Several investigating committees reporting on hospitalization in South Africa have emphasized the lack of comprehensive statistics on which to base their opinions and conclusions. More recently the Commission of Enquiry into the high cost of medical services also expressed similar views:

"Time and again the Commission was hampered in these efforts by the notable lack of factual information in the Republic. This lack was experienced on practically every level of the enquiry, and the Commission was obliged to find the basic information either by its own efforts or with the assistance of some interested group."

In spite of these difficulties the report contains the most comprehensive information available at present in the Republic of South Africa on the financial aspects of medical and hospital care.

The recent introduction in the Transvaal Provincial Hospitals of a new system of collection and collation of statistics has remedied the previous shortcomings to some extent. New methods for the collection, compilation, analysis and presentation of clinical records of patients are still to be introduced. It is therefore worth while reviewing the information that is at present available in the light of modern trends and concepts in the study-field of hospital statistics.

**STATISTICS OF THE JOHANNESBURG HOSPITAL**

**David Glajchen, M.B., B.Ch. (Rand), M.R.C.P. (Edin.), Postgraduate Research Assistant, Department of Medicine, University of the Witwatersrand, Johannesburg**

In addition, she would have an income from all sources, including from her children and boarders, of approximately R120 per month. She would, however, be free to take some other employment to enhance her earnings.

**THE NEW AIM—REHABILITATION OF THE TOTAL PERSON**

Throughout this very trying and difficult period she received constant advice, support and assistance from the various staff members of the Rehabilitation Treatment Clinic. Frequent discussions took place and many suggestions were put forward on how to alleviate her admittedly difficult position. The rehabilitation team, while making every effort to restore her to health, in addition tackled the problem of launching her again as a normal citizen, socially, vocationally and economically rehabilitated. Thus, instead of her standing alone to face a difficult position, she had a team skilled in many disciplines to ease her road back to as useful a life as any disabilities she may finally be left with, will allow.

**The Doctor’s Extended Function**

It is this bridging of the gap between the end of the medical treatment and the restoration of the patient to normal citizenship which I wish to stress. This, too, must be assumed by the doctor as one of his everyday functions. It must be emphasized that he should not consider his case completed until this last important hurdle has also been safely negotiated.

**REFERENCE**

USES OF HOSPITAL STATISTICS

The study of hospitalization, patients, and their illnesses, on a statistical basis can be an important source of information for many purposes. Modification of the present methods of collecting this information would make it of use, in this country, for other than financial and administrative purposes. With the increasing introduction of automatic data-processing methods there is urgent need for the standardization of all the basic information collected so as to serve multiple purposes. The scope and value of the findings would be enhanced by the use of uniform and widely accepted concepts, methods and definitions.

The data can provide information necessary for such studies as the survey type of medical research of diseases and responses to treatment; as well as for the comparison of the work of various hospitals, regions, provinces and even different countries.

The uses of hospital statistics can be grouped as follows:
1. Effective administration and operation of a hospital to provide proper care for its patients.
2. Organization, coordination and planning of hospital services in an administrative area.
3. Economic utilization of hospital facilities within the general health programme of the community, region or country.
4. Assessment of the morbidity of the population including epidemiological aspects of diseases.

Hospital statistics can refer either to the hospital as a residential institution for medical care or to the patient as an individual or unit. The data at present available in the Republic of South Africa refer almost entirely to 'hospital statistics' as opposed to 'patient statistics'. Although many characteristics are common to both, there are distinct advantages in separating these 2 aspects.

HOSPITAL FACILITIES SERVING JOHANNESBURG

Hospital resources for the care of patients include not only the facilities for bed and ambulatory care, but for laboratory and radiological diagnostic services, operating theatres and physiotherapy. The supplementary facilities for rehabilitation, social services and dispensing also contribute to the professional care of patients.

The most important item is, of course, that of the facilities for bed care. The unit of measurement of these facilities is that of the hospital bed, and only this aspect of the hospital facilities will be considered in detail at present.

The White population of Johannesburg and its environs is served by hospitals under the control of the Provincial Hospital Services and of several private organizations. There are a total of approximately 3,239 beds available.1

Table I lists the beds according to their various categories.

TABLE I. HOSPITALS SERVING WHITE POPULATION OF JOHANNESBURG

<table>
<thead>
<tr>
<th>Hospital</th>
<th>General medical and surgical installed beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johannesburg Group of Hospitals</td>
<td></td>
</tr>
<tr>
<td>1. Johannesburg Hospital</td>
<td>1,070</td>
</tr>
<tr>
<td>2. Fever Hospital</td>
<td>85</td>
</tr>
<tr>
<td>3. Queen Victoria Maternity Hospital</td>
<td></td>
</tr>
<tr>
<td>4. Transvaal Memorial Hospital for Children and E. P. Baumann Home</td>
<td>208</td>
</tr>
<tr>
<td></td>
<td>1,363</td>
</tr>
<tr>
<td>Edenvale Hospital</td>
<td>136</td>
</tr>
<tr>
<td>South Rand Hospital</td>
<td>421</td>
</tr>
<tr>
<td>Private nursing homes</td>
<td>1,319</td>
</tr>
<tr>
<td>Total</td>
<td>3,239</td>
</tr>
</tbody>
</table>

The Infectious Fever Hospital is listed under the Johannesburg Group. The hospitals serving mental and infectious conditions such as leprosy and tuberculosis, which fall under the control of the State or the local authority, are excluded from the table and also from the present study.

The major work by far is done by the Johannesburg Hospital which, for practical and statistical purposes, is separated from the rest of the hospital group. The Ronald Mackenzie Block and the Wings, the Julius Jeppe and the Chamber of Mines Blocks are situated on a single site. The Colin Gordon Nursing Home, Ward 8 (for miscarriages) of the Queen Victoria Maternity Hospital and the Otto Beit Convalescent Home are close by. Other units are housed in the privately owned Princess Nursing Home, the Florence Nightingale Nursing Home and the Joubert Park Private Hospital.

The hospitals under the control of the Provincial Hospital Services allocate the beds in a fixed pattern for adults or children, male or female, and the various specialties. Table II shows the various subdivisions of beds in the Johannesburg Hospital.

TABLE II. JOHANNESBURG HOSPITAL ALLOCATION OF BEDS

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>328</td>
</tr>
<tr>
<td>Surgery</td>
<td>218</td>
</tr>
<tr>
<td>Gynaecology</td>
<td>89</td>
</tr>
<tr>
<td>Orthopaedics</td>
<td>92</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>34</td>
</tr>
<tr>
<td>Otolaryngology</td>
<td>25</td>
</tr>
<tr>
<td>Urology</td>
<td>40</td>
</tr>
<tr>
<td>Thoracic surgery</td>
<td>35</td>
</tr>
<tr>
<td>Plastic surgery</td>
<td>20</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>32</td>
</tr>
<tr>
<td>Neurology</td>
<td>8</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>32</td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>30</td>
</tr>
<tr>
<td>Private patients</td>
<td>25</td>
</tr>
<tr>
<td>Nursing staff</td>
<td>17</td>
</tr>
<tr>
<td>Convalescence</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>1,070</td>
</tr>
</tbody>
</table>

* Excluded: 10 beds in Dental Hospital for maxillo-facial surgery.

Forty-six beds in the Colin Gordon Nursing Home had been on hire until the complete take-over by the Provincial Hospital Services and its incorporation into the Johannesburg Hospital in August 1962. The additional 40 beds so acquired were balanced by the closure of various wards in the rest of the Hospital in rotation for renovation and the use of up to 26 beds in the Otto Beit Convalescent Home for children from about that date. There has been no material change in the number of beds available in the Johannesburg Hospital between 1960 and 1964.

ADMISSION OF WHITE PATIENTS TO THE JOHANNESBURG HOSPITAL

An admission can be considered as the formal acceptance of a patient as an inpatient to receive medical and other professional services in the hospital, resulting in the allocation or the occupation of a bed. Patients discharging themselves or dying during the process of admission are also listed as hospital admissions.

A person above the age of 14 years is considered as an adult for purposes of hospitalization. The Johannesburg Hospital serves adult inpatients only, except in the sub-specialities of thoracic surgery, neurosurgery and ophthalmology. These inpatients are admitted through a single office, and are allocated to a particular unit or firm according to the day of the week and their medical or surgical requirements.

All admissions to the medical wards are direct because the continuous big demand does not allow for admission, by arrangement, of non-urgent cases. The wards serving general surgery, gynaecology and the sub-specialities of ophthalmology, otolaryngology, urology and orthopaedics, however, derive their patients from both direct and waiting-list admissions. The numbers of patients drawn from the waiting lists may be
markedly reduced or discontinued during the winter months when the direct admission rates are high.

The basic information of every admission, consisting of the name, religion, sex, marital status, home address, date of birth, date of admission and the number of the ward and unit to which the patient is sent, is recorded and stamped on a metal plate. The plates collected over a period of 24 hours from 8 a.m. are used to print the daily admission lists. These lists are then used for the calculations of the hospital statistics that are available.

On the whole the months of March and August are peak admission periods, with low figures in February, November and December (Table III). The gradual increase in the number of admissions over the past few years is well reflected in the annual figures. In 1960 there were 20,129 admissions, gradually increasing to 21,968 in 1963. This is a most significant increase if considered in conjunction with the fact that there has been no material change in the number of installed beds over this same period.

This increase in the number of admissions must be evaluated in the light of the growing demand for inpatient care, the number of extra beds made available, the rising bed occupancy rate, the change in the disease pattern and age distribution of the hospital population, the length of hospitalization, and the hospital mortality rate.

The daily discharge lists are similarly printed from the plates removed from the file on the discharge or death of a patient. Those plates remaining in the file at the end of the month represent the patients still in hospital. These figures also serve as the basis for the calculations of the several measurements of hospital utilization.

MEASUREMENT OF HOSPITALIZATION

The pattern of utilization of the hospital facilities and resources by the inpatient can be indicated in several ways:

1. Statistics of patient movement over a given period. This includes the number of patients in hospital at the beginning of the period, the number admitted, discharged, and those remaining at the end of the period.

2. Statistics of days of care. This is best calculated from a regular daily census, each inpatient being counted as one day-of-care. This is essential for the day-to-day working of a hospital. It can be expressed as the number of patient-days in a month or a year.

3. Statistics of other professional services. This is usually considered as the volume of services rendered in a month or a year.

Admissions and Discharges

The admission figures (Table III) are accurate, but unfortunately there is no easy way of separating the transfers between the Nursing Home units and the rest of the Johannesburg Hospital from the direct admissions. The number of transfers is probably not much more than 60 in any one month. The effect of their inclusion, however, will be to increase artificially the number of admissions and thereby shorten the calculated period of hospitalization per admission. Medical surveys of inpatients, however, will not be influenced materially because the numbers are relatively small.

Because the available hospital statistics in Johannesburg are used primarily for administrative purposes, several important points must be considered and allowed for if these same figures are to be used for the survey type of medical or social research. The admission figures (Table III) include the private patients of all categories, members of the nursing and medical staff, and patients whose injuries fall under the Motor Vehicle Insurance or Workmen’s Compensation Act. Because an independent research worker does not have free access to these patients for full clinical evaluation, and because the factors controlling their admission are overly different from those of the free and part-paying (Provincial) patients, they are best excluded from inpatient clinical surveys, unless the administrative and financial aspects are being studied specifically.

The Provincial patients admitted during the years 1960 to 1963 are therefore listed in Table IV so as to make these figures freely available to the workers contemplating ad hoc surveys of inpatients.

The discharges and deaths are noted daily by each ward. Because there is no daily census of patients, these ward notifications are used for the calculation, by subtraction, of the number of patients in hospital. Fortunately small notification errors become accumulative and by the end of any one month up to 300 extra patients, whose names were erroneously omitted from the daily discharge bulletins, may still be listed as inpatients. Corrections and adjustments have then to be made before the figures are used for the monthly hospital statistics. It is not possible at present to calculate the size or the significance of these errors that may have been introduced. The effects on such calculations as patient-days, bed occupancy rate, or length of hospital stay, which are derived from these basic figures, therefore, need to be assessed more fully.

Bed Occupancy

Until recently the statistics of the Johannesburg Hospital have been calculated on the basis of installed beds. This has now been replaced by the concept of available beds which is derived from the number of installed beds minus those withdrawn from use, plus any temporary additions. The bed occupancy rate, which is also used as a measure of the utilization of the hospital facilities, is calculated as the ratio of the daily average number of patients to the number of available beds during a given period, and is expressed as a percentage.

The annual figure, e.g. 82.8% (1962-63), is a composite one. It does not indicate the differences between the various hospitals in the Group, or the monthly or daily fluctuations. A
The data already discussed are mostly of a quantitative nature, whereas the patient statistics, apart from the length of hospitalization, are qualitative in character.

The concept of the length of hospitalization per patient is simply the total number of days the patient spent in hospital between admission and discharge. The average length of stay is determined by dividing the total number of patient-days over a given period by the figures obtained by adding the number of patients in hospital at the beginning to the number of admissions during the same period. This is calculated as a monthly or annual figure. The annual figures of 11.1 (1958-59), 12.3 (1959-60), 13.3 (1960-61) and 12.8 days (1961-62) are composite ones whereas the patient statistics, apart from the length of hospitalization, are qualitative in character.

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A good cross-section of patients suitable for the training of medical students and nurses may, therefore, not be available. This expected change in the role of the Johannesburg Hospital as a centre for the treatment of acute cases, as a regional centre, and as a teaching hospital needs further study. The intended extension and modification of the present medical aid schemes may rapidly accentuate these trends.

QUALITY OF THE CARE GIVEN
One must accept that a list of the facilities and the services offered do not serve as a measure of the full need of these services for their quality. The criteria for the measurement of the quality of the hospital care given have to be established. This is a full study on its own which still needs to be done.

SUMMARY
The inpatient statistics of the Johannesburg Hospital are reviewed in the light of modern trends and concepts. Expansion, modernization and standardization of the present methods for the collection and collation of this data, would facilitate the development of uses other than financial and administrative as at present.

Although the number of hospital beds has remained about the same since 1960, there has been a steady increase in the number of admissions. Except for a few relatively quiet months, the hospital is working at maximum capacity for most of the year.

The present role of the hospital is discussed in relation to the population served and the type of illnesses treated. The ageing of the population and the extension of the present system of medical aid funds may accentuate the change in role from a hospital for acute cases to that serving patients requiring highly specialized and long-term care.

Some of the more important gaps in our knowledge are mentioned and the need for further studies indicated. The publication of this paper opens the way for the carrying out of survey type medical and social studies in the Johannesburg Hospital. The methods to be used are also outlined.

Cases of Interest

LARYNGEAL AND TRACHEAL STENOSIS

W. A. Kerr, Chief Aural Surgeon, and P. A. Jaques, Registrar, Department of Otorhinolaryngology, Johannesburg Hospital

Case 1. Master R.K., 7 Years
This child was bitten by a dog on 10 October 1959, when one fang perforated the right ala of his thyroid cartilage. When first seen on 3 November 1959, mirror examination of the larynx showed marked reduction in the size of the glottic airway by a mass which replaced the anterior one-half of the right vocal fold (cord) and extended to the subglottic region. Spicules of the thyroid cartilage were visible in this mass, which prevented apposition of the vocal folds on attempted phonation. The posterior half of the right vocal fold was oedematous and immobile. The left vocal fold was slightly oedematous and showed slight mobility.

Operation was carried out on 12 November 1959—laryngofissure and tracheostomy; excision of the scar tissue and fragments of cartilage; preservation of the laryngeal mucosa and the insertion of a Vitallium plate, 1 mm. thick (Fig. 1, A), which was anchored with gauge 28, soft Austenal wire to a suitable frame (Fig. 1, B), on the neck.

The Vitallium plate was removed on 22 December 1959 and fortnightly dilatations were carried out, under general anaesthesia, using Jackson triangular dilators, until June 1960. The laryngeal appearances and the glottic airway improved progressively and granulations had to be removed on only two occasions. From June until December 1960, monthly dilatations were continued using up to size 38 Jackson bougies. During the latter period the smallest tracheotomy tube was used and was kept completely occluded, except at night; and it was finally removed in 1960. Up to the present time the laryngeal condition has remained satisfactory, though mobility of the right vocal fold has not returned. His voice is hoarse, but he leads a normal life.

Case 2. Mrs. F.D.W., 49 Years
This patient suffered multiple severe injuries in a motor car accident on 17 April 1965, including a direct hit on the larynx. Immediate tracheostomy was performed. The patient was first seen by us on 18 May 1965 when it was found that the tracheostomy had been allowed to close and the patient showed considerable stridor. Mirror examination of the larynx showed unusual prominence of both ventricular bands and oedema of the aryepiglottic folds. In the region of the vocal folds was an ovoid of scar tissue which extended subglottically and allowed an airway of about the size of a lead pencil. At that time there was no obvious infective process in the larynx.

After consultation with the senior plastic surgeon we were considering the performance of a plastic procedure on somewhat similar lines to that recently reported by Montgomery for the correction of an upper cervical defect of the trachea. However, on 16 June 1965, redness and swelling of the skin, with early fluctuation, appeared in the midline in the region of the lower border of the thyroid cartilage and this was accompanied by an increase in the laryngeal obstruction. On 17 June 1965 the following procedure was carried out under general anaesthesia: laryngoscopy and the introduction of a Negus bronchoscope (child's size) to ensure a moderate airway; then tracheostomy, the bronchoscope being left in situ; then