hospitals. Since statistics are divided by type of hospital department, the statistics for departments that provide treatment to long-staying patients, such as the tuberculosis departments, can be isolated.

The term "completed cases" is used to refer to regular discharges, deaths, and transfers.⁵⁴ Transfer patients are counted as completed cases whether they are interhospital or intrahospital transfers. Death statistics are usually presented separately as well as together with other completed cases. The number of healthy newborns is not included in the number of completed cases, but the number of sick newborns is included.

A bed day is counted for each patient present in the hospital at midnight.⁴⁷ The day of admission would therefore be counted as a bed day, but the day of discharge would not. A hospital stay of less than 1 day would not be counted as 1 bed day unless the patient was in the hospital at midnight.

The average length of stay is computed by dividing the number of bed days of completed cases by the number of completed cases. The standard deviation associated with the average length of stay is also calculated, and the

coefficient of variation, obtained by dividing the standard deviation by the mean length of stay, is computed.⁵⁶

Information published and available.—Statistics from the reporting system are published by the State Statistical Office 2 years after the year they were collected. Unpublished statistics are generally available to participating hospitals with less delay. The 10 university-affiliated hospitals in the system usually receive data about their patients 1 year after collection. Some tabulations are also sent to all participating hospitals in May following the end of the year the data were collected.⁵⁴

Published statistics from the reporting system are available in *Diseases of Inpatients in Schleswig-Holstein*.⁵⁶ Its two major tables present information on a list of selected diagnoses that cover 90 percent of all diagnoses. Both tables contain the number of completed cases and deaths, the average length of stay, and the standard deviation and coefficient of variation associated with the average length of stay for the selected diagnoses. Each table also reports the number of cases, bed days, and average length of stay by diagnosis and age (less than 1 year, 1-14, 15-44, 45-64, and 65 years and over). One table presents this information separately for the diagnoses in various hospital specialties (surgery; gynecology; obstetrics; internal medicine; infectious diseases; pediatrics; urology; orthopedics; ear, nose, and throat; psychiatry and neurology; dermatology and venereology; ophthalmology; teeth and gums; and radiation) and for diagnoses in hospitals without specialties.

Another set of tables presents information on 18 diagnostic groups. The number and percent of completed cases and deaths, the number of bed days, and the number of bed days per case are given by sex and diagnostic group. The number of completed cases is also reported by age group, sex, and diagnostic group. The percent of the cases in each age and diagnostic group is given for all patients and then separately for males and females. Within each age group the percent distribution of cases in the diagnostic groups is also given, first for all patients in each age group and then separately for males and females.

Four tables give statistics that are not separated by diagnosis. One reports the number of beds covered in the system and the percent of covered beds among all beds by type of hospital and hospital department. The second table presents the number of cases and the number of bed days per case, the latter separated by sex, by type of hospital department. The third table gives the number of discharges, the average stay by sex, the percent of patients, and the percent of the population, by age group. The fourth reports the number of deaths that occurred in each type of hospital department.

Unpublished tables sent to each hospital include lists of cases treated by the hospital and by separate hospital departments according to the main diagnosis. For each case the admission number, sex, age, and additional diagnoses are reported. Other unpublished tables present aggregated data for the hospital as a whole and for the separate departments, by diagnosis, age, and average length of stay. Also reported are the number of admissions and discharges cross-tabulated by health insurance group responsible for payment and type of accommodation.⁵⁵

OTHER DISCHARGE REPORTING SYSTEMS

Psychiatric Reporting System

While West Germany does not have a national psychiatric discharge reporting system, psychiatric patient data are collected in one State, Northrhine-Westphalia. The State, located on the west side of West Germany, borders the Netherlands and Belgium. Its population, 17 million persons, is the largest of the 10 States.⁵² The psychiatric reporting system covers the administrative regions of Düsseldorf and Cologne, which together contain about 9 million people.

Data collection.—The psychiatric reporting system is run by the Rhineland Provincial Union, a nongovernment association, and covers 10 association-owned psychiatric hospitals. The hospitals had a total of 10,627 beds in 1980, including beds for mentally handicapped patients.⁵⁷ The hospitals were collecting statistics,

including some diagnostic statistics, even before World War II. Computer data processing began in 1960, and in 1976 the hospitals installed data terminals for direct access to the association's central computer.

Information about each patient is collected at the times of admission and discharge. Hospital personnel add the information to the computer daily. Some data are processed by individual hospitals, but most are processed centrally by the association administrative staff.

Transfers to other hospitals and deaths are considered discharges. Intrahospital transfers are reported but do not count as discharges. Admission and discharge days are counted as separate bed days, and hospital stays of less than 24 hours are counted as 1 bed day. Total bed days for a year are computed by summing the number of patients in the hospital each midnight. Patients who are on leave for short periods, such as holidays, are regarded as present for the midnight count. Mean length of stay is calculated by multiplying the number of bed days by 2 and dividing the result by the total number of admissions and discharges. The statistics produced by the reporting system generally include both long-staying and short-staying patients, but short-staying patients can be identified separately.⁵⁷

Items available.—A large amount of information is collected for each patient admitted to one of the 10 psychiatric hospitals in the system. The hospital and department to which the patient is admitted are identified, as are the patient's name and admission number. Also reported are the date and time of admission, the legal basis of the admission, the place from which admitted, the source of admission (such as practicing physician, psychiatric clinic, or police), the number of admissions, the time since last admission, and whether the admission followed a suicide attempt. Patient characteristics recorded include birth date, sex, nationality, marital status, religion, occupation, place of residence, and residential status (such as lives alone, lives with siblings, or lives with spouse and child). Three admission diagnoses can be reported, and since 1972 the International Classification of Diseases has been used to code the diagnoses. Detailed information about the source and type

of payment for the hospital stay is also given.

If a patient is transferred from one hospital ward to another, the date of the transfer, the ward to which moved, and up to three transfer diagnoses are noted. If the legal basis of the hospitalization has changed, the new legal basis is also recorded. When a patient is discharged the collected information includes the date and hour of the discharge, up to three discharge diagnoses, the place to which discharged, and to whom the patient's care was transferred (general practitioner, neurologist, other specialist, or other).

Each year the Rhineland Provincial Union publishes a statistical report called *Data, Facts and Trends*.⁵⁸ The 1979 edition contains 1978 summary statistics from each psychiatric hospital and various statistical tables of the characteristics of the psychiatric patients for all the hospitals. The statistics for each hospital include number of beds, total admissions, first admissions, transfers-in, total patients treated, total discharges, transfers-out, deaths, patients in the hospital on December 31, bed days, average number of patients in the hospital per day, mean length of stay, and occupancy rate. Each hospital reports the number and percent of admissions and discharges in seven diagnostic categories, five age categories, and five legal categories. The number of admissions, treated patients, and discharges from each postal region the hospital serves are also reported. All information is given for the hospitals together as well as separately, and changes in several of the statistics from 1971 to 1978 are shown.

Most of the tables on patient characteristics give the number and percent of admissions in sets of categories by sex. For instance, the number and percent of admissions in marital status categories (single, married, divorced, widowed, and unknown) are given for males, females, and all patients. Tables show the distributions of admissions by age, number of admissions, time since last admission, residential status, source of admission, place from which admitted, whether suicide attempt, and occupation. The number and percent of admissions are also given by legal status and diagnosis, by age and diagnosis, and by age and legal status. The number and percent of treated patients, discharges, and deaths are

reported for length-of-stay categories, and the number and percent of discharges are given by place to which discharged. One table shows the number of admissions and discharges, and the average number of admissions per day for each month of the year. Other tables show information about patients with addictions, such as type of addiction, by age group.

Army Reporting System

A special discharge system that exists in West Germany's army hospitals was begun in 1960 by a government agency called the Institute of Defense Forces' Medical Statistics. The reporting system was established to learn more about army hospital utilization and morbidity patterns among soldiers. Since West German army hospitals and patients are quite different from other West German hospitals and patients, the reporting system's statistics are not at all representative of nationwide patterns of hospital use. The reporting system covers all army hospitals. Individual hospitals complete reporting forms for each discharged patient and send the forms to the institute for coding and processing.⁵⁹

The reporting forms include items that identify the hospital, department, and ward. The patient's name, hospital number, army grade, army activity, and first enlistment are reported, as are the patient's birthplace, occupation, next of kin, religion, marital status, and sex. The date, time, and type of admission (first, readmission with same illness or injury, readmission for other illness or injury, determination of fitness grade, and other) are listed. Intrahospital transfers, the departments transferred from and to, and the number of days of inpatient treatment in each department are reported. The date of discharge, place to which discharged, and total number of days of inpatient care are also given.

A primary diagnosis, four additional diagnoses, and up to five operations can be reported on the forms. The diagnoses are coded using a system similar to the International Classification of Diseases. The codes for operations were developed specifically for the army hospitals. If the patient died, the date, time, cause of death, and whether an autopsy was performed are

given. If the patient is disabled, the presumed cause of the disability and whether it was incurred in the line of duty are reported. The type of fitness for duty is also given. An overall summary of the patient's illness is written, and it is signed by the ward physician and the physician in charge of the patient's department.

The forms are completed for both long-staying and short-staying patients, and the statistics produced from the forms concern both types of patient. Discharge statistics include deaths and interhospital transfers but not intrahospital transfers. Bed-day statistics refer to the number of bed days used during the year, but mean length-of-stay statistics are computed using the number of bed days of discharges, which is divided by the number of discharges. The admission and discharge days are counted together as 1 bed day, and hospital stays of less than 24 hours are counted as 1 bed day.

Statistical reports are published monthly; another publication is prepared annually. The statistics are also supplied to the Federal Statistical Office for inclusion in its annual publication about hospitals.

AGGREGATE HOSPITAL REPORTS

Official hospital utilization statistics in West Germany are compiled by the Federal Statistical Office from aggregate hospital reports. All hospitals report, whether they are public, nonprofit, or profitmaking institutions. The hospitals receive annual questionnaires from the State Statistical Offices. Each State uses a somewhat different questionnaire, and the definitions of terms used to complete the questionnaires vary from State to State, but the Federal Statistical Office has established a committee to develop uniform forms and terminology.⁴⁷ Hospital staffs complete the questionnaires with information about the hospitals' operation and utilization during the calendar year. Usually the information comes from daily summaries of the hospitals' activities, the so-called "midnight statistics."⁵⁵ The completed forms are sent to area health departments, which aggregate the incoming data and report the results to the State Statistical Offices. The State offices then

forward the data to the Federal Statistical Office, which is responsible for processing and publishing them.

The Federal Statistical Office calculates separate utilization statistics for the acute care hospitals and special hospitals, which generally contain long-staying patients. As a group, patients in acute care hospitals had an average stay of 15.8 days in 1977, while patients in special hospitals averaged 58.7-day stays.⁸ However some types of hospitals that were part of the acute care group reported average stays that exceeded 30 days, and some special hospitals reported average stays of less than 30 days.

Transfers between hospitals are always considered discharges and new admissions, but transfers between departments within a hospital are counted as part of a single admission. Deaths are combined with other discharges for the purpose of computing utilization statistics, but they are also reported separately. A bed day is counted for each patient in the hospital at midnight. The total number of bed days thus refers to the number used during the year, not bed days used by patients discharged during the year. The average length of stay is calculated by multiplying the total number of bed days by 2 and dividing by the total number of admissions and discharges. The rates of discharges and bed days per unit of population generally are not computed, but State or nationwide rates can be calculated from the published statistics.⁶⁰

The statistics from the aggregate reports are published annually in "Hospitals,"⁸ which is number 6 in the *Health Care Statistics* series published by the Federal Statistical Office. The 1979 edition of "Hospitals" presents 1977 data, which primarily concern hospital beds. For instance, the number of hospitals and beds are shown by State, type of hospital ownership, hospital size, hospital specialty, and hospital regions within States. The number of beds per 10,000 population are given by State and type of hospital ownership. The number and types of hospital personnel are reported in another set of tables. Hospital utilization statistics are presented in three tables: one for males, one for females, and one for both sexes. The number of patients hospitalized at the beginning of the year, admissions, total patients treated, discharges, deaths,

patients hospitalized at the end of the year, bed days, and average length of stay are reported in each table by type of hospital ownership, hospital specialty, and State. The average occupancy rates of hospitals are also reported by hospital specialty, hospital ownership, and State. An additional table presents data on hospital births and shows the number of women who gave birth and the number who experienced complications, the number of newborns and whether the newborns were live or dead, the bed days and average lengths of stay of all maternity patients and of those with complications, and the number of inpatients who experienced miscarriages. This information is reported by State and hospital ownership.

The Federal Statistical Office publishes similar tables in its monthly statistical publication, *Economics and Statistics*.⁶¹ The tables are usually less detailed than those in "Hospitals" but contain more recent statistics. The statistics in both publications are used to document the existence, location, and level of hospital use, which are necessary to know for administrative purposes. However the information is not sufficient for detailed studies of hospital operation, including studies of cost effectiveness, that are important for hospital management and planning.⁵⁵

HOUSEHOLD SURVEY

West Germany began experimenting with population health surveys in 1963.⁵³ Additional health surveys were undertaken in 1966, 1970, and 1972. In 1973 a section on illnesses, accidents, and handicaps was added to the Microcensus, an ongoing household survey conducted by the Federal Statistical Office. The Microcensus has operated since 1957 and primarily collects household demographic, social, and economic data. The data have been used for economic studies and to update the regular census. The Microcensus is conducted four times each year, but the health questions are included only once a year.

The Microcensus samples cover almost all of the West German population; only military personnel and institutionalized individuals are

excluded. The sampling ratio is between 0.25 and 1.0 percent of the population. Study areas are chosen at random using as a sample frame all the regions covered in the regular census. Every household within a chosen study area is part of the sample. One person is interviewed in each household and answers questions about the health of all the household members. Interviewers are lay volunteers, recruited and trained by the State Statistical Offices.

The items included in the health section of the Microcensus have changed somewhat over time but have always focused more on illness and disability than on the utilization of health services. For example, the 1978 questionnaire included a list of questions for a household member who had suffered an illness, accident, or handicap during the 4-week period prior to the interview. If a person had experienced more than one health problem, the questions addressed the most serious problem. Whether the illness was chronic, the length and type of illness, and whether the person was still sick when the interview took place were asked. The length of time the person was unable to work due to the illness, accident, or handicap was recorded. The questionnaire also reported each household member's height and weight, whether he or she smoked, and if so, what and how much he or she smoked.

Questions about the use of health services also referred only to the most serious health problem experienced in the 4 weeks prior to the interview. Whether the household member saw a physician for the problem was noted, as was the type of physician (general practitioner or specialist), and whether the visit was to a hospital

outpatient department. Hospital stays of at least 1 night were also reported. The definition of a hospital excluded institutions supervised by a single doctor that do not offer regular medical treatment, such as homes for the elderly.

Microcensus statistics are published in the Federal Statistical Office *Health Care Statistics* series. They are also available in such publications as *Data from the Health Care System*, published by the Federal Ministry of Youth, Family, and Health. While most published statistics do not concern hospitalization, some information is provided. For instance, tables in *Data from the Health Care System, 1977*⁶² show the percent of sick persons who had been hospitalized by sex and age group; by sex and type of illness; by sex, age group, and ability to work; and by sex, type of illness, and ability to work.

It was expected that the Microcensus statistics would outline the health status of the West German population and thereby provide information to develop need-based planning of the health care system. Some researchers and policymakers have not found the statistics to be as useful as was hoped. The use of nonmedically trained interviewers and the procedure of asking questions about only one health disorder have been criticized. Changes in the questions that are asked about health have made time-trend studies difficult. Moreover switches in the time of year the questions are asked (from May to October) could introduce seasonal variation to the findings. It has been suggested that a separate health interview survey might produce more useful health data, and discussion of such a separation has been taking place.⁴⁷

U.S. NATIONAL HOSPITAL DISCHARGE SURVEY

In the United States a number of national, State, and local data systems collect hospital utilization statistics. This chapter is concerned with the National Hospital Discharge Survey. This survey is the major source of national estimates of short-stay hospital utilization. Other important discharge reporting systems, which are more limited in scope than the National Hospital Discharge Survey, are discussed in appen-

dix II. Also in appendix II are brief descriptions of the main national hospital and household surveys that collect hospital utilization statistics.

The National Center for Health Statistics (NCHS) established the U.S. National Hospital Discharge Survey in 1965.² Previously NCHS had collected some hospital use information through its household Health Interview Survey, begun in 1958.⁶³ Information about hospital

Table G. General hospital discharge reporting systems, by country and reporting system

General hospital discharge reporting system	Denmark	Scotland	West Germany		United States
	Inpatient registration systems	Scottish Hospital In-Patient Statistics	Schleswig-Holstein hospital morbidity study	Insurance fund statistical systems	National Hospital Discharge Survey
Agency or agencies responsible	National Health Service, Association of County Councils, local and regional computer centers	Information Services Division of the Common Services Agency, Scottish Health Service	State Statistical Office, Schleswig-Holstein	Sickness insurance funds	National Center for Health Statistics
Year begun	1970	1951—one region, 1961—entire country	1969	---	1965
Main publications ¹	Series publications in <i>Medical Statistics Reports</i> [6,19] <i>Medical Report II: Report on Hospitals and Other Institutions for Treatment of the Sick in Denmark</i> [18], published until 1978	<i>Scottish Hospital In-Patient Statistics</i> [37] <i>Scottish Health Statistics</i> [40]	<i>Diseases of Inpatients in Schleswig-Holstein</i> [56]	Annual reports of Federal associations of sickness funds, such as <i>Illness-type, Illness-cause, and Death Statistics</i> [51] <i>Survey of Social Security</i> [50]	Series 13 publications in <i>Vital and Health Statistics</i> [66,70-73] <i>Detailed Diagnoses and Surgical Procedures for Patients Discharged From Short-Stay Hospitals</i> [75]

¹Numbers in parenthesis are for references, which give full bibliographic information on the publications.

births and deaths was also reported on birth and death certificates. In 1962-63 NCHS developed the Master Facility Inventory (MFI), a comprehensive list of hospitals, nursing homes, and other inpatient health facilities in the United States.⁶⁴ As well as being a source of national statistics on the number, type, and geographic distribution of inpatient facilities, the MFI was expected to serve as a sampling frame for surveys of specific types of facilities and their users. A continuing survey of hospital discharges, which uses the MFI as the sampling frame, was in the planning stages when the MFI was developed. In 1964 a sample of 95 hospitals was drawn from the MFI for a pilot study of hospital discharges.⁶⁵ In 1965 a master sample of 690 hospitals was drawn from the MFI, of which 315 were inducted into the National Hospital Discharge Survey.

An additional 150 hospitals from the master sample were inducted into the survey during the first years of its operation; by 1969 a total of 465 hospitals was involved. In 1972 and every 2 or 3 years since, the master sample has been supplemented by a "birth sample" drawn from lists of new hospitals added to the MFI since 1965.

In 1978 there were 535 hospitals in the survey sample, and of these, 413 participated in the survey.

The survey was designed as a continuing general purpose study of hospital utilization patterns. It was not established to answer any single question or to provide data to any particular group. The collected statistics are available to the public and are used by government agencies, health policymakers, university researchers, hospital supply companies, and a variety of other groups and individuals.

The National Hospital Discharge Survey and the discharge reporting systems in Denmark, Scotland, and West Germany to which it is compared are listed in table G. The table shows that the U.S. survey is like the Scottish system in one respect: It is the responsibility of a single national agency. No one national agency in either Denmark or West Germany has a similar responsibility. National data are compiled in both countries, but each has a number of reporting systems that are operated by separate agencies. The National Patient Register in Denmark receives data from the separate registration systems, and the Sozialdatenbank in West Germany

receives data from the various sickness insurance funds.

METHODS OF DATA COLLECTION

One way that the National Hospital Discharge Survey differs from the other three countries' reporting systems is that it uses a two-stage sampling design. Sampling is not part of the design of the reporting systems in Denmark, Scotland, or Schleswig-Holstein in West Germany. All hospitals covered by these systems are expected to supply abstracts of information for all discharges except those that are specifically excluded from the systems, such as psychiatric discharges in Denmark and Scotland. The sickness insurance funds in West Germany also collect some information on all the discharges covered by their reporting systems, but they obtain more detailed data on samples of discharges. The samples are drawn in a one-stage process from the universes of all discharges covered by particular types of sickness insurance funds. In contrast, a sample of hospitals is drawn from the universe of hospitals covered by the U.S. survey, and then a sample of discharges is selected from each sample hospital.

The original sample of hospitals for the U.S. survey included all the hospitals in the universe with 1,000 beds or more. The hospitals in the universe with less than 1,000 beds were divided into primary strata by bed size (6-49 beds, 50-99 beds, 100-199 beds, 200-299 beds, 300-499 beds, and 500-999 beds) and region (Northeast, North Central, South, and West). Hospitals within the primary strata were further classified by type of ownership and more detailed geographic divisions. In 1965 a controlled selection technique was used to draw the master sample of hospitals from these hospital classes. A systematic random sample method was used to supplement the master sample. The sampling probabilities vary from certainty for the largest hospitals to 1 in 40 for the smallest hospitals.^{2,66}

The sample hospitals' discharges are sampled with probabilities that vary inversely with the probability of selection of the hospital. In hospitals with 1,000 beds or more, only 1 percent of discharges are sampled; 40 percent of the dis-

charges are sampled in some of the smallest hospitals.⁶⁷ The sample of discharges is randomly selected, usually by using the last digit or digits of the patient's medical record number. If the hospital's list of discharges does not show medical record numbers, every k th discharge on the list is selected for the sample, beginning with a discharge chosen at random.

An abstract form is completed for each sample discharge. The information for the abstract is taken from the face sheet of the patient's hospital record. In about two-thirds of the hospitals the hospital staff completes the abstracts. In the remaining hospitals the forms are completed by U.S. Bureau of the Census personnel, acting for NCHS. All hospitals send completed abstracts to a census regional office for review. Each form is checked for completeness, and then all are sent to NCHS. The NCHS staff codes the diagnoses and surgical operations or procedures listed on each abstract. When the coding is done, the data on the forms are transferred to computer tapes, and the tapes are edited and processed.

These data collection procedures differ from the procedures used in the other three countries in the areas of central coding of medical information and central data processing. Discharge forms are completed and coded by hospital personnel in Denmark, Scotland, and Schleswig-Holstein. The one exception is the occupation item, which is centrally coded in Scotland. Information about the coding procedures of the West German sickness insurance funds was not obtained. Not all data processing is centralized in Denmark and Scotland. Local and regional computer centers process discharge data in Denmark, but the centers also provide the National Health Service with data tapes. In Scotland two area health boards and two local computer centers process data, in addition to the national computer center.

COVERAGE

Not all U.S. hospitals are within the scope of the National Hospital Discharge Survey. Excluded are institutional hospitals, such as prison hospitals and university student health centers,

as well as all Federal hospitals, such as military and Veterans' Administration hospitals. Hospitals with less than six beds and those in which the average length of stay of all patients is 30 days or more are also excluded. The sample of discharges drawn from participating hospitals sometimes excludes patients treated in long-term care units if the units keep records separately from the rest of the hospital. All other discharges are sampled, but the survey reports usually exclude data for newborns.

The coverage of the discharge reporting systems in the other three countries is compared with the coverage of the U.S. survey in table H. It is important to note that none of the reporting systems in the other countries excludes hospitals on the basis of patients' average length of stay. In Scotland and Denmark psychiatric hospitals are excluded from the reporting systems, but almost all other long-term hospitals are included. The Schleswig-Holstein study covers acute care hospitals, but these hospitals are defined by the type of treatment they provide, not by the patients' average length of stay. While most of the acute care hospitals in West Germany report average patient stays of less than 30 days, not all do, and a few special care hospitals report average stays of less than 30 days. The

sickness insurance funds in West Germany obtain data from all hospitals, those classified as acute and special care.

Several different patterns of coverage exist in regard to psychiatric patients. The general discharge reporting systems in Denmark and Scotland not only exclude patients in psychiatric hospitals but also patients treated in psychiatric units of other hospitals. Both countries have specialized reporting systems that cover the psychiatric hospitals and units. The Schleswig-Holstein study excludes all patients in psychiatric hospitals, since the hospitals are classified as special care hospitals, but the study covers patients discharged from psychiatric units in acute care hospitals. The West German sickness insurance funds collect information on any psychiatric patient whose hospitalization was covered by fund insurance, whether the patient is discharged from a psychiatric hospital or a psychiatric unit in another type of hospital. The U.S. survey covers patients discharged from psychiatric hospitals in which the average length of stay is less than 30 days. Patients discharged from hospital psychiatric units are also covered if the units are in hospitals that are within the scope of the survey and if they are not long-term units with separate record systems.

Table H. Comparability of coverage of general hospital discharge reporting systems, by country and reporting system

Coverage	Denmark	Scotland	West Germany		United States
	National Patient Register	Scottish Hospital In-Patient Statistics	Schleswig-Holstein hospital morbidity study	Insurance fund statistical systems	National Hospital Discharge Survey
System covers.....	Ninety-six percent of all general and specialized somatic hospitals as of 1979	Scottish Health Service hospitals	Seventy percent of discharges from acute care hospitals in Schleswig-Holstein as of 1977	Hospitalizations covered by sickness insurance funds	Sample of discharges from sample of short-stay hospitals
System does not cover....	Five private general and specialized somatic hospitals as of 1979 Psychiatric hospitals Psychiatric units in nonpsychiatric hospitals	Private hospitals and private beds in Scottish Health Service hospitals Psychiatric hospitals Psychiatric units in nonpsychiatric hospitals Maternity patients Newborns	Thirty percent of discharges from acute care hospitals in Schleswig-Holstein as of 1977 Special care hospitals, including psychiatric hospitals, in Schleswig-Holstein	Hospitalizations not covered by sickness insurance funds	Long-stay hospitals Federal hospitals Hospitals with less than six beds Institutional hospitals Some long-term units in short-stay hospitals

Another important difference in coverage is the exclusion of maternity patients and newborns from the general reporting system in Scotland. A special reporting system covers Scottish maternity patients and newborns. Newborns are within the scope of the other reporting systems, but only in Denmark are they routinely counted as discharges in published reports.

Private hospitals are not fully represented in some of the systems. Hospitals that have not yet joined the reporting systems in Denmark and Schleswig-Holstein are all privately owned. The small number of private hospitals in Scotland are excluded from the Scottish reporting system, as are patients discharged from private beds in Scottish Health Service hospitals. The U.S. survey and the West German sickness insurance funds' statistical systems cover private hospitals. The funds' statistical systems are the only ones that exclude uninsured patients, however, and the U.S. survey is alone in excluding Federal hospitals and hospitals with less than six beds.

ITEMS COLLECTED

The abstract forms used for the 1977 National Hospital Discharge Survey contain the items listed in table J. The hospital and patient are identified by numbers on the forms, which are used only for reviewing and processing the data. No information that would permit identification of individual hospitals or patients is released from the survey. In Denmark, Scotland, and Schleswig-Holstein not only are hospitals identified on the forms, statistics for individual hospitals are tabulated. The tabulations are primarily for the use of the individual hospitals. Few of the reporting systems' routine publications present data separately by hospital.

Most of the other items collected by the U.S. survey are also collected in the other three countries. The major exception is the item on race, which is only collected in the United States. Other exceptions are the expected source of payment, which is only collected in the United States and Schleswig-Holstein, and the date of surgical procedure(s), which is only collected in the United States and Scotland. In addition, the Schleswig-Holstein study does not obtain in-

formation about marital status or surgical procedures.

The content of the item on patient disposition differs among reporting systems. For the U.S. survey, the types of dispositions include routine discharge, discharged home; left against medical advice; discharged, transferred to another facility or organization; discharged, referred to organized home care service; died; and not stated. The information about patient disposition in the other reporting systems includes whether or not the patient was transferred to another department within the hospital. Transfers to other facilities or organizations are also specified in more detail in the other reporting systems. For instance, a transfer to another hospital is reported separately from a transfer to a nursing home in all three countries. The Denmark and Schleswig-Holstein system also report whether or not a patient who had died was autopsied. The U.S. survey is, however, the only one of the four to collect information on transfers to home care services, and only Scotland and the United States note irregular discharges, such as leaving against medical advice.

Some items are collected by the reporting systems in Denmark, Scotland, or Schleswig-Holstein, but not by the U.S. survey. For instance, the other reporting systems obtain information about the source or type of admission. The content of the item(s) varies. In Scotland the categories of admissions include emergency and from waiting list. In Schleswig-Holstein the categories include transfer from another department, transfer from another hospital, and newborn. In Denmark categories similar to those in Scotland and Schleswig-Holstein are used, and others are included, such as from nursing home and through outpatient department.

Another item not included in the U.S. survey, but identified in Denmark and Scotland, is the hospital department in which the patient was treated. In Denmark the hour of admission is also included, as is the kind of accident suffered by patients admitted for treatment of accidental injuries. In Scotland the physician in charge of the patient's case is identified, the patient's occupation is given, and the date the

Table J. Comparison of items collected in the United States¹ with those collected in Denmark, Scotland, and West Germany, by reporting system

Item	Denmark	Scotland	West Germany ²
	National Patient Register 1979	Scottish Hospital In-Patient Statistics 1977	Schleswig-Holstein hospital morbidity study 1979
Hospital number	Yes	Yes	Yes
Case number	Yes	Yes	Yes
Date of admission	Yes	Yes	Yes
Date of discharge	Yes	Yes	Yes
Disposition of patient	Yes	Yes	Yes
Date of birth or age.....	Yes	Yes	Yes
Sex.....	Yes	Yes	Yes
Race.....	No	No	No
Marital status	Yes	Yes	No
Region of residence.....	Yes	Yes	Yes
Expected source of payment.....	No	No	Yes
Principal diagnosis.....	Yes	Yes	Yes
Other diagnoses.....	Yes	Yes	Yes
Principal surgical procedure	Yes	Yes	No
Other surgical procedures.....	Yes	Yes	No
Date of surgical procedure(s)	No	Yes	No

¹1977 U.S. National Hospital Discharge Survey.

²Detailed information was not obtained about the items collected by the sickness insurance funds in West Germany.

patient was placed on the waiting list is noted. The Schleswig-Holstein study includes an item about the patient's accommodation, that is, a one-bed room, two-bed room, or room with more than two beds. The diagnoses reported in the Schleswig-Holstein study are also qualified as being final, provisional, or "state after" (which refers to a condition that occurred after or was due to the illness).

The principal diagnosis and additional diagnoses are coded somewhat differently by the reporting systems. As seen in table K, the principal diagnosis is defined in various ways. In the U.S. survey the principal diagnosis is defined as the condition established after study to be chiefly responsible for occasioning the admission of the patient to the hospital.⁶⁶ The Scottish reporting system uses the definition recommended in the ninth revision of the International Classification of Diseases,³⁹ and the definition used in the Schleswig-Holstein study is similar. Both refer to the main condition or illness treated, which is not necessarily the condition responsible for admission. In Denmark

the physician decides which condition is most important, and it is coded as the principal diagnosis. The criteria that Danish physicians use to determine the importance of conditions are not specified. Thus the most important condition may or may not be the condition responsible for admission or the main condition treated.

All the reporting systems use the International Classification of Diseases (ICD) to code diagnoses, but each utilizes a different variation. In Denmark and Schleswig-Holstein, the eighth revision of ICD is used, but the National Patient Register uses a special Danish adaption. The Scottish system and the U.S. survey have begun using the ninth revision of ICD, but in the United States the clinical modification (ICD-9-CM)⁶⁸ is employed. Three- or four-digit codes are utilized in Scotland and Schleswig-Holstein, four- to five-digit codes in the United States, and five- to six-digit codes in Denmark. In Denmark and Scotland medical records staffs code data; specially trained NCHS staff code the U.S. survey data. In Schleswig-Holstein physicians usually code the diagnoses.

Table K. Coding of diagnoses in general hospital discharge reporting systems, by country and reporting system

Coding of diagnoses	Denmark	Scotland	West Germany ¹	United States
	National Patient Register	Scottish Hospital In-Patient Statistics	Schleswig-Holstein hospital morbidity study	National Hospital Discharge Survey
Definition of principal diagnosis coded	The condition the physician decides is most important	The main condition treated or investigated during the hospital stay	The main illness for which the patient was under treatment	The condition established after study to be chiefly responsible for occasioning the patient's admission to the hospital
Code used.....	International Classification of Diseases, eighth revision, Danish adaptation	International Classification of Diseases, ninth revision, as of 1980	International Classification of Diseases, eighth revision	International Classification of Diseases, ninth revision, clinical modification, as of 1979
Detail of code	Five to six digits	Four digits	Three to four digits	Four to five digits
Coding done by	Medical secretaries in individual hospitals	Medical records staff in individual hospitals	Usually physicians, sometimes other hospital personnel, in individual hospitals	National Center for Health Statistics staff

¹Detailed information was not obtained about the coding of items by the sickness insurance funds in West Germany.

DEFINITIONS AND PROCEDURES

The statistics most commonly produced by discharge reporting systems concern discharges, bed days, and average lengths of stay. Some differences in the way these statistics are computed exist among the reporting systems. The U.S. National Hospital Discharge Survey defines a discharge as the termination of a period of hospitalization by death or by the disposition of the patient to his or her place of residence, a nursing home, or another hospital.⁶⁶ The reporting systems in Denmark, Scotland, and Schleswig-Holstein also regard deaths and releases of patients to their homes or other institutions as discharges, but in addition these reporting systems label transfers from one department or specialty to another within a hospital as discharges. The effect of including intrahospital transfers in the number of discharges probably varies from country to country. Only the Scottish reporting system publishes statistics about intrahospital transfers. In 1976, 3 percent of all the discharges reported by the Scottish

system were transfers from one specialty to another within a single hospital.³⁷

In one respect, the discharge reporting systems count bed days the same way: Each system sums up the bed days accumulated by discharged patients during a yearlong reporting period. This procedure does not count the bed days of patients still in the hospital at the end of the reporting period, but if a discharged patient's hospitalization extended through more than the 1-year reporting period, all the bed days used in the previous year or years are counted. It is important to be aware that this is not how bed days are usually computed for the annual questionnaires on utilization that are completed by hospital personnel in most countries. Instead, the total days of care supplied by the hospital during the year is usually reported. The total days of care includes bed days used by patients who are still hospitalized at the end of the reporting period and excludes bed days used in previous reporting periods. The two procedures for computing bed days result in nearly equivalent bed-day statistics for a year when most of the patients reported are hospitalized for short

periods, but the procedures are likely to result in different bed-day statistics when many long-staying patients are covered.⁶⁹

The bed days of a discharge are computed in the U.S. survey by counting all the days from the date of admission to the date of discharge. The day of admission is counted as 1 bed day, but the day of discharge is not. Stays of less than 1 day are counted as 1 bed day. The reporting systems in Denmark and Scotland follow the same procedures in counting bed days, but until 1979 both the admission and discharge days were counted as bed days in Scotland. In Schleswig-Holstein a bed day is counted for each midnight the patient was in the hospital. This procedure usually results in counting the admission day as 1 bed day, the discharge day and hospital stays of less than 1 day as 0 bed days.

Average length of stay is calculated in the U.S. survey by dividing the total number of bed days of patients discharged during a year by the number of patients discharged. The same formula for average length of stay is used by the reporting systems in Denmark, Scotland, and Schleswig-Holstein, but the resulting statistics are not completely comparable with the U.S. statistics because of the different ways discharges and bed days are computed. The most important variation is in the pre-1979 Scottish statistics on the average length of stay. Counting the discharge day as a bed day increases the average stay by a full day. However counting intrahospital transfers as discharges decreases the average length of stay. In Scotland the decrease in the average stay for all patients was only a fraction of a day in 1976, but the decrease could be greater in Denmark or Schleswig-Holstein if intrahospital transfers were more common. The average length of stay reported for Schleswig-Holstein is also somewhat reduced by the failure to count 1 bed day for hospital stays of less than 1 day.

INFORMATION PUBLISHED OR AVAILABLE

Statistics from the National Hospital Discharge Survey have been published in NCHS's *Vital and Health Statistics* series 13 reports since 1966. Three reports are usually published from

survey data collected during each calendar year. One type of report presents summary statistics on hospital utilization. The summary reports for 1965-73 contain only nonmedical statistics,⁷⁰ but subsequent reports include some statistics on diagnoses and surgical operations. More detailed information about hospital utilization by diagnosis is presented in a second report,⁷¹ and a third report supplies more detailed data on surgical operations.⁷² In addition to these annual reports, special analyses of the survey data are sometimes presented in separate publications, such as in a recent report on hospital utilization of persons with alcohol-related diagnoses.⁷³

A recent annual report, "Utilization of Short-Stay Hospitals, Annual Summary for the United States, 1978,"⁶⁶ contains the following detailed tables:

1. Number, percent distribution, and rate of patients discharged from short-stay hospitals, by sex and age.
2. Number, percent distribution, and rate of days of care, average number of hospital beds occupied daily, and average length of stay for patients discharged from short-stay hospitals, by sex and age.
3. Number and percent distribution of patients discharged from short-stay hospitals by age and length of stay, according to sex.
4. Number and percent distribution of patients discharged from short-stay hospitals by color and age of patient, according to sex.
5. Number and percent distribution of days of care for patients discharged from short-stay hospitals by color and age of patient, according to sex.
6. Average length of stay for patients discharged from short-stay hospitals, by color, age, and sex.
7. Number of patients discharged from short-stay hospitals and days of care, by sex, age, geographic region, and bed size of hospital.

8. Rates of patients discharged from short-stay hospitals and of days of care, by geographic region, age, and sex.
9. Average length of stay for patients discharged from short-stay hospitals, by geographic region, age, and sex.
10. Average length of stay for patients discharged from short-stay hospitals, by sex, age, geographic region, and bed size of hospital.
11. Number of patients discharged from short-stay hospitals and days of care, by type of ownership of hospital and age and sex of patient.
12. Average length of stay for patients discharged from short-stay hospitals, by type of ownership of hospital, age of patient, and sex.
13. Number of patients discharged from short-stay hospitals, rate of discharges, and average length of stay, by category of first-listed diagnosis and age.
14. Number of discharges and average length of stay for patients discharged from short-stay hospitals, by category of first-listed diagnosis, sex, and color; and rate of discharges by category of first-listed diagnosis and sex.
15. Number of patients discharged from short-stay hospitals, rate of discharges, and average length of stay, by category of first-listed diagnosis and geographic region.
16. Number of patients discharged from short-stay hospitals and average length of stay, by category of first-listed diagnosis and bed size of hospital.
17. Number of all-listed diagnoses for patients discharged from short-stay hospitals, by diagnostic category and age, sex, color, geographic region, and bed size of hospital.
18. Number of all-listed operations for patients discharged from short-stay hospitals, by surgical category, age, sex, and color.
19. Rate of all-listed operations for patients discharged from short-stay hospitals, by surgical category, age, and sex.
20. Number of all-listed operations for patients discharged from short-stay hospitals, by surgical category and geographic region.
21. Rate of all-listed operations for patients discharged from short-stay hospitals, by surgical category and geographic region.
22. Number of all-listed operations for patients discharged from short-stay hospitals, by surgical category and bed size of hospital.

Tables 1 and 2 present statistics for the following age groups: under 1 year, 1-4 years, 5-14 years, 15-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years, 65-74 years, and 75 years and over. In other tables only the age groups of under 15 years, 15-44 years, 45-64 years, and 65 years and over are used. In tables 3-12 statistics are given separately for the categories of females including deliveries and females excluding deliveries, but other tables show only one category for females. Statistics on color are given for two main groups: white and all other. The all-other group includes all categories other than white. In tables 4-6 an additional category is reported—color not stated—and the patients in this category accounted for more discharges and bed days in 1978 than did the patients in the all-other category. In tables 16, 17, and 22 the hospital bed-size categories are 6-99 beds, 100-199 beds, 200-299 beds, 300-499 beds, and 500 beds or more. In tables 7 and 10 the categories are 6-99 beds, 100-499 beds, and 500 beds or more. The geographic regions reported in the tables are Northeast, North Central, South, and West, which correspond to the regions used by the U.S. Bureau of the Census.

Tables 13-16 present statistics on first-listed diagnoses. The first-listed diagnosis is the one identified as the principal diagnosis or else the one listed first on the face sheet of the medical record. All-listed diagnoses, reported in table 17, are the first-listed diagnosis and up to four other diagnoses listed on the face sheet of the medical record.⁶⁶ The statistics on diagnoses are presented for broad groupings of diseases and

injuries, which correspond to classes I-XVII of the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States*⁷⁴ (ICDA), the classification system used for the survey during 1970-79. Some statistics are also presented for subcategories. For instance, statistics are given for class VI, Diseases of the Nervous System and Sense Organs (ICDA 320-389), and for the subcategories of Diseases of the Central Nervous System (ICDA 320-349), Cataract (ICDA 374), and Diseases of the Ear and Mastoid Process (ICDA 380-389).

All-listed operations, reported in tables 18-22, are the first three operations listed on the face sheet of the medical record, excluding certain procedures and treatments not generally considered surgery.⁶⁶ The statistics on operations are reported for classes 1-17 of the ICDA section, Surgical Operations, Diagnostic and Other Therapeutic Procedures; and statistics are given for some subcategories of the classes.

The annual reports that concentrate on hospital utilization by diagnosis present statistics for a more extensive list of subcategories within each ICDA class than do the summary reports. For instance, while statistics are presented for 4 subcategories within class IX, Diseases of the Digestive System, in the 1978 summary report,⁶⁶ statistics are given for 15 subcategories of the class in the 1975 report on hospital utilization by diagnosis.⁷¹ Similarly, the report on surgical operations presents statistics for detailed lists of subcategories within the classes of operations.⁷²

In addition to *Vital and Health Statistics* series 13 reports, NCHS published data in 1979 from the National Hospital Discharge Survey in a report titled *Detailed Diagnoses and Surgical Procedures for Patients Discharged From Short-Stay Hospitals: United States, 1977*.⁷⁵ The report presents statistics for each ICDA code. For instance, statistics are given for over 150 codes for class IX, Diseases of the Digestive System. The statistics are shown by age and sex of patients discharged, conditions diagnosed, and surgical procedures performed. Other publications of this type are expected to be produced using data from subsequent years of the survey's operation.

Statistics from the survey are also published in such reports as *Health, United States*⁷⁶ and *The Nation's Use of Health Resources*.⁷⁷ Un-

published data are available in the form of data tapes and special tabulations, which are prepared to meet specific requests for information. Restrictions placed on the release of the data are only those related to the confidentiality of institutions and individuals.

The main sources of published data from the reporting systems in the United States, Denmark, Scotland, and West Germany are listed in table G. Most of these publications present hospital utilization statistics by diagnosis. Typically the number and rate of discharges and bed days and the average length of stay are given for categories of diagnoses by age and sex. The diagnoses are grouped somewhat differently in each publication, but all use the International Classification of Diseases as the basis for the groupings. The number of age groups also varies; the statistics on diagnoses may be given for as few as three age groups or as many as seven. Discharge and bed-day rates are computed using different definitions of the population. For instance, the U.S. rates are calculated using the civilian noninstitutionalized population, in Scotland the total population is used, and the West German sickness insurance funds present rates per 10,000 members.

Diagnostic statistics are also given by other types of categories. Geographic regions constitute a common category, but there is considerable variation among other types of categories for which data are presented. The U.S. publications are the only ones to show statistics on diagnoses by color and bed size. In Denmark and Schleswig-Holstein diagnostic statistics are given by type of hospital department. The sickness insurance funds in West Germany show diagnostic statistics by type of membership in the funds, and in Scotland diagnostic statistics are given by source of admission and type of patient disposition.

Statistics on different types of surgical operations are not available in West Germany but are published elsewhere. Statistical comparisons are hampered not only by different groupings of the operations but also by the use of different classification systems to code operations. The United States is the only one of the countries to use the ICD codes for operations.

It should also be pointed out that not all the publications present national data. In Denmark the last national data published in the

discontinued series of medical reports, *Medical Report II*, were for 1974-75. Only data from local areas of the country have been published thus far in the *Medical Statistics Reports* series. In West Germany the main sources of data are either the Schleswig-Holstein publications, which only cover one State, or the publications from the several associations of sickness insurance funds, each of which only covers hospitalizations insured by a particular type of fund. The Scottish publications, like the U.S. publications, present national data.

SUMMARY

The U.S. National Hospital Discharge Survey and the reporting systems in Denmark, Scotland, and West Germany are similar in some ways and

different in others. Abstracts of information for discharged patients are completed in each reporting system, and the abstracts contain many similar items. Information about patients' diagnoses is collected in each system, and each uses a variation of the International Classification of Diseases to code the diagnoses. The reports published by the systems usually provide statistics on diagnoses by age and sex. However the reporting systems cover different sets of hospitals and patients. The procedures used to collect data vary, and the procedures for computing statistics are dissimilar. Although the reporting systems' similarities allow cross-national comparisons of hospital utilization by diagnosis, the systems' differences require that the statistics be carefully adjusted before the comparisons are made.

HEALTH SERVICES SYSTEMS

In addition to understanding different discharge reporting systems, those who intend to compare hospital utilization data among countries should have some knowledge of the countries' health services system characteristics. Certain characteristics are likely to significantly affect hospital use rates. For instance, the numbers and types of available long-term-care facilities can affect hospital use. Patterns in the provision of ambulatory and home care can be important, and the costs of receiving hospital and other health care services should be considered. These aspects of the health services systems in Denmark, Scotland, West Germany, and the United States are discussed briefly in this section. Further information about the health services systems in each country can be found in various publications.^{4,16,48,78-84}

LONG-TERM-CARE FACILITIES

Cross-national comparisons of hospital utilization data need to take into account differences in the types of facilities that provide long-term care. When long-term care is primarily the responsibility of the hospital system, higher

bed-day rates and higher average lengths of stay are likely to be reported than when other types of long-term-care facilities exist.

The number of beds per population in long-term hospitals is one indicator of the extent to which the hospital system supplies long-term care. Table D shows that the United States has fewer beds per 1,000 population in long-term hospitals than does Denmark, Scotland, or West Germany. However, as seen in table B, the United States also has a smaller percent of the population age 65 years and over (the major users of long-term-care facilities) than do the other three countries. If long-term hospital beds per 1,000 population age 65 years and over are compared, the United States remains low with about 13 beds per 1,000 persons age 65 years and over; while Denmark has about 17; West Germany, 26; and Scotland, 40.

These statistics do not include beds in long-term units of short-term hospitals. All four countries have some beds in such units, and the number has been increasing in Denmark and Scotland. In Denmark the units usually have been established for aged and chronically ill individuals who require more intensive medical supervision than that available in nursing homes.⁸⁵ Some units in Scottish hospitals treat

elderly patients who require extensive medical and nursing care, while other units provide a level of care similar to that available in nursing homes in other countries.³⁶

The statistics on long-term hospital beds in Scotland also do not include beds in facilities for the mentally deficient, but those facilities are considered part of the hospital system. In 1977-78 there were 19 hospitals for the mentally deficient in Scotland, and they contained 6,635 beds.⁷ The statistics do include beds in joint-user hospitals, which are hospitals where local social services authorities and the health service share facilities, and beds in contractual hospitals, which are private institutions that make agreements with the health service to provide care. In 1977-78 there were 22 joint-user and contractual hospitals in Scotland, and they contained 1,531 beds, almost all of which were for long-term care.

Bed statistics for West Germany's long-term hospitals include beds in institutions called the Kurkrankenhäuser, which do not have close counterparts in the other three countries. The Kurkrankenhäuser may be equivalent to rehabilitation centers, extended care facilities, or rest homes. They are usually owned by pension funds and are primarily located in resort areas.^{46,82} In 1977 the Kurkrankenhäuser accounted for 57 percent of the discharges from West German special care hospitals and had an average length of stay of 30.1 days.⁸

Each country has some long-term care facilities outside the hospital system. The United States has a large number of beds in such facilities. In 1976, 20,468 nursing homes operated in the United States, and they had a total of 1,414,865 beds, which was 6.5 beds per 1,000 population, or 61.7 beds per 1,000 population age 65 years and over.⁹ There were also 6,280 other inpatient institutions with 375,805 beds in the United States in 1976, including facilities for the mentally retarded, the emotionally disturbed, dependent children, unwed mothers, alcoholics, and others.

Comparable data on long-term-care facilities in the other countries are not available, but Denmark is said to have a good supply of beds in institutions outside the hospital system.⁸⁷ The institutions include nursing homes; convalescent

homes; rehabilitation centers; facilities for the mentally retarded, the blind, the deaf, and others with handicaps; and old age homes. Most facilities for the handicapped are the responsibility of the national government, but other institutions are either provided or supervised by municipal social welfare authorities. The relationships between the hospitals and these institutions have been problematic because the latter are administered by different committees at the local level and different ministries at the national level. However there is growing recognition of the need to reduce the burden on hospitals of long-staying patients who do not require hospital treatment, and each county is now expected to set up a joint hospital-welfare committee to facilitate collaboration between the two systems of care.

Fewer types of long-term care facilities exist outside the hospital system in West Germany. A nursing home system exists but is considered inadequate.⁸⁸ Approximately 1 percent of persons age 65 years and over are in nursing homes, but it is estimated that 2 percent need nursing home care. Old age homes are more prevalent than nursing homes; approximately 4 percent of the elderly reside in them. These homes do not routinely supply medical care, though, and plans call for them to be replaced by sheltered housing in the community.

As mentioned earlier, Scotland does not have a nursing home system. Some long-term patients receive care in homes run by local social services authorities or by voluntary organizations. In 1972, 390 of these homes contained over 13,000 beds,⁸⁹ and the number of beds has been steadily increasing. Most are residential facilities and provide only minimal medical services.

Thus the four countries differ widely in the extent to which their hospital systems are responsible for long-term care. The Scottish hospital system includes the most long-term-care facilities, and the West German hospital system includes a larger proportion of such facilities than do the hospital systems in Denmark or the United States. The U.S. hospital system probably includes the smallest proportion of long-term-care facilities, but further data are needed to study this point.

AMBULATORY AND HOME CARE SERVICES

Hospital use may be affected by several aspects of ambulatory and home care services. The supply of physicians and the way they are organized are likely to have an effect. The availability of nurses for ambulatory care and home nursing programs is expected to be important, as is the degree of development of home support services.

The number of physicians per 10,000 population does not vary greatly among the four countries. In 1977 Scotland had the lowest number, 16.7 physicians per 10,000 population;⁹⁰ West Germany had the highest, 20.3 per 10,000 population.⁴⁶ The United States reported 17.9 physicians per 10,000 population in 1977;⁷⁶ Denmark had 19.5 physicians per 10,000 population in 1976.⁹⁰

In the United States 15 percent of professionally active physicians were in general or family practice in 1977, and the rest reported a specialty practice. Most physicians, 64 percent, were office based; that is, they spent the greatest amount of their time in practices based in private offices. Another 27 percent were hospital-based; that is, salaried hospital physicians; and 9 percent were primarily involved in teaching, administration, research, and other non-patient-care activities. About 24 percent of physicians not employed by the Federal government were in group practices in 1975, an increase from 18 percent in 1969.⁷⁶

In the United States ambulatory and hospital care are generally provided by the same physician. Physicians in office-based practices usually can admit their patients to hospitals and attend them in the hospitals. Physicians in hospital-based practices also provide a certain amount of ambulatory care. Some see ambulatory patients in part-time private practices, and some provide ambulatory care in hospital outpatient departments and emergency rooms.

In Denmark approximately 30 percent of physicians were in general practice in 1975, and the rest were employed by hospitals and provided specialized care.⁸⁷ The number and percent of specialists has been increasing over the last 25 years, but the number of general practi-

tioners has remained relatively constant. General practitioners are remarkably evenly distributed geographically. Every area with a population of 2,330 plus or minus 10 percent has a general practitioner in its midst.¹⁶

Traditionally, hospital and ambulatory care have been quite separate in Denmark. Until recently hospitals maintained very few outpatient departments, and hospital physicians still have only limited possibilities for private practice. Most ambulatory care is provided by general practitioners, who cannot follow patients that have been referred to a hospital. A referral from a general practitioner is required before a hospital will admit a patient, except in an emergency. During the last 15 years most general practitioners in Denmark have joined group practices. The groups usually establish themselves in private health centers or clinics that contain shared laboratories and other diagnostic facilities so that most diagnostic and therapeutic problems can be handled without referring a patient to a hospital. All surgical cases except those involving very simple procedures are referred to hospitals.

In 1977, 57 percent of physicians in Scotland were hospital based, 37 percent were in general practice, and 6 percent were in public health or held administrative positions.⁴⁰ As in Denmark, almost all specialists are employed by hospitals. General practitioners engage in private practice under contracts with the Scottish Health Service. In most cases general practitioners provide only ambulatory care services, but there are some exceptions. General practitioners in rural areas can admit patients to cottage hospitals and look after them during their hospital stays. In urban areas some general practitioners work part-time in hospitals, but usually they serve as part of a specialized unit staff and do not care for their own patients.⁹¹ As a rule, specialists see only hospitalized patients, but again there are some exceptions. Specialists see ambulatory patients referred to hospital outpatient departments, and some specialists maintain part-time private practices in which they treat ambulatory patients. A small number of physicians not affiliated with the health service provide ambulatory care and follow their patients who are admitted to a private hospital. In the majority of cases, though, patients receive ambulatory care and hospital care from different physicians.⁴⁸

Recently general practitioners in Scotland have been joining group practices and moving into health centers.⁹¹ Primary care teams of physicians, nurses, and midwives have developed in these settings. The health centers are also equipped with more diagnostic and treatment facilities than solo practitioners have been able to support in the past, and the availability of the facilities may decrease the number of hospital referrals made by general practitioners.

In 1977 approximately 47 percent of all physicians in West Germany were in private practice, 45 percent were employed by hospitals, and 8 percent worked in other institutions, such as public health departments, industries, and research organizations.⁴⁶ About 48 percent of full-time hospital physicians were specialists, and 47 percent of all physicians were specialists. A large number of the hospital staff who were not specialists were in training, frequently specialist training. The number of specialists has increased in recent years, while the number of general practitioners has remained constant.

Ambulatory and hospital care are usually provided by different physicians in West Germany. Very few hospitals have outpatient departments, and only 7 percent of all physicians, the "Belegärzte," follow patients both in and out of the hospital.⁸² Most hospital care is supplied by physicians employed by the hospitals; most ambulatory care, by physicians in private practice. Physicians in private practice usually do not belong to group practices.⁸¹ However many share laboratory facilities and other equipment or maintain their own laboratories and equipment; thus it is unnecessary for them to refer patients to hospitals for many tests and minor procedures.

Differences in the supply, specialization, and organization of physicians probably affect hospital utilization among the four countries. While physician services may substitute for hospital services, a larger supply of physicians also could lead to increased hospital use since more physicians can evaluate more patients and find more health disorders that need hospital treatment. The larger the proportion of specialists, hospital based or not, the more hospitalizations there may be, since the complex medical equipment and facilities located in hospitals are likely to be used more by specialists than by general practi-

tioners. Large numbers of hospital-based physicians, whether or not they are specialists, may also increase the emphasis on hospital care. However the growth in group practices could decrease hospital use since more extensive diagnostic and treatment facilities can be supported by most group practices than by most solo practices. Further study is needed of these possible relationships.

The effects of nurses being involved in ambulatory and home care, and of the availability of other home support services also require further study. When nurses play a significant role in the provision of ambulatory care services, they may substitute in part for physicians and thus increase access to the health services system. However, whether increased access leads to an increase or decrease in hospital use requires careful investigation. The availability of home nursing and other home support services probably reduces the need for hospital and other inpatient care. These services should allow patients to complete their convalescence at home after hospital treatment for an acute illness, and help maintain the chronically ill and disabled outside institutions. However it is possible that users of home services have different characteristics than do users of inpatient facilities.

Most nurses in Denmark, Scotland, West Germany, and the United States work in hospitals and other inpatient institutions. However some nurses in each country provide ambulatory or home care services. In the United States nurses have a long history of involvement in ambulatory and home care. Public health nursing, school nursing, private duty nursing, and home visit nursing all existed before 1915.⁷⁸ At that time private duty nursing, which provided home care as well as hospital care, outnumbered all other nursing categories. The proportion of private duty nurses declined over time, though, and the proportion of nurses employed in hospitals increased. In 1974, 75 percent of the registered nurses in the United States worked in hospitals and nursing homes. Another 4 percent were in nursing education, 7 percent worked in public health and schools, and the remainder were in occupational health, private duty, doctors' offices, and other fields.⁹²

Recently there has been renewed interest in the United States in nursing roles outside

hospitals. The role of the nurse practitioner has been created to help with the shortage of physicians in certain areas of the country. Nurse practitioners are trained to perform tasks previously performed by physicians. In 1979 there were an estimated 16,240 nurse practitioners in the United States, and the majority provided primary care.⁷⁶ There is also increasing interest in home nursing as part of comprehensive home care programs. The home care programs are seen as possible alternatives to costly long-term institutional care.⁹³

In 1975 approximately 74 percent of the nurses in Denmark were employed in hospitals, and the rest were in social welfare; that is, they worked as public health nurses or in nursing homes, old age homes, and the like.⁸⁷ Public health nursing did not exist in the country until 1937, when a program was started to train nurses as infant home visitors who would provide regular well-baby checkups. Beginning in 1946 infant home visitors also supplied school nursing services, and in the 1950's experimental programs combined home nursing for adults and children with infant home visiting and school nursing.¹⁶ Today specially trained public health nurses sometimes provide all these services, sometimes only school or infant care. Some registered nurses without special training also supply home and school nursing care. However there is a shortage of nurses in Denmark. There are not enough registered nurses in general or enough specially trained nurses for the public health posts. Therefore the home nursing services are not readily available in all areas.

In 1977, 92 percent of Scotland's nursing personnel worked in hospitals, but almost all other nurses were in community services.⁴⁰ Community nurses are primarily home nurses and health visitors. The health visitors are public health nurses with special training in social services, mental health problems, and interviewing skills. The role of the community nurse developed in the nineteenth century when voluntary organizations began hiring nurses to visit people's homes to help the sick and teach proper child care. Now employed by the health service, the community nurses continue to provide a significant amount of health care. In 1973 home nurses made over 3 million visits, 2 million of which were to patients age 65 years or over, and

health visitors made an additional 1.9 million home visits, 18 percent of which were to the elderly.⁸⁹

Almost all the nursing personnel in West Germany work in hospitals. There are very few public health nurses in the country who provide ambulatory care services. Physicians in public health departments and private practices supply services, such as well-baby examinations, that public health nurses supply in many other countries. Some home nursing services do exist. Five major voluntary agencies have organized home nursing services, and a few public agencies, profitmaking agencies, and religious organizations also have done so.⁸⁸ Home nursing services are primarily available in urban and industrial areas, but even there insufficient personnel exist to supply all the necessary services. Comprehensive social services centers are being developed to help meet the needs of the population, especially the aged. The centers are staffed with nurses and social workers and offer a wide range of support services to local areas.

In addition to home nursing, other inhome support services are available in each country. These include homemaker or home-help services and meals-on-wheels programs. Home help consists of assistance with household management, such as cleaning, washing, shopping, as well as personal assistance with dressing, bathing, and the like. Meals-on-wheels programs supply hot meals to persons, usually the elderly, who are unable to shop for or prepare food and who have no one to help them on a regular basis.

In Denmark local social welfare authorities are required by law to provide home help to needy elderly and disabled pensioners.⁸⁵ Local social services authorities in Scotland have established numerous home-help and inhome meal services.⁸⁹ In West Germany social services centers provide home-help and inhome meal services, as do a variety of other voluntary and government agencies. At present the services are usually available only in urban areas, but further expansion is planned.⁸⁸ In the United States welfare and voluntary agencies provide home support services, and there is some Federal financing of services covered by Medicare and the amendments to the Social Security Act of 1975. The number of homemaker-home-health-aides is much smaller than needed, though, and

the Medicare reimbursement policies are so complex and restrictive that they inhibit the growth of services.^{88,93}

To summarize, each of the four countries exhibits different patterns in the availability and organization of ambulatory and home care services. The United States is unique in that ambulatory and hospital care are generally provided by the same physician. The United States also has the highest percent of specialist physicians, the lowest percent of hospital-based physicians, and the highest proportion of nurses working outside inpatient care facilities. Denmark has the highest percent of hospital-based physicians, an especially even distribution of general practitioners, and widely available home-help services. Scotland reports the lowest number of physicians per 10,000 population, but it has well-established community nursing and home support programs. West Germany has the highest number of physicians per 10,000 population, the lowest percent of specialist physicians, and very few nurses working outside hospitals.

COSTS OF RECEIVING HEALTH CARE

In this section the patients' cost of receiving hospital care is compared with the costs of receiving other forms of health care. The focus is on whether persons in each of the countries have barriers to or incentives for hospital use. Since physicians usually decide when to admit and discharge patients, there is also a brief discussion of how physicians are paid and whether the method of payment could provide economic incentives for hospital use.

In 1976, 89 percent of the U.S. civilian non-institutionalized population was covered by some type of health insurance, while 11 percent, or about 23 million people, had no insurance.⁹³ Private hospital insurance, which covered 76 percent of the population, was the most common. Some persons who carried private insurance were also covered by government Medicare and Medicaid programs. An additional 4 percent of the population was covered only by Medicare, and 6 percent was covered exclusively by Medicaid. Almost all those enrolled in Medicare are age 65 years or over, while Medicaid covers cer-

tain low income individuals. Frequently persons must make copayments for insured health services, and some services are generally excluded from insurance coverage.

In 1977 the proportion of hospital expenses paid directly by U.S. patients was quite small: 6 percent.⁹⁴ Private insurance covered 37 percent of the expenditures for hospital care; Medicare, 24 percent; Medicaid, 9 percent; and other Federal, State, and local government programs, 22 percent. The remaining 2 percent was accounted for by philanthropy and industry. Nevertheless, persons using hospital services could incur significant out-of-pocket expenses. A 1975 survey showed that the average annual out-of-pocket hospital expense to persons with an expense was \$264. For 41 percent of persons with a hospital expense, the amount paid directly was less than \$50, but for 12 percent it was over \$500.⁹⁵

U.S. physicians are usually paid on a fee-for-service basis. However hospital-based physicians receive salaries from the hospitals, and a small proportion of office-based physicians are in pre-paid group practices and are paid on a capitation basis. Capitation is the payment of a fixed amount each year per person without regard to the amount of medical care the person receives. In 1977, 39 percent of the total cost of physician services was paid directly by patients; 37 percent was paid by private insurance; 24 percent was paid by government programs.⁹⁴ The average annual out-of-pocket expense for physician services, among persons with an expense, was \$107 in 1975.⁹⁵

Most U.S. nursing homes are private profit-making institutions. Approximately 41 percent of the total expense of nursing home care was paid directly by patients in 1977, and government programs covered 57 percent of the costs.⁹⁴ Data on the cost of nursing home care to those with an expense is not available from the 1975 survey. Direct payments for drugs amounted to 83 percent of the total cost of drugs in 1977.⁹⁴ Private health insurance covered 8 percent of the total cost of drugs, and government programs covered 9 percent. In 1975 the average annual expense for prescription drugs was \$59 for persons with an expense, and the average annual expense for optical services among persons with an expense was \$67.⁹⁵

In 1977 direct payments accounted for 92 percent of the total expense for eyeglasses and appliances. Private insurance covered 2 percent of the total cost of eyeglasses and appliances that year, and government programs covered 6 percent.⁹⁴

These statistics indicate that the out-of-pocket costs of receiving health care in the United States could be a barrier to hospital use for some; an incentive for others. The cost of hospital care is likely to be difficult to pay for persons without insurance or for insured persons who must make substantial copayments. However, among those with comprehensive insurance coverage of hospital expenses, the higher proportion of the costs for other health services that must be paid out-of-pocket could encourage hospital use.

In Denmark the entire population is required to take part in the health insurance system. Since 1973 the system has been administered by the county councils and has been financed by a graduated income tax. Two types of insurance exist. Under the first plan there are no direct charges for physician services, but persons must agree to see only one general practitioner during the year and to see specialists only if referred by the general practitioner. Under the second plan persons may see any general practitioner or specialist they wish at any time, but they are charged directly by the physician and are reimbursed only in part by health insurance. Until 1976 all persons with an income below a certain limit, some 80 percent of the population, had the first type of coverage, and those with higher incomes had the second type. Since 1976 there has been free choice between the plans for all.¹⁶

The expense of public hospital treatment in Denmark does not require insurance coverage since hospital care is provided without any direct charges to the patient. Hospitals receive their funds from the county governments and patients must attend a hospital in the county where they reside to receive free care. There were small fees for hospital use until 1973, but health insurance covered the fees for the most part.⁸⁷

Care in convalescent homes is also free of charge. However, to reside in an old age home or another facility operated by the local social welfare authorities, an individual must give up his or her pension, except for a small amount for daily

necessities. If an individual has income in addition to the pension, most of that income must be used to pay for maintenance expenses in the welfare facility.⁸⁵

Hospital physicians are salaried by the hospitals and do not charge inpatients for their services. General practitioners are reimbursed by the insurance system using both capitation and fee-for-service principles. About half of the income most general practitioners receive from the insurance system is based on the number of persons on their lists, and half is based on the services the general practitioners have provided.¹⁶ Drugs are divided into three categories. The county government pays 75 percent of the cost of one category, the necessary drugs, and pays 50 percent of the cost of the second category, the less important drugs. The cost of other drugs must be paid directly by the patient.⁸²

In sum, there are no cost barriers to receiving hospital care in Denmark, and there is little economic incentive for patients to choose hospital care over ambulatory care. However free long-term care in hospitals might be preferred by patients to the loss of their pensions and the other costs of treatment in a social welfare facility.

In Scotland health insurance exists, but is carried only by a small proportion of the population. Most health care is financed by the health service from general government revenues and is provided to patients without direct charge. Hospital care can be obtained without charge in health service hospitals, but some patients choose to pay a small fee for more private accommodations. Other patients prefer to be treated by a private physician and pay a special fee for the privilege.⁴⁸ Patients who use private hospitals or private beds in health service hospitals are charged for care, but the number of private hospitals and beds is quite small. The fees for special treatment in the health service hospitals and for private hospitalizations are usually covered, at least in part, by private insurance policies.

Ambulatory care is provided without charge for the most part. Small charges are made for some medicines, dentures, eyeglasses, and other appliances, but physicians' services are generally supplied without cost to the patient. General practitioners are paid by the health service on a

capitation basis, with various modifications. There are special adjustments to encourage physicians to practice in underserved areas and increased payments for treatment of the elderly, night calls, and other practices the health service wishes to encourage.⁹¹ Specialists are salaried by the health boards but are often allowed to engage in part-time private practice in which they charge patients directly. In addition a small number of physicians in full-time private practice charge their patients directly for treatment. Private insurance funds cover the charges for private ambulatory care in many cases.

Thus there are no significant cost barriers to receiving hospital care in Scotland, nor are there incentives for patients to choose hospital care rather than other kinds of health care. Most ambulatory care is free to the patient, and so is most long-term care, since it takes place in hospitals.

In West Germany 96 percent of the population is covered by insurance from a local or specialized sickness insurance fund. Many persons covered by insurance from a sickness insurance fund also carry supplementary private insurance, and a small percent of the population only carries insurance from a private insurance company.^{48,81,82} The sickness insurance funds cover the costs of hospital care necessary for the treatment of an illness or injury. If the patient wishes to have more private hospital accommodations or to be treated in the hospital by the physician of his or her choice, there is a direct charge, but often it is covered by the supplementary insurance policies. The sickness insurance funds cover the costs of long-term care in hospitals, including the *Kurkrankenhäuser*. The costs of nursing home treatment are included in the standard coverage of the sickness insurance funds in some States, and the coverage can be obtained on an optional basis in several other States.

The costs of ambulatory care for the treatment of an illness or injury are covered almost entirely by the sickness insurance funds. The physician from whom treatment is received must be registered with the funds, but almost all physicians in private practice are registered. Patients who make visits to nonregistered physicians usually carry private or supplementary insurance

to cover the costs of these visits. Patients must make small copayments for prescription drugs and appliances, and not all of the costs of preventive health services are covered by insurance, but the sickness insurance funds are moving toward more complete coverage of preventive care.

Hospital physicians are usually salaried, but if they provide ambulatory care outside the hospital, they receive fee-for-service reimbursement. Physicians in private practice are reimbursed on a modified fee-for-service basis. The sickness insurance funds pay prearranged lump sums to local physician associations, which in turn pay the physicians' shares of the lump sum based on the number and type of services the physicians have provided to insured persons.⁴⁸

In West Germany, as in Denmark and Scotland, there is little indication of cost barriers or incentives that influence patients who choose hospital care. Nursing home care could be more costly for West German patients than hospital or ambulatory care, but health services are generally available without significant out-of-pocket costs.

In addition to the probable effect of economic barriers and incentives on patient choices in the United States, U.S. physicians may have more economic incentive to hospitalize patients than do physicians in the other three countries. The use of fee-for-service reimbursement in the United States for most physicians' services that are provided in hospitals makes it financially rewarding for physicians to admit patients and perform expensive treatments. Salaried hospital physicians have no such incentive. When capitation alone is used as a basis of payment for office-based physicians, and the office-based physicians do not follow patients in the hospitals, there may be an economic incentive for physicians to refer patients who require time-consuming care to hospitals. The office-based physician's income is not increased by providing complex services, and it is not decreased by having the hospitals provide the services. Fee-for-service payment for office-based physicians who do not follow patients in hospitals could create economic incentives for the office-based physician to provide as many services as possible outside the hospital. In Denmark, Scotland, and West Germany, office-based physicians generally

do not follow hospitalized patients, but none of the countries uses either capitation alone or pure fee-for-service reimbursement. In spite of the modifications, there may be some incentive for office-based physicians in Scotland to refer patients to hospitals and for office-based physicians in West Germany to avoid hospital referrals.

SUMMARY

This section has surveyed characteristics of the health service systems in Denmark, Scotland, West Germany, and the United States. Certain characteristics in each country are likely to increase hospital utilization. In the United States the characteristics include economic incentives to physicians and patients for hospital use and the high percent of physicians in specialty practices. In Denmark the high proportion of

hospital-based physicians may increase hospital use. In Scotland the use of capitation to pay office-based physicians and the absence of a nursing home system probably increase hospital use, and in West Germany the large number of physicians per population and the lack of sufficient alternative facilities for long-term care are likely to increase hospital use.

On the other hand, each health services system has some characteristics that should decrease hospital use: for instance, the large number of alternative facilities for long-term care in the United States, the well-established programs for home care in Denmark and Scotland, and the small percent of physicians who are specialists in West Germany. Further research is needed to understand the interactions of these factors and the effects they have on hospital use. Increased understanding of the effects of health services system characteristics should result in more useful comparisons of hospital utilization statistics.

SUMMARY AND CONCLUSIONS

The comparability of hospital utilization statistics in Denmark, Scotland, West Germany, and the United States was discussed in this report. The main focus was on general hospital discharge reporting systems, which collect abstracts of information about individual discharges. For Denmark, Scotland, and West Germany, other types of reporting systems were also discussed, including those that cover special hospitals or groups of patients (such as psychiatric or maternity patients), annual hospital reports of aggregate utilization data, and household surveys that collect information about hospital use.

Although the United States has many important hospital data systems, only the National Hospital Discharge Survey was described here. Other U.S. sources of national hospital utilization statistics are briefly reviewed in appendix II. The National Hospital Discharge Survey was chosen for comparison with the general hospital discharge reporting systems in the other three countries because it is the major source of national estimates of short-stay hospital use for the United States.

Several similarities were found in the comparison of the four countries' reporting systems; for instance, many of the same items of information are collected in each system, and each uses a variation of the International Classification of Diseases to code diagnoses. However differences also exist, particularly in the types of hospitals and patients covered in the reporting systems and in the definitions and procedures used by the systems to compute utilization statistics.

The report also contained a brief review of the health services systems in the four countries. Information was given about characteristics of the health services systems that are likely to affect hospital utilization rates. The characteristics include the availability of separate long-term-care facilities, patterns in the provision of ambulatory and home care services, and the costs to patients of receiving various kinds of health care. Each country's health services system was shown to have some characteristics that are expected to increase hospital use and others that are likely to decrease it.

The information presented indicates that discharge reporting systems in other countries

could be valuable sources of data for comparative studies. However the differences in the reporting systems require further evaluation, and procedures need to be developed to adjust the data to take the differences into account. Work is underway in this area. As mentioned in the introductory section, a 10-country study is being done to estimate the effects of differences in the reporting systems on the data the systems produce. The study covers the four countries discussed in this report and the six countries whose discharge reporting systems are described in an earlier report.¹ Data from each country is adjusted to take the differences in the reporting systems into account.

Further research is also needed into the effects health services system characteristics have on hospital utilization rates. This type of research is valuable in its own right. Health policymakers are deeply concerned with controlling hospital use and associated high costs. Understanding the systemic factors that affect hospital utilization rates should assist policy-making decisions. When the broad effects of health services system characteristics are understood, it will also be possible to make more detailed comparisons of hospital utilization statistics. Specific questions—such as whether discharge rates for respiratory disease are related to

rates of automobile ownership, and what the relationship is between hospital staffing ratios and average length of stay—can be studied cross-nationally once controls are introduced for the system differences that affect discharge rates (such as percent of specialists) or differences that affect length of stay (such as the presence or absence of a nursing home system).

The cross-national research already done that uses data from discharge reporting systems gives an indication of the promise of future research. R. F. Bridgman uses data from areas of eight countries, including Schleswig-Holstein in West Germany, to study the relationship between the level of socioeconomic development and hospital utilization.⁹⁶ In other studies hospital caseloads are compared cross-nationally,⁹⁷ the relationship between hospital use and hospital expenditures is examined,⁹⁸ and the effect of the number of surgeons on surgical rates is explored.⁹⁹ Further research using data that have been adjusted to take differences in the statistical systems into account, and that control for the broad effects of health services system characteristics, should help answer many additional questions about hospital use that concern the United States and other countries of the world.



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APPENDIX II

SOURCES OF NATIONAL HOSPITAL UTILIZATION STATISTICS IN THE UNITED STATES IN ADDITION TO THE NATIONAL HOSPITAL DISCHARGE SURVEY

In addition to the National Hospital Discharge Survey, many local, State, and national statistical systems in the United States collect hospital statistics. The following are brief descriptions of some of the major sources of national hospital statistics.

GENERAL HOSPITAL DISCHARGE REPORTING SYSTEMS

Abstracting Services

Approximately two-thirds of the hospitals in the United States subscribe to an abstracting service. The hospitals supply data about each of their discharges to the services, which, for a fee, process the data on computers and provide the hospitals with various tabulations. The largest abstracting service is the Professional Activity Study (PAS), begun in 1953 by the Commission on Professional and Hospital Activities (CPHA). It covers 1,460 hospitals, or about 31 percent of all the discharges from nongovernmental short-stay hospitals in the United States. Information abstracted for PAS includes patient characteristics, length of stay, diagnoses, tests, treatments, and physician. In addition to the tabulations provided to the subscribing hospitals, PAS data are published in the CPHA series, *Length of Stay in PAS Hospitals*,¹⁰⁰ and data tapes are available to researchers on a contractual basis.

Medicare Claims File

Health insurance is provided by a variety of public and private agencies and organizations in

the United States, many of which compile data from hospitalization claims. Medicare is a national public health insurance program that covers most people age 65 years and over, those with chronic renal disease, and those who meet the disability provisions of the Social Security Act. The Medicare Claims File is maintained by the Health Care Financing Administration (HCFA), Department of Health and Human Services (DHHS). Information from 20 million Medicare claims has been collected since the file was begun in 1966. Twenty-percent systematic samples of claims have also been drawn and coded for medical diagnosis. HCFA publishes some hospital statistics from the file in its periodicals *Health Care Financing Notes*¹⁰¹ and *Health Care Financing Review*.¹⁰² Hospital utilization statistics by diagnosis are available on tape.

SPECIAL HOSPITAL REPORTING SYSTEMS

Mental Health National Reporting Programs

The National Institute of Mental Health (NIMH), DHHS, conducts several major surveys: the Inventory of Mental Health Facilities, the Annual Census of Patient Characteristics for State and county mental hospitals, and sample surveys of selected mental health facilities. Eight types of facilities are covered by the NIMH surveys: psychiatric hospitals, psychiatric services in general hospitals, community mental health centers, other multicomponent mental health facilities, residential treatment centers for

NOTE: A list of references follows the text.

emotionally disturbed children, outpatient mental health facilities, mental health day-night facilities, and transitional mental health facilities. For the inventory data are collected on services provided, caseload, staffing patterns, and expenditures of the individual mental health facilities. State and county mental hospitals and community mental health centers are surveyed annually for the inventory; other mental health facilities are surveyed biennially. For the annual census data are collected on the age, sex, and diagnostic characteristics of resident patients and admissions in State and county mental hospitals. In the sample surveys detailed information is collected on patient characteristics in certain types of mental health facilities; the type of facilities covered varies. NIMH publishes data in its *Report Series on Mental Health Statistics*¹⁰³⁻¹⁰⁶ and has data tapes available.

Federal Hospital Reporting Programs

Several Federal agencies operate statistical systems that receive data about hospitalizations in particular types of Federal hospitals. The Bureau of Medical Services, DHHS, operates an Inpatient Data System that receives data about hospitalizations in the eight general hospitals run by the Public Health Service. The Indian Health Service (IHS), DHHS, has an Inpatient Data System that contains information on hospital services provided to American Indians and Alaskan natives in the 50 IHS hospitals and other hospitals that have contracts with the IHS. The Veterans' Administration (VA) maintains the Patient Treatment File, which contains a medical record abstract for each discharge from the 172 VA hospitals and discharges whose hospital care was provided under the auspices of the VA. In the Department of Defense the various Armed Forces operate hospitals for their personnel in the United States and abroad, and they collect statistics on the use of these hospitals.

AGGREGATE HOSPITAL REPORTS

Annual Survey of Hospitals

Beginning in the 1940's the American Hospital Association (AHA) has conducted an

Annual Survey of Hospitals. The survey covers almost all hospitals in the United States and the U.S. territories. Each hospital is mailed a questionnaire requesting information about its services, utilization, personnel, and finances. Over 90 percent of the hospitals usually respond to the questionnaire, and estimates are made of data for nonreporting hospitals. Statistics from the survey are published annually in the AHA publications *Guide to the Health Care Field*¹⁰⁷ and *Hospital Statistics*¹⁰⁸ and are available on tape.

HOUSEHOLD SURVEYS

National Health Interview Survey

The National Center for Health Statistics has been operating the National Health Interview Survey since 1957. The survey covers the civilian noninstitutionalized population of the United States. A multistage probability design is used to draw samples of households, and all adult members of the households are interviewed. The interviews are conducted each week throughout the year. Approximately 120,000 persons in 40,000 households are interviewed each year. Information is gathered about the demographic characteristics of the household members, their health status, and their use of health services. Data from the survey are published in series 10 of *Vital and Health Statistics*,¹⁰⁹ and are available on tape.

National Surveys of Health Services

The Center for Health Administration Studies at the University of Chicago conducted national household surveys of health care utilization and expenditures in 1953, 1958, 1963, 1970, and 1976. The surveys covered the noninstitutionalized population of the United States. Self-weighting probability samples of households were drawn for each survey, and the last three surveys also oversampled certain persons and families of special concern in health policy formation. The 1976 survey oversampled rural southern black persons, persons of Spanish heritage living in the Southwest, and persons experiencing episodes of illness. For the 1976 survey 7,787 persons were interviewed in 5,432

households. Information was collected about social and demographic characteristics, health status, and access to the health care system. Major sources of the results of the 1976 survey are:

*Two Decades of Health Services: Social Survey Trends in Use and Expenditures*¹¹⁰ and *Health Care in the U.S.: Equitable for Whom?*¹¹¹ Data tapes from each survey are also available.



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