

WAIKATO CENTRE FOR APPLIED STATISTICS by Ray Littler

On Wednesday, 4 February 1987 a formal agreement establishing the Waikato Centre for Applied Statistics was signed by the University Vice-Chancellor and MAF's Agricultural Research Division Regional Director. The Centre has been set up initially for a two year trial period with the participating institutions sharing the cost of the salary of the Director, Ray Littler. Membership includes 9 Ruakura biometricians and about 10 University staff with Mathematics Department statisticians supplemented by staff with statistical interests from Biological Sciences, Earth Science, Economics, Management Studies and Psychology.

The Centre embodies an agreement between the two institutions to cooperate to "foster the development and effective use of statistical methods in research". The tangible fruits of this cooperation should be seen in a number of projects of an educational, research or consultancy nature.

Graduate Course in Consultancy

We will offer a course in which senior students gain practical experience by "apprenticeship" to Ruakura biometricians. There will also be Ruakura contributions to other statistical courses to inject some of the flavour of statistical practice.

University Consulting Service

The Centre Director will coordinate statistical consulting in the University. The recognition that at least part of a position should be devoted to statistical collaboration in university research is a small breakthrough for us. Activities such as workshops on statistical packages and techniques will be offered to both University and Ruakura staff.

Professional Development for Ruakura Statisticians

We biometricians anticipate that involvement with student supervision, joint seminars and so on will help us keep abreast of theoretical developments. We also hope that the venture will make it easier to attract visitors to stretch our minds. We claim that access to Ruakura's rolling hectares of data and problems will prove an irresistible attractant.

Consultancy Business

The pursuit of consulting work has begun with manufacturing and processing industries, agricultural R & D and environmental monitoring emerging as probable target areas. We are excited about the chance to make a contribution to new application areas, a little taken aback by the urgency of commercial consultancy, and keen to control income-motivated work so that a reasonable proportion of our time remains concentrated on our primary responsibilities in agricultural research, statistical research, teaching and so on.

PRIVATE HOSPITALS NOT PROVEN CHEAPER

We run a media release that some of the major dailies were either too frightened of or too preoccupied with Winston, Rod, Max, Koro and Rocky, to carry:

The recent study by BERL, of the relative efficiency of public and private hospitals sponsored by the Southern Cross Medical Society, reached conclusions that were not soundly supported by the statistical analysis by BERL of the available data.

This view was expressed by the President of the New Zealand Statistical Association, Dr P. Thomson, in presenting a criticism of the quality of the study, by the association's Survey Appraisals and Public Questions Committee.

One conclusion of the Southern Cross study not supported by the evidence, was that the cost advantages of private hospitals indicated by their analysis arose "primarily from managerial differences".

Although the Southern Cross study mentioned many critical problems with their analysis, it provided no estimates of their effects, and ignored them in the final analysis and conclusion. An alternative study by the Otago Hospital Board has shown that by taking into account a single factor, the use of out patient facilities, the savings in using private hospitals, estimated by the Southern Cross study at 40 percent, fell to 23 percent. Use of outpatient facilities is only one of the factors not evaluated in the Southern Cross study.

Other critical factors not adequately taken into account in the Southern Cross study included:

1. The effect of having more aged patients who, on the average, cost more and have a longer length of stay in public hospitals;
2. An indication of the severity of the illness, or complications of the patients. Many people with debilitating or complicating conditions (epileptics, diabetics), will not qualify for insurance, and hence may not afford private hospital stay;
3. The extent to which public hospital facilities are used for diagnostic or post operative care by private hospital patients;
4. The extent to which more complicated operations tend to be done in public hospitals because of better facilities in the event of complications;
5. The cost of providing teaching activities for nurses and doctors in public hospitals;
6. The cost of the operation of casualty services by public hospitals;
7. The cost of specialised diagnostic services, e.g. pathology and x-ray laboratories;
8. The cost of specialised treatment services such as intensive care units, special surgery units, radiotherapy, radiotherapy, etc.
9. The fact that drugs and chemicals provided in public

hospitals are included in their costs, while in private hospitals prescribed drugs are obtained free of charge from retail chemists by the social security vote.

The Survey Appraisals and Public Questions Committee found this lack of supporting data, which would allow proper appraisal of the cost effectiveness of public and private hospitals and would identify how length of stay and treatment costs were influenced by the factors listed above, to be a serious fault in the Southern Cross study. Without such data the committee found the conclusion of the report to be unacceptable by customary professional statistical standards.

The committee concluded that while the Southern Cross study may have stimulated public interest in the topic, it certainly does not have the statistically sound basis required of an authoritative review of the comparative cost of hospital activities in the public and private sector. It noted that an alternative assessment of the likely impact of several key issues not measured in the Southern Cross study had been made by Mr Pugh of the Otago Hospital Board.

SUBMISSION TO THE REVIEW OF HEALTH STATISTICS

Colin Cryer, a member of the association's executive committee, is also convenor of a study group/subcommittee examining charging for access to Public Data Bases. The following is a submission Colin prepared for the Review Committee on Health Statistics:

This submission is limited to the health statistics collected by the National Health Statistics Centre of the Department of Health. It encompasses the mortality, hospital discharge and cancer data systems.

The systems used by the National Health Statistics Centre (NHSC) to ascertain cases, coding and editing would appear to result in close to 100% case ascertainment, as well as valid data and data coding, as far as the data sources used will permit. They deserve praise for the rigorous manner in which they collect, code and check their data. However, their data is still limited by the quality of the original data sources.

1. SOURCES OF NHSC DATA

1.1 MORTALITY DATA

There are five principal source documents that may contribute to the data collected in the mortality data file. These are:

- Death Certificate
- Department of Justice's 'Guide Form'
- Coroner's Report
- Post Mortem Report
- Medical Certificate of Causes of Foetal and Neonatal Death

Wellington School of Medicine student projects which considered sources of New Zealand health data have indicated that Death Certificates are a source of problems due to basic problems such as illegible writing, inadequate documentation of cause of death and failure to complete the cause of death correctly, e.g. by providing the sequence of events in reverse order. In such cases, an attempt is made by NHSC staff to obtain further information from other sources. However, the degree to which this is successful is unclear. Death Certificates have also been found to be an inaccurate source of information in overseas studies (Cameron and McGoogan, *J Pathol* 133:273-83, 1981; Schottenfeld et al, *Bull, NY Acad. Med.* 58:778-794, 1982; *Lancet* Editorial 2(8236):22-3, 1981).

It is **recommended** that the limitations and problems of the Death Certificate be assessed and documented by NHSC together with the impact these problems have on the validity of the NHSC mortality data file. Methods of improving the quality of the information on the Death Certificate should be sought.

The Department of Justice 'Guide Form' is completed by the funeral director and is the major source of demographic data on the deceased. This includes data on the ethnic origin of the deceased. A medical student project to investigate ethnic classification in New Zealand (Department of Community Health, Wellington, 1980) identified some major problems with the 'Guide Form' as a source of data on ethnic origin. A proportion of these forms are not completed correctly. Due to the sensitivity of asking questions on ethnic origin, some funeral directors do not ask the relevant questions. Instead, some leave the questions blank, some guess the ethnic origin, some give the form to relatives of the deceased if the deceased 'looks Maori'. Obviously this is a major source of problems. Considering the politically sensitive nature of the data on ethnic origin, the extent of the problem of ethnic classification should be documented.

It is **recommended** that the validity of the data on ethnic origin on the mortality data file be investigated by the NHSC in conjunction with the Department of Statistics, that the level of the current inaccuracies be estimated and, if found to be inaccurate, means of improving the situation be sought.

1.2 HOSPITAL DISCHARGE DATA

The primary sources of data for this system are patient admission and discharge forms. The admission forms are typically completed by the admissions clerk whereas the discharge form is usually completed by a house surgeon and occasionally the consultant. These discharge data are the primary source for coding the patient diagnosis. 'Hearsay' evidence from hospital doctors suggests that the quality of some of the data from which diagnosis is coded is suspect, although we have available no documented evidence to support this.

Consequently, it is **recommended** that the quality and validity of the diagnoses obtained from hospital sources be investigated and the rates of misclassification for a range of patient types be estimated.

1.2 CANCER REGISTER

One deficiency with the Cancer Register data, recently highlighted by a study of stomach cancer (O'Connor, personal communication), is that some cases that are recorded by the cancer register as still alive have in fact died. On a small study this was estimated to be at a level of 3%. Although this is small (and the true value could be even smaller) it is still extremely important when using the register to estimate life expectancy for cancer patients since surviving patients have a large influence in such estimates. The Cancer Register is updated from the sources used by the Mortality Data section of the NHSC. There appear to be some problems with this updating procedure.

It is **recommended** that the extent to which the problem of inaccurate information on the survival of cancer patients exists be investigated by NHSC and, if necessary, that the system of updating the Cancer Register be reviewed.

1.4 GENERAL

From the above statements, it can be seen that although the National Health Statistics Centre generally succeed in producing data bases which reflect their primary data sources, those sources themselves are likely to result in inaccuracies in the NHSC data files. It