THE COLLECTION AND UTILIZATION OF MEDICAL STATISTICS IN NEW ZEALAND

Prepared jointly by

Dr. H.B. Turbott
Director-General of Health, New Zealand

and

Mr. R.J. Rose
Medical Statistician
Department of Health, New Zealand
# CONTENTS

1. **INTRODUCTION** ............................................. 1  
   1.1 The establishment and development of the Medical Statistics Branch ........................... 1  
   1.2 The history of the statistical unit in the New Zealand Health Department ..................... 1  
   1.3 A note on administrative procedure .......... 1  
   1.4 The Maori - a special health problem in New Zealand ................................................. 2  
   1.5 The provision of a health information service.. 2  

2. **DEATH MATERIAL** ............................................. 3  
   2.1 The source of death material ......................... 3  
   2.2 The use made of death material .......................... 4  

3. **BIRTH, OBSTETRIC AND PERINATAL MATERIAL** ............... 5  
   3.1 The source of birth, obstetric and perinatal material ................................................ 5  
   3.2 The use made of birth, obstetric and perinatal material ............................................. 5  

4. **GENERAL HOSPITAL MATERIAL** ................................. 6  
   4.1 The source of general hospital material .......... 6  
   4.2 The use made of general hospital material .......................... 6  
   4.2.1 Administrative uses .................................... 6  
   4.2.2 Epidemiological and research uses ................. 7  

5. **MENTAL HOSPITAL MATERIAL** .................................. 8  
   5.1 The source of mental hospital material .......... 8  
   5.2 The use made of mental hospital material .......... 8  

6. **CANCER MORBIDITY MATERIAL** ................................. 9  
   6.1 The source of cancer morbidity material .......... 9  
   6.2 The use made of cancer morbidity material ....... 9  

7. **CHILD HEALTH MATERIAL** .................................... 10  
   7.1 The source of child health material ................. 10  
   7.2 The use made of the material ............................ 10  

8. **SPECIAL STATISTICAL STUDIES AND AD HOC SURVEYS** .......... 10  

9. **SUMMARY** .................................................. 11/12
1. INTRODUCTION

1.1 The establishment and development of the Medical Statistics Branch

This paper describes the functions and the organization of the Medical Statistics Branch in the New Zealand Department of Health.

Health statistics in New Zealand have undoubtedly developed to a greater extent than in most other countries. The reasons for this lie not so much in that New Zealand is a compact island country with a small but usefully sized population, but more through the strength and activity of the whole public health service, which not only indirectly controls all hospital facilities but also provides its own institutions in some cases for the treatment of sickness.

The extensive activities of the central public health authority have led quite naturally to a demand for figures not only in respect of disease and health standards but also those which will afford some measure of the efficiency of the health services provided. An additional element which has fostered statistical development has been the cooperative attitude of the medical profession outside the public service which has resulted in a very harmonious relationship.

1.2 The history of the statistical unit in the New Zealand Health Department

It is relevant to discuss briefly the history of the Medical Statistics Branch in the Department of Health. The general policy in New Zealand is for statistics to be centralised in the Department of Statistics but in 1919, through the negotiations of the then Director-General of Health, all statistics with a medical content were transferred, together with some staff, to the Department of Health. Thus the unit when established had as its nucleus all cause-of-death data, a full coverage of the public hospitals and the beginnings of a national cancer registry. This work was carried out on the unit's own small machine plant. The subsequent development of these basic statistics and the extension into other fields have been largely to meet the requirements of the Department's divisional directors and administrators.

1.3 A note on administrative procedure

The obvious advantage in having a statistical unit equipped to supply health data of any type will be wasted unless the unit is integrated into the top administration of the Health Department. While an effective statistical programme must be made up, in the main, of continuous projects it must also be flexible enough to fit in new demands arising from changes in departmental policy, and from current health campaigns. Liaison between the unit and the administration at various levels is carried out by:
(a) The Medical Statistician as head of the statistical unit is accountable in all matters to an Assistant Director-General who heads the senior division which is Public Health. At the same time he is allowed sufficient autonomy to deal directly with the heads of divisions not included under the Public Health Bureau, for the obligation is on him to provide a service to these divisions in any way that may be required.

(b) The Medical Statistician is at the direct disposal of the Director-General of Health and his Deputies in supplying information to them or in the interpretation of statistical data.

(c) The Medical Statistician attends bureau meetings (there are three bureaus in the Department) which are held regularly. This enables him to keep up with any departmental activities. Through this contact he is often in a position to make a useful contribution by outlining statistical projects which could be initiated to supply answers to queries arising out of delivered talks and the resultant discussion.

1.4 The Maori - a special health problem in New Zealand

New Zealand has a bi-racial society, by far the larger group being predominantly of European descent while the smaller but more rapidly increasing group comprises those descended from the original Maori race. The European section of the population has by world standards extremely low mortality levels while that recognised as Maori has a mortality experience similar to that of underdeveloped countries.

Theoretically there should not be any disparity in mortality between the two races because all legislation, health and hygiene regulations, and social welfare and medical care, are available to Maori and European alike. Furthermore, the same registration procedures apply to Maori and European and there would be no difference in accuracy as between the figures for the two races. The explanation lies in a handicap, which all developing nations have to overcome, in their attitude to health and hygiene and in overall living standards.

From the Maori welfare angle and from the point of view of the public health administrator, who has the planning of health services, and again by reason of the unique opportunity afforded to the epidemiologists, it is important to take out tabulations covering the total population as well as those for the European population and Maori population separately.

1.5 The provision of a health information service

The New Zealand experience is one of a steady and growing demand for information concerning disease and sickness from the public in general as distinct from government agencies. The meeting of this demand for knowledge is considered to be a very important function of the Medical Statistics Branch. While some enquiries can be answered by extraction of
data from published or unpublished tables, many of them necessitate additional tabulations and reference to original collection material. A single enquiry often involves tapping more than one source of data, while WHO and United Nations reports and the medical statistics publications for individual countries must often be referred to for comparative figures. The enquiries cover a wide range of occupations and interests while many come from overseas. Common originators of these requests are university and research centres, newspapers and doctors, medical and lay students and trainee and post-graduate nurses. The following table sets out the number of general public requests received in 1963 under the heading of the subject matter of the request:

<table>
<thead>
<tr>
<th>Subject matter of enquiry</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital data</td>
<td></td>
</tr>
<tr>
<td>General Hospitals</td>
<td>75</td>
</tr>
<tr>
<td>Mental Hospitals</td>
<td>19</td>
</tr>
<tr>
<td>Death data</td>
<td>70</td>
</tr>
<tr>
<td>Cancer case registration</td>
<td>12</td>
</tr>
<tr>
<td>Foetal death data</td>
<td>10</td>
</tr>
<tr>
<td>Miscellaneous survey data</td>
<td>10</td>
</tr>
<tr>
<td>Birth data</td>
<td>6</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>15</td>
</tr>
<tr>
<td>Total enquiries for data</td>
<td>217</td>
</tr>
</tbody>
</table>

2. DEATH MATERIAL

New Zealand's death statistics have attained a very high standard in terms of accuracy and scope. In the main this situation has evolved out of opportunities offered in a welfare state. The advantages possessed over other countries are mainly in respect of cause-of-death data in that post-mortem reports and coroner’s papers are routinely available to the classifier. When necessary, hospital case-note summaries are available for reference.

2.1 The source of death material

In New Zealand the Office of the Registrar-General carries out the legal recording processes in respect of death, while the central bureau or Department of Statistics is responsible for the demographic side of data analysis.
The system in operation at present is for the items to be transcribed onto a punch card by the local registrar from the register itself; these cards are then forwarded to the Department of Statistics, where all except cause-of-death items are punched into the cards and tables run off. The cards are then forwarded to the Branch where they are matched up with the death certificates which were received direct from the Registrar-General. A new system is under pilot trial by which a carbon copy of the death registration form completed by the Funeral Director will be forwarded straight to the Health Department. This system will avoid errors in transcription.

2.2 The use made of death material

The medical administrators of the Department of Health are in frequent touch with the Medical Statistics Branch to obtain death figures which will reflect the success or otherwise of their disease prevention programmes. As soon as the year's preliminary death figures are available they are discussed with Divisional Directors principally Public Health, Maternal Health, Child Health and Tuberculosis. Keen interest is taken in New Zealand's figures in relation to those of the leading countries in defined fields. International ranking tables have become a feature in the furnished tabulations.

Tabulation of causes of death are taken out for areas under the control of separate medical officers of health, except where a large city such as Auckland is divided into separate health districts. These district figures have proved to be of great value to medical officers in pin-pointing localities where more intensive health education measures could prove profitable.

There is special emphasis on infant and foetal loss according to locality. A table containing all the relevant data for each race, numbers of births and stillbirths, numbers of deaths both neonatal and post-neonatal and the calculated rates, is made out for each hospital district and subdivisions of each hospital district. (Hospital district figures can be combined into health district totals in most cases.)

In order that the Occupational Health Branch of the Department may direct its efforts usefully, standardised mortality ratios for all occupations are programmed for the three years 1960-1963 around the 1961 census. Despite the fact that in New Zealand there are no extremes of wealth and poverty, social strata do exist and social class mortality figures, which can be correlated with occupation, show the effect on health of the whole socio-economic environment.

Two surveys linked to death records are at present being carried out. Both are in respect of Maoris, one covering acute myocardial infarction, which is so prevalent in the middle-aged Maori, and the other cancer of the lung in Maori women. These studies are carried out by research groups by obtaining supplementary information from hospital records, the physician certifying the death, or from relatives by means of interview.
3. BIRTH, OBSTETRIC AND PERINATAL MATERIAL

New Zealand has a fine record in the reduction of foetal and infant death rates and has always featured among the countries of the world with the very lowest figures.

3.1 The source of birth, obstetric and perinatal material

(a) A punch card is forwarded by the local Registrar to the Department of Statistics in respect of each live-birth and each stillbirth registered. For each birth the birth weight and period of gestation is also supplied on this card. Tabulations are taken out by the Department of Statistics showing birth-weights and gestation periods in a number of cross tabulations, live-births and stillbirths separately, and these are routinely supplied to the Medical Statistics Branch. The Medical Certificate of Causes of Stillbirth or of Foetal Death are forwarded direct to the Branch by the Registrar-General where they are matched up with the birth cards for all stillbirths which are also forwarded to the Branch. Commencing in 1965 a Medical Certificate of Causes of Perinatal Death will replace the present stillbirth certificate and will also be used for the certification of all liveborn infants dying within one week. This change will result in more meaningful underlying cause statistics which will be helpful in indicating where preventive measures could be applied.

(b) Each maternity hospital (ninety-nine per cent. of New Zealand births take place in a public or a private hospital) furnishes a monthly summary return, enumerating abortions and abnormal confinements which took place there, as well as sickness and congenital deformities in the babies born. This return is forwarded through the local Medical Officer of Health to Head Office where national figures and rates are compiled for the various types of hospital.

(c) A very detailed obstetric form is completed for each patient entering the largest of New Zealand's maternity hospitals. This return covers all complications of pregnancy, labour, delivery and the puerperium, as well as health details of the baby.

3.2 The use made of birth, obstetric and perinatal material

National birth and perinatal data are utilized primarily by the Maternal and Child Health Division of the Department through the local medical officers of health. There are other agencies, such as the Plunket Society, which employ this information for educational purposes.

Immmaturity plays a leading role in perinatal wastage which is forcefully indicated by tables taken out at intervals correlating birth weights with the outcome of pregnancy and the chances of dying; there is great value also in the issue of immaturity rates for different localities.
The combining of data from birth and death sources together with an extension into a sample of household surveys has shown up a group of high-risk mothers. These findings have pointed to the need for effort to be directed towards the education and supervision of this group, an undue proportion of which are Maori mothers—of high ages, high parity and living in substandard environment.

The individual hospital collection has as its aim the disclosure of significant medical factors behind perinatal loss. From this study presumably more intensive research results which can lead to a review of technical procedures.

4. GENERAL HOSPITAL MATERIAL

The collection of hospital statistics in New Zealand commenced exactly ninety years ago in the year 1873.

Hospital care in New Zealand is provided by two types of hospital—public hospitals and private hospitals. The former are largely autonomous but are financed through government funds administered by the Department of Health. Private hospitals are privately owned and administered. Public hospitals deal with about eighty per cent of all in-patient cases treated in general hospitals throughout the country.

4.1 The source of general hospital material

Currently a written punch card is forwarded to the Medical Statistics Branch for each patient discharged or dying in a public hospital containing such details as age, sex, race, occupation, place of residence, period of stay, diseases treated, operations, place and mode of accident. Private hospitals are not covered by the collection scheme.

One morbidity census of hospital in-patients both public and private has been carried out and this will be repeated at intervals of five years.

From time to time special ad hoc studies in depth are carried out linked to the routine hospital collection.

4.2 The use made of general hospital material

The practical uses made of public hospital material are manifold but will be set out briefly under the following headings which must necessarily overlap in some respects:

4.2.1 Administrative uses

As in other countries, hospital treatment is expensive and it is desirable that the length of stay in hospital should be kept to a minimum, consistent with the welfare of the patient. The data for each hospital are compared in twenty-nine selected disease groups by
means of a calculated "Bed-time Index". This index provides some measure of the efficiency of a hospital in terms of length of stay. It is found that the variations in the index between hospitals is quite striking for some diseases.

Proposals submitted by hospital boards to the Department of Health for capital expenditure are examined against a background of the use which would be made of the facilities as revealed by the numbers of expected cases and the future demands. Examples of this have been in connection with the installation of super-voltage equipment and the location of specialist neurosurgical, cardio-thoracic and neurosurgical units, as well as centres for the treatment of spinal injury.

As an addition to the national statistical unit an Operational Research Unit has been set up which works in close co-operation with the Medical Statistics Branch. This unit has defined objectives of its own such as to enable hospitals to be built more scientifically, to ensure that the best use is made of hospital resources and beds, and to get the utmost value out of skilled nursing staff. National or locally compiled statistics have limited uses for the purposes of this unit and the Operational Research Unit commonly makes ad hoc studies.

4.2.2 Epidemiological and research uses

In addition to the full statistical tables of hospital in-patients published in the Annual Medical Statistics Report - Part 2 Morbidity, a detailed statistical report is fed back. This shows by each disease title in the International Classification of Diseases the total days stay and the numbers discharged and dying in that hospital. It is known that the figures contained in these reports are discussed at board meetings and at clinical meetings of hospital staff.

Around the time of a population census each medical officer of health is supplied with hospital data in respect of the total in-patient treatment for a short list of a hundred disease groups, with first admissions separated from re-admissions. A considerable amount of knowledge as to the incidence and prevalence of sickness in an area can be obtained from these tables.

The incidence of many forms of sickness is very much higher in the Maori race and as a result a disproportionate number of Maori patients enter hospital. At census years special racial tabulations are taken out for certain areas which will be useful to those estimating the future load on hospitals arising out of the more rapid growth of the Maori population. One advantage of a combined written-punch card is that these form an index, covering many years, to particular conditions so that the hospital notes for most, if not all, of the cases occurring in the country are available to research clinician. This method of investigation has been used for enquiries into many serious diseases of obscure aetiology. Small "registers" are maintained by the Branch for certain conditions, such as hydatid disease, which permit of a continuous study of the treatments and progress in chronic or recurrent diseases.
Very extensive use is made of hospital material of admissions for accident, especially by departmental health education officers. In each case the injury, the cause of the accident and the place of occurrence of the accident are recorded. Many enquiries for this information also come from other government departments as well as the many societies concerned with accident prevention on the road, in the home and in the factory. In addition to this, the New Zealand Standards Institute and the Consumer Institute are supplied with information on request about injuries received while appliances such as electric radiators, washing machines and power tools were being used, or in respect of clothing material which presents a fire hazard.

5. MENTAL HOSPITAL MATERIAL

Largely by reason of the fact that all New Zealand's mental hospitals (except one) are department-owned, our in-patient mental health statistics are very comprehensive. Our statistical recording is very extensive for a national collection, and in the inclusion of items covering types of treatment, the response to treatment, and the identification of aetiological agents, known or hypothesised, we have advanced further than have most other countries.

5.1 The source of mental hospital material

A statistical return is furnished to the Medical Statistics Branch in respect of each patient who either enters a mental hospital by way of first admission, re-admission, return from leave and transfer-in, or who leaves a mental hospital by way of outright discharge, trial leave, death, transfer-out or unauthorised leave.

At five-yearly intervals a census of mental hospital inmates is carried out to augment the information in respect of those patients who have been recorded through movement.

5.2 The use made of mental hospital material

The liaison between the Mental Health Division and the Medical Statistics Branch is extremely close. Truly it can be said that mental health statistics have become an administrative tool in the making of any change in legislation, in deciding building programmes, in defining needs and in the provision of equipment, facilities and ancillary services. This function is carried out in one direction by coding the place in which each patient normally resides and the preparation of tables showing first admissions by diagnostic groups in each of thirty-seven regions. This information in association with regional population projections is used in planning the future needs in both hospital building and specialist services. Another example is in respect of outright discharges and discharges on trial leave. Both forms of release have their advocates but as outright discharge usually implies long stay in hospital, different release patterns are of considerable interest in any study of the utilization of hospital beds. Information about the average stay in hospital and on leave for both types of leaver is prepared and presented to the annual conference of medical superintendents. This information is examined with a view to finding the optimum length of stay.
A study is under way which will provide the pattern of those released and those who are re-admitted.

A comprehensive annual report is published giving figures by medical classification in different categories of patient movement, both national and for each institution separately. Cross tabulations illustrate condition on discharge, average stay for selected diagnoses. Historical summaries depict the far reaching changes over the last thirty years in the rate, purpose and service of mental hospitals. Tables covering psychiatric patients in general hospitals are included. This report might be expected to provide both administrators and psychiatrists concerned with epidemiology, with all the information which would be required but notwithstanding there are around twenty requests each year which require further reference to the punched cards.

6. CANCER MORBIDITY MATERIAL

6.1 The source of cancer morbidity material

Established in the Medical Statistics Branch is a National Cancer Register. Special data are recorded for cancer in respect of each cancer case diagnosed at a public hospital or seen at a cancer clinic operated by the New Zealand Cancer Society. A small number of privately treated cases are registered.

6.2 The use made of cancer morbidity material

The treatment of cancer is a problem of considerable size which naturally is of vital concern to the Public Health Division of the Department. At the same time the Cancer Society is recognised as the senior consulting authority in this country and through the executive and its members is the prime direct user of the statistical information. This information covers for each site other than skin cancers, national incidence, treatment and survival by stage, reasons for non-treatment and delay in reporting symptoms. These figures when analysed provide a measure of the effectiveness of cancer detection campaigns and the success or otherwise of publicity directed towards persuading people to seek early advice. The index to cancer cases is being used to carry out detailed epidemiological investigations into sites such as lung, cervix and breast, and also leukaemia.

At intervals of five years a full report is issued with comparisons in incidence and survival with the figures of many overseas registries. A report in less detail is issued at yearly intervals containing district data, which will be of use to the field officers of the Cancer Society and also to health education officers of the Department in anti-cancer campaigns.

A detailed medical report of diseases and abnormalities, both malignant and non-malignant, found in each person examined during cancer detection campaigns, or attending at special centres established for this type of medical examination, is being statistically processed by the Branch.
7. **CHILD HEALTH MATERIAL**

A new policy has recently been implemented whereby children in New Zealand schools are examined only where the parents desire it or when the teacher thinks it is necessary. It is felt that the former routine examinations are unnecessary and that the teachers themselves are competent to give indications of a child's deviation from normal health. A new statistical assessment programme is being designed to check on the effectiveness of the change.

7.1 **The source of child health material**

A combined written-punch card which is self-coding into major categories will continue to be made out for each child examined and found to have a defect. A stratified sample of children will be selected for routine examination, and a questionnaire will be filled in by the parents to elicit the medical history of the child, with particular reference to past illnesses, consultations with doctors and periods of hospitalisation.

7.2 **The use made of the material**

The analysis of the defects will continue to provide an indication of the standard of health of the children, as well as being a pointer to where preventive or health education efforts directed towards the improvement in health of schoolchildren could be best applied.

The sample survey is designed to show whether the new child health policy is successful.

Additionally it will provide a measure as to whether adequate use is made of the medical services available in the country. The general home environment and the background health history of the child will be correlated with the defects of one sort or another.

8. **SPECIAL STATISTICAL STUDIES AND AD HOC SURVEYS**

To be fully effective in rendering a service to all Divisions of the Department of Health, as well as aiding units and people outside the Department who are engaged in some form of statistical activity, the annual programme of the Branch must be a flexible one. The Branch does occasionally initiate studies involving field work (compressed air work on the Auckland Harbour Bridge is an example), but its main contribution in the special study line is the assembly of material obtained in regular national collections of mortality and morbidity data so that special health problems are brought out into the spotlight. Examples of these studies are Maori-European mortality differences, domestic accidents in hospital admissions, infant and foetal loss, and lung cancer in New Zealand. The role of the Branch when assisting with studies initiated and directed by divisional directors varies considerably, but in general it includes sample selection, the format of the questionnaire and then the carrying out of the classifying,
punching and tabulating processes. It will also most certainly be expected to assist with the interpretation of the results as well as their presentation in the Special Report Series of the Department. This form of help is not confined to departmental officers and, with the approval of the Director-General, the same assistance is provided to promote health or health-connected studies carried out by research units and clinicians or by other government departments.

Representative studies published or to be published in the Special Report Series include:

<table>
<thead>
<tr>
<th>Study</th>
<th>Initiated by</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.N.T. Diseases in Maori Children</td>
<td>Services for the Deaf Committee, New Zealand Board of Health</td>
</tr>
<tr>
<td>Health of Tokelau Islanders</td>
<td>Department of Island Territories</td>
</tr>
<tr>
<td>Nature of First Aid Services in Industry</td>
<td>Department of Labour</td>
</tr>
<tr>
<td>Elderly Persons Accommodation Needs</td>
<td>Minister of Health</td>
</tr>
<tr>
<td>The Health of the Maori in Rural Communities</td>
<td>Medical Unit, Wellington Hospital</td>
</tr>
<tr>
<td>Growing Pains</td>
<td>Physical Medicine Division</td>
</tr>
<tr>
<td>Smoking Habits of New Zealand Doctors</td>
<td>Health Education Division</td>
</tr>
<tr>
<td>Trends in Notifiable Diseases</td>
<td>Public Health Division</td>
</tr>
</tbody>
</table>

9. SUMMARY

The organisation, functions and responsibilities of the Medical Statistics Branch in the New Zealand Department of Health are described briefly, with emphasis on the sources of the data collected and the uses made of these data to meet the specific needs of the administrators of the Department, as well as those of a number of agencies and people outside of the Department.

The Branch maintains continuous collections of death, hospital and other morbidity material which are used as indices of the levels in health of the community. The manner in which data are supplied to the public health administrators, both at central headquarters and in districts, is described with some comment on the value of such data.
Discontinuous collections of data are maintained. While these collections are usually initiated by medical officers of the Department, such are occasionally sponsored by societies, organizations or people outside the Department who are concerned with public health or engaged in clinical medicine. Technical, machine and editorial assistance only are provided to a number of people who are engaged in some form of statistical research into particular diseases or aspects of diseases. The aim in this respect is to introduce a considerable degree of flexibility into the health statistical service to cover new fields and to meet temporary needs for information.