PATTERNS OF DISEASE
IN COMMUNITY GENERAL HOSPITALS

- Thomas W. Simpson

In visiting community general hospitals in various parts of the world, the keen medical observer is soon struck by the differing patterns of disease among patient populations. After a time, he develops a growing awareness of the types of illness prevalent in the community, and begins to realise what the major local medical problems are. If he stays there long enough he sees how these patterns vary with the seasons and with the passing years. This kind of information is helpful to the clinician in practice, even as an unvalidated impression of abundance or rarity of certain diseases in the community, but may be more useful as a guide toward precise studies on specific diseases of importance.

Most public health statistics are compiled on the basis of routine or occasional surveys, specialised clinic attendance records, registration records from institutions for the isolation and treatment of patients with categorical illnesses, and data submitted by hospitals and

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** Associate Professor of Medicine and Pathobiology, Johns Hopkins University, Baltimore, USA; formerly Resident Coordinator, Johns Hopkins Center for Medical Research and Training, Calcutta, India.
individual clinicians on a very limited number of reportable diseases.

University of Hawaii and the Government of Japan, members of the medical staff at a
216-bed general hospital recognised a number of problems inherent in their clinical records and
arrived at satisfactory ways of avoiding many of these pitfalls. As a result, records from this
hospital have become increasingly valuable as a primary source of reliable clinical and
epidemiologic information relevant to disease problems in the Ryukyu Islands. Some of these
problems and possible solutions to them were:

1. Failure to challenge or change an initial impression:—

Sometimes this was mere laziness in the care of a patient who was not very sick, had not
demanded close attention, and had recovered uneventfully; sometimes there was reluctance
on the part of house-officers to question a "snap diagnosis" made by a superior
attending physician (usually on admission before all the facts were known).

Most commonly, however, this problem was due to a lack of awareness of other diag-
nostic possibilities. For instance, many cases of eosinophilic meningitis had apparently been
dismissed as possible Japanese encephalitis or tuberculous meningitis (both very common
on the island) until an observant house officer noted high eosinophilia of the peripheral
blood with eosinophilic pleocytosis of the cerebrospinal fluid in one such case. A medical
consultant, from his experience elsewhere, suggested in turn the likely possibility of infection
by the rat lungworm, ANGIOSTRONGYLUS CANTONENSI S.

In summary, there had been a rather consistent failure to think in terms of differential
diagnosis, in which a number of diagnostic possibilities are considered in order of like-
lihood. Logical steps may then be taken to prove or exclude each possibility in a metho-
dical way.

2. Failure to confirm a suspected diagnosis by conclusive tests:

A clinician was entirely satisfied with diagnosis of "Aseptic Meningitis" after observa-
tion of a patient with a self-limited febrile illness associated with signs of meningeal irrita-
tion and moderate lymphocytosis of the cerebrospinal fluid. Another more astute physician,
noting the rather marked conjunctival, hyperemia (seen in good light during morning
rounds) suggested a more specific etiology. Acute and convalescent sera were obtained for
further study; subsequent tests at a referral center confirmed the consultant's hunch that
the patient had leptospirosis. Enteroviral infections were excluded at the same time.

Another patient was treated with several antibiotics and finally by attempted surgical
drainage of suspected infectious "cellulitis" of the foot. The consulting pathologist found
the material from the surgical wound to be bacteriologically sterile but detected copious urate crystals. The patient's serum uric acid level was then determined and proved to be very high. As the first well-documented cases of gout in Okinawa, the patient responded dramatically to colchicine therapy.

All that is required here is a certain amount of tenacity on the part of the house-officer and perseverance on the part of a responsible attending physician.

3. Lack of standardized disease terminology and classification:

Members of the medical staff of the Okinawa hospital had received their medical training in many different places—chiefly Japan, Taiwan, Germany, the Scandinavian countries or America—either during the remote past or in more recent years. Hospital charts were written basically in the Japanese language, but were filled with medical terms in English, German and even Latin. There was a great tendency for each clinician to keep his own private records that were not incorporated into a functional hospital record system. Final diagnoses were seldom recorded in a general register. An effort was made therefore to create a modern department of medical records. The "International Classification of Disease" was adopted (1) Seminars were held by each clinical department on a regular basis. Acceptable systems of disease classification, diagnostic criteria and staging of pathological processes were made known to the entire staff (ostensibly for training of house-officers) until nearly everyone was using the same approach.

The steadily expanding use of biopsy techniques and available consultant services in interpretation of histologic material actually demand the use of standardized terminology and criteria. This is especially true with regard to lymphomas, liver diseases, and glomerular lesions of the kidney. A brilliant young Okinawan internist who was trained in an American renal disease center has made an outstanding contribution by first standardizing the technique of kidney biopsy and then studying a large series of patients with the nephrotic syndrome; his methods are identical with those of the American hospital where the trained and the results are thus directly comparable. The distinct difference between the USA and Okinawa in the prevalence of lipid nephrosis and membranous glomerulonephritis in adults that he has described is undoubtedly valid. A similar approach has been taken by other clinicians interested in specific disease processes of other organ systems. International criteria for diagnosis and management of cardiovascular disease, rheumatic disorders, syphilis, tuberculosis, leprosy, leukemias and lymphomas, gastric carcinoma and hepatitis are now well known and widely used by the hospital staff.
4. Selection factors that produce a bias in hospital admission:

This is an aspect of extreme importance in attempting to utilize hospital data for statistical purposes. Factors that influence the admission to hospitals of patients with specific diseases are often elusive, varying from one locality to the next, and always difficult to assess. Nevertheless, an effort must be made to sort out these factors and objectively weigh the importance of each in influencing hospital admissions in a differential manner.

At the Okinawa Central Hospital, some biases of this sort could be rather easily discerned. Leprosy cases, for example, were excluded from the hospital and invariably sent to a leprosarium on a small neighboring island. The number of tuberculosis cases was always fixed, since a definite bed allotment was provided for lung resection cases and these beds were kept constantly filled by transfer from a large tuberculosis hospital a few miles away. Most obstetrical deliveries were done in the home by midwives and only complicated cases were admitted to the hospital—the Okinawan people feel quite strongly that a child must be born at the ancestral hearth-side. If possible, they prefer to die there also, so that moribund patients are almost always carried home to die. Thus, hospital statistics on leprosy, tuberculosis, normal births and hospital mortality are enormously biased by religious, traditional, social and legal influences and are virtually useless as sources of community health statistics.

Other factors are less easily detected but may be equally important. A large number of connective tissue disorders for example are to be found on the wards of the Okinawa Central Hospital, including a remarkable number of patients with lupus erythematosus and with Hashimoto’s thyroiditis. While these two clinical entities are unusually common among Okinawan people, it also became apparent in 1968 that disproportionately large numbers of cases were being admitted because the leading internist was an expert in “collagen diseases” and the most senior surgeon was highly respected for his skill in performing a thyroideectomy. Conversely, rheumatoid arthritis was rarely seen in the hospital in that year because almost all crippling arthritis cases went to an orthopedic hospital in another part of the island: congenital cardiac anomalies and severe mitral stenosis were not often seen because a survey team from a Japanese medical school came each year for examination of school children and surgically amenable cases were referred to the Japanese hospital for corrective operations. With the development of a modern physical therapy department and a skilled cardiovascular surgical team, these trends were quickly reversed. Many cases of rheumatoid arthritis and advanced mitral stenosis then began to appear on the wards, all under active treatment in an attractive modern
Certain other factors may be so insidious as to almost defy detection. Walking or travelling in a northward direction is believed by many Okinawa people to be unlucky; facing or proceeding towards the south is propitious. There was a small but definite tendency for the hospital to attract patients from the rural northern parts of the island. Patients in the urban population south of the hospital often prefer to travel on down the road to another hospital, rather than come a much shorter distance in an inauspicious direction. It is doubtful that disease statistics could be altered very much by so subtle an influence, but perhaps in other situations the impact of local customs and religious beliefs might be great indeed.

5. Lack of adequate communication with physicians in the community and region:

One must always bear in mind that cases admitted for hospital treatment may represent only the visible tip of a community “iceberg”. In the Ryukyu Islands, Japanese encephalitis is a regularly occurring epidemic disease among the human population with a reservoir in the local pig population that serves to amplify the transmission of the disease during the summer mosquito season. Virtually all Okinawa children have demonstrable protective antibodies before the completion of high school, presumably because of Inapparent infection or mild febrile illness that either passes unrecognized or does not require hospital treatment. Only a small number of children are admitted with clinically evident encephalitis which may be fatal or leave significant sequelae. These cases represent the “tip of the iceberg”. Their presence in the hospital reflects only that the disease is seasonally prevalent among the general population. The severity of the illness is the major selection factor leading to hospitalization of these encephalitis cases. The same thing may be true in many illnesses that vary in severity from almost asymptomatic to fulminant or fatal.

Waves of respiratory illness or diarrheal disease may spread through a community and heavily burden the local practitioners, but only the most severe or complicated cases arrive in the hospital wards. The true incidence of the disease in the community cannot be easily derived by counting the numbers of these few unusual cases that gain admission. Recognition of such epidemics require full and continuing communication among the hospital staff and the local or regional practicing physicians. This is most effective at
a personal level but enhanced considerably by regularly scheduled hospital conferences to which the local practitioners are invited and made welcome. Perhaps the best service the hospital can render here is to provide early etiologic confirmation that will be useful to the community physician.

Finally, communication by means of formally published scientific papers may provide a lasting—and thus perhaps more valuable—contribution to local medical knowledge, especially if these are published quickly and frequently in local medical Journals.

VALUE OF THE HOSPITAL STUDY SERIES

Sometimes patterns of disease may appear without apparent bias in hospitalized patients. The simplest situation is illustrated by the occurrence of incidental conditions among the patient population as a valid sample of the general population. The relative prevalence of asymptomatic strongyloidiasis among hospitalized adult Okinawans is about 7%; the relative prevalence of nocturnal microfilaremia due to Wuchereria bancrofti happens to be also about 7%. Each of these is very close to the actual prevalence of these parasites among the whole adult population of central and southern Okinawa (though higher prevalence rates may be found in remote rural areas in the north and on outlying islands). Thus the hospital figures become a reliable measure of community prevalence of these two conditions.

Another situation were observed patterns of disease may be nearly free of bias occurs when an entire group of patients with a given disease process can be examined and the relative proportions of sub-categories determined by objective criteria. For instance, all of the cases of nephrotic syndrome in young adults were studied by means of percutaneous renal biopsy and the histologic lesion verified. Thus sub-classified, the proportion of each histological type was determined. Similarly, all cases of leukemia and lymphoma could be accurately sub-classified, by means of blood, bone-marrow, and lymph-node examinations. A striking paucity of chronic lymphocytic leukemia and of Hodgkin's disease was noted, in contrast to the pattern that emerges from similar studies on American and European populations.

Another careful study of 1,000 consecutive upper G I examinations done in the radiology department was subject to verifiable bias in patient selection, but revealed a very high prevalence of duodenal diverticulosis and an interesting 1:2 ratio of gastric and duodenal ulcers. These particular relationships are most likely true and devoid of appreciable bias.

Thus, almost any diagnostic procedure that is done regularly on all patients admitted
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for a given symptom complex or disease category may reveal validly significant patterns in the distribution of sub-types of disease within that category. These patterns may best be brought out by longitudinal, prospective studies on a series of cases studied on a definite protocol (2).

CONCLUSION

A great deal of information is accumulated every day in the patients records of community hospitals around the world. Much of it is useless because of incomplete or improper documentation. Most of it is wasted because of failures in communication. Yet, community hospital records remain one of the richest sources of potentially valuable medical knowledge.

Some of the distant goals in the recognition of worldwide disease patterns can be reached only when physicians working in community hospitals begin to think constantly of these simple ideals:

1) Critical evaluation of hospitalized patients in terms of different diagnosis as part of an objective, problem-oriented approach.

2) Pursuit of precise diagnosis by use of definitive modern, standardized diagnostic procedures.

3) Consistent use of standard international nomenclature and disease criteria, with a clear understanding of the semantic implications and pragmatic advantages.

4) Recognition of patient selection factors that affect hospital admissions of patients with certain diseases or which limit admission to certain grades of illness.

5) Enhanced local communication between institutional staffs and community physicians as the first step in improving communication on a regional and international level (3).

Greatly expanded worldwide communication through international health agencies, exchange of professional opportunities among different countries, and increased availability of medical publications that cross language barriers are important and even essential, but require lavish outlays of time and money. The simple mechanisms listed above can serve to build a connecting link between any community hospital and the outside world, so that its medical records may contribute to the ultimate understanding of clinical disease patterns on a global scale.
REFERENCES

(1) World Health Organisation Committee, 1957

(2) Dorman, J. and Dickinson, J., 1972
   Experience with typhoid fever at Shanta Bhawan

(3) Rajbhandari, P. L., 1972,
   The concept of basic health care