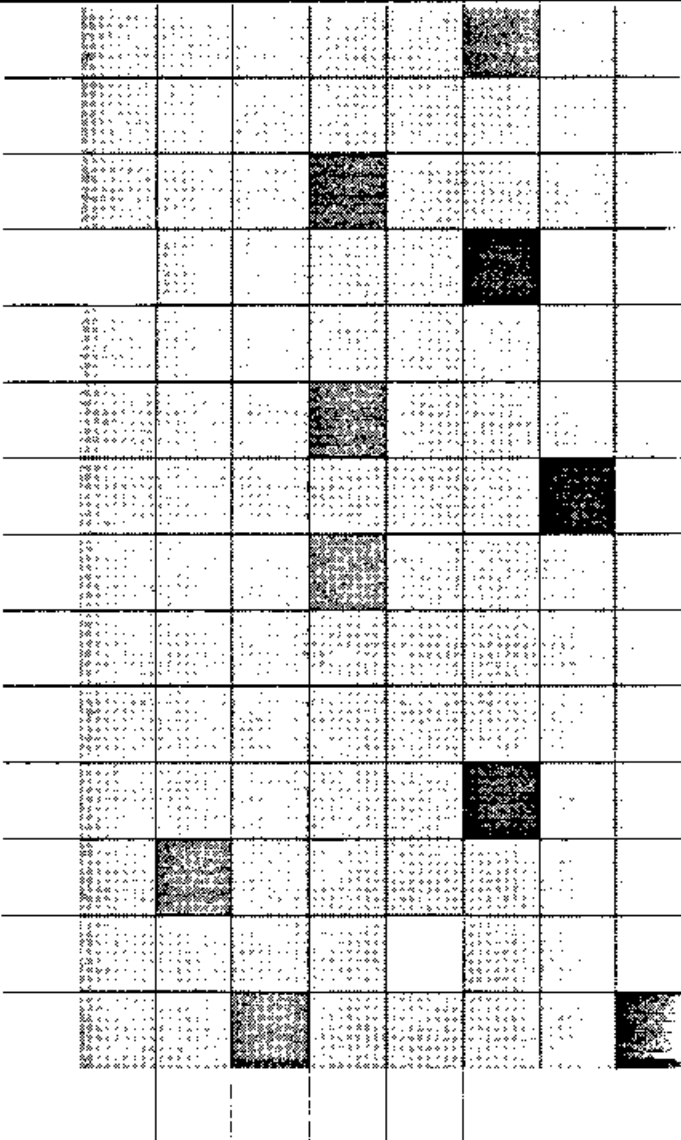


**AN INTRODUCTION TO CASEMIX
AND THE NATIONAL
COSTING STUDY**



Information Circular No. 20



EPIDEMIOLOGY AND HEALTH INFORMATION BRANCH

INTRODUCTION

Comprehensive information on the casemix and cost of a national sample of public and private hospitals with more than 50 beds was compiled for 1991/92 during the National Costing Study. This study, undertaken by KPMG Peat Marwick, was designed to analyse the cost behaviours of Australian hospitals. Data for the period 1 July - 31 December 1991 is now available from the study.

This Information Circular is the first in a series which will present the results of the National Costing Study. It provides background to the development and implementation of Casemix in Queensland and Australia, and includes summary data from the study.

CASEMIX DEFINED

Casemix is a system which groups patients into clinically meaningful and resource homogeneous groups to describe the output of a hospital. Such systems can be used to help match a hospital's use of resources with its output. Casemix measures have been used for various hospital 'products' including acute inpatients, ambulatory patients and long term non-acute inpatients. Diagnosis Related Groups (DRGs) are the best known casemix classification system. Thus casemix is a methodology for classifying patient care episodes and using them to better manage health care.

COMMONWEALTH DIRECTION

In 1987 the Commonwealth Department of Health began funding the development of Casemix in Australia. Since late 1991, this Casemix implementation initiative has been restated from time to time as meaning that by July 1, 1993, the infrastructure will be in place which will allow all applicable hospitals in Australia to provide costed Casemix information in accordance with classification systems and standards developed for Australian health.

This initiative flowed from a joint Commonwealth/State agreement in 1991 that the 'development of Casemix' in Australia should be accelerated. Since that time, it has been variously interpreted as meaning that Casemix would in some way be linked to payment of hospitals.

The original implementation initiative has now been overtaken by the new Medicare Agreement in which the Commonwealth and the States have agreed to use Casemix as the currency of inter-state hospitalisation commerce, and as the basis for distributing funds from the Improved Public Access Pool (Part B Pool).

USES OF CASEMIX

The most prevalent use of casemix is to analyse the clinical and financial behaviour of hospitals in their provision of acute care, and to use this understanding in the management process. This is a significant challenge: problems of resource allocation, cost control, quality assurance, outcome measurement and inter-institutional comparisons have always existed and need to be addressed with or without casemix. Casemix makes this challenge achievable.

One of the simpler ways to apply casemix information to the management process is through the use of comparisons - one hospital with another, one hospital with a group of hospitals, one clinical unit with another clinical unit. Casemix provides a tool which allows for valid comparisons between hospitals. In mathematical terms, one cause of variation must be controlled in order to understand the other. Variations between patients can be controlled by using casemix classifications. They permit homogeneous groups of patients to be compared, so that the remaining differences can be seen to be caused by differences in providing care.

Casemix is also commonly used to review clinical practice, for facilities and services planning, for workforce planning, and for internal management of hospitals.

'AUSTRALIANISATION' OF CASEMIX

The majority of DRG casemix development has occurred in the United States. As a result, many of the tools used in early Casemix work in Australia were reliant upon American classification systems, costing software and even the relative weights which were used to apportion hospital costs among the various DRGs.

In July 1992, the Commonwealth released the first uniquely Australian acute inpatient classification system called AN-DRGs. These DRGs were the result of the analysis by the various Colleges and professional organisations of acute inpatient care in Australian hospitals, and represented a more accurate reflection of clinical practice in Australia. This classification system was computerised by the 3M Corporation and is now made available in AN-Grouper v.1 and AN-Grouper v.2.

Even with availability of Australian DRGs and an Australian Grouper, there remained the problem of the relative weights which are used to distribute acute inpatient costs over these new DRGs (see attached technical notes on defining costweights) . Most hospitals in the United States are required to maintain their own unique DRG weights (or their equivalent). However, the State of Maryland obtained an exemption from this requirements in the early 1980s by developing a set of service weights which would be used by each hospital in the State in lieu of individual hospital weights. It is these Maryland weights which had been used in Australia for all DRG developmental work.

In order to calculate Australian cost service weights, two activities were pursued:

- * the Maryland database of service weight information was 'regrouped' according to the Australian DRGs;
- * the Commonwealth tendered for a cost weight study to be conducted which would analyse the cost behaviour of Australian hospitals when their patient population was grouped according to the new Australian DRG classification system.

This second initiative gave rise to the National Costing Study.

THE STUDY

The tender for the National Costing Study was awarded to KPMG Peat Marwick, Health Division, Adelaide Office. KPMG designed a study in consultation with the Commonwealth, all States and Territories, private hospital associations, insurers and representatives from various professional organisations.

The Study design exhibited the following key characteristics:

- * It was prospective in nature.
- * It was based upon a predetermined set of definitions and principles. Where uniform definitions were not able to be used (i.e. in some of the areas of patient definitions), complete disclosure of the definitions used and their impact were developed.
- * The hospitals selected for the study were chosen based on a scientific sampling of the population of over 50 bed hospitals in Australia.
- * To the extent possible, it resolved the timing issues which arise from the lack of accrual accounting in most Australian public hospitals.

The study design and the rules under which it was to operate were incorporated into a Cost Weight Study Manual which, along with instructions, was distributed to participating hospitals by a member of the KPMG study team prior to the commencement of the study.

The selection of hospitals was co-ordinated by the University of South Australia, and the final sample included 100 hospitals as follows:

State	Public	Private
NSW	22	8
VIC	17	6
QLD	12	5
SA	7	3
WA	7	3
TAS	2	2
ACT	2	1
NT	2	1
TOTAL AUST	71	29

This sample was designed to include:

- 3 Paediatric hospitals
- 3 Women's hospitals with Neonatal Intensive Care units
- 6 Nationally funded centres
- 3 Hospitals with clinical costing systems activated

QUEENSLAND PARTICIPATION IN THE STUDY

Queensland viewed participation in the study as an opportunity to accelerate Casemix implementation in public hospitals and the proliferation of the infrastructure required to operate in a Casemix environment. In total 12 Public and 5 Private hospitals in Queensland were officially chosen for the study.

The public hospitals chosen represent only 7 of the State's Regions. In order to expand the base of hospitals participating in the study, and allow for creation of a broader community of expertise, Regional Directors were encouraged to include other hospitals in their region to participate in the study on a parallel basis. Parallel study hospitals would perform the same tasks as the official study hospitals, and receive the same financial, personnel and technological support from Central Office as did the official study hospitals.

As a result, the final tally of official participants and parallel participants were as follows:

OFFICIAL PARTICIPANTS IN THE STUDY

Public

Ayr
Bundaberg Base
Cairns Base
Gold Coast
Logan
Mater Adult
Nambour
Prince Charles
Princess Alexandra
Redcliffe
Royal Brisbane
Royal Women's

Private

Holy Spirit Private
Mater Misericordia
St Andrew's Private
St Vincent's Hospital
Wesley Hospital

PARALLEL PARTICIPANTS

Atherton
Townsville
Mackay
Rockhampton
Longreach
Roma
Maryborough
Toowoomba
Dalby
Warwick
Stanthorpe
Goondiwindi
Repatriation Greenslopes
Gympie
Ipswich

These hospitals account for almost 80% of separations for Queensland public hospitals.

THE RESULTS

The official study has now been completed, and the results for the first six months have been released on a selective basis.

The data base in which the results are stored represents the richest source of information about the financial behaviour of Australian hospitals ever assembled. The information includes 750,000 inpatient separations and accounts for over \$3 billion in hospital expenditures. It is possible to obtain information at gross levels (e.g. the average cost of an acute inpatient stay in an Australian hospital is \$2,700) or at an extremely detailed level (e.g. the average cost of drugs used by Study Hospital XYZ during hospitalisation for a normal newborn delivery was \$37.52).

The results published to date provide the individual study hospitals with the detailed results of their operations in casemix costed terms, and the aggregated results for all the study hospitals in their State. Tables are also available which compare the results for metropolitan, non-metropolitan, teaching and non-teaching hospitals.

USING THE RESULTS

The results provide average cost components for each DRG, based upon the hospitals which participated in the study. Using DRG 675 - Normal Vaginal Delivery without Complications as an example, the results of the study include:

Cost Component	QLD	Lowest	Average	Highest
Normal Delivery	\$1,668	\$1668	\$2,055	\$2,300 (ACT)
Nursing Cost	\$766	\$766	\$810	\$989 (VIC)
Medical Cost	\$116	\$116	\$207	\$464 (ACT)
Diagnostic Tests	\$17	\$17	\$26	\$49 (SA)
Surgery/ICU	\$98	\$98	\$152	\$208 (NSW)
Drugs/Other	\$155	\$155	\$227	\$381 (WA)
Overheads	\$516	\$516	\$634	\$715 (ACT)
Av. Length of Stay	4.06	3.81	4.14	4.60 (VIC)

The cost components which make up the total costs of each DRG are defined more narrowly than those shown above; for example, Diagnostic Tests comprise Imaging and Pathology; Surgery/ICU comprises Surgery, Critical Care, and Medical/Surgical Supplies; etc. On a hospital by hospital basis, the division is even finer, with Imaging separated into X-Ray, CT Scanning and Ultra Sound, and so on.

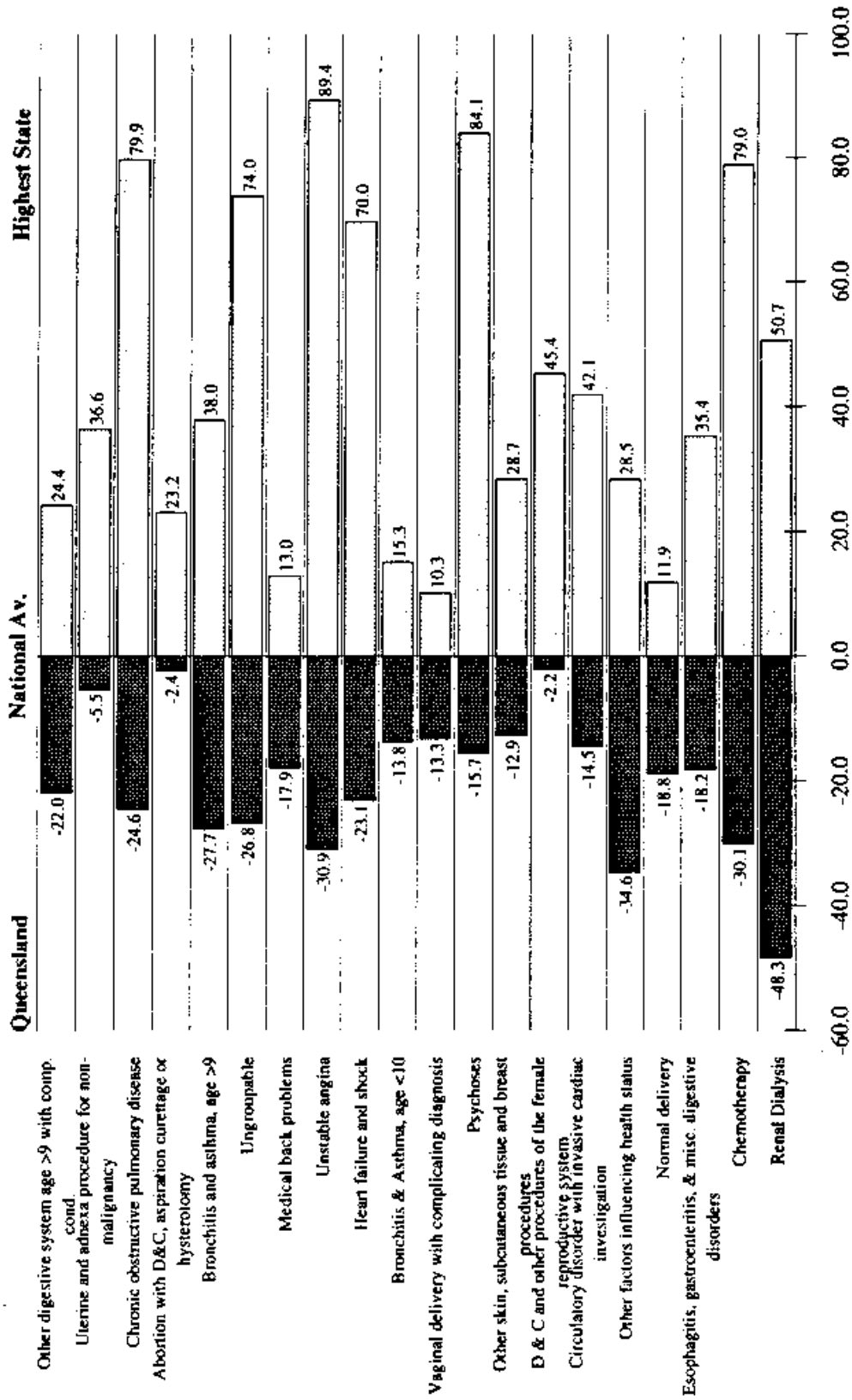
The above results show that, for this DRG, Queensland has the lowest cost overall, and the lowest cost on a component by component basis. This is not unusual across all DRGs. Queensland Health and KPMG have begun preliminary investigations to isolate the specific causes for this trend.

The following table and graph show summary level data from the study for the twenty most frequently occurring DRGs.

TABLE 1 KPMG NATIONAL COSTING STUDY - TOP 20 NATIONAL DRGS BY VOLUME

DRG	TITLE	NUMBER SEPS QLD	AVERAGE COST (\$)		HIGHEST COST (\$)	LOWEST COST (\$)
			Queensland	National		
565	Renal Dialysis	14108	293.84	568.64	857.10 (SA)	293.84 (QLD)
780	Chemotherapy	4140	730.54	1045.85	1871.77 (ACT)	730.54 (QLD)
330	Esophagitis,gastroenteritis, & misc. digestive orders	5221	749.36	915.92	1240.39 (ACT)	749.36 (QLD)
675	Normal delivery	4280	1668.23	2055.51	2299.56 (ACT)	1668.23 (QLD)
934	Other factors influencing health status	1837	928.29	1419.72	1824.71 (NSW)	928.29 (QLD)
250	Circulatory disorder with invasive cardiac investigation	1510	1872.73	2189.97	3111.37 (VIC)	1830.10 (WA)
646	D & C and other procedures of the female reproductive system	2848	1322.28	1351.98	1966.40 (WA)	1180.51 (NSW)
484	Other skin, subcutaneous tissue & breast procedures	2310	1114.41	1278.77	1645.52 (SA)	1114.41 (QLD)
836	Psychosis	2090	3480.80	4128.35	7599.45 (ACT)	1671.94 (WA)
674	Vaginal delivery with complicating diagnosis	1147	2206.64	2544.93	2807.63 (ACT)	2206.64 (QLD)
186	Bronchitis & Asthma, age <10	584	1061.85	1231.92	1419.88 (WA)	1061.85 (QLD)
252	Heart failure & shock	1346	2472.78	3150.99	5356.64 (ACT)	2472.78 (QLD)
270	Unstable angina	1562	1353.63	1959.80	3712.18 (ACT)	1353.63 (QLD)
432	Medical back problems	1293	1866.36	2271.90	2567.19 (NSW)	1866.36 (QLD)
952	Ungroupable	2308	1952.65	2666.82	4640.19 (SA)	1952.65 (QLD)
185	Bronchitis & asthma, age >9	1293	1151.81	1593.73	2199.19 (ACT)	1151.81 (QLD)
683	Abortion with D & C , aspiration curettage or hysterotomy	893	1148.63	1176.92	1450.37 (WA)	999.33 (NSW)
177	Chronic obstructive pulmonary disease	1222	2214.58	2936.27	5281.17 (ACT)	2214.58 (QLD)
645	Uterine and adnexa procedure for non-malignancy	1511	2470.98	2613.67	3569.86 (ACT)	2221.04 (WA)
333	Other digestive system age >9 with comp condition	1142	636.06	815.21	1014.21 (ACT)	636.06 (QLD)

**PERCENTAGE VARIATION IN COST FROM THE
NATIONAL AVERAGE FOR THE TOP 20 DRGS, JANUARY 1991 - JUNE 1991**



Attachment 1. Technical Notes on Defining National Cost Weights

In order to allocate the costs of an inpatient service (e.g. Radiology) across the various DRGs using that service, it is necessary to use a weight for that service, relative to the DRG, adjusted by a volume measure of the number of patients in that DRG. The National Cost Weights used in the KPMG study to allocate the costs of the various hospital services among the DRGs is a mixture of cost weight data base of the Maryland Rate Review Commission, and information obtained from Australian hospitals.

In the area of Nursing Service Weights, the results were heavily influenced by Australian information obtained from two Australian studies - one conducted by the South Australian Health Commission, and the other by a New South Wales nursing consortium.

All of the service weights were subjected to a clinical review during which clinicians were provided with the opportunity to identify those AN-DRGs where clinical practice was so different between Australia and the USA that the empirically derived (from Maryland) service weights were not appropriate. Six service weight review panels were formed to review the initial service weights in the areas of Pathology, Imaging, Critical Care, Allied Health and Pharmacy.

Each of the service weight panels were provided with details of the Maryland database, a profile of each AN-DRG showing the number of cases, average length of stay, proportion of same day patients, etc. and the frequency of occurrence of principal and secondary diagnoses and principal procedure of the patients in each DRG. The AN-DRGs were then grouped into bands with similar service weights; e.g. Band 1 would contain AN-DRGs with service weights ranging between 0-20% of the average, Band 2 between 21-40%, Band 3 between 41-60% and so on. Clinicians examined every DRG within each band and considered whether or not it fit with the others in terms of expected use of the service under review. If it did not fit, the clinicians were asked to identify the band to which in their judgement it more appropriately belonged. During this process about 10% of the AN-DRGs changed bands, with roughly the same number moving up bands as moved down.

Variations on this method were applied to the various services as were deemed appropriate.

Gaps in the application of this methodology have given rise to anomalies in the cost allocation process of certain services to certain DRGs. For example, in the absence of more accurate information, certain Medical and Surgical Supply costs were allocated to DRGs based upon occupied bed days. This has resulted in some very obvious anomalies in the results. For example, certain expensive prostheses and pace-maker equipment have been included in a total pool of Medical and Surgical Supplies and allocated on a broad statistical basis, with the result that the final costs of Hip Replacement, for example, are understated.

These anomalies will be addressed in the next round of service cost weight development.

REFERENCES FOR FURTHER READING:

NATIONAL COSTING STUDY: Production of Cost Weights for AN-DRGs Version One, Summary Report, KPMG Peat Marwick, August 1993

NATIONAL DRG COST WEIGHTS PROJECT STUDY: Hospital Reference Manual, KPMG Peat Marwick, August 1992

HEALTH CARE FOR ALL AUSTRALIANS: 1992-93 Reforms, Budget Related Paper No. 8, Commonwealth Department of Health Housing and Community Services.

QUEENSLAND COMMONWEALTH MEDICARE AGREEMENT: JULY 1993 - JUNE 1998, February 1993