CENTRE FOR HEALTH PROGRAM EVALUATION

TECHNICAL REPORT 4

1994 Victorian Cost Weights

A Study of Fifteen Hospitals' Patient-Level AN-DRG Costs

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Introduction

An accurate estimate of cost relativities between types of cases is essential to the fairness of any case payment system. Fairness, in turn, is fundamental to ensuring that the payment system does not create incentives to provide some forms of care at the expense of others, thus distorting access to the full range of hospital services which may be needed.

This study reports on the costs of care in 15 Victorian hospitals, and tests the validity and reliability of patient-level clinical costing data as the basis for setting relative payment weights. The study was funded by the Victorian Department of Health and Community Services (DHCS), and coordinated by Health Solutions Pty Ltd.

It builds on the research team's 1992/93 study of similar data in five Victorian hospitals which was used by the Victorian DHCS as the basis for cost weights in its 1993-94 funding formula for inpatient hospital services. In both studies, case types are classified using Version 1 of Australian National Diagnosis Related Groups (ANDRGs, herein referred to simply as `DRGs').

The study uses information on the costs of treating patients in fifteen study hospitals, comprising 156,496 patient separations in the five month period, 1 July to 30 November 1993. This represents 50.3% of Victorian separations in the same period.

The larger number of hospitals (and hence cases) provided by the 1993 sample reported here has resulted in more reliable weights on every criterion used for assessment. Between 82 and 86 percent of DRGs (representing up to 99% of all cases) have been assessed as being sufficiently reliable for payment purposes. Only five DRGs (in contrast to 20 in last year's sample) had no cost data available in the current sample.

Confidence in the measurement of costs has also been increased in the intervening year, with hospitals installing more computerised feeder systems, and developing greater sophistication in using clinical costing systems as a management tool. As a byproduct, these developments strengthen the validity of data used in the study to estimate cost weights.

This report provides a table of cost relativities recommended to the Department of Health and Community Services as the basis for ANDRG cost weights for 1994-95. It evaluates the reliability of the weights and reports on the effects of the Department's newly adopted trimming criteria on the proportions of cases classed as inliers. It reports on changes in costs and cost relativities between the two studies, and reviews the impact of changes, taking into account the number of cases affected, for each of the 24 Major Diagnostic Categories (MDCs).

Recommendations are made regarding future development of the weight-setting method adopted by the Department particularly in order to stabilise weights for DRGs with intrinsically small samples. The effect which trimming criteria based on Average Length of Stay (ALOS) have on variability of costs within DRG is also discussed, and the option of adopting cost-based trimming criteria suggested.

Background

In 1992/93, the Victorian Department of Health and Community Services sponsored a study of the use of clinical costing system data for use in setting resource weights for AN-DRGs. This is referred to here as the 1992/93 study, reflecting the fact that 1992 data was analysed for the final report published in 1993.

Weights calculated using data from five hospitals which had installed the Transition-1 costing software were used as the basis for the initial set of DHCS weights for case payment to Victorian hospitals, beginning 1 July 1993. A full report of this study can be found in *Resource Weights for ANDRGs Using Patient Level Clinical Costs: A study of Five Victorian Hospitals* (Melbourne: NHMRC National Centre for Health Program Evaluation, Technical Report 3), 1993.

For the 1993/94 study, Health Solutions Pty Ltd again coordinated the research team and organised data collection in the fifteen hospitals. Health Computing Services (HCS) Australia provided data extraction and verification support to the project. The NHMRC National Centre for Health Program Evaluation undertook the data analysis with statistical support from the University of Melbourne Department of Paediatrics' Clinical Epidemiology and Biostatistics Unit.

Cost Allocation Methodology

The Transition 1 Decision Support System (utilised by all but one hospital in the study group) provides management reporting data to hospital executives, clinicians and departmental management staff by using a combination of process and job order costing techniques.

The major steps involved include:

- identification of General Ledger (GL) cost centres into Direct and Indirect cost centres, the former being those cost centres which provide patient related goods and services, the latter being support or overhead departments such as Domestic and Personnel.

- all GL expenditure costs are classified and mapped into a range of seven (minimum) cost types as follows;

VL	-	*Variable Labour*
VS	-	*Variable Supplies*
VO	-	*Variable Other*
FDL	-	*Fixed Direct Labour*
FDF	-	*Fixed Direct Facilities*
FDE	-	*Fixed Direct Equipment*
FDO	-	*Fixed Direct Other*

In addition two more cost types are created to reflect the variable and fixed overhead costs received by the Direct Departments from the Indirect departments as part of the cost allocation process.

- payroll job codes are also classified into fixed and variable codes by the client hospital.

- each cost centre classified as Direct must identify its outputs as Intermediate Products (IP) and build standard costs for each IP identified, usually based on budgeted volumes and costs for the hospital.

The final result is that each direct cost centre has a set of standard costs for each Intermediate Product (or output) which are then charged to patients as `users' of the products (these products could be Biochemistry Tests, Radiology Procedures, Patient Dependency Scores etc).

- cost centres classified as Indirect are allocated to Direct Cost centres on a step down or simultaneous equation basis determined by the hospitals as most appropriate, usually simultaneous equation.

- the record of each patient's costs in the final analysis can be considered as a bill of materials and services based on actual usage of standard budgeted costs.

The PANACEA system utilised in only one hospital in the sample uses different terminology to Transition 1, but the methodology to produce costed inpatients is basically similar to that outlined above.

Cost Structures

The General Ledger and Payroll structures of Victorian public hospitals are very similar due to the development of a common DHCS supported Chart of Accounts. In addition hospitals utilise the HCS Australia payroll systems which maintain data in a standardised accrual format corresponding to the DHCS Chart of Accounts.

The clinical costing systems are all based on this accrual payroll data and its mapping to subsequent General Ledger cost centres. This means that the structures and type of costs contained within the General Ledger are very similar across the field.

Capital Costs

Capital costs are not generally contained within the costing data for the reason that most capital items are not usually brought to account until year's end, especially depreciation, employee entitlements, accruals and DHCS payments made on behalf of hospitals. For reasons of data timeliness and consistency with the appropriate AN-DRG coding system, the data utilised in the study relates to separations between July and the end of November, 1993. Consequently end of year adjustments are not included although several hospitals do include depreciation in their costs on a year to date pro-rata basis.

Medical Costs

All hospitals in the sample have either full-time salaried medical staff and/or sessional medical staff. These latter staff are remunerated on a sessional basis to treat public patients with private or chargeable patients being billed by the doctor privately. Most hospitals have taken the approach of only allocating sessional costs to public inpatients since private patients are

billed separately by the doctor. Several hospitals have however, for convenience allocated sessional costs to all inpatients. In general the basis of allocation of medical costs is length of stay per inpatient in each clinical unit as defined by the hospital.

Selection of Participating Hospitals

Hospitals were requested to provide data to the study provided, in a format of total costs per inpatient discharge (plus medical and prosthesis costs if available) which could later be rolled up into DRG level costs. Individual patient level cost data per discharge was required for the survey period (July to November 1993) from each participating hospital for reasons of:

- Consistency of approach to costing and ability of data to be integrated into the total data base, building from each case upwards to DRG level; and,

- Trimming requirements based on DHCS guidelines, and which can only be performed with individual case data.

For those reasons data could not be accepted from hospitals unless they could demonstrate that all inpatients discharged for the study period had been accounted for and **all** costs had been allocated to these inpatients in a manner analogous to those hospitals with formal patient level costing systems. In effect, this meant only those hospitals with the Transition 1 system and one other hospital utilising the PANACEA system.

Several hospitals in the process of implementing such systems could not be included either because implementation was not sufficiently advanced, or their data had not been adequately verified and thus was unacceptable to the study.

Table 1 below details the hospitals which participated in the study. Throughput data for each hospital from *Rainbow Hospital Indicators* for the 1992/93 financial year has been used to illustrate the comparative importance of these hospitals in terms of inpatient throughput in the Victorian public hospital system.

TABLE 1 Participating Hospitals *(Source Rainbow Indicators)*

Name	***DHCS Group***	***1992/93 Inpatients***	***1992/93 Beddays***
Alfred	A	37234	216250
Austin	A	35218	167805
Box Hill	A	19251	93173
Cancer Institute	A	9108	41422
Dandenong	A	21065	106101
Geelong	A	27653	131066
Mercy for Women	A	12142	63767
Monash Medical Centre	A	46330	226365
Mornington Peninsula	A	26066	111732
PANCH	A	19005	79047
Royal Children's	A	25203	86049
Royal Women's	A	28403	107702
St. Vincent's	A	29723	150331
Western	A	31727	150584
Ballarat Base	B	16164	65259
		384292	**1796653**

A = Large Specialist and General Teaching Hospitals.

B = Large Regional Base and Suburban Hospitals.

These hospitals together represent over 50% of all Victorian public inpatients treated and public beddays reported for the 1992/93 year. All major tertiary and specialty teaching hospitals are represented with the exception of The Royal Melbourne Hospital, Royal Victorian Eye and Ear Hospital, Fairfield Hospital and Royal Dental Hospital. Collectively the sample group represented just over 61.0% of the total gross operating costs for public hospitals in 1991/92 of $2.0 billion *(Appendix 3: Model of Casemix Funding 1991/92)*.

Status of Feeder Systems Data

A review of Table 2 indicates that no hospital has a complete range of department specific patient-based feeder systems operative at present. In general almost all sites have well developed Diagnostic, Pathology, Radiology and Theatre Systems providing comprehensive patient level data.

Medical costs are always allocated on the basis of patient length of stay (LOS) in clinical units, due to the lack of identifiable patient based services data for medical staff. Hospitals have however undertaken extensive studies to ensure that appropriate medical staff costs are aligned with the various inpatient clinical units and thus costed to all the patients treated within these units. All sites in the sample utilise sessional rather than Visiting Medical Officer (VMO) staffing arrangements, the latter rendering detailed accounts for all public patients treated, whereas sessional staff are paid for blocks of sessions usually of 4 hour duration. Therefore information on VMO-based medical costs will need to be determined from a separate study, since these costs are not represented in the current one.

Ward nursing costs are allocated to inpatients based on a ward specific patient level dependency system in almost half of the sites. In the others, ward based LOS is used to allocate costs to the inpatients in that ward. Most of these hospitals are implementing some form of patient level dependency or care plan systems to replace LOS in the near future.

Most sites use some form of LOS for allocation of Allied Health cost centres to patients due to a lack of feeder systems. Although this has historically been an under developed area of computerisation, attention is now being paid to developing better information systems in these areas.

Pharmacy is well computerised, however the prevalence of imprest systems in most public hospitals (while considered to be cost effective for service delivery) does not yield extensive computerised patient level data. Imprest costs (at around 50 - 70% of drug costs) are allocated on a LOS basis with individual scripts for inpatients and discharges tracked to individual inpatients making up the balance of inpatient costs. Some hospitals are taking steps to re-allocate imprest items issued from the patient drug charts, however this is an expensive and time consuming process. Future developments in devices such as bar coding and portable optical readers may assist in this.

TABLE 2 Hospital Feeder System Status

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	H15
Period of Data available 1993/94 - months	5	4	5	4	5	5	5	5	5	5	5	5	5	5	5
Departmental Feeder Systems															
Wards	LOS	DF	LOS	LOS	DF	LOS	LOS	LOS	DF	DF/LOS	LOS/DF	LOS	DF	LOS	LOS
Theatre	DF	DF	DF	DF	DF	DF	DF	DF	DF	LOS	DF	DF	DF	DF	DF
Pathology	DF	DF	DF	LOS	DF	DF	DF	DF/LOS	DF	DF	DF	DF	DF	DF	DF
Radiology	DF	DF	DF	DF	DF	DF	DF	DF	DF	LOS	DF	DF	DF	DF	DF
Pharmacy	DF	DF	DF	LOS	LOS	LOS	DF	DF	DF	LOS	DF	DF	LOS	DF	DF
Medical	LOS	LOS	LOS/DF	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS/DF	LOS	LOS	LOS	LOS
Allied Health	DF	LOS/DF	LOS	LOS	DF	LOS	LOS	LOS	LOS	LOS	LOS/DF	LOS	DF	LOS	LOS
Depreciation in Costs	No	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No
Separate Prosthesis	No	No	No	No	Yes	No	No	No	No	No	No	No	Yes	No	No
Sessional Medical Costs to Public Patients Only	Yes	Yes	Yes	Yes	All	All	Yes	All	Yes	Yes	Yes	Yes	All	Yes	Yes

Note:

1. DF = *Specific Departmental feeder system used to allocate costs of department to individual inpatients.*
2. LOS = *Actual Inpatient Ward Bed Days or Clinical Unit Days used to allocate costs of department to inpatients in the absence of a patient level departmental feeder. Some hospitals use a combination of LOS and other Departmental Feeders such as Theatre and Dependency to allocate specialised clinical units for example Anaesthetics and surgical units. A combination of LOS and DF in some Allied Health departments is also used.*

The Victorian Branch of the Society of Hospital Pharmacists has undertaken a survey of extent of modelling (as opposed to patient-level measurement) of pharmacy costs in 15 Victorian hospitals which have implemented a clinical costing system (11 of which are represented in the current study). Their review identified particular cost items (drugs used in clinical trials, clinical pharmacy services, on-site manufacture of agents) as areas which required improved cost allocation approaches.

Data Issues

Several issues of data completeness arose as a result of the short timelines of the project. Two hospitals were able to contributed data on costs for only four of the five study months. It was thus necessary to take steps to ensure that representative costs from different sorts of hospitals were proportionately represented in the final weights.

Of particular concern was the fact that one of the two hospitals with less than the full five months' data was the Royal Children's Hospital. It is argued that the statewide tertiary referral role of this hospital results in a different within-DRG mix of patients, specifically, a higher proportion of more complex cases. Including only 80% of the RCH's equivalent 5-month case load had the potential to underrepresent cases with presumed higher costs of care, and thus, lower the weight of affected DRGs. A second and closely related problem is the intrinsically small cell sizes of a number of DRGs, and particularly those classifying paediatric patients.

A decision was taken on policy grounds to employ mean substitution to bring the count of cases in the two hospitals up to an equivalent (or pro rata) 5-month total, and to calculate the average cost per DRG for the whole sample based on the inclusion of these substituted cases. The mean cost for the entire sample thus more accurately reflects any systematically higher (or lower) cost cases which would otherwise have been omitted, but tends to underestimate the degree of variability around the mean by adding 20% of the two hospitals' separations into the sample at a single (mean) value.

Appendix A qualifies DRGs (Q6 `+') in which more than 10% of `cases' result from mean substitution. Case counts (N of cases) are reported as non-integers where, for example, a hospital treated 13 cases over the four months, and thus, mean substitution yielded an additional 3.25 cases. If this were the only hospital reporting separations in the DRG, a total of 16.3 cases would appear as the number of cases treated in total.

Any study which attempts to use data as timely as that used here inevitably faces some data incompleteness. Because initial data extraction was undertaken within four weeks of the end of the sampling period, not all cases were coded or assigned to a DRG in the resulting data set. Some 2,250 cases (1.4%) were not assigned a DRG, and thus were not available for further analysis of DRG-specific costs. These cases represent 31,624 occupied bed days, and had an average cost nearly twice that of other cases ($4,149 compared with $2,120). A high proportion of these uncoded cases came from a single hospital.

The hospital from which most of the cases of missing DRG assignment arose does not treat an unusual or specialised casemix in Victoria, and the average cost of omitted cases in this hospital was below the all-hospital mean. Thus the assumption has been made that these cases would be randomly distributed across DRGs. Costs of the smaller number of uncoded cases from the other hospitals, however, substantially raised the all-hospital average cost.

The higher cost of these omitted cases suggests that there may have been a small but systematic effect of these omissions on average costs of some DRGs, as higher-cost cases remained uncoded at time of data extraction.

Finally, case counts and cost allocations for renal dialysis in one hospital were not able to be reconciled in time for inclusion in the study. All DRG 565 cases from this hospital were removed from analysis.

Issues of Data Trimming

Because hospital resource-use data are inevitably skewed by a small number of resource-intensive cases, some form of data trimming is conventionally used to ensure that the averages reported better represent the central tendency amongst cases analysed.

Victoria has recently adopted a new trimming algorithm which trims low stay outliers more rigorously than previous criteria. The trimming approach adopted defines as outliers all cases with a length of stay less than one-third or more than three times the state ALOS for the DRG, with an upper trim of 100 days for all DRGs.

For this study, data were trimmed using the new Victorian ALOS criteria, and average costs are reported using the arithmetic mean of trimmed or inlier cases. Appendix A notes DRGs with more than 20% of cases trimmed as low outliers (Q8 = `L') and those with more than 20% trimmed as high outliers (Q9 = `H').

In 10 DRGs, more than 50% of cases were trimmed from the original sample (see Appendix K for a listing of these DRGs). Low-trim percentages for this group of DRGs ranged from 31.7% of cases to 73.7%, and high trimming removed between 5.8% and 21.2% of cases. For 6 of these DRGs (29, 323, 816, 833, 834 and 910) trimming removed a substantial proportion of cases at both ends of the ALOS spectrum.

DRG 29, for example, had 32.6% of untrimmed cases removed on the basis of the low trim threshold, and an additional 19.9% removed beyond the high trim threshold. For DRG 910, the original 19 cases were reduced to 2 inlier cases, again largely on the basis of low trim criteria.

Close examination of data from the 15 hospitals reveals that trimming criteria based on ALOS still result in wide variability in average costs. This is to be expected, as ALOS is only a proxy for the costs of care. Two cases with the same length of stay will have significantly different costs if, for example, one of the two patients spends any time in ICU.

Previously, data on costs of care have not been comprehensive or reliable enough to develop cost-based trimming criteria. With the data collected for this study, sufficient information is now available to do so, and this would go some way toward reducing the with-in DRG variability in cost per case still apparent in this year's data (see discussion of CV and RSEM, below).

After trimming, 139,035 pro rata cases (134,898 `real' cases) were available for analysis, representing 88.8% percent of total admissions. This is a substantial increase in the proportion of cases trimmed (11.2%) compared with the 1992/93 study, where only 5.4% of cases were trimmed out.

Untrimmed cases had a mean cost of $2,488. Trimming of outlier cases reduced the mean cost per case to $2,120. Because trimming criteria relate to both high and low stay outliers, the effect on average cost per case is somewhat unpredictable, and this decrease reflects a balancing of cases trimmed from both ends of the distribution of costs. Despite the effect on particular DRGs of the new low trimming criteria, the trimming of high outliers had a greater influence on mean cost. Similarly, ALOS fell from 4.4 to 3.6 days with trimming.

Reliability of Cost Weights

Data from the fifteen hospitals were analysed in a number of steps. The first was to reconcile patient counts and reported costs with last year's hospital separations and expenditures data.

The second step was to screen data from each hospital in order to identify anomalous patterns, for example, in the proportion of costs identified as fixed costs, the proportion of same day patients, and average trimmed and untrimmed costs. This was done by examining scatterplots of individual hospital values against those of the entire sample. Anomalous patterns were followed up with further investigation to rule out data anomalies. Because participating hospitals have been assured of the confidentiality of their own data, these analyses are not reported here.

The reliability of the cost data was then assessed on the basis of the following indicators:

- the degree of correlation between each pair of hospital costs on a DRG by DRG basis
- the number of cases on which data were available (sample size for each DRG)
- the variability of costs around the mean (measured as both the coefficient of variation, and the relative standard error of the mean)
- the number of hospitals contributing cost data for each DRG
- the proportion of cases attributable to mean substitution, and
- the proportion of cases affected by trimming.

Each of these indicators of reliability is reported in greater detail below; when reported individually, numbers of DRGs affected are considered to be independent of other sources of unreliability. The final section below reports the cumulative impact of all qualifications on DRGs.

Correlation of Hospital Costs

As a way of identifying hospitals in the study whose costs might be very different from those of other hospitals, the correlation coefficient for each pair of hospitals was calculated to test whether and to what degree cost relativities are linearly related. Table 3 below reports the matrix of Spearman rank correlation coefficients from the analysis of cost per DRG using untrimmed data, and Table 4 reports correlations of costs for trimmed cases.

Coefficients for untrimmed cost data range from a low of .260 between Hospitals 6 and 15, to a high of .778 between Hospitals 7 and 9. Comparing the cost per DRG for trimmed cases, coefficients ranged from .409 for Hospitals 6 and 15 to a high of .874 between Hospitals 3 and 10. All of these relationships were statistically significant ($p < .01$).

For most pairs of hospitals, there is a fairly strong rank correlation between costs for common DRGs. The inclusion of specialist hospitals (such as the Royal Children's and Peter MacCallum Cancer Institute) results in lower correlations for more pairs of hospitals than was the case in the 1993 Study. Correlation was particularly strong between pairs of obstetric hospitals.

The degree of overlap in case types between each pair of hospitals is also reported in this matrix. Thus, for example, Hospitals 2 and 3 treated 340 DRGs in common when untrimmed cases are compared, and 316 in common when only trimmed cases are considered.

Small Sample Sizes

As expected, increasing the sample of hospitals from five to fifteen considerably increased the average cell size, decreased the number of DRGs for which no cost data is available, and reduced the number of DRGs with cost data based on only very few cases.

Sample size is important, as the larger the sample size, the more confident one can be that the observations in the sample accurately reflect the larger population from which they were drawn. The larger the sample size, the less vulnerable to sampling error will be the estimator, in this case, average cost of care in each DRG. Sample size is also important to the stability of relationships between DRG weights over time, as costly single cases in small cell DRGs can have a large impact on the relative weight of such DRGs.

The increased sample of hospitals and cases reduced the number of DRGs with less than 30 cases from 42.9% in 1992/93 to only 24.5% (129 DRGs) in the current study. When this criterion is relaxed to a cell size of 10 or more, only 44 DRGs (8.4%) fall below the threshold.

Of these 44, five (0.9% of DRGs) recorded no cases in the sample hospitals: DRG 72 (*Primary iris procedures except glaucoma*), DRG 710 (*Neonate, admission wt 1500 - 1999g, w/ significant OR procedure w/o multiple major problems*), DRG 800 (*HIV w specified related condition, age <10 years*), DRG 805 (*HIV w/o specified related condition, age <10 years*), and DRG 937 (*Tertiary aftercare, age =>1 yr*). These DRGs are qualified with ** in Appendix A (Q1). The small number of zero-case cells contrasts with the 1993 study, where some 20 DRGs (3.8%) had no cost data available.

DRGs with fewer than 10 cases in the fifteen hospitals are noted with an * in Appendix A, and are listed in Appendix B. For the most part, these small-cell DRGs reflect areas with intrinsically small numbers of cases: liver transplantation (DRG 5), extensive and/or transferred burns cases (DRGs 910-912). Eleven of the small cell DRGs relate exclusively to infants and children (DRGs 116, 192, 700, 702, 715, 716, 751, 773, 871, 887 and 937).

Nearly a third of these DRGs are `intrinsically small,' that is, fewer than thirty cases per year may be treated in Victoria. Analysis of the proportion of state cases which the sample

represented revealed that for 13 of the small cell DRGs, the current sample contained at least 25% of Victorian separation for the DRG in 1992. Appendix C lists these DRGs, and they are noted in Appendix A as Q3 = `@'. For these DRGs, the weight assigned may be more robust than for other small cell DRGs, but may still vary considerably from year to year.

Variability Around the Mean

The removal by trimming of unusually long-stay patients or unusually short-stay (*eg,* one-day patients) should reduce variability around the mean (see discussion of trimming criteria above), but even after trimming, there was considerable variability in per case costs for the data examined here.

Variability is an important indicator of how reliably the mean of the relevant whole population (in this instance, the cost of cases treated in a particular DRG across Victoria) is estimated by the mean of the sample of hospitals and cases. Such variability is conventionally measured in terms of the coefficient of variation (CV), calculated as the standard deviation divided by the mean of the distribution. A CV of less than 1 is taken to identify data with an acceptable degree of variation in casemix studies. CVs greater than 1 provide evidence of increasing degrees of variability amongst cases, which may indicate bimodal or very skewed distributions.

Thirty-six DRGs (6.8%) had CVs greater than 1.25, the threshold adopted in the 1993 Study. Cases not assigned a DRG also had a CV greater than 1.25. These are listed in Appendix D, and identified as Q4 (`^') in Appendix A. The largest CVs found were for DRGs 6 (*Bone marrow transplantation*), 87 (*Other disorders of the eye, age < 10 yrs*), and 173 (*Cystic fibrosis*) at 2.18, 2.83 and 2.80, respectively. In addition, two error DRGs (0 and 952) had CVs > 2.

While CV is conventionally used in this way, it is problematic in cases with very small and very large sample sizes. In the former, cases may be quite tightly clustered around the mean of the distribution, but because of the small sample, not reliably reflect the population mean. In the latter, samples with large numbers of cases may contain considerable variability, but still provide an accurate estimate of the central tendency of the distribution. The CV gives an estimate of the relative variability of the cost estimates, but does not address the more relevant issue of the precision of estimation of the mean.

The confidence which can be placed in a sample mean is best measured by the (estimated) standard error of the mean (SEM), from which the conventional 95% confidence interval (the range of the mean ± 1.96 SEM) is calculated (SEM = SD/√n). But the standard error is not an ideal criterion for determining which mean values are reliably estimated because it depends on the scale, in the sense that for two DRGs with the same SEM but different mean costs, we would be less concerned about the high-cost group. Thus, it seems reasonable to base decisions on the *relative SEM,* which we label RSEM, and is simply SEM divided by the mean.

Essentially, the point is that the mean of a highly variable DRG may be precisely estimated if there are enough cases in the sample on which the mean is based, while on the other hand, a less variable DRG with few cases may give rise to an imprecisely estimated mean.

For calculation of the RSEM, the 'real' number of cases was used rather than the number inflated by mean substitution. Values for RSEM ranged from 0 to .69. At a threshold of .2, the average cost of some 54 DRGs was identified as highly variable *relative to the size of the sample.* These are noted in Appendix A as Q5 (`:'), and listed in Appendix E.
Only 9 DRGs identified as highly variable are common between the two measures, and RSEM will be used in the final calculation of qualifications on DRG weights.

It should be remembered that mean substitution of missing data may have artificially reduced variability in DRGs in which a higher proportion of cases was added to the sample. For this reason, qualification 6 (`+') in Appendix A is included to flag the 58 DRGs in which 10% or more of cases result from substitution.

Number of Hospitals Contributing Data

When cost weights are based on only one, or even two hospitals, they are less likely to be representative of the range of cost structures in the larger universe of Victorian hospitals, even when the cell size or other inclusion criteria may be acceptable. A third issue of data reliability is the number of hospitals from which data were available. Hospitals which specialise in particular clinical areas (obstetric hospitals, for example) treat a much smaller set of DRGs than the 526 possible. This is also in part a consequence of some DRGs in the Australian National set which have been formed to deal with very rare cases, as noted above.

A total of 37 DRGs (7.0%) had cost data available from only one or two hospitals, including the 5 DRGs for which no cost data is available. This contrasts with 117 DRGs which relied on data from fewer than three hospitals in the 1993 Study. When data were not available from at least four hospitals, the cost weight in Appendix A is qualified by `#' in the column headed Q7. These DRGs are detailed in Appendix F.

For this criterion of data reliability, there is obvious overlap with several others. In addition to the 5 0-case cells, 17 of the 37 DRGs have fewer than 3 cases in the sample, and thus cannot include data from three or more hospitals. In 17 DRGs, only children (<15 years) were treated, and thus cases are not reported from hospitals which treat only adult patients. HIV and complex cardiac surgery DRGs also feature on this list, and because of the specialised nature of treatment, are unlikely to be provided in many Victorian hospitals, even were the sample enlarged.

Implied Hierarchy of DRG Resource Use

Many DRGs are formed on the basis of splitting variables which identify subgroups of patients with greater resource use. Thus, patients with complications and/or comorbidities (CCs) are expected to require more resources for their care than others in the same DRG without complications. Theses splits in AN-DRG 1 have been evaluated using ALOS data as a proxy for costs.

While the data used in the two Victorian weights studies represents the most accurate measurement of treatment costs for DRGs in Australia, the face validity of the weights derived is improved if implied hierarchies are reflected in the data. Clinical review and more detailed study of the component costs of individual DRGs would be necessary to determine whether

differences between the implied hierarchy and costs as measured by the clinical costing system were due to data artefacts or reflected actual clinical practice.

DRGs whose costs are higher or lower than expected given those of related DRGs are noted in Appendix A with Q10 = `!' in order to flag them for further review.

Cumulative Effect of Qualifications on the Data

As will be apparent from scanning Appendix A, cost weights for some DRGs are unreliable for several reasons: those with fewer than 10 cases may come from only one or two hospitals; those with large CVs may represent only a small number of cases.

When multiple sources of qualifications on data are taken into account, the study provides relatively reliable estimates of the cost relativities for between 430 and 453 of the 526 DRGs (81.7% - 86.1%). This contrasts with the first study's 65.7% of DRGs. Table 5 presents information on DRGs with acceptable data quality when assessed by criteria applied in the 1992/93 study. Because some DRGs would be qualified on two factors, the way in which these are entered into an exclusion algorithm determines the number of cases assigned to each factor. The tables show frequency and percent of DRGs removed at each level of data qualification.

Table 5 Cumulative Data Qualifications on 1992/3 Criteria

Criterion	Frequency	Percent of DRGs
No data qualification (reliable DRGs)	453	86.1
<3 Hospitals	32	6.1
CV > 1.25	36	6.8
No cases reported	5	1.0
Total	527	100.0

This year, additional data qualifications have been introduced into the analysis, including the RSEM and any reversal in the implied hierarchy of DRG resource intensity. When the RSEM replaces the coefficient of variation to measure variability, and when data qualifications are considered, 430 DRGs may be considered to be reliable. These results are presented in Table 6.

Table 6 Cumulative Data Qualifications Using All 1993-94 Criteria

Criterion	Frequency	Percent of DRGs
No data qualification (reliable DRGs)	430	81.7
Cell size < 10	3	0.6
RSEM <.2	38	7.2
< 3 Hospitals	28	5.3
Hierarchy reversal	22	4.2
No cases reported	5	1.0
Total	526	100.0

Relatively little is known about the empirical relationship of costs of treatment (rather than simply ALOS) for pairs of DRGs in Australia. Because a large number of DRGs are called into question on the basis of `reversal' of presumed cost hierarchies, a second analysis was undertaken relaxing the cell size and hierarchy reversal criteria. This yielded an additional 19 DRGs (449 DRGs in total), as shown in Table 7.

Table 7 Cumulative Data Qualifications Relaxing Cell Size and Hierarchy Criteria

Criterion	Frequency	Percent
No data qualification (reliable DRGs)	449	85.4
RSEM < .2	40	7.6
< 3 Hospitals	32	6.1
No cases reported	53	1.0
Total	526	100.0

Applying these last criteria, some 99.0% of *cases* in the sample are characterised by DRGs with adequate data quality.

Changes in Average Cost from 1992/93

In policy terms, it is desirable for cost weights to remain stable from one year to the next. Amongst other reasons, stability allows providers to make projections of their revenue. On the other hand, some flexibility in weights is desirable, particularly when changes in cost reflect real changes in clinical practice.

The actual calculation of relative weights is referred to the Department, as interpolation of values for DRGs with no cost data from this study, and other adjustments necessary to deal with data weaknesses, will lead to changes in weights assigned on the basis of data from the current study alone. Provisional weights can be calculated by dividing the average cost of each DRG by the all-cases average cost. Publication of such provisional weights, however, would result in inevitable confusion with the final DHCS weights used for payment. When interpolation and other changes are made, changes in the raw costs of care may not translate directly into changes in cost weights.

There were a number of *a priori* reasons to expect costs to change between the earlier study and the present one. First, hospitals have been under increased pressure to reduce cost per case as a result of budget cuts and the introduction of casemix funding. In fact, the cost of the average trimmed case fell between the two years by $133 (-5.9%), and the average untrimmed case by $245 (-9.0%). Assuming that economies would be more easily made for some DRGs than for others, the cost relativities could be expected to change, but in unpredictable ways.

Second, the enlargement of the sample has resulted in more cases being available for analysis. DRG weights which were estimated in the previous study on the basis of inadequate samples will now reflect the wider range of cases and costs, and the wider range of hospitals which the 15-hospital sample affords, and thus appear to increase or decrease in cost. Such changes reflect a more accurate estimate of the average cost of patients treated in the DRG.

Third, a large number of DRGs are `intrinsically small,' that is, in any one year, a small number of patients will be treated in the category. In 1992/3, for example, some 34 DRGs had 30 or fewer patients assigned to the DRG in Victoria. The weights for these DRGs will always be vulnerable to the effects of a single very expensive case, and subject to quite large changes in value from year to year.

Finally, the newly introduced trimming criteria made changes in the weights inevitable, as a very different set of inlier cases was being described for each DRG than was the case in 1992/93.

Appendix J is made up of a series of graphs plotting the percent change in the DRG average cost against the number of cases in that DRG. The horizontal axis describes increasing number of cases for the DRG, and the vertical axis the percent of positive or negative change in the weight, centred on a line defining no change.

The best outcome for any MDC would be for DRGs to be closely clustered around the 0-change horizontal line, regardless of sample size. DRGs are more problematic if the percent change in either direction is large *and* the number of cases is large. On the premise that larger changes in weight are more acceptable for small-cell DRGs, the analysis here will consider in greater detail those DRGs which fall outside a triangle defined by 100% change in either direction, with its apex at 1000 cases.

DRGs with more than a 100% increase in cost are not included on the graphs, but are separately listed in Appendix G. Those with a greater than 50% decrease in cost are included, but are also separately listed in Appendix H. The 23 DRGs with more than 1000 cases in the 15-hospital sample have been removed from the MDC graphs in order to maintain a uniform scale for comparison across MDCs. These high volume DRGs and changes in their weights will be noted in the appropriate MDC. Twenty other DRGs have been omitted from the graphs, as they had no cost data available in the 1992/3 study, and thus could not be compared with the 1993-94 cost.

MDC 0: Pre-MDC DRGs

Four of the six DRGs in this MDC are shown on the first graph in the Appendix J series. DRG 2 (*Mouth, larynx or pharynx disorder w tracheostomy age <16*) is one of the 17 DRGs with an increase in weight of over 100% and thus has been omitted from the table (see Appendix G). This increase in weight is presumably because of the inclusion this year of cases from the Royal Children's Hospital for this specialised paediatric DRG, whose weight was notably low in 1993. The *Liver transplant* DRG (5) is also omitted; cost data were not available from the 1992/93 study for comparison. Other DRGs in this MDC showed only small (<20%) changes on relatively small numbers of cases.

MDC 1: Diseases and Disorders of the Nervous System

MDC 1 illustrates the desirable triangular pattern of smaller changes in weight with larger numbers of cases in the DRG. Only DRG 34 (*Specific cerebrovascular disorders except TIA*), with 943 cases and a 17% change in weight lies outside the triangle. DRG 43 (*Hypertensive encephalopathy*) demonstrates the usefulness of discounting large changes when associated with very small numbers of cases; in this case, the 61% decrease in weight is based on the costs of a single case.

MDC 2: Disease and Disorders of the Eye

Two DRGs in this MDC have been omitted from analysis: DRG 72 (*Primary iris procedures except glaucoma*) because no cases were included in this year's sample; DRG 75 (*Lens procedures w or w/o vitrectomy age <10*) because data was not available in last year's study. More DRGs in this MDC have decreased in weight than have increased, but most are associated with relatively small numbers of cases. The lack of data from the Royal Victorian Eye and Ear Hospital in both studies would not have affected the change between the two studies, but may bias against the most complex cases treated.

MDC 3: Diseases and Disorders of the Ear, Nose, Mouth and Throat

This MDC shows a similar pattern to that of MDC 2: the greatest changes occurring in DRGs with the fewest cases, and more DRGs showing decreases than increases. DRG 117 (*Miscellaneous ear, nose, mouth & throat procedures*), with 638 cases and a 29% decrease in average cost is perhaps one exception to the pattern. A second exception is DRG 132 (*Epiglottitis*), which has been omitted from the graph because the increase in average cost was more than 2500%, rising from $144 to $3,756 in spite of more than 20% of cases removed by high trimming. The cost is based on only five cases in the second study, and the variability relative to the small sample is large (RSEM > .2).

MDC 4: Diseases and Disorders of the Respiratory System

Again, DRGs with large changes in cost are clustered at the low end of the case-count axis. Only DRG 177 (*Chronic obstructive pulmonary disease*) is outside the triangle, with only an 11.2% increase in weight for its 958 cases. Five DRGs have been omitted from the graph: DRGs 185 and 186 (*Bronchitis and asthma in adults and children, respectively*) because their large sample sizes would otherwise have distorted the dimensions of the graph. Both show modest decreases in weight of 9.8 and 10.1, respectively.

Two other DRGs were omitted because their average costs increased by more than 100%: DRG 173 (*Cystic fibrosis*) by 268% and 181 (*Interstitial lung disease w/ CC*) by 128%. In the former case, the change can be attributed to a more accurate measure of the costs of treating cystic fibrosis patients, as both hospitals specialising in their care have been included in this year's sample. In the latter case, the large change is based on only 13 cases.

A fifth DRG (191--*BPD & other chronic respiratory diseases arising in perinatal period*) was omitted due to the lack of comparison data from 1992/93.

MDC 5: Diseases and Disorders of the Circulatory System

Four DRGs in this MDC have been omitted because of missing cost data in the first study: DRGs 220 (*Heart transplant*) and 241-243 (*Implantation/ replacement of AICD*). Three other large volume DRGs are separately listed at Appendix I with more than 1000 cases in the 1993-4 sample: DRG 250 (*Circulatory disorders except AMI; w/ invasive cardiac investigation procedure*) showed a 26% decrease, and DRGs 252 (*Heart failure and shock*) and 270 (*Unstable angina*) showed <20% increases. In the former case, costs of care in the three major hospitals treating patients in this DRG were fairly close, suggesting a problem with the earlier cost data. Both of the latter increases were probably attributable to trimming of low cost cases, as both had >20% cases low-trimmed.

Outside the low-volume/high change triangle, DRG 261 (*Chest pain*) with 912 cases decreased by 29%, and DRG 249 (*Circulatory disorders w/ AMI w/o invasive cardiac investigation procedure w/o CC*) with 946 cases, increased by nearly 13%.

MDC 6: Diseases and Disorders of the Digestive System

With the exception of two high volume DRGs (omitted from the graph, but listed in Appendix I), the expected association of smaller change in cost with higher volume of cases is apparent. The exceptions are DRGs 330 and 331 (*Oesophagitis, gastroent & misc digestive disorders in adolescents and adults w/o CC, and in children,* respectively). The average cost of the larger volume adult DRG fell by 22%, and the children's by 12%. All 15 hospitals contributed cost data for DRG 330, but average costs varied, even amongst the high-volume providers, with the hospital having the highest costs more than 50% higher than the lowest cost hospital.

MDC 7: Diseases and Disorders of the Hepatobiliary System and Pancreas

DRG 367 (*Cholecystectomy w/o CDE*) is the only noteworthy DRG in this MDC. With more than 1000 cases, this DRG decreased in average cost by 16%. No qualifications were raised on the data, and cases are evenly spread amongst 11 of the 13 hospitals contributing data. Average

cost in these hospitals, however, varied considerably, with the cost of the procedure in the highest cost hospital more than two and a half times higher than that of the lowest.

MDC 8: Disease and Disorders of the Musculoskeletal System and Connective Tissue

DRGs in this MDC are unproblematic in terms of changes in cost between the two studies. More DRGs decreased in average cost than increased. Six medical DRGs in the series 428 - 434 decreased in average cost *in spite of having more than 20% of cases trimmed as low outliers.* Only DRG 424 has been omitted from the graph, due to a lack of cost data from the earlier study.

MDC 9: Diseases and Disorders of the Skin, Subcutaneous Tissue and Breast

Although most DRGs in this MDC decreased in average cost, the changes are reasonable in relation to the number of cases involved. One high volume DRG has not been included in the graph: DRG 484 (*Other skin, subcutaneous tissue & breast procedures*), and it increased in average cost by a modest 6%.

MDC 10: Endocrine, Nutritional and Metabolic Diseases and Disorders

Increases and decreases in average cost per DRG are balanced in this MDC, with all DRGs represented on the graph, and none showing changes in average cost disproportionate to the number of cases affected.

MDC 11: Diseases and Disorders of the Kidney and Urinary Tract

Two DRGs (572 *Urinary stones w/o ESW lithotripsy*, and 578 *Other kidney & urinary tract diagnoses age >9*) were found to have larger decreases in average costs than expected for the numbers of cases in the sample. Both follow a similar pattern in terms of variation in cost across hospitals contributing data. The largest volume providers had average costs >40% above the all-hospital cost. Smaller-volume providers each contributed fewer cases, at an average cost >40% below the combined mean cost. All 15 hospitals contributed some data to DRG 578, and 14 of the 15 did so for DRG 572.

Admit for Renal Dialysis (DRG 565) was not included on the graph because of its large volume of cases, nor was DRG 559 (*Transurethral procedures age > 9 w/ CC*) which saw a 164% increase based on 3 cases in the current study.

MDC 12: Diseases and Disorders of the Male Reproductive System

All 21 DRGs in the MDC are plotted, and changes in average cost follow the expected pattern.

MDC 13: Diseases and Disorders of the Female Reproductive System

No major changes are apparent in this MDC. Two DRGs have been omitted from the graph (DRG 645 *Uterine & adnexal procedures for non-malignancy*, and 646 *D&C, conization, vagina, cervix & vulva procedures*) because of large volumes. Both showed only small changes in average cost between the two studies: -3% for the former, and -6% for the latter.

MDC 14: Pregnancy, Childbirth and the Puerperium

Important changes in average costs for these DRGs are not apparent from the graph in Appendix J because of the exclusion of five high volume DRGs, four of which have decreased by roughly 20%. For DRGs 674 and 675 (*Vaginal delivery w and w/o complicating diagnoses, respectively*) no clear reason for the cost reduction is apparent. Data from 10 hospitals has been used to calculate the average; high and low cost providers are split between specialist maternity and general hospitals, large volume and small volume providers.

For DRGs 685 and 686, the pattern found in MDC 11 is reversed: that is, the large volume providers tend to be *less expensive* for these two DRGs, with smaller, lower volume hospitals considerably more expensive. The remaining high volume obstetric DRGs show much less change in cost from last year.

MDC 15: Newborns and Other Neonates with Conditions Originating in the Perinatal Period

As with the preceding MDC, omissions from the graph (percent change by number of cases) are important in characterising changes to the weights for these DRGs. For example, the largest volume DRG (727--*Neonate, adm wt >2499g w/o significant O.R. procedure, w/o problem*) has decreased in cost by 45%. DRG 726 appears on the graph outside the expected triangle, with 912 cases reflecting a 15% reduction in the average cost.

These two cost reductions suggest a change in the proportion of healthy and sick newborns `admitted' for care. Coding rules formally allow admission of full-term neonates only if they require medical care. This anomaly will require further investigation of coding practices by the Department.

Three very small DRGs (702, 704 and 715) have all increased by more than 100%, but each on the basis of fewer than 10 cases. One additional DRG has been omitted because no cases were reported in this year's sample.

MDC 16: Diseases and Disorders of the Blood and Blood Forming Organs and Immunological Disorders

Two large changes in average cost are worth noting for this MDC. The first is the 24% decrease in cost for DRG 753 (*Red blood cell disorders age >9*), a classification with 1825 cases in the 1993-94 sample. The second is the > 100% increase in the cost for DRG 756 (*Reticuloendothelial & immunity disorders w major CC*), a relatively small volume DRG.

All 15 hospitals contributed cost data for DRG 753. No clear pattern of costs emerged, with a range of $1,000 between the lowest and highest cost hospitals around the mean cost of $803. Variability around the mean of pooled *cases* was not large.

Only 10 hospitals contributed data for DRG 756. Here, the number of cases and high average cost is principally attributable to the single largest provider of care in this DRG.

MDC 17: Myeloproliferative Diseases and Disorders, and Poorly Differentiated Neoplasms

Radiotherapy (DRG 779) recorded an increase in average cost of more than 1700%: from $428 in the 1992/93 study, to $7,824 in the current one. Inclusion of the two radiotherapy centres in the state in the sample gives greater credibility to the weight for this very specialised procedure.

Chemotherapy (DRG 780), the largest DRG in the MDC with nearly 7600 cases in the sample, increased in cost by nearly 30%, again most likely related to the inclusion of specialist cancer treatment centres.

A third DRG (773--*Lymphoma & non-acute leukaemia w other O.R. procedures, age <10*) is the third of the DRGs omitted from the graph in Appendix J for this MDC. The six cases in this year's sample was not matched by any cases from last year's study, and so a cost comparison could not be made.

Finally, DRG 774 (*Lymphoma & non-acute leukaemia*) appears on the graph outside the expected area, with a decrease of over 45% on 685 cases. Fourteen hospitals contributed data, dominated by several large providers. No consistent pattern in average cost was identified.

MDC 18: Infectious and Parasitic Diseases (Systemic or Unspecified Sites)

Four of the five omitted DRGs from the plot of case numbers and change in average cost are attributable to data inadequacy: the current study had no cost information for DRGs 800 and 805 (*HIV diagnoses in children*); the previous study lacked data for DRGs 801 and 804. A fifth DRG is omitted because it increased by more than 100%: DRG 806. All others fitted well into the diagram, with greater change in weight associated with smaller numbers of cases. Four weights increased, and seven decreased.

MDC 19: Mental Diseases and Disorders

DRG 837 (*Childhood mental disorders*) increased by nearly 2000%, from an average of $509 per case to $10,665, based on 25 cases in the current year's sample. For this DRG, the change in average cost was not attributable to the inclusion of a large specialist paediatric hospital, as might have been assumed.

As was true of last year's study, most DRGs in the MDC have at least one qualification on the reliability of the data, 7 of the 9 DRGs having had more than 20% of cases low-trimmed. Only one DRG (833--*Neuroses except depression*) increased in average cost between the two studies.

MDC 20: Alcohol/Drug Use and Alcohol/Drug Induced Organic Mental Disorders

Five of the six DRGs in this MDC decreased in average cost, and most had quite small numbers of cases. No comparison cost from 1992/93 was available for DRG 850 (*Opoid abuse or dependence, left AMA*).

MDC 21: Injuries, Poisonings and Toxic Effects of Drugs

All but 5 DRGs in this MDC have been plotted in Appendix J, and form the typical triangular pattern of decreasing size of change with increasing number of cases. Two additional DRGs (871--*Tracheostomy for multiple significant trauma age <16*, and 894--*Lead poisoning*) had no cases in the current year's sample. Two others, with samples < 20 cases, increased by large amounts: DRG 882 (*Injuries to unspecified or multiple sites age >9 w major CC*) from $1442 to $3795, and DRG 892 (*Other injury, poisoning & toxic effect diagnosis w CC*) from $1185 to $6270. The largest DRG in the MDC (N = 1136), DRG 889 (*Poisoning & toxic effects of drugs age >9 w/o CC*) decreased by over 30% between the two years.

MDC 22: Burns

Burns DRGs are intrinsically small, and no comparison data were available for two of the six DRGs in the MDC. The largest change in average cost was for DRG 915 (*Non-extensive burns w/o O.R. procedure*), which decreased in cost by a third.

MDC 23: Factors Influencing Health Status and Other Contacts with Health Services

The largest DRG in the MDC (934--*Other factors influencing health status*) is also not shown on the graph because its 1266 cases would have distorted the scale and reduced comparability between MDCs. This DRG showed only a small 9.1% increase in average cost. Most other DRGs in the MDC had lower average costs in the second year study.

MDC 24: Error DRGs

This group of DRGs with invalid assignment logic contains small numbers of cases, and has no importance for payment policy. In general, the average cost of DRGs in this group increased between the two studies.

Recommendations for Future Research

A number of data qualifications are remediable, and this section reviews improvements in the quality of data for weight setting most of which have been noted elsewhere in the report.

For small cell DRGs, it is recommended that changes in weights from year to year be stabilised by taking several years' data into account, as for example, the calculation of a 3-year rolling average.

To take into account end of year adjustments to hospital accounting data, it is recommended that future studies use a 12-month sample of cost data from as many hospitals as can provide such data. This would have the additional benefit of accounting for hypothesised seasonal variation in costs of care, and if extracted for a completed financial year, be based on fully audited expenditure data. However, these benefits should be balanced against losing the advantage of very timely information on current practice patterns (e.g., the introduction of new surgical techniques or day-stay procedures in particular DRGs) which a current 5-month sample provides.

Variability in some DRGs is likely to be reduced substantially if cost-based trimming criteria were adopted. The current data provides the opportunity to test the extent to which cost-based trimming might improve within-DRG variations in average cost.

The growing sophistication of hospitals in using clinical costing systems (estimating volume for setting of cost standards, for example) increases the possibility of data distortion by hospitals contributing data. For future studies, more sophisticated screens to compare hospitals with each other should be developed to enhance detection of data errors and/or distortions.

Developments in clinical costing systems, particularly Transition 2 which is currently being implemented in some Victorian hospitals, make possible the attribution of costs to each day of care. Data of this kind could be used in future studies to guide the development of payment for outlier cases.

Finally, analysis at the hospital level reveals considerable variation in average cost for many DRGs. Participating hospitals should consider using the database developed for this project as a tool for benchmarking the use of intermediate products and other cost comparisons to assist in better clinical and resource management.

LIST OF APPENDICES

Key to Appendix A

MS_N		Number of cases including those added at the mean cost (mean substitution)
AVCOST93		Average cost of cases in 15 hospital sample (1993)
AVCOST92		Average cost of cases in 5 hospital sample (1992)
Q1	**	No cases represented in sample
Q2	*	<10 cases represented in sample
Q3	@	<10 cases but >50% state volume in DRG
Q4	^	Coefficient of variation >1.25
Q5	:	Relative standard error of the mean (RSEM) > .2
Q6	+	>10% of cases added by mean substitution
Q7	#	<3 Hospitals contributing cost data
Q8	L	>20% of cases low trimmed (removed by low trim criteria)
Q9	H	>20% of cases high trimmed (removed by high trim criteria)
Q10	!	Complications and comorbidity (CC) hierarchy of weights reversed

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
0	Cases not assigned a DRG	2252.5	2250.0	4,149	4,010				^						
1	Mth, lx or phx disord w trach'y age >15	20.0	20.0	13,607	13,890										
2	Mth, lx or phx disord w trach'y age <16	19.5	16.0	5,451	988					:	+				
3	Trach'y oth than for mth,lx or phx disord age >1	266.5	264.0	35,487	38,104										
4	Trach'y oth than for mth,lx or phx disord age <1	214.3	174.0	12,885	10,715						+				
5	Liver transplant	9.0	9.0	75,277	0		*	@				#			
6	Bone marrow transplant	27.5	26.0	63,080	21,008				^	:					
20	Craniotomy exc for trauma age >9	349.8	344.0	8,143	7,349										
21	Craniotomy for trauma age >9	55.0	54.0	7,606	7,767										
22	Ventricular shunt revision age <10	21.5	19.0	2,888	2,577						+	#			
23	Craniotomy age <10 w CC	14.3	12.0	9,833	9,845					:	+	#			
24	Craniotomy age <10 w/o CC	30.8	27.0	4,721	8,388						+				
25	Spinal procs	48.0	47.0	7,750	7,731										
26	Extracranial vasc procs	239.5	237.0	5,356	5,576										
27	Carpal tunnel release	362.3	355.0	801	990										
28	Periph & cranial nerve & other N S proc	276.3	270.0	1,342	1,568										
29	Spinal disords & injuries	16.8	15.0	2,218	2,444					:	+		L		
30	N S neoplasms	196.8	192.0	3,323	3,170										
31	Degenerative N S disords w CC	51.0	50.0	5,821	5,821										
32	Degenerative N S disords w/o CC	123.5	120.0	2,571	2,653								L		
33	Multiple sclerosis & cerebellar ataxia	95.0	94.0	2,368	2,945								L		
34	Sp'fic cerebrovasc disords exc TIA	943.0	923.0	5,951	5,094								L		
35	TIA & precerebral occlusions w CC	123.0	119.0	3,178	2,677										
36	TIA & precerebral occlusions w/o CC	181.0	176.0	2,233	1,475				^				L		
37	Nonsp'fic cerebrovasc disords w CC	17.3	17.0	5,050	5,919					:					
38	Nonsp'fic cerebrovasc disords w/o CC	26.3	25.0	2,458	2,039					:			L		
39	Cranial & periph nerve disords w CC	49.5	49.0	5,143	4,617								L		
40	Cranial & periph nerve disords w/o CC	294.3	284.0	917	1,902				^						

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
41	N S infection exc viral meningitis	88.0	83.0	3,370	2,818										
42	Viral meningitis	167.5	160.0	1,228	990										
43	Hypertensive encephalopathy	1.0	1.0	1,984	5,040		*					#	L		
44	Nontraumatic stupor & coma	31.3	30.0	967	930										
45	Seizure age >9 w CC	148.5	145.0	2,154	2,460										
46	Seizure age >9 w/o CC	652.3	637.0	847	893				^						
47	Seizure age <10	423.8	387.0	792	947										
48	Headache age >9	255.3	250.0	859	929				^						
49	Headache age <10	25.0	22.0	672	344						+				
50	Traumatic stupor & coma, coma >1 hr	56.8	56.0	1,841	1,411				^	:					
51	Traumatic stupor & coma, coma <1 hr	487.0	464.0	754	893				^						
52	Concussion	155.3	151.0	462	489										
53	Oth disords of N S w CC	58.0	57.0	3,741	4,017										
54	Oth disords of N S w/o CC	165.0	156.0	1,484	1,837										
70	Retinal procs	42.3	37.0	1,960	2,568						+				
71	Orbital procs	20.5	20.0	2,082	3,082								L		
72	Primary iris procs exc glaucoma	0.0	0.0	#N/A	#N/A	**	*					#			
73	Lens procs w or w/o vitrectomy age >9 w CC	58.8	57.0	1,631	2,698										
74	Lens procs w or w/o vitrectomy age >9 w/o CC	676.3	639.0	1,340	1,493										
75	Lens procs w or w/o vitrectomy age <10	14.8	12.0	827	#N/A						+	#			
76	Extraocular procs exc both orbit & lacrimal	351.8	318.0	966	1,104										
77	Intraocular procs exc retina,iris,lens & glaucoma	10.8	10.0	2,061	1,513								L		
78	Maj corneal,scleral & conjunctival procs	18.8	17.0	2,137	1,456										
79	Oth corneal,scleral & conjunctival procs	38.8	37.0	873	970										
80	Glaucoma procs	49.5	47.0	1,465	2,950										
81	Lacrimal procs	95.0	85.0	832	1,078						+				
82	Hyphema	22.3	22.0	986	1,334					:					
83	Acute maj eye infections	37.0	36.0	1,750	1,758										
84	Neurological eye disords	32.3	31.0	1,232	2,323										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
85	Oth disords of the eye age >9 w CC	62.8	62.0	1,099	1,466										
86	Oth disords of the eye age >9 w/o CC	71.8	71.0	819	953										
87	Oth disords of the eye age <10	47.8	43.0	1,313	3,364				^	:					
110	Maj head & neck procs	23.3	23.0	12,088	8,865					:					
111	Sialoadenectomy	60.8	60.0	2,475	2,750										
112	Salivary gland procs exc sialoadenectomy	25.8	24.0	1,088	1,415										
113	Cleft lip & palate repair	56.3	49.0	2,856	3,234						+				
114	Mth procs	159.5	147.0	931	1,304										
115	Sinus & mastoid procs age >9	121.0	117.0	1,880	2,593										
116	Sinus & mastoid procs age <10	6.8	6.0	2,733	3,885		*			:	+				
117	Misc ear, nose, Mth & throat procs	638.0	608.0	1,255	1,766										
118	Rhinoplasty	124.8	120.0	1,187	1,869										
119	T&A proc,exc tonsillect &/or adenoidect age >9	65.0	60.0	1,357	1,687										
120	T&A proc,exc tonsillect &/or adenoidect age <10	217.0	192.0	985	1,477						+				
121	Tonsillect &/or adenoidect age >9	308.3	288.0	1,017	1,313										
122	Tonsillect &/or adenoidect age <10	429.8	376.0	1,132	1,449				^		+				
123	Myringotomy w tube insertion age >9	67.8	63.0	642	913										
124	Myringotomy w tube insertion age <10	540.3	483.0	563	661						+				
125	Oth ear, nose, Mth & throat O.R. procs	245.8	233.0	2,122	2,510										
126	Dental & oral dis exc extract'ns & restor'ns age	185.0	181.0	1,105	1,440										
127	Dental & oral dis exc extract'ns & restor'ns age	118.5	108.0	653	674										
128	Dental extract'ns & restor'ns	597.3	531.0	883	814						+				
129	Ear, nose, Mth & throat malig	83.8	83.0	1,553	2,240										
130	Dysequilibrium	131.5	128.0	977	1,250				^						
131	Epistaxis	119.5	116.0	883	1,237										
132	Epiglottitis	5.5	5.0	3,756	144		*			:				H	
133	Otitis media & URI age >9 w CC	42.5	40.0	2,232	1,782										
134	Otitis media & URI age >9 w/o CC	237.0	231.0	945	1,091										
135	Otitis media & URI age <10	408.0	377.0	796	943										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
136	Laryngotracheitis	563.8	506.0	627	608						+				
137	Nasal trauma & deformity	205.3	199.0	573	508										
138	Oth ear, nose, Mth & throat dx age >9	230.8	225.0	987	1,061										
139	Oth ear, nose, Mth & throat dx age <10	143.5	128.0	710	625						+				
160	Maj chest procs w maj CC	63.5	62.0	15,386	12,325										
161	Maj chest procs w non-maj CC	93.3	92.0	10,210	9,396										
162	Maj chest procs w/o CC	115.0	113.0	6,914	9,321										
163	Oth resp syst O.R. procs w maj CC	79.5	79.0	8,483	5,025										
164	Oth resp syst O.R. procs w non-maj CC	48.3	48.0	4,236	5,154								L		
165	Oth resp syst O.R. procs w/o CC	92.5	90.0	2,082	1,651										
166	Resp syst dx w ventilator support	59.0	57.0	7,894	7,907										
167	Pulmonary embolism	156.0	154.0	4,360	4,423										
168	Resp infections & inflammations age >9	156.0	150.0	5,042	5,221										
169	Resp infections & inflammations age <10	20.5	19.0	2,885	2,983										
170	Resp neoplasms	423.3	415.0	2,891	2,845								L		
171	Maj chest trauma w CC	49.0	48.0	4,980	5,523										
172	Maj chest trauma w/o CC	50.0	49.0	1,850	1,556										
173	Cystic fibrosis	208.3	185.0	10,395	2,821				^	:	+		L		
174	Sleep apnoea	5.5	5.0	228	457		*			:					
175	Pleural effusion	83.5	81.0	2,633	3,212										
176	Pulmonary oedema & respiratory failure	105.5	105.0	2,972	2,736										
177	Chronic obstructive pulmonary disease	958.3	934.0	2,930	2,634										
178	Simple pneumonia & pleurisy age >9 w CC	660.8	646.0	3,657	3,814										
179	Simple pneumonia & pleurisy age >9 w/o CC	428.0	419.0	2,208	2,281										
180	Simple pneumonia & pleurisy age <10	363.0	326.0	1,568	1,320						+				
181	Interstitial lung disease w CC	13.0	13.0	7,241	3,179										
182	Interstitial lung disease w/o CC	58.8	58.0	4,273	2,786								L		
183	Pneumothorax w CC	39.8	39.0	3,969	5,037										
184	Pneumothorax w/o CC	89.0	87.0	2,213	2,563										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
185	Bronchitis & asthma age >9	1041.5	1003.0	1,543	1,710										
186	Bronchitis & asthma age <10	2208.8	2029.0	940	1,046										
187	Resp signs & symp w CC	50.8	48.0	2,059	1,645								L		
188	Resp signs & symp w/o CC	341.3	330.0	855	1,044										
189	Oth respiratory syst dx w CC	332.5	327.0	3,863	3,723										
190	Oth respiratory syst dx w/o CC	310.3	303.0	1,307	1,757										
191	BPD & oth chronic resp diseases arising in perina	18.3	16.0	306	#N/A					:	+	#			
192	Oth respiratory problems after birth	3.3	3.0	1,239	1,039		*			:					
220	Heart transplant	12.0	12.0	25,132	#N/A							#			
221	Card valve proc w pump & w invas card invest proc	24.0	24.0	20,792	38,365										!
222	Card valve proc w pump & w invas card invest proc	4.0	4.0	15,133	29,892		*	@		:		#			!
223	Card valve proc w pump & w/o invas card invest pr	125.8	125.0	15,811	25,949										!
224	Coronary bypass w invas card invest proc	104.0	104.0	17,135	18,552										
225	Coronary bypass w/o invas card invest proc	442.0	442.0	11,846	14,194										
226	Oth cardiothoracic or vasc procs, w pump	78.0	76.0	18,259	16,400										
227	Oth cardiothoracic procs w/o pump	57.8	52.0	4,334	5,445										
228	Maj reconstruct vasc proc w/o pump w maj CC	110.5	109.0	13,303	15,813										
229	Maj reconstruct vasc proc w/o pump w non-maj CC	142.3	141.0	9,944	12,053										
230	Maj reconstruct vasc proc w/o pump w/o CC	119.3	117.0	7,418	8,410										
231	Vasc procs exc maj recon w/o pump w CC	167.5	165.0	5,060	8,253										
232	Vasc procs exc maj recon w/o pump w/o CC	512.3	506.0	3,093	4,662										
233	Amput'n for circ syst disords exc upper limb & to	70.3	69.0	10,469	18,624										
234	Upper limb & toe amputation for circ syst disords	33.3	33.0	6,158	7,527										
235	Perm card p'maker impl w AMI,heart failure or sho	1.3	1.0	7,447	15,405		*			:	+	#			
236	Perm card p'maker impl w/o AMI,heart failure or s	211.5	204.0	4,168	9,827										
237	Card p'maker revision exc device repl'mnt	13.3	13.0	3,084	6,228					:				H	
238	Card p'maker device repl'mnt	33.5	33.0	3,999	8,227										
239	Vein ligation & stripping	350.3	341.0	1,694	1,215										
240	Oth circulatory syst O.R. procs	60.0	58.0	6,696	7,760								L		

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
241	Implantation or repl'mnt of AICD,total syst	1.0	1.0	3,239	#N/A		*					#		H	
242	Implantation or repl'mnt of AICD leads	1.0	1.0	4,309	#N/A		*	@				#			
243	Implantation or repl'mnt of AICD,generator	1.0	1.0	44,512	#N/A		*					#			
244	Circ disord w AMI w invas card invest proc,died	2.0	2.0	5,034	2,722		*					#			
245	Circ disord w AMI w invas card invest proc w CC	11.8	11.0	7,339	9,852										!
246	Circ disord w AMI w invas card invest proc w/o CC	152.5	146.0	5,449	6,185										
247	Circ disord w AMI w/o invas card invest proc,died	167.8	164.0	2,425	2,189										
248	Circ disord w AMI w/o invas card invest proc w CC	105.3	104.0	8,218	4,797										!
249	Circ disord w AMI w/o invas card invest proc w/o	946.0	929.0	4,864	4,322										
250	Circ disord exc AMI, w invas card invest proc	1504.8	1453.0	1,636	2,225										
251	Infective endocarditis	20.5	20.0	12,812	16,023										
252	Heart failure & shock	1190.0	1165.0	3,445	2,881								L		
253	Deep vein thrombosis	70.0	70.0	3,340	3,445										
254	periph vasc disords	512.3	501.0	2,581	2,762								L		
255	Atherosclerosis w CC	85.0	84.0	3,290	4,904				^						
256	Atherosclerosis w/o CC	98.0	97.0	2,241	2,720								L		
257	Hypertension w CC	23.8	22.0	1,695	4,824										!
258	Hypertension w/o CC	36.8	36.0	2,402	2,122				^	:			L		!
259	Syncope & collapse w CC	68.5	67.0	1,765	1,970								L		
260	Syncope & collapse w/o CC	280.3	277.0	569	813										
261	Chest pain	912.3	896.0	857	1,202										
262	Oth circulatory syst dx w CC	51.8	50.0	5,109	6,045										
263	Oth circulatory syst dx w/o CC	502.8	491.0	1,983	3,195										
264	Congenital heart disease age >9	8.3	8.0	2,192	4,660		*			:					
265	Congenital heart disease age <10	24.5	20.0	1,114	1,472					:	+	#			
266	Maj arrhythmia & card arrest w CC	72.8	72.0	4,961	4,175				^						
267	Maj arrhythmia & card arrest w/o CC	83.0	82.0	1,996	2,179										
268	Non-maj arrhythmia & conduct'n disords w CC	253.3	244.0	2,548	2,404										
269	Non-maj arrhythmia & conduct'n disords w/o CC	415.0	399.0	1,101	1,030										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
270	Unstable angina	1438.5	1398.0	2,388	2,047								L		
271	Valvular disords w CC	39.0	37.0	2,817	3,835										
272	Valvular disords w/o CC	65.8	64.0	940	1,584										
300	Rectal resection w CC	32.5	31.0	8,804	9,176										
301	Rectal resection w/o CC	30.0	28.0	6,928	7,156										
302	Maj small & large bowel procs w CC	320.3	311.0	10,841	10,517										
303	Maj small & large bowel procs w/o CC	238.8	233.0	6,452	6,521										
304	Peritoneal adhesiolysis w CC	55.5	54.0	6,883	8,741										
305	Peritoneal adhesiolysis w/o CC	95.0	92.0	3,074	3,470										
306	Minor small & large bowel procs w CC	33.8	33.0	7,128	4,679										
307	Minor small & large bowel procs w/o CC	50.3	49.0	4,003	3,412										
308	Stom, oesoph & d'denal procs age >9 w maj CC	49.5	48.0	16,152	15,353										
309	Stom, oesoph & d'denal procs age >9 w non-maj CC	103.8	102.0	9,674	9,223										
310	Stom, oesoph & d'denal procs age >9 w/o CC	91.0	91.0	5,043	5,312										
311	Stom, oesoph & d'denal procs age <10	49.0	43.0	3,034	3,087						+				
312	Anal & stomal procs	740.5	717.0	1,460	1,579										
313	Hernia procs exc inguinal & femoral age >9	268.0	262.0	2,177	2,559										
314	Inguinal & femoral hernia procs age >9	704.3	687.0	1,667	1,915										
315	Hernia procs age <10	459.3	404.0	838	791						+				
316	Appendicectomy w complicated principal dx	221.8	218.0	2,992	3,125										
317	Appendicectomy w/o complicated principal dx	788.5	758.0	1,953	2,053										
318	Oth digestive syst O.R. procs w CC	37.0	36.0	7,723	8,322										
319	Oth digestive syst O.R. procs w/o CC	133.0	130.0	1,521	2,346										
320	Digestive malig	466.5	452.0	1,225	1,765										
321	GI haemorrhage w CC	242.8	236.0	2,643	2,561										
322	GI haemorrhage w/o CC	654.0	642.0	1,127	1,471										
323	Complicated peptic ulcer w CC	26.8	26.0	3,564	1,864								L	H	
324	Complicated peptic ulcer w/o CC	170.8	169.0	734	807										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
325	Uncomplicated peptic ulcer	294.0	290.0	683	1,000										
326	Inflammatory bowel disease w CC	42.5	40.0	2,984	3,487										
327	Inflammatory bowel disease w/o CC	161.5	156.0	1,263	1,804										
328	GI obstruction	381.3	368.0	2,040	2,244										
329	Oesoph'tis, gastroent & misc digest disord age >9	433.0	416.0	1,994	1,829								L		
330	Oesoph'tis, gastroent & misc digest disord age >9	4300.5	4198.0	631	804										
331	Oesoph'tis, gastroent & misc digest disord age <1	1475.5	1316.0	993	1,128				^		+				
332	Oth digestive syst dx age >9 w CC	150.8	145.0	2,556	2,328								L		
333	Oth digestive syst dx age >9 w/o CC	841.5	822.0	752	770										
334	Oth digestive syst dx age <10	116.3	105.0	779	724										
360	Pancreas, liver & shunt procs w CC	49.5	49.0	11,086	14,787										
361	Pancreas, liver & shunt procs w/o CC	34.5	34.0	5,466	4,949								L		
362	Bil tract proc exc cholecyst w maj CC	27.3	27.0	12,069	13,997										
363	Bil tract proc exc cholecyst w non-maj CC	9.0	9.0	6,483	11,345		*								!
364	Bil tract proc exc cholecyst w/o CC	15.3	15.0	8,243	5,290										!
365	Cholecystectomy w CDE w CC	11.5	11.0	10,480	9,969										
366	Cholecystectomy w CDE w/o CC	21.8	21.0	7,141	6,397										
367	Cholecystectomy w/o CDE	1111.0	1094.0	2,923	3,483										
368	Hepatobiliary dx proc for malig	13.3	13.0	5,185	9,341										
369	Hepatobiliary dx proc for non-malig	11.0	11.0	6,955	15,913				^	:				H	
370	Oth hepatobiliary or panc O.R. procs	31.3	31.0	1,215	3,739										
371	Cirrhosis & alcoholic hepatitis w CC	112.3	110.0	3,761	4,211								L		
372	Cirrhosis & alcoholic hepatitis w/o CC	94.3	94.0	889	1,521										
373	Malignancy of hepatobiliary syst or panc	221.3	215.0	2,682	2,540										
374	Disord of panc exc malig w CC	101.0	98.0	4,363	3,346										
375	Disord of panc exc malig w/o CC	137.5	133.0	2,303	2,406								L		
376	Disord of liver exc malig,cirr,alc hepa w CC	139.3	138.0	3,852	3,498										
377	Disord of liver exc malig,cirr,alc hepa w/o CC	225.0	223.0	996	1,027										
378	Disord of the biliary tract w CC	173.5	169.0	3,018	3,690										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
379	Disord of the biliary tract w/o CC	514.3	505.0	987	1,163										
400	Bilat or multip maj joint procs of lower extremit	11.0	10.0	15,177	19,035					:					
401	Maj joint & limb reattach procs w CC	406.8	398.0	8,557	10,739										
402	Maj joint & limb reattach procs w/o CC	466.0	455.0	7,058	8,307										
403	Hip & femur procs exc maj joint age >9 w CC	304.5	297.0	7,096	10,945										
404	Hip & femur procs exc maj joint age >9 w/o CC	308.3	299.0	5,338	6,919										
405	Hip & femur procs exc maj joint age <10	41.3	35.0	3,486	4,369						+				
406	Amput'n for musculoskel syst & conn tissue disord	15.5	15.0	6,859	10,431										
407	Biopsies of musculoskel syst & conn tissue	73.8	68.0	2,119	4,699								L		
408	Wnd debrid & skn grft exc hand,MS & conn tiss dis	53.5	53.0	14,695	19,948										
409	Wnd debrid & skn grft exc hand,MS & conn tiss dis	136.8	134.0	2,145	3,267										
410	Wnd debrid & skn grft exc hand,MS & conn tiss dis	20.5	18.0	1,237	1,828						+			H	
411	Lower extrem & humer proc exc hip,foot,femur age	512.5	496.0	3,619	4,283										
412	Lower extrem & humer proc exc hip,foot,femur age	85.5	75.0	1,733	1,964						+				
413	Knee procs	628.0	608.0	1,301	1,377										
414	Maj shoulder/elbow proc	61.5	60.0	2,112	2,810										
415	Shoulder,elbow or forearm proc,exc maj joint proc	314.0	301.0	2,107	2,273										
416	Foot procs	374.3	349.0	1,857	2,277										
417	Soft tissue procs	396.8	378.0	1,510	1,925										
418	Maj thumb or joint proc	50.3	49.0	1,687	1,767										
419	Hand or wrist proc, exc maj joint proc	828.3	802.0	1,020	1,269										
420	Local exc'n & removal of int fix dev of hip & fem	128.3	121.0	1,537	1,461										
421	Local exc'n & removal of int fix dev exc hip & fe	720.0	695.0	1,015	993										
422	Arthroscopy	351.3	345.0	940	737										
423	Oth musculoskel syst & conn tissue O.R. proc age	151.8	148.0	2,199	2,650										
424	Oth musculoskel syst & conn tissue O.R. proc age	6.0	5.0	1,793	#N/A		*	@		:	+	#			
425	Fractures of femur	52.5	50.0	3,211	5,214										
426	Fractures of hip & pelvis	148.8	145.0	3,654	4,629								L		
427	Sprains, strains, & disloc of hip, pelvis & thigh	12.5	12.0	2,208	4,849					:					

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
428	Osteomyelitis	57.3	52.0	2,684	3,410								L		
429	Path fractures & musculoskel & conn tissue malig	275.0	265.0	4,756	3,539								L		
430	Connective tissue disords	199.0	193.0	2,367	2,451								L		
431	Septic arthritis	20.5	20.0	4,083	2,559										
432	Medical back problems	556.5	544.0	1,817	1,785								L		
433	Bone diseases & Sp'fic arthropathies w CC	63.0	62.0	3,405	3,746								L		
434	Bone diseases & Sp'fic arthropathies w/o CC	106.3	102.0	1,727	1,739								L		
435	Non-Sp'fic arthropathies	42.0	38.0	1,112	2,282										
436	Signs & symp of musculoskel syst & conn tissue	236.3	230.0	952	1,107										
437	Tendonitis, myositis & bursitis	110.0	105.0	1,343	1,794										
438	Aftercare, musculoskel syst & conn tissue	116.5	114.0	1,778	2,007								L		
439	Fx, sprain,strain & disl of forearm, hand, foot a	591.8	562.0	709	725										
440	Fx, sprain,strain & disl of forearm, hand, foot a	354.3	333.0	780	689										
441	Fx, sprain,strain & disl of uparm,lowleg ex foot	99.0	98.0	3,984	5,742										
442	Fx, sprain,strain & disl of uparm,lowleg ex foot	479.3	469.0	1,193	1,611				^						
443	Fx, sprain,strain & disl of uparm,lowleg ex foot	126.0	120.0	1,032	971										
444	Maj cranio-maxillo facial surgery	27.3	25.0	5,258	4,969										
445	Minor cranio-maxillo facial surgery	20.8	17.0	2,819	2,538						+				
446	Oth musculoskel syst & conn tissue dx	204.5	191.0	855	1,000										
447	Back & neck procs w spinal fusion	117.3	111.0	9,574	7,447										
448	Back & neck procs w/o spinal fusion	208.8	206.0	6,017	5,841										
480	Skin graft &/or debrid for skin ulcer, cellulitis	80.0	78.0	11,447	17,327										
481	Skin graft &/or debrid exc for skin ulcer, cellul	445.0	434.0	2,448	3,076								L		
482	Perianal & pilonidal procs	125.5	124.0	1,289	1,781										
483	Skin, subcutaneous tissue & breast plastic procs	240.3	235.0	1,176	1,414										
484	Oth skin, subcutaneous tissue & breast procs	1202.5	1158.0	797	753										
485	Skin ulcers	98.0	96.0	4,779	6,064										
486	Maj skin disords	70.3	65.0	2,093	5,287										
487	Malignant breast disords	83.8	83.0	972	1,558										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
488	Non-malignant breast disords	75.8	74.0	1,069	1,228										
489	Cellulitis age >9 w CC	166.5	162.0	3,757	3,730				^						
490	Cellulitis age >9 w/o CC	373.5	364.0	1,975	2,145										
491	Cellulitis age <10	113.3	100.0	1,369	1,315						+				
492	Trauma to the skin, subcut tissue & breast age >9	69.5	67.0	1,669	1,949								L		
493	Trauma to the skin, subcut tissue & breast age >9	585.3	581.0	608	851										
494	Trauma to the skin, subcut tissue & breast age <1	123.8	116.0	872	671										
495	Maj procs for malignant breast conditions	162.8	160.0	4,137	4,286										
496	Minor procs for malignant breast conditions	116.8	115.0	1,427	2,442										
497	Maj procs for non-malignant breast conditions	15.3	15.0	2,036	3,351										
498	Minor procs for non-malignant breast conditions	661.3	651.0	873	1,162										
499	Minor skin disords	447.0	431.0	728	838										
520	Amputat of low limb for endocrine,nutrit & metabo	10.3	10.0	13,983	11,394				^	:					
521	Adrenal procs	12.5	12.0	6,135	8,160										
522	Pituitary procs	18.0	18.0	7,972	5,481										
523	Skin graft & wnd debrid for endoc,nutrit & metab	5.0	5.0	10,246	13,031		*						L		
524	O.R. procs for obesity	64.3	64.0	2,997	1,672										
525	Parathyroid procs	13.0	13.0	4,994	5,722										
526	Thyroid procs	205.8	201.0	2,785	3,564										
527	Thyroglossal procs	28.3	25.0	1,467	1,913						+				
528	Oth endocrine, nutrit & metab O.R. proc	14.0	14.0	918	1,703					:				H	
529	Diabetes age >35	287.3	282.0	3,410	2,768										
530	Diabetes age <36	237.8	217.0	2,031	2,522										
531	Nutrit & misc metabolic disords age >9 w CC	185.3	181.0	2,570	3,225										
532	Nutrit & misc metabolic disords age >9 w/o CC	133.5	131.0	730	1,601										
533	Nutrit & misc metabolic disords age <10	203.3	179.0	1,488	1,532				^		+				
534	Inborn errors of metabolism	74.5	71.0	973	577				^						
535	Endocrine disords	118.8	113.0	2,382	1,965								L		
536	Compulsive nutrition disord rehabilitation	33.5	33.0	15,158	2,803										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
550	Kidney transplant	20.0	20.0	10,314	13,227										
551	Kidney,ureter & maj bladder proc for neoplasm w C	42.3	41.0	10,606	8,714										
552	Kidney,ureter & maj bladder proc for neoplasm w/o	20.5	20.0	5,830	6,538										
553	Kidney,ureter & maj bladder proc for non-neoplasm	276.0	260.0	4,780	5,157										
554	Prostatectomy w CC	16.8	16.0	4,595	4,104										
555	Prostatectomy w/o CC	14.5	14.0	2,563	2,947										
556	Minor bladder procs	111.0	105.0	2,423	2,711										
557	Transurethral procs w CC	79.5	77.0	2,539	3,513										
558	Transurethral procs w/o CC	303.3	295.0	1,329	1,292										
559	Urethral procs age >9 w CC	3.0	3.0	2,266	855		*								
560	Urethral procs age >9 w/o CC	65.5	63.0	1,488	2,116										
561	Urethral procs age <10	12.0	10.0	754	477					:	+				
562	Oth kidney & urinary tract O.R. procs	87.5	86.0	5,114	7,172										
563	Renal failure w CC	166.8	164.0	4,546	5,940										
564	Renal failure w/o CC	78.8	77.0	1,637	1,828										
565	Admit for renal dialysis	7032.0	6839.0	342	344										
566	Kidney & urinary tract neoplasms w CC	43.0	42.0	3,331	2,395										
567	Kidney & urinary tract neoplasms w/o CC	73.8	72.0	630	548										
568	Kidney & UTI age >9 w CC	175.5	170.0	2,949	2,551				^						
569	Kidney & UTI age >9 w/o CC	355.8	347.0	1,947	1,590								L		
570	Kidney & UTI age <10	151.5	135.0	1,470	1,641						+				
571	Urinary stones w ESW lithotripsy	305.0	305.0	2,403	2,126							#			
572	Urinary stones w/o ESW lithotripsy	756.8	750.0	895	1,183										
573	Kidney & urinary tract signs & symp age >9	370.8	360.0	663	909										
574	Kidney & urinary tract signs & symp age <10	12.3	11.0	738	714					:	+				
575	Urethral stricture age >9 w CC	10.5	10.0	1,575	1,028					:					
576	Urethral stricture age >9 w/o CC	45.5	45.0	568	780										
577	Urethral stricture age <10	10.8	10.0	709	637					:					
578	Oth kidney & urinary tract dx age >9	791.5	770.0	1,046	1,532				^						

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
579	Oth kidney & urinary tract dx age <10	105.5	91.0	976	1,959						+				
600	Maj male pelvic procs	28.8	28.0	5,930	7,709								L		
601	Transurethral prostatectomy w maj CC	38.8	38.0	4,781	5,956										
602	Transurethral prostatectomy w non-maj CC	233.0	225.0	3,536	4,757										
603	Transurethral prostatectomy w/o CC	530.3	516.0	2,397	2,968										
604	Testes procs, for malig w maj CC	3.0	3.0	5,863	9,747		*			:				H	
605	Testes procs, for malig w non-maj CC	17.0	16.0	1,738	4,698										
606	Testes procs, for malig w/o CC	48.3	47.0	1,340	956										
607	Testes procs, non-malig age >9	352.0	331.0	1,099	1,071										
608	Testes procs, non-malig age <10	249.5	223.0	894	844						+				
609	Penis procs	161.8	141.0	2,015	2,342						+				
610	Circumcision age >9	93.8	89.0	836	737										
611	Circumcision age <10	531.0	479.0	614	655										
612	Oth male reprod syst O.R. proc for malig	11.3	11.0	2,897	2,313										
613	Oth male reprod syst O.R. proc exc for malig	11.3	11.0	874	2,519					:					
614	Malignancy, male reprod syst	67.8	65.0	2,033	3,143										
615	Benign prostatic hypertrophy w maj CC	2.0	2.0	4,297	9,174		*					#		H	
616	Benign prostatic hypertrophy w non-maj CC	25.8	25.0	2,189	6,181										
617	Benign prostatic hypertrophy w/o CC	74.0	72.0	629	526										
618	Inflammation of the male reprod syst	139.8	137.0	1,209	1,473										
619	Sterilization, male	203.3	200.0	510	636										
620	Oth male reprod syst dx	82.8	79.0	640	799										
640	Pelvic evisceration & radical vulvectomy	57.0	57.0	7,064	7,003										
641	Uter,adnex proc for non-ov'n/adnex malig w CC	21.3	21.0	7,749	6,866										
642	Uter,adnex proc for non-ov'n/adnex malig w/o CC	81.0	80.0	5,020	5,379										
643	Female reprod syst reconstructive procs	387.0	378.0	3,148	3,526										
644	Uter & adnex proc for ovarian or adnex malig	42.3	42.0	6,082	6,244										
645	Uter & adnex proc for non-malig	1738.5	1713.0	2,820	2,895								L		
646	D&C, conization, vagina, cervix & vulva procs	4438.0	4372.0	766	815										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
647	Laparoscopy & incisional tubal interruption	466.3	463.0	861	1,075										
648	Endoscopic tubal interruption	85.0	83.0	700	847										
649	Oth female reprod syst O.R. procs	36.8	36.0	4,087	3,217										
650	Malignancy, female reprod syst	77.8	76.0	1,210	1,056										
651	Infections, female reprod syst	85.3	84.0	1,096	1,600										
652	Menstrual & other female reprod syst disords	570.5	560.0	620	649										
670	Caes'n delivery w/o complicating dx w CC	10.0	10.0	3,488	6,046										
671	Caes'n delivery w/o complicating dx w/o CC	776.8	770.0	3,325	3,838										
672	Caes'n delivery w complicating dx w CC	35.0	35.0	5,503	5,241										
673	Caes'n delivery w complicating dx w/o CC	1163.3	1151.0	3,917	4,254										
674	Vag delivery w complicating dx	3408.5	3374.0	2,377	2,925										
675	Vag delivery w/o complicating dx	5900.3	5820.0	1,951	2,545										
676	Vag delivery w O.R. proc w complicating dx	35.3	34.0	4,023	3,464										
677	Vag delivery w O.R. proc w/o complicating dx	43.5	43.0	2,849	2,284										
678	Postpartum & post abortion dx w/o O.R. proc	368.3	350.0	1,324	1,270								L		
679	Postpartum & post abortion dx w O.R. proc	164.5	163.0	940	938										
680	Ectopic pregnancy	202.0	199.0	2,018	2,266										
681	Threatened abortion	478.8	474.0	972	1,193										
682	Abortion w/o D&C	136.3	135.0	973	1,585										
683	Abortion w D&C, aspir'n curettage or hysterotomy	3011.0	2981.0	602	652										
684	Preterm labour	773.8	767.0	772	834										
685	Oth antepartum dx w complicating principal dx	2565.0	2548.0	589	797										!
686	Oth antepartum dx w/o complicating principal dx	1178.0	1165.0	866	1,219										!
700	NN,died/trans <5 days of birth,born here,w sig O.	1.0	1.0	140	4,281		*	@				#			!
701	NN,died/trans <5 days of birth,born here,w/o sig	136.3	136.0	963	1,137										!
702	NN,died/trans <5 days of birth,not born here,w si	3.8	3.0	2,004	349		*	@		:	+	#			
703	NN,died/trans <5 days of birth,not born here,w/o	41.8	39.0	1,517	1,388										
704	NN,died >4 days of birth	10.3	9.0	39,239	8,142						+	#	L		
705	NN,adm wt <750g	12.8	12.0	39,682	38,167									H	

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
706	NN,adm wt 750-999g	30.5	30.0	38,361	30,488									H	
707	NN,adm wt 1000-1499g, w signif O.R. proc	17.5	17.0	30,903	31,664										
708	NN,adm wt 1000-1499g, w/o signif O.R. proc	106.8	106.0	18,636	17,385										!
709	NN,adm wt 1500-1999g,w signif O.R. proc, w mult m	12.0	11.0	26,828	21,126										
710	NN,adm wt 1500-1999g,w signif O.R. proc, w/o mult	0.0	0.0	#N/A	19,723	**	*					#			
711	NN,adm wt 1500-1999g,w/o signif O.R. proc, w mult	51.3	51.0	12,241	19,623										
712	NN,adm wt 1500-1999g,w/o signif O.R. proc, w maj	79.5	79.0	9,574	10,643										
713	NN,adm wt 1500-1999g,w/o signif O.R. proc, w othe	78.8	78.0	7,880	9,524										
714	NN,adm wt 1500-1999g,w/o signif O.R. proc, w/o pr	61.0	60.0	7,619	7,899										
715	NN,adm wt 2000-2499g,w signif O.R. proc, w mult m	8.0	7.0	19,980	6,514		*	@		:	+				!
716	NN,adm wt 2000-2499g,w signif O.R. proc, w/o mult	4.0	4.0	5,593	10,738		*	@		:		#			!
717	NN,adm wt 2000-2499g,w/o signif O.R. proc, w mult	43.5	42.0	7,245	6,741										
718	NN,adm wt 2000-2499g,w/o signif O.R. proc, w maj	72.5	72.0	6,641	7,097										
719	NN,adm wt 2000-2499g,w/o signif O.R. proc, w othe	125.5	124.0	5,136	6,124										
720	NN,adm wt 2000-2499g,w/o signif O.R. proc, w/o pr	179.5	178.0	2,835	4,054										
721	NN,adm wt >2499g,w signif O.R. proc, w mult maj p	73.0	61.0	17,156	16,031						+				!
DRG	**Description**	**MS_N_Trim**	**N_Trim**	**Avcost 93**	**Avcost 92**	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**
722	NN,adm wt >2499g,w signif O.R. proc, w/o mult maj	22.8	20.0	8,612	4,484						+		L		!
723	NN,adm wt >2499g,w minor abdo proc	37.3	33.0	2,175	1,589						+				
724	NN,adm wt >2499g,w/o signif O.R. proc, w mult maj	104.5	98.0	4,429	5,178										!
725	NN,adm wt >2499g,w/o signif O.R. proc, w maj prob	319.5	308.0	2,139	2,386										
726	NN,adm wt >2499g,w/o signif O.R. proc, w other pr	912.0	894.0	1,180	1,380										
727	NN,adm wt >2499g,w/o signif O.R. proc, w/o proble	1338.3	1328.0	757	1,370										
750	Splenectomy age >9	38.3	37.0	5,141	6,065										
751	Splenectomy age <10	2.3	2.0	3,035	#N/A		*	@		:	+	#			
752	Oth O.R. procs of blood & blood forming organs	126.3	119.0	1,169	1,635										
753	Red blood cell disords age >9	1825.0	1801.0	803	1,052										
754	Red blood cell disords age <10	171.3	153.0	1,225	823				^		+				

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
755	Coagulation disords	401.0	390.0	738	1,249										
756	Reticuloendothelial & immunity disords w maj CC	50.5	43.0	5,125	2,545						+				
757	Reticuloendothelial & immunity disords w non-maj	92.3	83.0	4,361	2,638						+		L		
758	Reticuloendothelial & immunity disords w/o CC	360.8	338.0	612	549										
770	Lymphoma & leuk w maj O.R. proc	76.8	76.0	6,213	6,850										!
771	Lymphoma & non-acute leuk w other O.R. proc age >	38.3	37.0	7,518	5,501										!
772	Lymphoma & non-acute leuk w other O.R. proc age >	81.8	79.0	2,021	3,209										
773	Lymphoma & non-acute leuk w other O.R. proc age <	6.0	5.0	7,542	#N/A		*	@		:	+	#			
774	Lymphoma & non-acute leukaemia	684.8	664.0	973	1,793										
775	Acute leuk w/o maj O.R. proc	201.5	195.0	1,721	3,518				^					H	
776	Myeloprolif disord or poorly diff neopl w maj O.R	13.0	13.0	12,161	10,730										
777	Myeloprolif disord or poorly diff neopl w maj O.R	19.0	19.0	5,243	5,219										
778	Myeloprolif disord or poorly diff neopl w other O	29.3	29.0	3,087	1,832								L		
779	Radiotherapy	463.5	459.0	7,824	428										
780	Chemotherapy	7571.3	7527.0	589	454										
781	History of malig w/o endoscopy	11.5	11.0	601	1,267										
782	History of malig w endoscopy	42.8	42.0	521	826										
783	Oth myeloprolif dis or poorly diff neopl dx w CC	24.5	24.0	3,900	2,784										
784	Oth myeloprolif dis or poorly diff neopl dx w/o C	61.5	59.0	1,423	1,856										
800	HIV w specified related condition, age <10	0.0	0.0	#N/A	#N/A	**	*					#			
801	HIV related CNS disease, age >9	4.0	4.0	22,274	#N/A		*			:					
802	HIV related malig, age >9	16.3	16.0	1,017	7,875									H	
803	HIV related infection, age >9	214.0	214.0	1,104	4,246										
804	HIV w other related condition, age >9	15.3	15.0	2,208	#N/A					:					
805	HIV w/o specified related condition, age <10	0.0	0.0	#N/A	#N/A	**	*					#			
806	HIV w/o specified related condition, age >9	28.0	28.0	1,004	454							#			
807	O.R. proc for infectious & parasitic diseases	104.8	103.0	7,063	7,219								L		
808	Septicaemia age >9	242.0	236.0	4,975	4,531										
809	Septicaemia age <10	58.8	50.0	3,874	3,432				^		+				

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
810	Postoperative & post-traumatic infections	227.3	219.0	2,348	2,946								L		
811	Fever of unknown origin age >9 w CC	50.3	49.0	2,730	2,382										
812	Fever of unknown origin age >9 w/o CC	42.0	41.0	2,085	1,633										
813	Fever of unknown origin age <10	68.0	63.0	657	783										
814	Viral illness age >9	201.0	194.0	1,322	1,231				^						
815	Viral illness age <10	314.3	281.0	862	1,071						+				
816	Oth infectious & parasitic diseases dx w CC	10.0	10.0	4,147	5,492								L		
817	Oth infectious & parasitic diseases dx w/o CC	81.0	80.0	1,425	2,328										
830	O.R. proc w principal dx of mental illness	16.3	16.0	9,237	15,312								L		
831	Acute adjust react & disturb of psychosocial dysf	230.8	217.0	1,148	1,379										
832	Depressive neuroses	161.8	156.0	3,207	3,799				^				L	H	
833	Neuroses exc depressive	46.5	45.0	3,908	3,694								L	H	
834	Disord of personality & impulse control	47.8	44.0	2,264	5,170				^	:			L	H	
835	Organic disturbs & mental retardation	237.0	232.0	5,518	7,967								L		
836	Psychoses	383.5	360.0	4,480	7,168				^				L		
837	Childhood mental disords	25.0	24.0	10,665	509								L		
838	Oth mental disord dx	56.3	51.0	517	2,131										
850	Opioid abuse or dependence, left AMA	1.0	1.0	4,269	#N/A		*					#			
851	Opioid abuse or dependence	11.3	11.0	1,092	3,061					:			L		
852	Cocaine or other drug abuse or dependence, left A	1.0	1.0	564	2,158		*					#			
853	Cocaine or other drug abuse or dependence	55.8	52.0	1,870	3,630				^				L		
854	Alcohol abuse or dependence, left AMA	22.3	22.0	558	680										
855	Alcohol abuse or dependence	218.0	216.0	857	988										
870	Trach'y for multip signif trauma age >15	26.3	26.0	54,365	40,846										
871	Trach'y for multip signif trauma age <16	2.5	2.0	23,055	#N/A		*			:	+	#	L		
872	Craniotomy for multip signif trauma	6.3	6.0	21,749	26,105		*	@		:					
873	Hip,femur & limb reattach proc for multip signif	40.3	40.0	16,419	13,016										
874	Oth O.R. proc for multip signif trauma	41.3	40.0	12,289	11,371										
875	Head, chest & lower limb dx of multip signif trau	45.8	44.0	7,402	5,506										

DRG	Description	MS_N_Trim	N_Trim	Avcost 93	Avcost 92	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
876	Oth dx of multip signif trauma	6.0	6.0	3,810	7,806		*								
877	Skin grafts for injuries	43.5	42.0	3,264	5,271										
878	Wound debrids for injuries	136.8	130.0	1,386	2,021										
879	Hand procs for injuries	73.8	73.0	1,170	1,827										
880	Oth O.R. procs for injuries w CC	38.0	37.0	10,189	9,105										
881	Oth O.R. procs for injuries w/o CC	131.8	126.0	1,507	2,640										
882	Injuries to unspec or multip sites age >9 w maj C	4.3	4.0	3,795	1,442		*			:			L		
883	Injuries to unspec or multip sites age >9 w non-m	43.0	41.0	2,107	2,921										
884	Injuries to unspec or multip sites age >9 w/o CC	239.3	236.0	690	946										
885	Injuries to unspec or multip sites age <10	33.5	32.0	696	780										
886	Allergic reactions age >9	56.8	56.0	787	1,024				^						
887	Allergic reactions age <10	9.3	9.0	598	301		*			:					
888	Poison & toxic effects of drugs age >9 w CC	297.0	293.0	1,670	1,762										
889	Poison & toxic effects of drugs age >9 w/o CC	1136.0	1121.0	732	1,054										
890	Poison & toxic effects of drugs age <10	196.0	180.0	536	469				^						
891	Complications of treatment	382.5	369.0	1,404	1,502										
892	Oth injury, poison & toxic effect dx w CC	15.3	15.0	6,270	1,185					:			L		
893	Oth injury, poison & toxic effect dx w/o CC	186.0	183.0	945	869										
894	Lead poison	1.0	1.0	2,469	#N/A		*	@				#	L		
910	Burns, transf to another acute care facility	2.0	2.0	2,097	3,783		*					#	L		
911	Extensive burns w O.R. proc	1.3	1.0	28,783	#N/A		*			:	+	#			
912	Extensive burns w/o O.R. proc	2.3	2.0	1,946	#N/A		*	@		:	+	#			!
913	Non-extens burns w skin graft	61.3	58.0	7,126	5,737								L		
914	Non-extens burns w wnd debrid or other O.R. proc	6.5	6.0	3,720	4,277		*			:					
915	Non-extens burns w/o O.R. proc	95.5	87.0	1,140	1,704										
930	O.R. proc w dx of other contact w health services	464.3	455.0	755	742										
931	Rehabilitation	410.3	408.0	3,672	4,299								L	H	
932	Signs & symp	143.5	140.0	939	1,859										
933	Aftercare	703.0	677.0	842	963				^						

934	Oth factors influencing health status	1266.5	1243.0	687	630									
935	Multiple, other & unspec congenital anomalies	2.5	2.0	2,183	607		*			:	+	#		H
936	Infant aftercare for wgt gain,age >28 days <1 yea	12.5	12.0	12,217	23,693									
937	Tertiary aftercare, age =>1 year	0.0	0.0	#N/A	#N/A	**	*					#		
950	Extensive O.R. proc unrelated to principal dx	204.0	196.0	5,323	4,593								L	
951	Principal dx invalid as discharge dx	10.3	10.0	7,215	6,802					:			L	
952	Ungroupable	30.0	30.0	1,809	1,327			^		:			L	
953	Prostatic O.R. proc unrelated to principal dx	25.3	25.0	11,197	8,240									
954	Non-extens O.R. proc unrelated to principal dx	133.0	119.0	1,230	1,495			^			+			H

APPENDIX B

DRGs with < 10 Cases

DRG	Description	Trimmed N*
5	Liver transplant	9.0
43	Hypertensive encephalopathy	1.0
72	Primary iris procs exc glaucoma	.0
116	Sinus & mastoidprocs age <10	6.8
132	Epiglottitis	5.5
174	Sleep apnoea	5.5
192	Oth respiratory problems after birth	3.3
222	Card valve proc w pump & w invas card invest proc	4.0
235	Perm card p'maker impl w AMI,heart failure or sho	1.3
241	Implantation or repl'mnt of AICD,total syst	1.0
242	Implantation or repl'mnt of AICD leads	1.0
243	Implantation or repl'mnt of AICD,generator	1.0
244	Circ disord w AMI w invas card invest proc,died	2.0
264	Congenital heart disease age >9	8.3
363	Bil tract proc exc cholecyst w non-maj CC	9.0
424	Oth musculoskel syst & conn tissue O.R. proc age	6.0
523	Skin graft & wnd debrid for endoc,nutrit & metab	5.0
559	Urethral procs age >9 w CC	3.0
604	Testes procs, for malig w maj CC	3.0
615	Benign prostatic hypertrophy w maj CC	2.0
700	NN,died/trans <5 days of birth,born here,w sig O.	1.0
702	NN,died/trans <5 days of birth,not born here,w si	3.8
710	NN,adm wt 1500-1999g,w signif O.R. proc, w/o mult	.0
715	NN,adm wt 2000-2499g,w signif O.R. proc, w mult m	8.0
716	NN,adm wt 2000-2499g,w signif O.R. proc, w/o mult	4.0
751	Splenectomy age <10	2.3
773	Lymphoma & non-acute leuk w other O.R. proc age <	6.0
800	HIV w specified related condition, age <10	.0
801	HIV related CNS disease, age >9	4.0
805	HIV w/o specified related condition, age <10	.0
850	Opioid abuse or dependence, left AMA	1.0
852	Cocaine or other drug abuse or dependence, left A	1.0
871	Trach'y for multip signif trauma age <16	2.5
872	Craniotomy for multip signif trauma	6.3
876	Oth dx of multip signif trauma	6.0
882	Injuries to unspec or multip sites age >9 w maj C	4.3
887	Allergic reactions age <10	9.3
894	Lead poison	1.0
910	Burns, transf to another acute care facility	2.0
911	Extensive burns w O.R. proc	1.3
912	Extensive burns w/o O.R. proc	2.3
914	Non-extens burns w wnd debrid or other O.R. proc	6.5
935	Multiple, other & unspec congenital anomalies	2.5
937	Tertiary aftercare, age =>1 year	.0

Number of DRGs = 44

*Non-integer values due to mean substitution of case costs for hospitals reporting <5 months of data.

APPENDIX C

Small Cell DRGs with > 25% State Volume in 1992

DRG	Description	N of Cases*	1992 Victorian Sep'ns
5	Liver transplant	9.0	28
222	Card valve proc w pump & w invas card inve	4.0	12
242	Implantation or repl'mnt of AICD leads	1.0	1
424	Oth musculoskel syst & conn tissue O.R. pr	6.0	19
700	NN,died/trans <5 days of birth,born here,w	1.0	1
702	NN,died/trans <5 days of birth,not born he	3.8	9
715	NN,adm wt 2000-2499g,w signif O.R. proc, w	8.0	23
716	NN,adm wt 2000-2499g,w signif O.R. proc, w	4.0	9
751	Splenectomy age <10	2.3	5
773	Lymphoma & non-acute leuk w other O.R. pro	6.0	5
872	Craniotomy for multip signif trauma	6.3	20
894	Lead poison	1.0	2
912	Extensive burns w/o O.R. proc	2.3	7

Number of DRGs = 13

*Non-integer values due to mean substitution of case costs for hospitals reporting <5 months of data.

APPENDIX D

DRGs with Coefficient of Variation > 1.25

DRG	Description	CV
0	Cases not assigned a DRG	5.81
6	Bone marrow transplant	2.18
36	TIA & precerebral occlusions w/o CC	1.32
40	Cranial & periph nerve disords w/o CC	1.29
46	Seizure age >9 w/o CC	1.36
48	Headache age >9	1.56
50	Traumatic stupor & coma, coma >1 hr	1.57
51	Traumatic stupor & coma, coma <1 hr	1.72
87	Oth disords of the eye age <10	2.83
122	Tonsillect &/or adenoidect age <10	1.32
130	Dysequilibrium	1.64
173	Cystic fibrosis	2.80
255	Atherosclerosis w CC	1.33
258	Hypertension w/o CC	1.26
266	Maj arrhythmia & card arrest w CC	1.26
331	Oesoph'tis, gastroent & misc digest disord age <1	1.46
369	Hepatobiliary dx proc for non-malig	1.45
442	Fx, sprain,strain & disl of uparm,lowleg ex foot	1.33
489	Cellulitis age >9 w CC	1.59
520	Amputat of low limb for endocrine,nutrit & metabo	1.53
533	Nutrit & misc metabolic disords age <10	1.36
534	Inborn errors of metabolism	1.26
568	Kidney & UTI age >9 w CC	1.57
578	Oth kidney & urinary tract dx age >9	1.26
754	Red blood cell disords age <10	1.57
775	Acute leuk w/o maj O.R. proc	1.58
809	Septicaemia age <10	1.41
814	Viral illness age >9	1.75
832	Depressive neuroses	1.46
834	Disord of personality & impulse control	1.39
836	Psychoses	1.46
853	Cocaine or other drug abuse or dependence	1.34
886	Allergic reactions age >9	1.33
890	Poison & toxic effects of drugs age <10	1.29

933	Aftercare	1.33
952	Ungroupable	2.10
954	Non-extens O.R. proc unrelated to principal dx	1.49

Number of DRGs = 37

APPENDIX E

DRGs with Relative Standard Error of the Mean (RSEM) >.2

DRG	Description	RSEM
2	Mth, lx or phx disord w trach'y age <16	.22
6	Bone marrow transplant	.43
23	Craniotomy age <10 w CC	.32
29	Spinal disords & injuries	.21
37	Nonsp'fic cerebrovasc disords w CC	.23
38	Nonsp'fic cerebrovasc disords w/o CC	.23
50	Traumatic stupor & coma, coma >1 hr	.21
82	Hyphema	.21
87	Oth disords of the eye age <10	.43
110	Maj head & neck procs	.24
116	Sinus & mastoid procs age <10	.22
132	Epiglottitis	.29
173	Cystic fibrosis	.21
174	Sleep apnoea	.24
191	BPD & oth chronic resp diseases arising in perina	.21
192	Oth respiratory problems after birth	.48
222	Card valve proc w pump & w invas card invest proc	.41
235	Perm card p'maker impl w AMI,heart failure or sho	.50
237	Card p'maker revision exc device repl'mnt	.24
258	Hypertension w/o CC	.21
264	Congenital heart disease age >9	.29
265	Congenital heart disease age <10	.21
369	Hepatobiliary dx proc for non-malig	.44
400	Bilat or multip maj joint procs of lower extremit	.30
424	Oth musculoskel syst & conn tissue O.R. proc age	.38
427	Sprains, strains, & disloc of hip, pelvis & thigh	.21
520	Amputat of low limb for endocrine,nutrit & metabo	.48
528	Oth endocrine, nutrit & metab O.R. proc	.23
561	Urethral procs age <10	.25
574	Kidney & urinary tract signs & symp age <10	.24
575	Urethral stricture age >9 w CC	.20
577	Urethral stricture age <10	.35
604	Testes procs, for malig w maj CC	.39

613	Oth male reprod syst O.R. proc exc for malig	.24
702	NN,died/trans <5 days of birth,not born here,w si	.46
715	NN,adm wt 2000-2499g,w signif O.R. proc, w mult m	.31
716	NN,adm wt 2000-2499g,w signif O.R. proc, w/o mult	.33
751	Splenectomy age <10	.25
773	Lymphoma & non-acute leuk w other O.R. proc age <	.34
801	HIV related CNS disease, age >9	.37
804	HIV w other related condition, age >9	.24
834	Disord of personality & impulse control	.21
851	Opioid abuse or dependence	.27
871	Trach'y for multip signif trauma age <16	.37
872	Craniotomy for multip signif trauma	.25
882	Injuries to unspec or multip sites age >9 w maj C	.23
887	Allergic reactions age <10	.25
892	Oth injury, poison & toxic effect dx w CC	.23
911	Extensive burns w O.R. proc	.50
912	Extensive burns w/o O.R. proc	.38
914	Non-extens burns w wnd debrid or other O.R. proc	.32
935	Multiple, other & unspec congenital anomalies	.69
951	Principal dx invalid as discharge dx	.28
952	Ungroupable	.38

Number of DRGs = 54

APPENDIX F

DRGs with Cost Information from < 3 Hospitals

DRG	Description	N of Hospitals
5	Liver transplant	1
22	Ventricular shunt revision age <10	2
23	Craniotomy age <10 w CC	2
43	Hypertensive encephalopathy	1
72	Primary iris procs exc glaucoma	0
75	Lens procs w or w/o vitrectomy age <10	2
191	BPD & oth chronic resp diseases arising in perina	2
220	Heart transplant	1
222	Card valve proc w pump & w invas card invest proc	2
235	Perm card p'maker impl w AMI,heart failure or sho	1
241	Implantation or repl'mnt of AICD,total syst	1
242	Implantation or repl'mnt of AICD leads	1
243	Implantation or repl'mnt of AICD,generator	1
244	Circ disord w AMI w invas card invest proc,died	2
265	Congenital heart disease age <10	2
424	Oth musculoskel syst & conn tissue O.R. proc age	2
571	Urinary stones w ESW lithotripsy	2
615	Benign prostatic hypertrophy w maj CC	2
700	NN,died/trans <5 days of birth,born here,w sig O.	1
702	NN,died/trans <5 days of birth,not born here,w si	1
704	NN,died >4 days of birth	2
710	NN,adm wt 1500-1999g,w signif O.R. proc, w/o mult	0
716	NN,adm wt 2000-2499g,w signif O.R. proc, w/o mult	1
751	Splenectomy age <10	2
773	Lymphoma & non-acute leuk w other O.R. proc age <	2
800	HIV w specified related condition, age <10	0
805	HIV w/o specified related condition, age <10	0
806	HIV w/o specified related condition, age >9	2
850	Opioid abuse or dependence, left AMA	1
852	Cocaine or other drug abuse or dependence, left A	1
871	Trach'y for multip signif trauma age <16	1
894	Lead poison	1
910	Burns, transf to another acute care facility	2
911	Extensive burns w O.R. proc	1

912	Extensive burns w/o O.R. proc	2
935	Multiple, other & unspec congenital anomalies	1
937	Tertiary aftercare, age =>1 year	0

Number of DRGs = 37

APPENDIX G

DRG	Description	Percent Change	N of Cases*
2	Mth, lx or phx disord w trach'y age <16	451.93	19.5
6	Bone marrow transplant	200.27	27.5
132	Epiglottitis	2515.99	5.5
173	Cystic fibrosis	268.42	208.3
181	Interstitial lung disease w CC	127.80	13.0
536	Compulsive nutrition disord rehabilitation	440.69	33.5
559	Urethral procs age >9 w CC	164.98	3.0
702	NN,died/trans <5 days of birth,not born he	473.56	3.8
704	NN,died >4 days of birth	381.95	10.3
715	NN,adm wt 2000-2499g,w signif O.R. proc, w	206.73	8.0
756	Reticuloendothelial & immunity disords w m	101.34	50.5
779	Radiotherapy	1726.77	463.5
806	HIV w/o specified related condition, age >	120.99	28.0
837	Childhood mental disords	1994.38	25.0
882	Injuries to unspec or multip sites age >9	163.18	4.3
892	Oth injury, poison & toxic effect dx w CC	429.24	15.3
935	Multiple, other & unspec congenital anomal	259.59	2.5

Number of DRGs = 17

*Non-integer values due to mean substitution of case costs for hospitals reporting <5 months of data.

APPENDIX H

DRGs With an Average Cost Decrease of >50%

DRG	Description	Percent Change	N of Cases*
40	Cranial & periph nerve disords w/o CC	-51.80	294.3
43	Hypertensive encephalopathy	-60.63	1.0
80	Glaucoma procs	-50.32	49.5
87	Oth disords of the eye age <10	-60.97	47.8
174	Sleep apnoea	-50.14	5.5
235	Perm card p'maker impl w AMI,heart failure	-51.66	1.3
236	Perm card p'maker impl w/o AMI,heart failu	-57.59	211.5
237	Card p'maker revision exc device repl'mnt	-50.48	13.3
238	Card p'maker device repl'mnt	-51.39	33.5
257	Hypertension w CC	-64.86	23.8
264	Congenital heart disease age >9	-52.97	8.3
369	Hepatobiliary dx proc for non-malig	-56.29	11.0
370	Oth hepatobiliary or panc O.R. procs	-67.52	31.3
407	Biopsies of musculoskel syst & conn tissue	-54.90	73.8
427	Sprains, strains, & disloc of hip, pelvis	-54.48	12.5
435	Non-Sp'fic arthropathies	-51.28	42.0
486	Maj skin disords	-60.41	70.3
532	Nutrit & misc metabolic disords age >9 w/o	-54.38	133.5
579	Oth kidney & urinary tract dx age <10	-50.17	105.5
605	Testes procs, for malig w non-maj CC	-63.02	17.0
613	Oth male reprod syst O.R. proc exc for mal	-65.31	11.3
615	Benign prostatic hypertrophy w maj CC	-53.16	2.0
616	Benign prostatic hypertrophy w non-maj CC	-64.58	25.8
700	NN,died/trans <5 days of birth,born here,w	-96.73	1.0
775	Acute leuk w/o maj O.R. proc	-51.10	201.5
781	History of malig w/o endoscopy	-52.55	11.5
802	HIV related malig, age >9	-87.08	16.3
803	HIV related infection, age >9	-74.01	214.0
834	Disord of personality & impulse control	-56.21	47.8
838	Oth mental disord dx	-75.76	56.3
851	Opioid abuse or dependence	-64.31	11.3
852	Cocaine or other drug abuse or dependence	-73.86	1.0
876	Oth dx of multip signif trauma	-51.20	6.0

Number of DRGs = 33

*Non-integer values due to mean substitution of case costs for hospitals reporting <5 months of data.

APPENDIX I

Percent Change in Average Cost for DRGs with > 1000 Cases

DRG	Description	Percent Change	N of Cases*
185	Bronchitis & asthma age >9	-9.80	1041.5
186	Bronchitis & asthma age <10	-10.09	2208.8
250	Circ disord exc AMI, w invas card invest p	-26.48	1504.8
252	Heart failure & shock	19.59	1190.0
270	Unstable angina	16.66	1438.5
330	Oesoph'tis, gastroent & misc digest disord	-21.54	4300.5
331	Oesoph'tis, gastroent & misc digest disord	-11.96	1475.5
367	Cholecystectomy w/o CDE	-16.08	1111.0
484	Oth skin, subcutaneous tissue & breast pro	5.81	1202.5
565	Admit for renal dialysis	-.54	7032.0
645	Uter & adnex proc for non-malig	-2.60	1738.5
646	D&C, conization, vagina, cervix & vulva pr	-5.97	4438.0
673	Caes'n delivery w complicating dx w/o CC	-7.91	1163.3
674	Vag delivery w complicating dx	-18.73	3408.5
675	Vag delivery w/o complicating dx	-23.35	5900.3
683	Abortion w D&C, aspir'n curettage or hyste	-7.79	3011.0
685	Oth antepartum dx w complicating principal	-26.01	2565.0
686	Oth antepartum dx w/o complicating princip	-28.98	1178.0
727	NN,adm wt >2499g,w/o signif O.R. proc, w/o	-44.77	1338.3
753	Red blood cell disords age >9	-23.72	1825.0
780	Chemotherapy	29.71	7571.3
889	Poison & toxic effects of drugs age >9 w/o	-30.52	1136.0
934	Oth factors influencing health status	9.07	1266.5

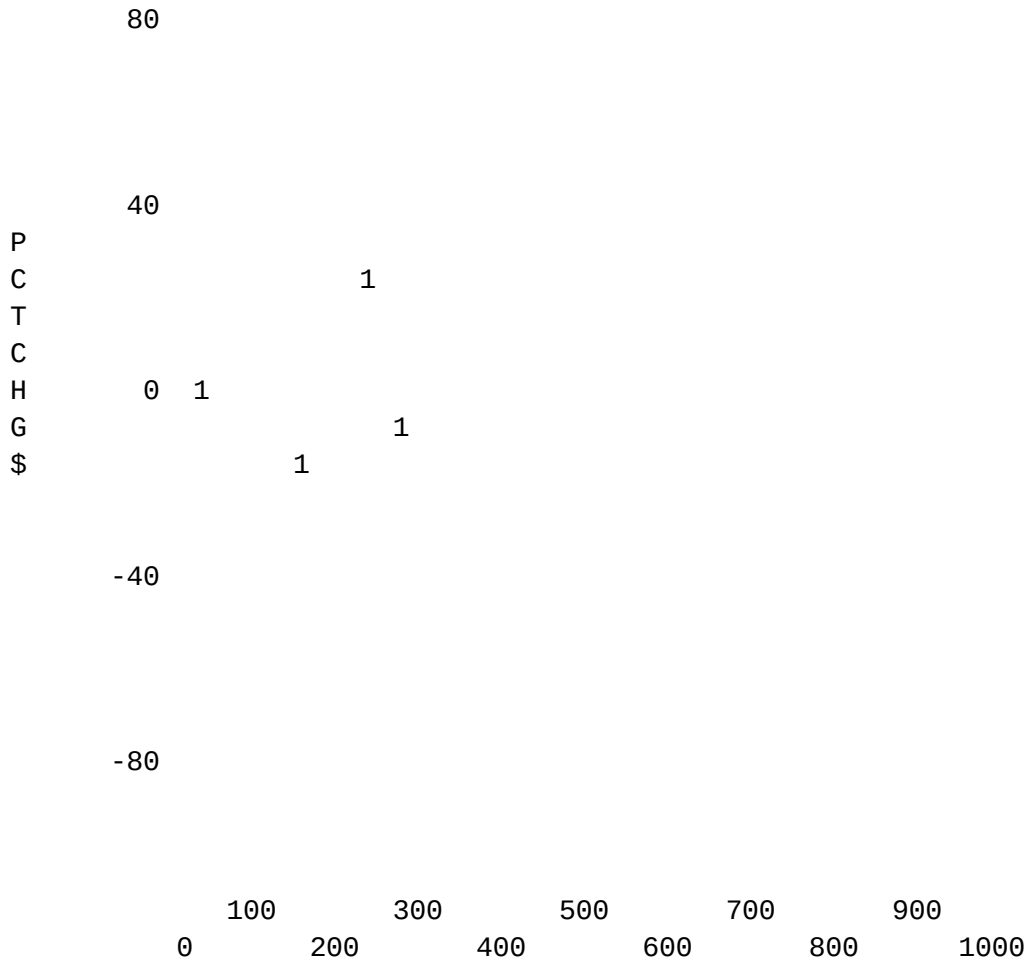
Number of DRGs = 23

*Non-integer values due to mean substitution of case costs for hospitals reporting <5 months of data.

APPENDIX J

MDC0: Pre-MDC DRGs

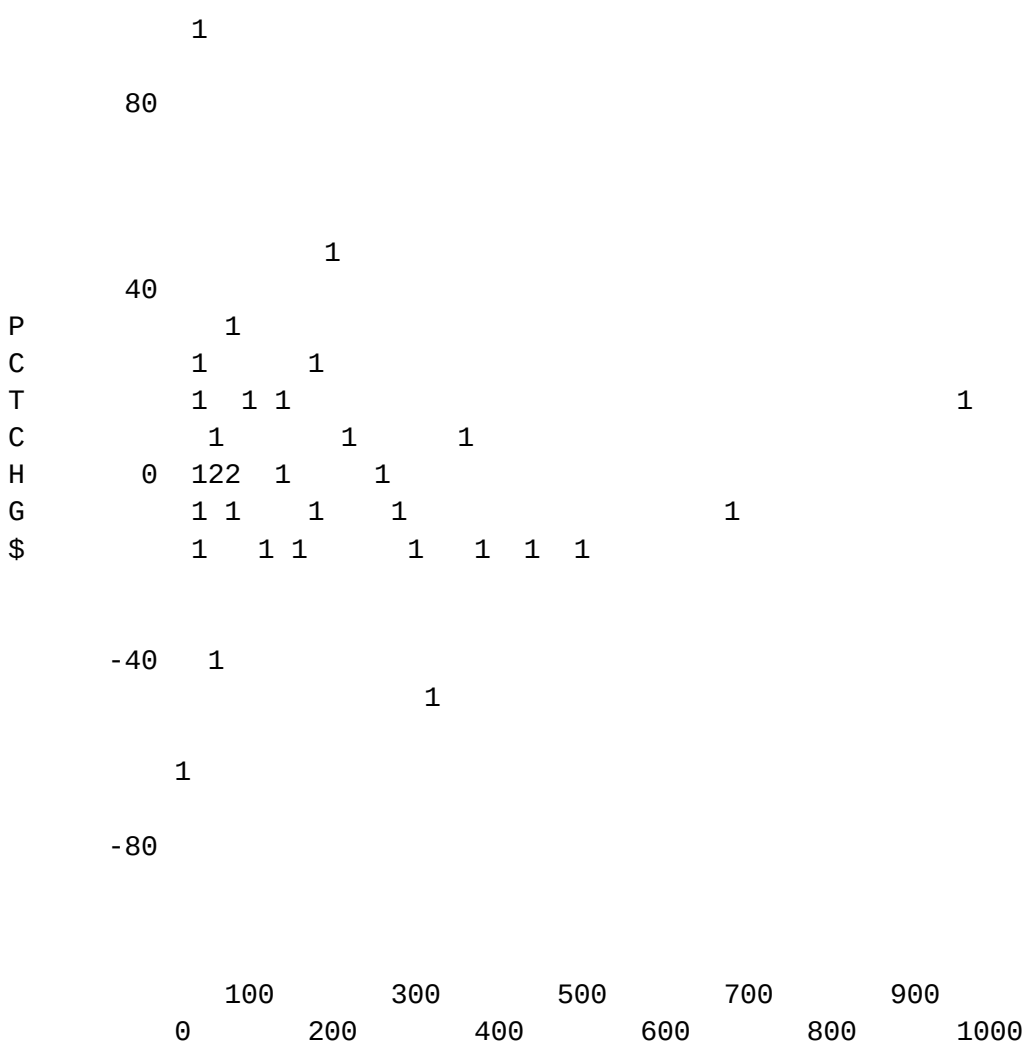
Plot of Percent Change in Cost with DRG Size (N of Cases)



4 of 6 DRGs included.

MDC 1: Diseases and Disorders of the Nervous System

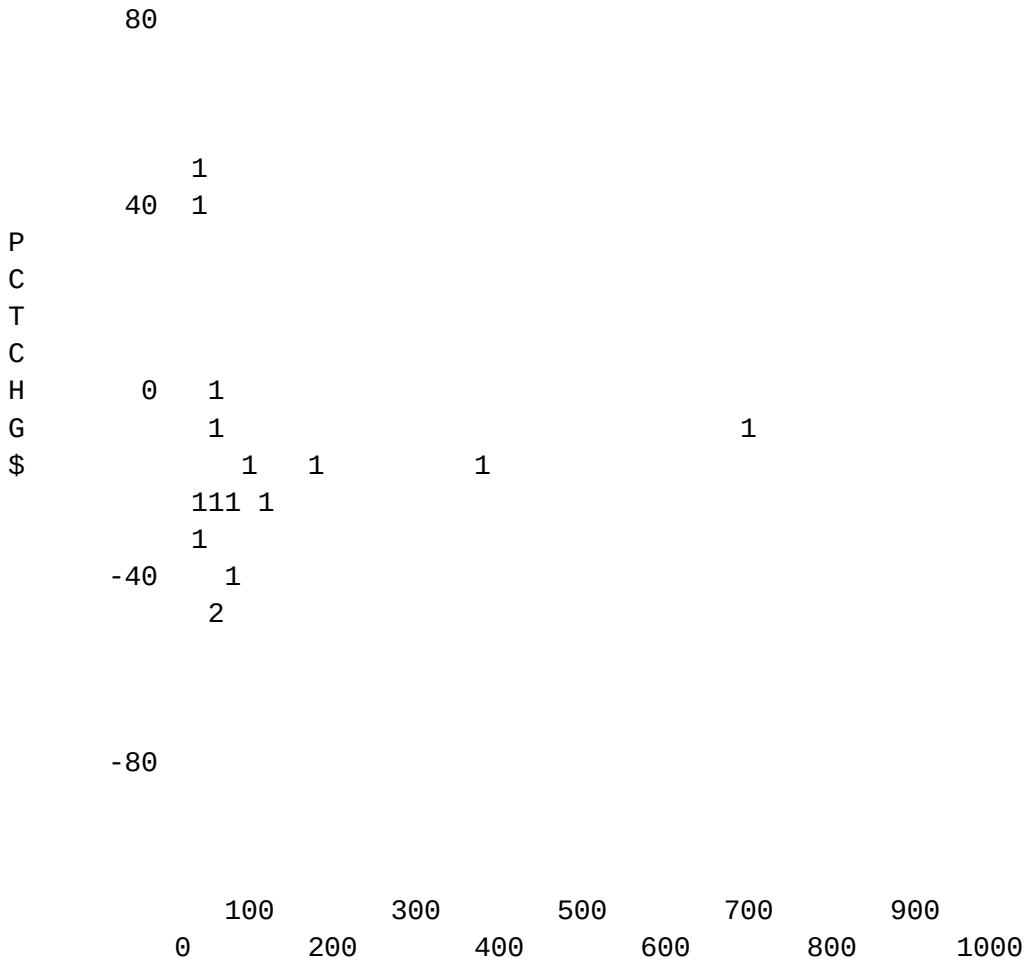
Plot of Percent Change in Cost with DRG Size (N of Cases)



34 of 35 DRGs included.

MDC2: Disease and Disorders of the Eye

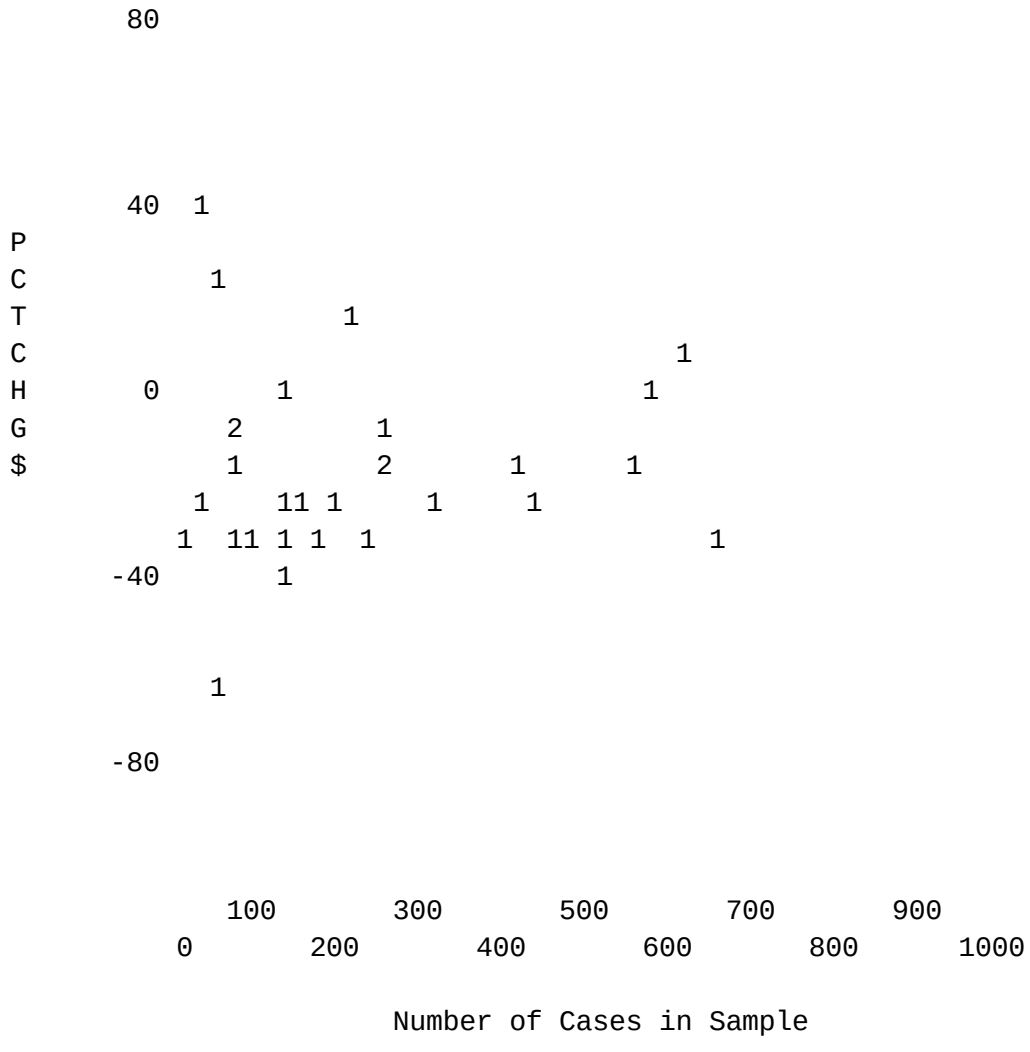
Plot of Percent Change in Cost with DRG Size (N of Cases)



16 of 18 DRGs included.

MDC3: Diseases and Disorders of the Ear, Nose, Mouth and Throat

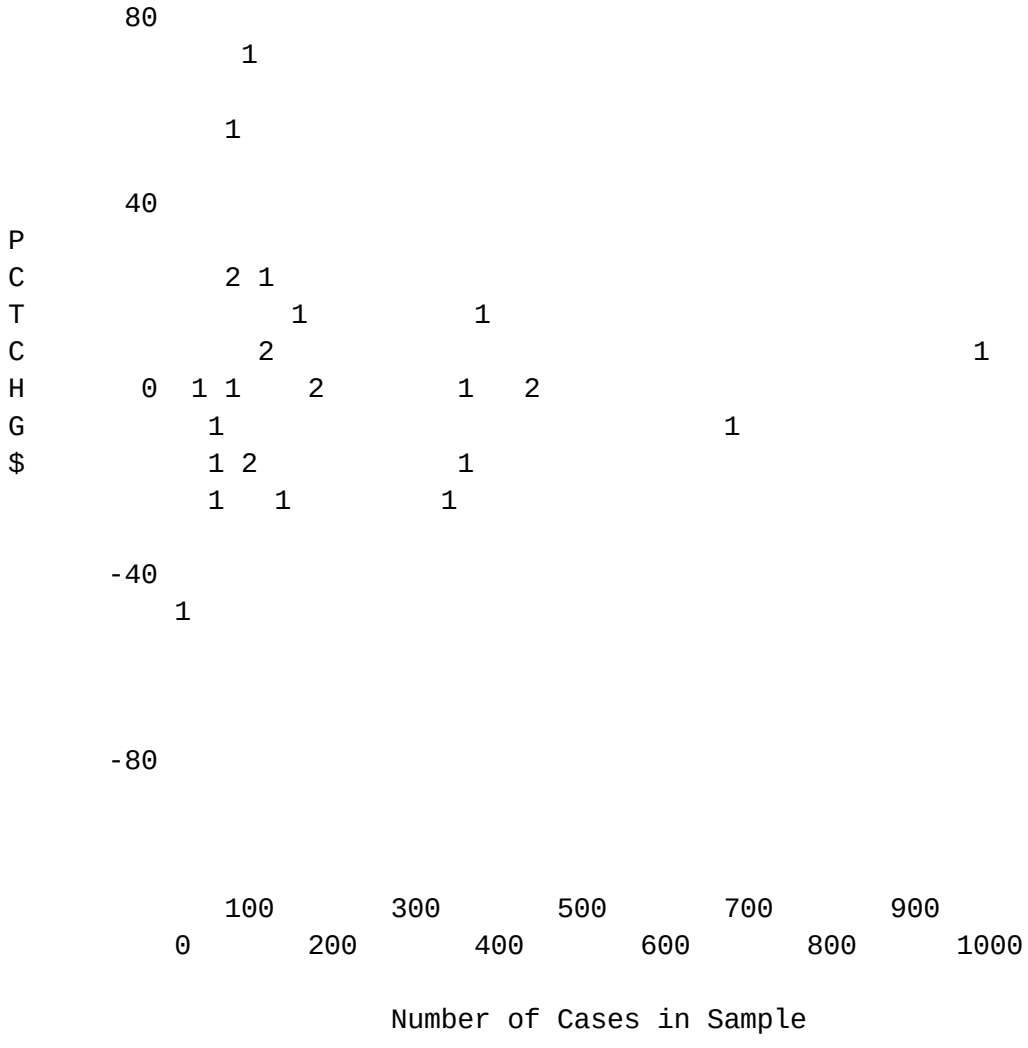
Plot of Percent Change in Cost with DRG Size (N of Cases)



29 of 30 DRGs included.

MDC4: Disease and Disorders of the Respiratory System

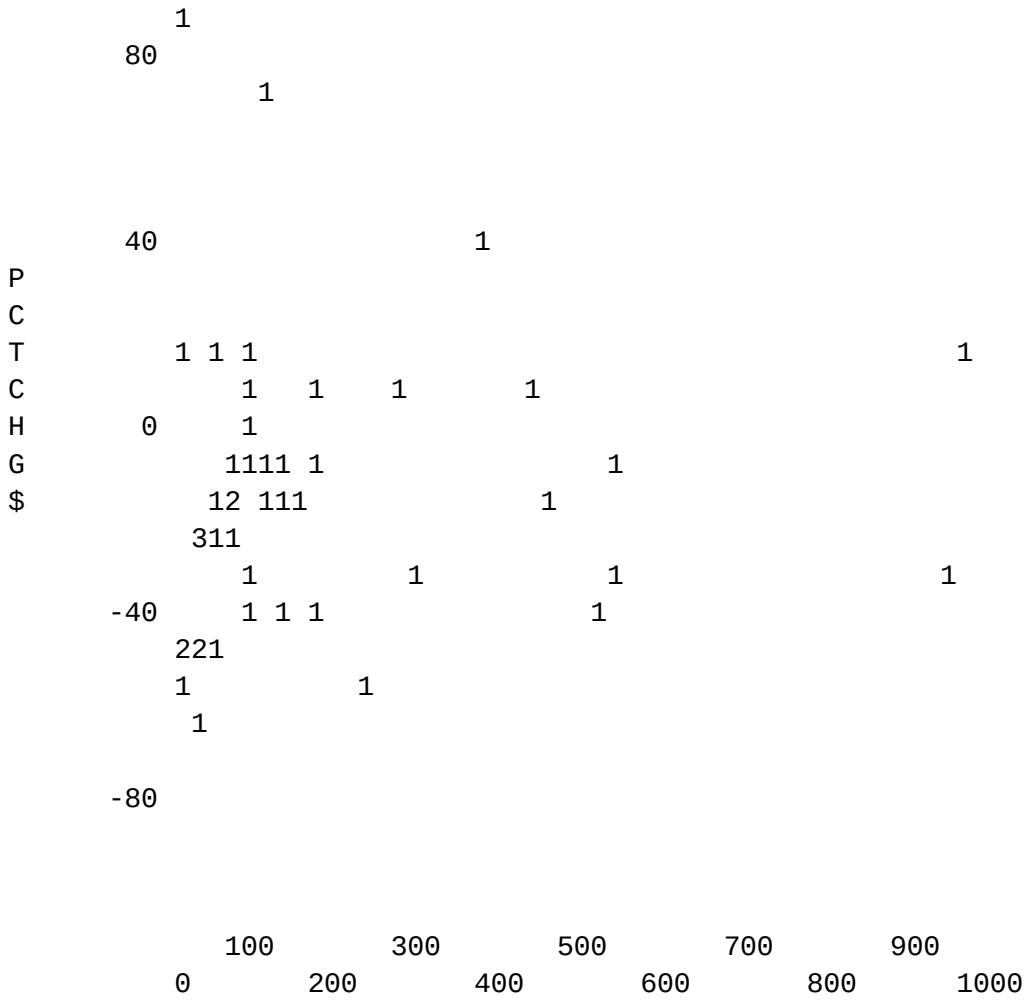
Plot of Percent Change in Cost with DRG Size (N of Cases)



27 of 32 DRGs included.

MDC5: Diseases and Disorders of the Circulatory System

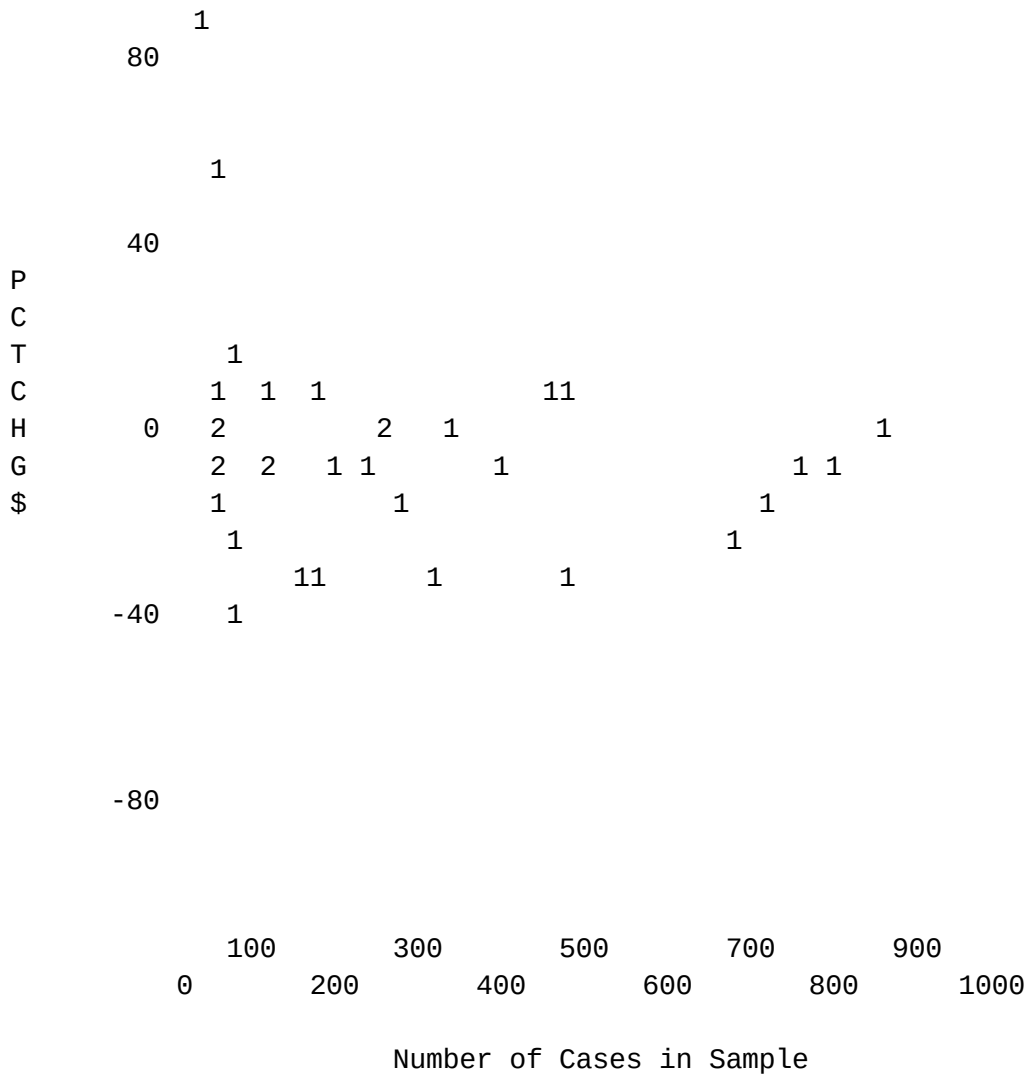
Plot of Percent Change in Cost with DRG Size (N of Cases)



46 of 53 DRGs included.

MDC6: Diseases and Disorders of the Digestive System

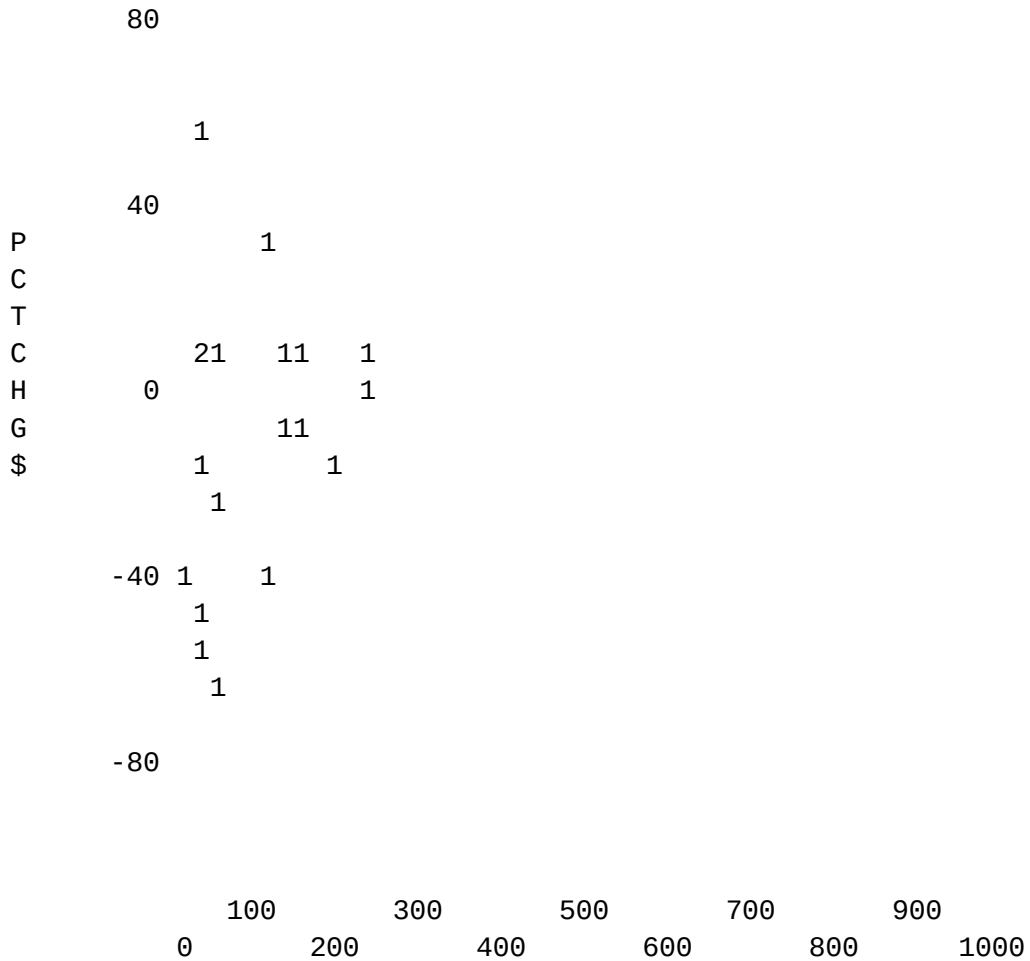
Plot of Percent Change in Cost with DRG Size (N of Cases)



33 of 35 DRGs included.

MDC7: Diseases and Disorders of the Hepatobiliary System and Pancreas

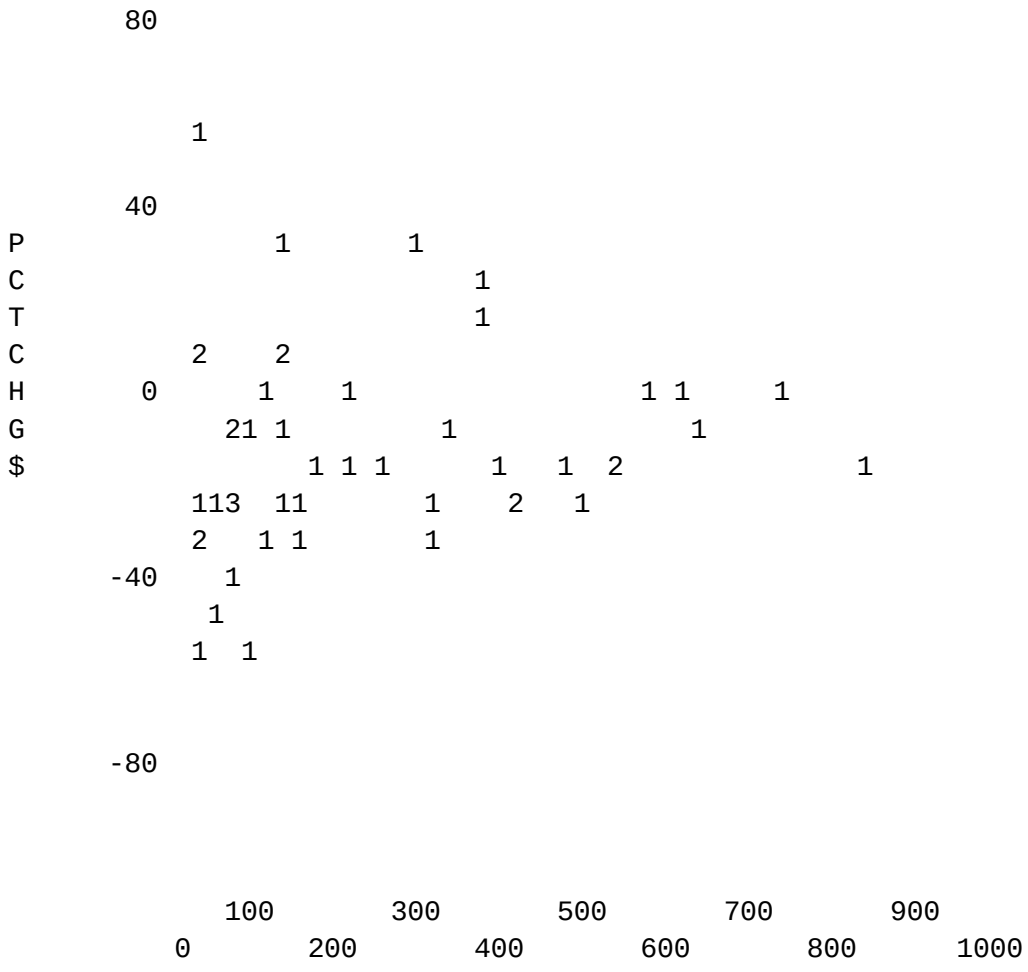
Plot of Percent Change in Cost with DRG Size (N of Cases)



19 of 20 DRGs included.

MDC8: Disease and Disorders of the Musculoskeletal System and Connective Tissue

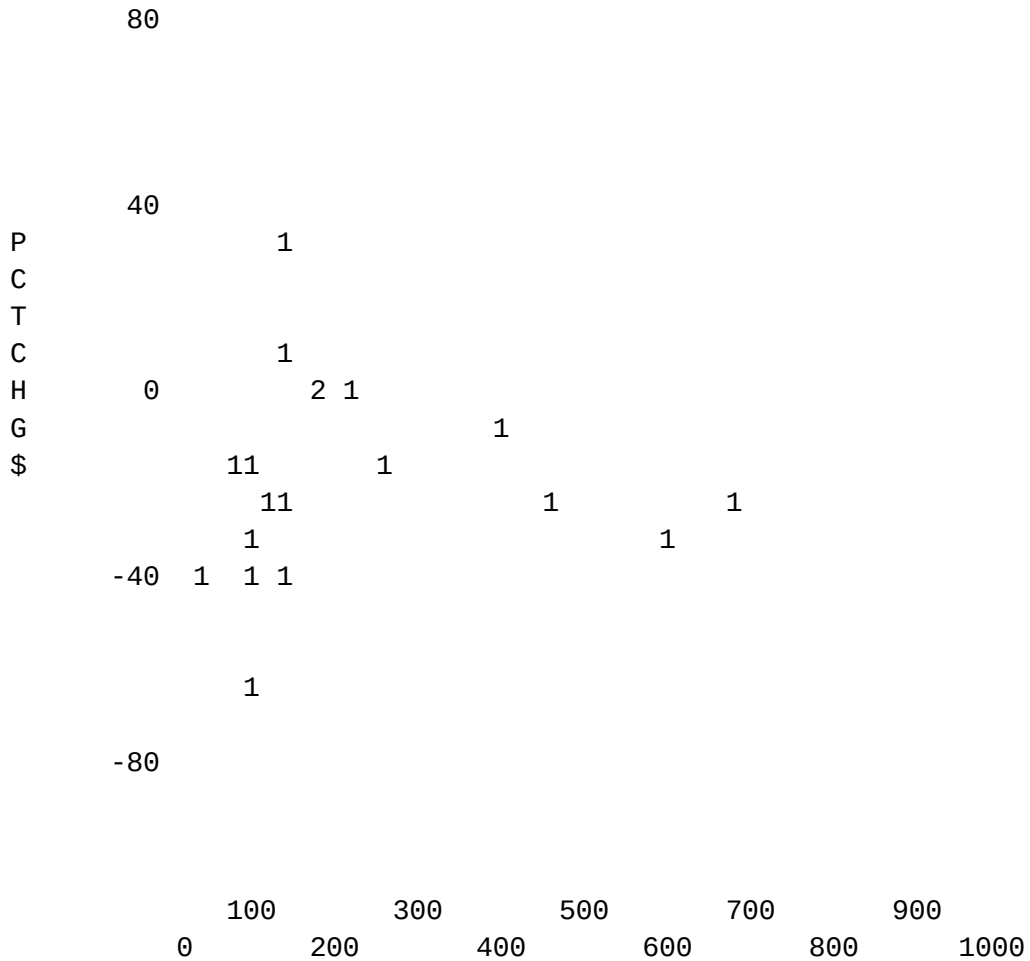
Plot of Percent Change in Cost with DRG Size (N of Cases)



48 of 49 DRGs included.

MDC9: Diseases and Disorders of the Skin, Subcutaneous Tissue and Breast

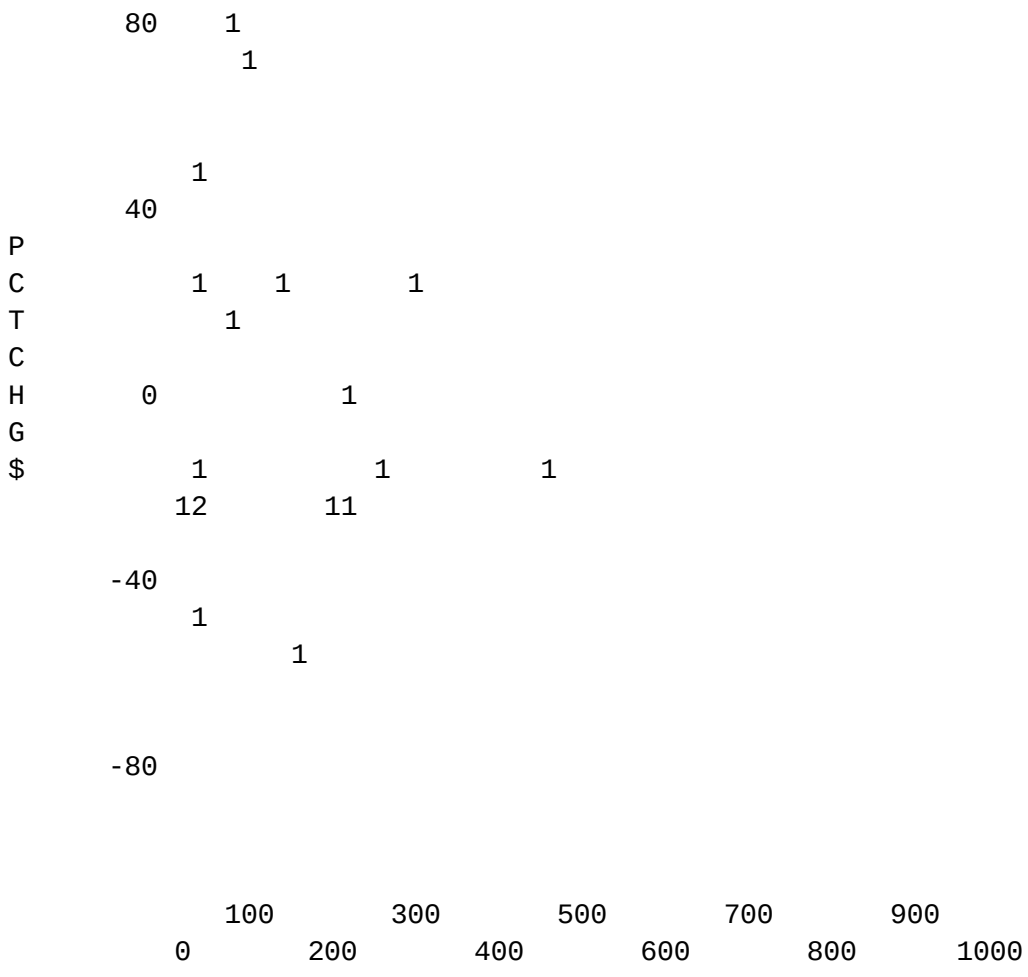
Plot of Percent Change in Cost with DRG Size (N of Cases)



19 of 20 DRGs included.

MDC10: Endocrine, Nutritional and Metabolic Diseases and Disorders

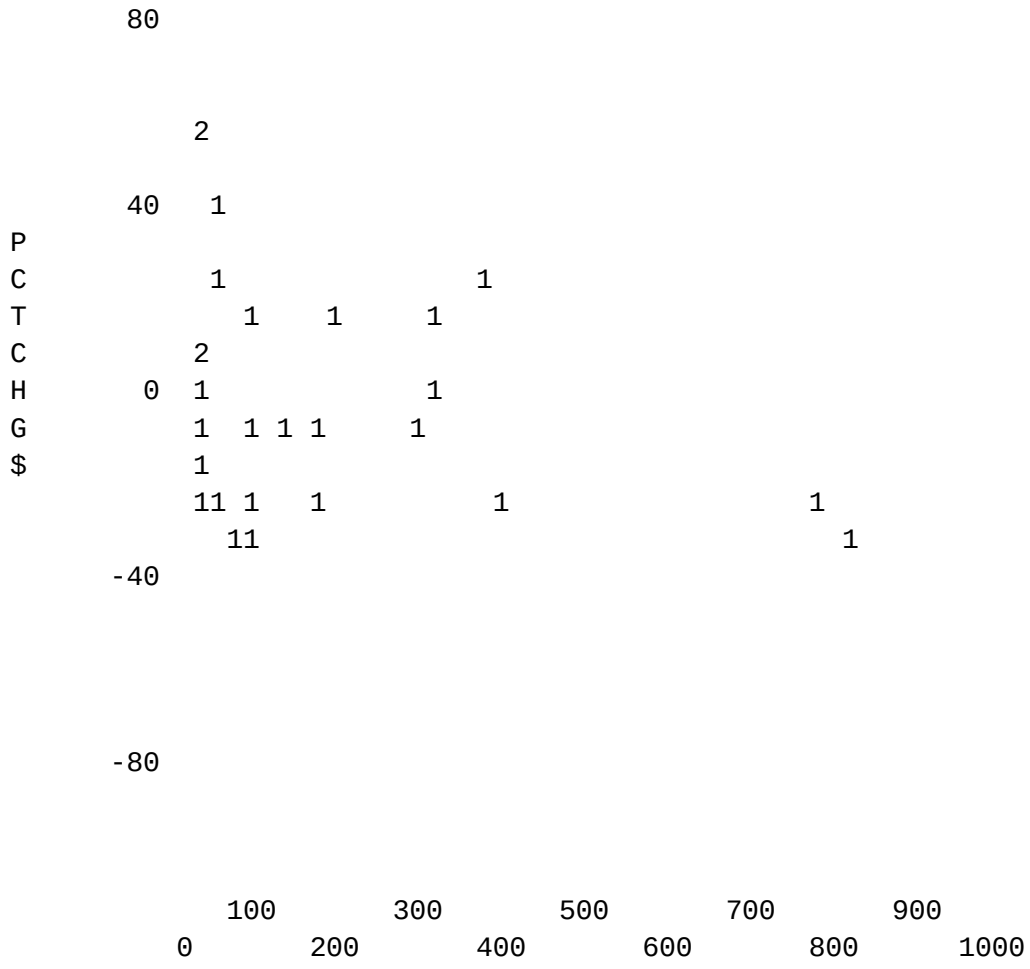
Plot of Percent Change in Cost with DRG Size (N of Cases)



18 of 18 DRGs included.

MDC11: Diseases and Disorders of the Kidney and Urinary Tract

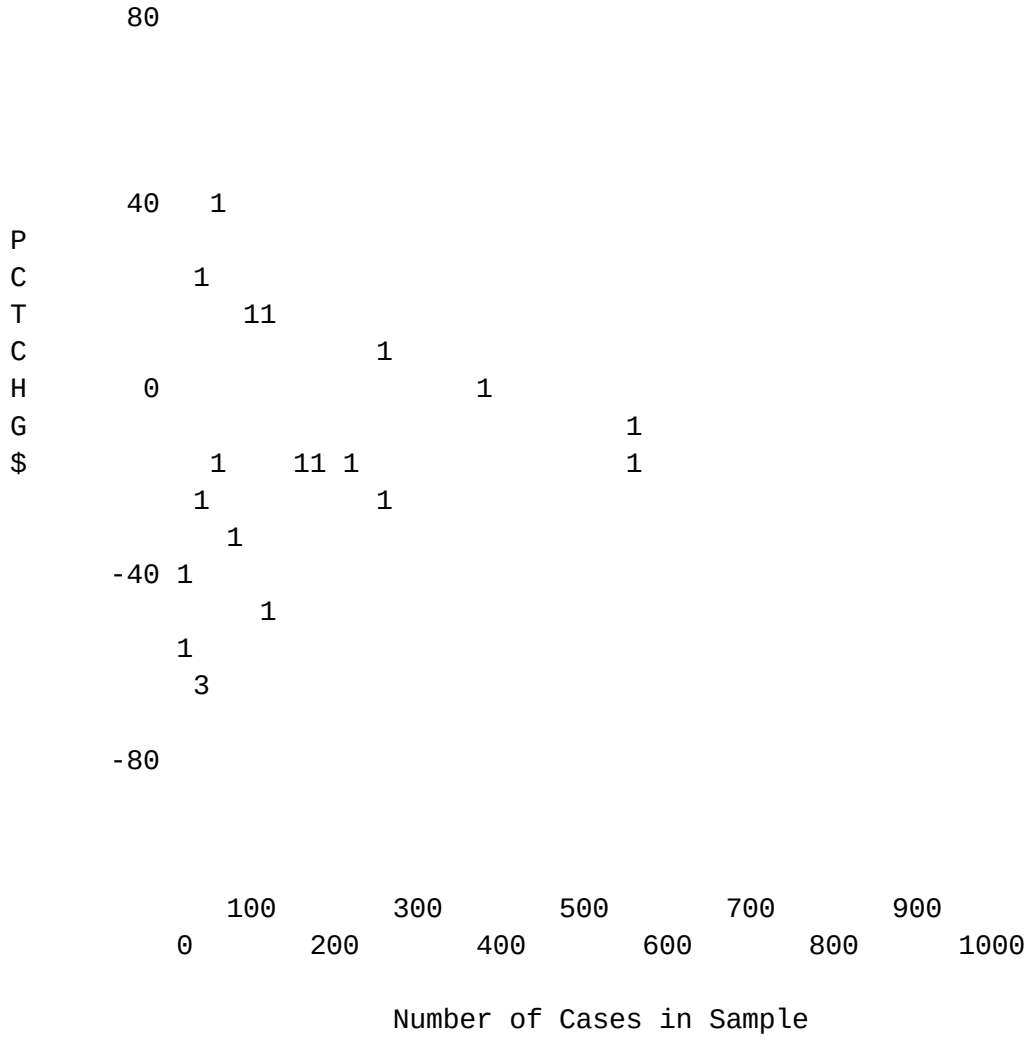
Plot of Percent Change in Cost with DRG Size (N of Cases)



27 of 30 DRGs included.

MDC12: Diseases and Disorders of the Male Reproductive System

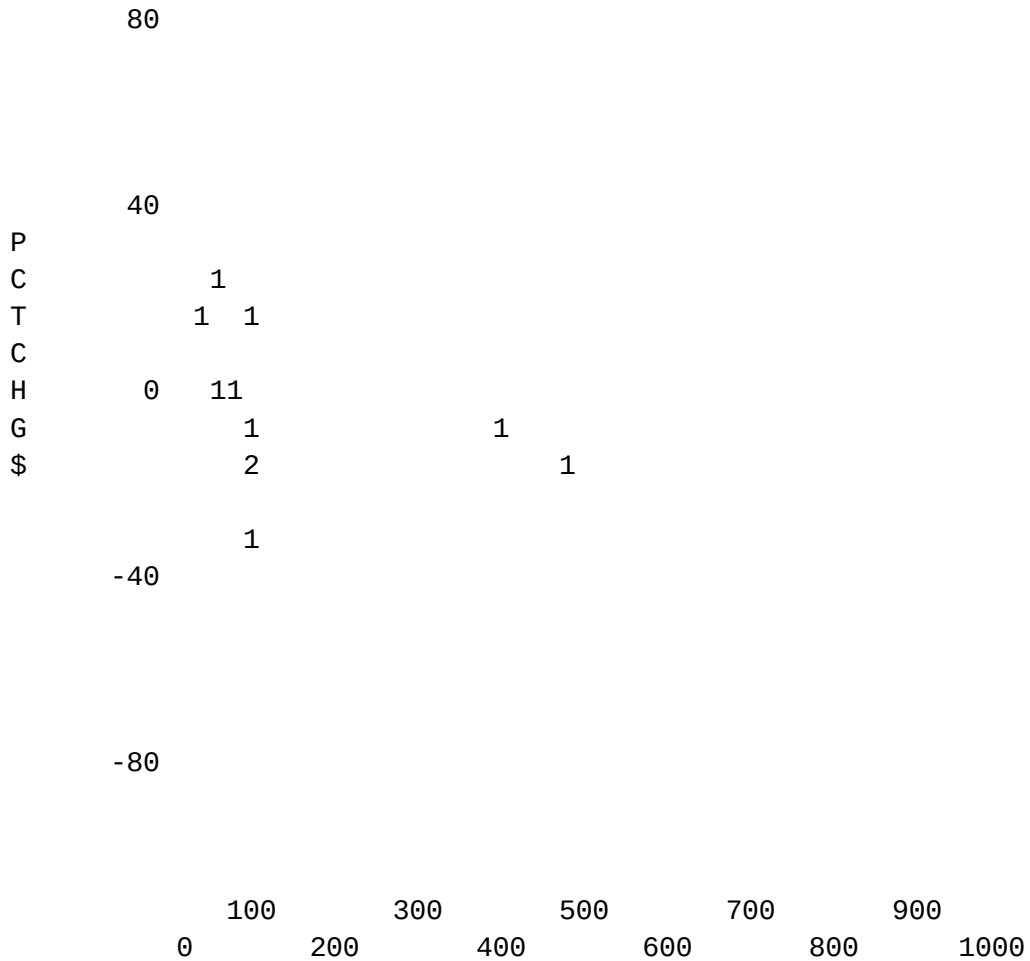
Plot of Percent Change in Cost with DRG Size (N of Cases)



21 of 21 DRGs included.

MDC13: Diseases and Disorders of the Female Reproductive System

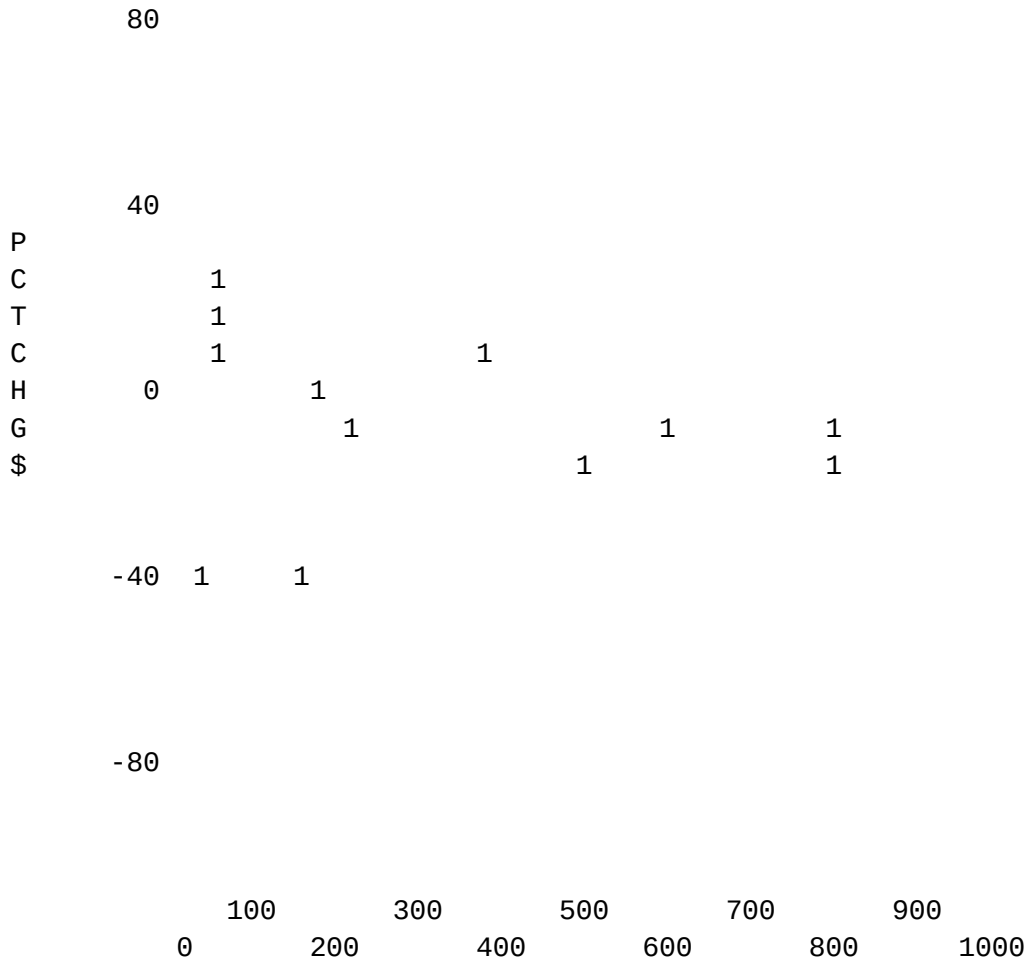
Plot of Percent Change in Cost with DRG Size (N of Cases)



11 of 13 DRGs included.

MDC14: Pregnancy, Childbirth and the Puerperium

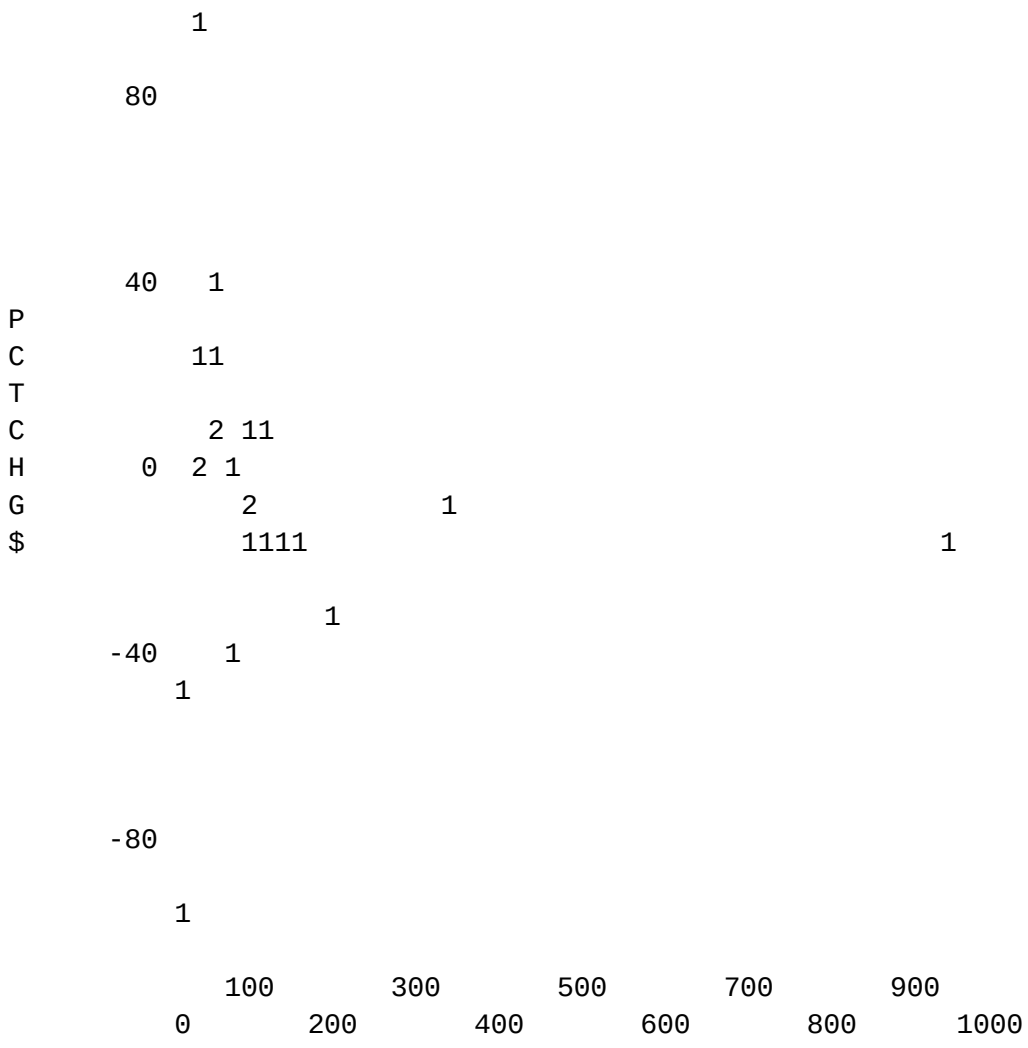
Plot of Percent Change in Cost with DRG Size (N of Cases)



12 of 17 DRGs included.

MDC 15: Newborns and Other Neonates with Conditions Originating in the Perinatal Period

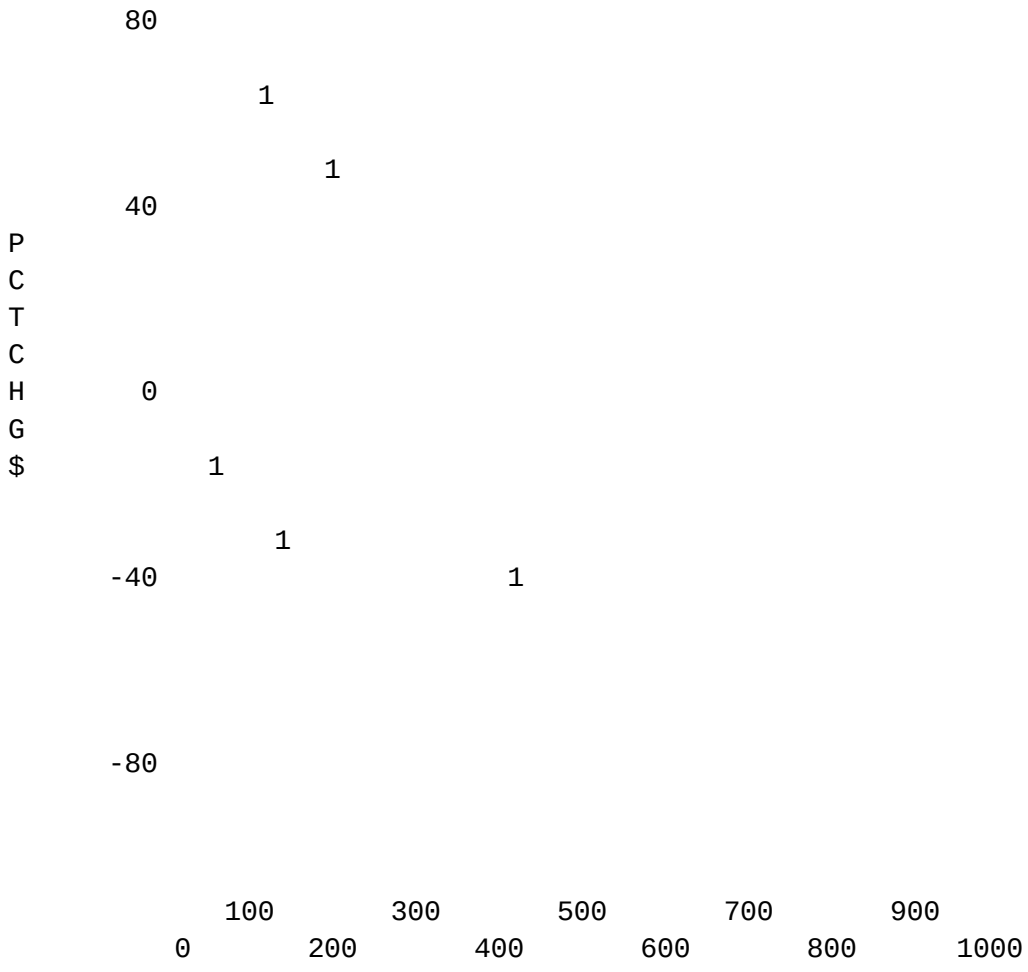
Plot of Percent Change in Cost with DRG Size (N of Cases)



23 of 28 DRGs included.

MDC16: Diseases and Disorders of the Blood and Blood Forming Organs and Immunological Disorders

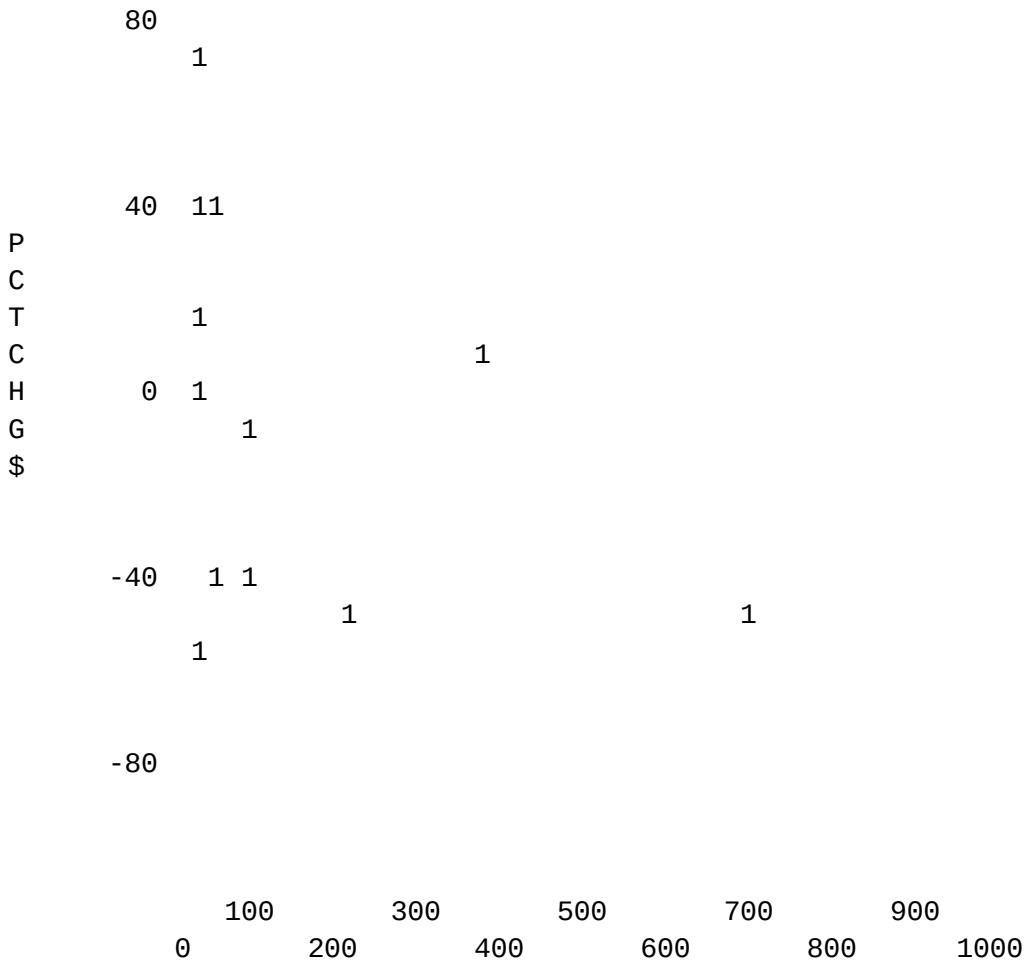
Plot of Percent Change in Cost with DRG Size (N of Cases)



5 of 9 DRGs included.

MDC17: Myeloproliferative Diseases and Disorders, and Poorly Differentiated Neoplasms

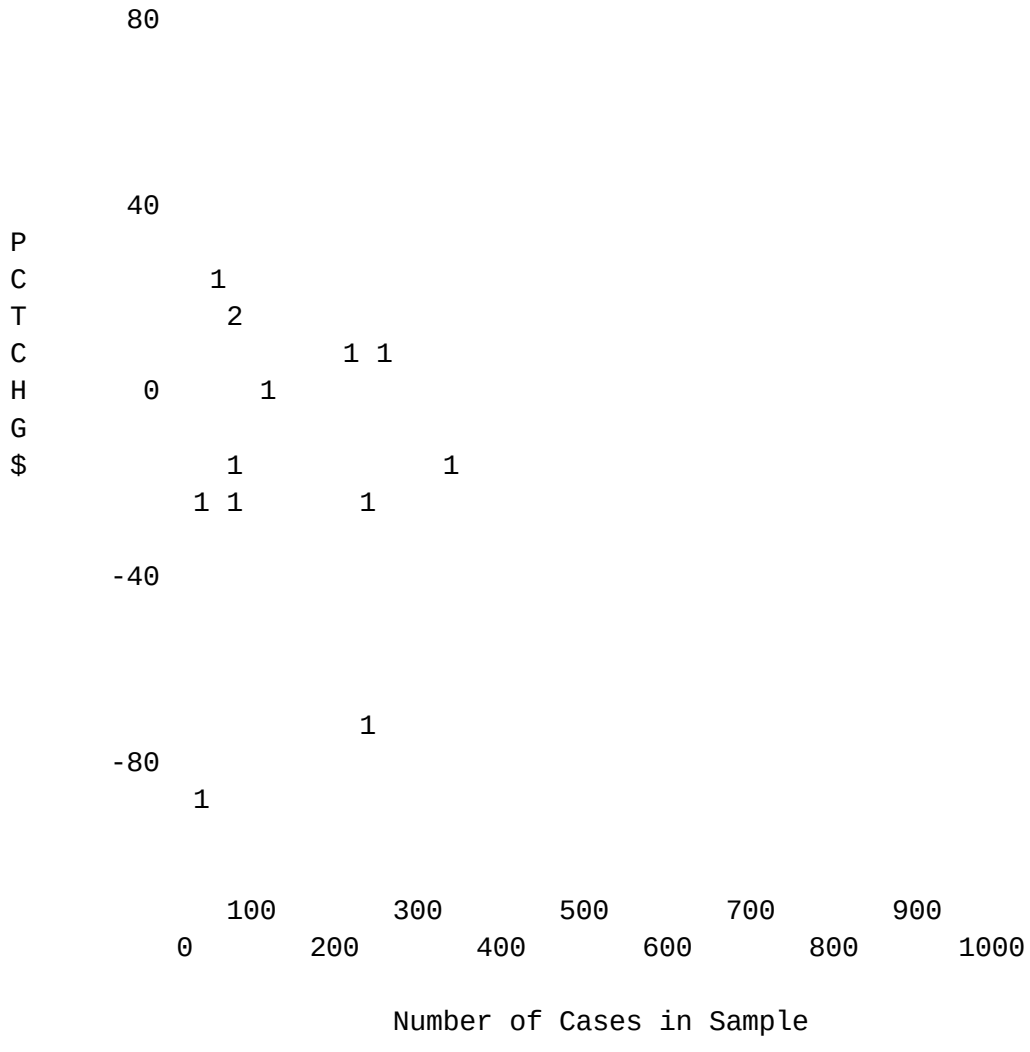
Plot of Percent Change in Cost with DRG Size (N of Cases)



12 of 15 DRGs included.

MDC18: Infectious and Parasitic Diseases (Systemic or Unspecified Sites)

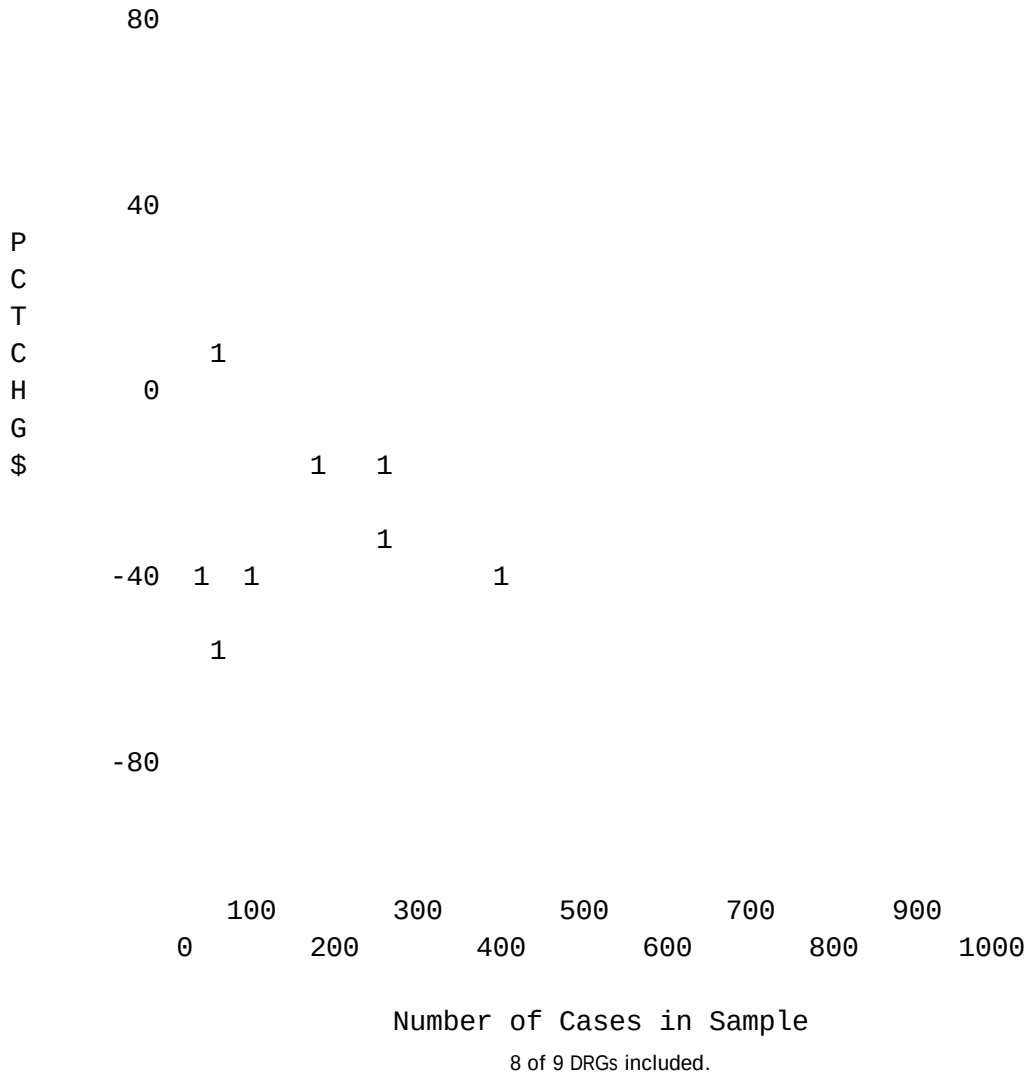
Plot of Percent Change in Cost with DRG Size (N of Cases)



13 of 18 DRGs included.

MDC19: Mental Diseases and Disorders

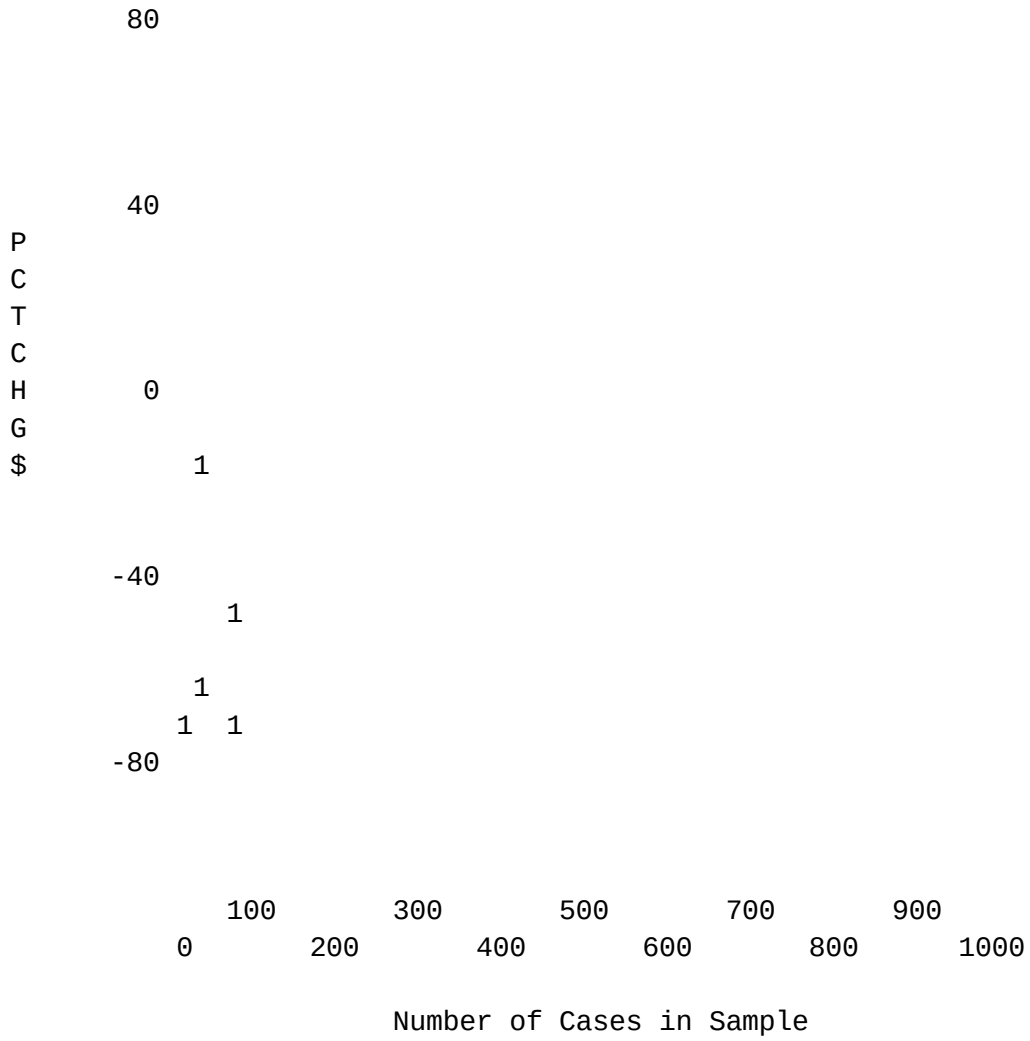
Plot of Percent Change in Cost with DRG Size (N of Cases)



8 of 9 DRGs included.

MDC20: Alcohol/Drug Use and Alcohol/Drug Induced Organic Mental Disorders

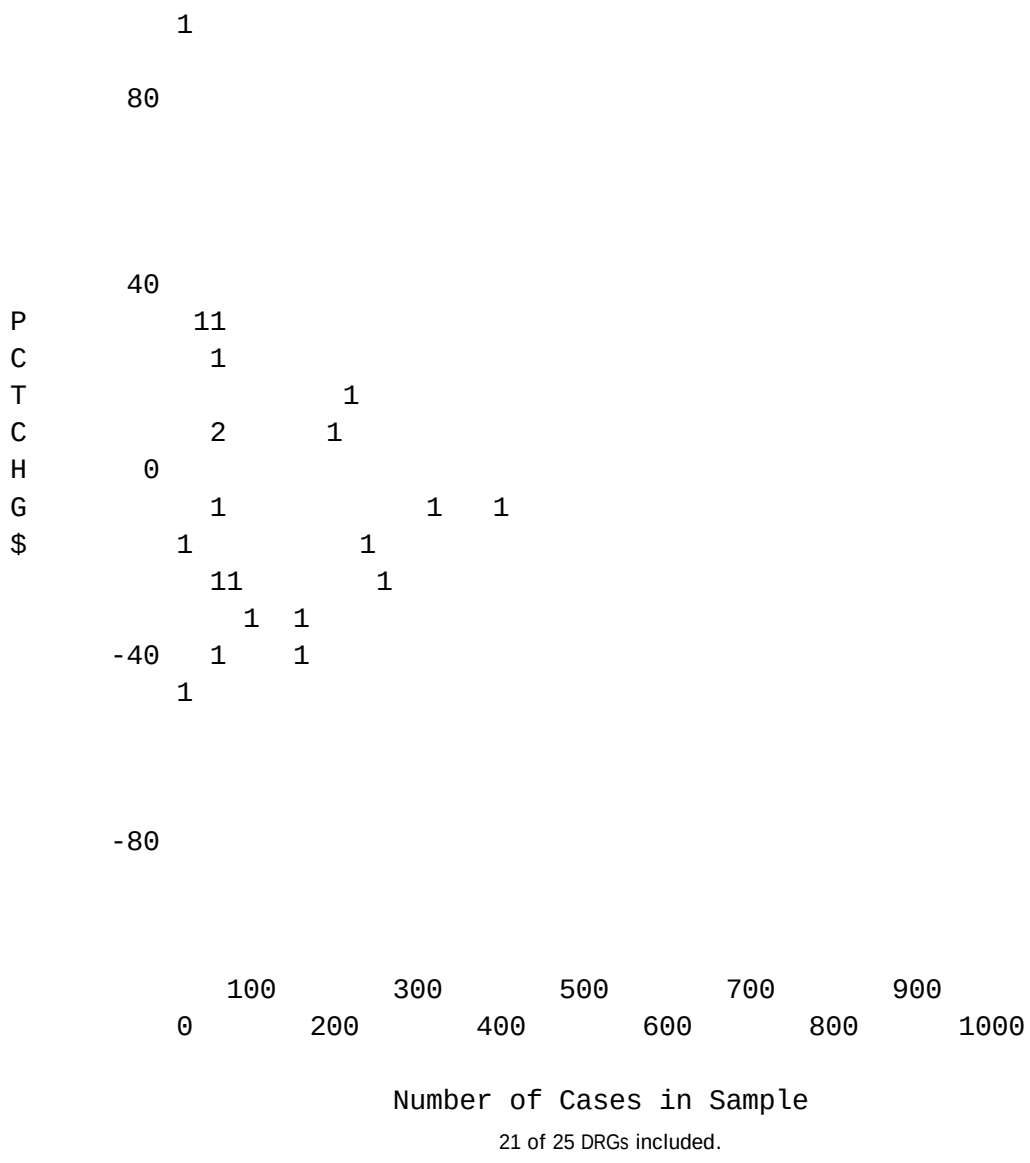
Plot of Percent Change in Cost with DRG Size (N of Cases)



5 of 6 DRGs included.

MDC21: Injuries, Poisonings and Toxic Effects of Drugs

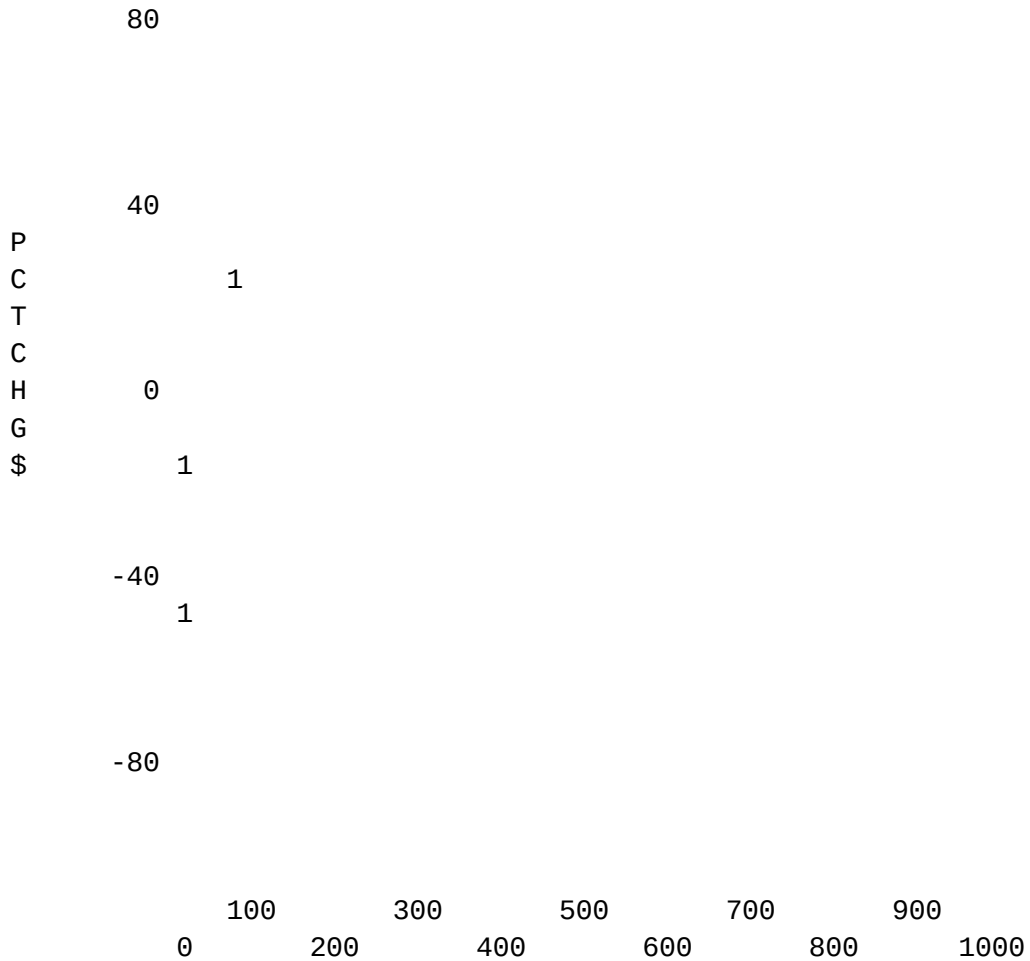
Plot of Percent Change in Cost with DRG Size (N of Cases)



21 of 25 DRGs included.

MDC22: Burns

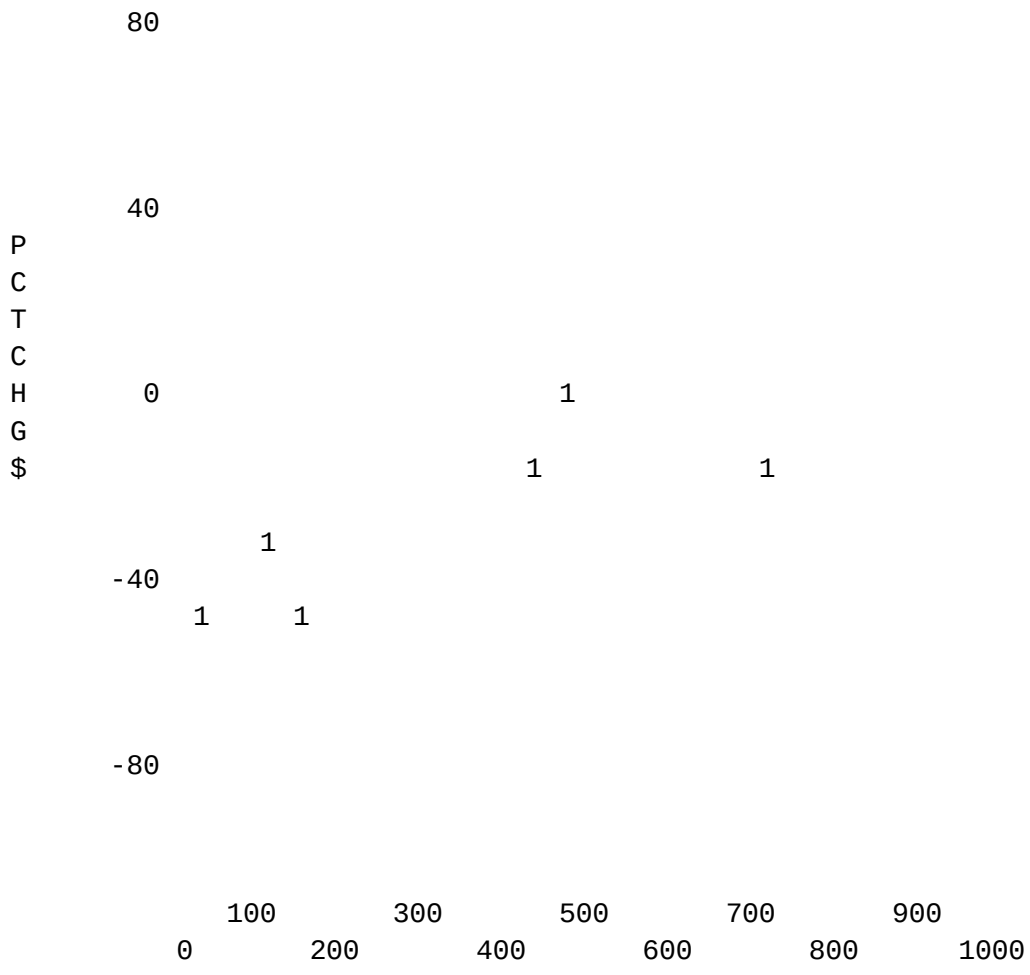
Plot of Percent Change in Cost with DRG Size (N of Cases)



3 of 6 DRGs included.

MDC23: Factors Influencing Health Status and Other Contacts with Health Services

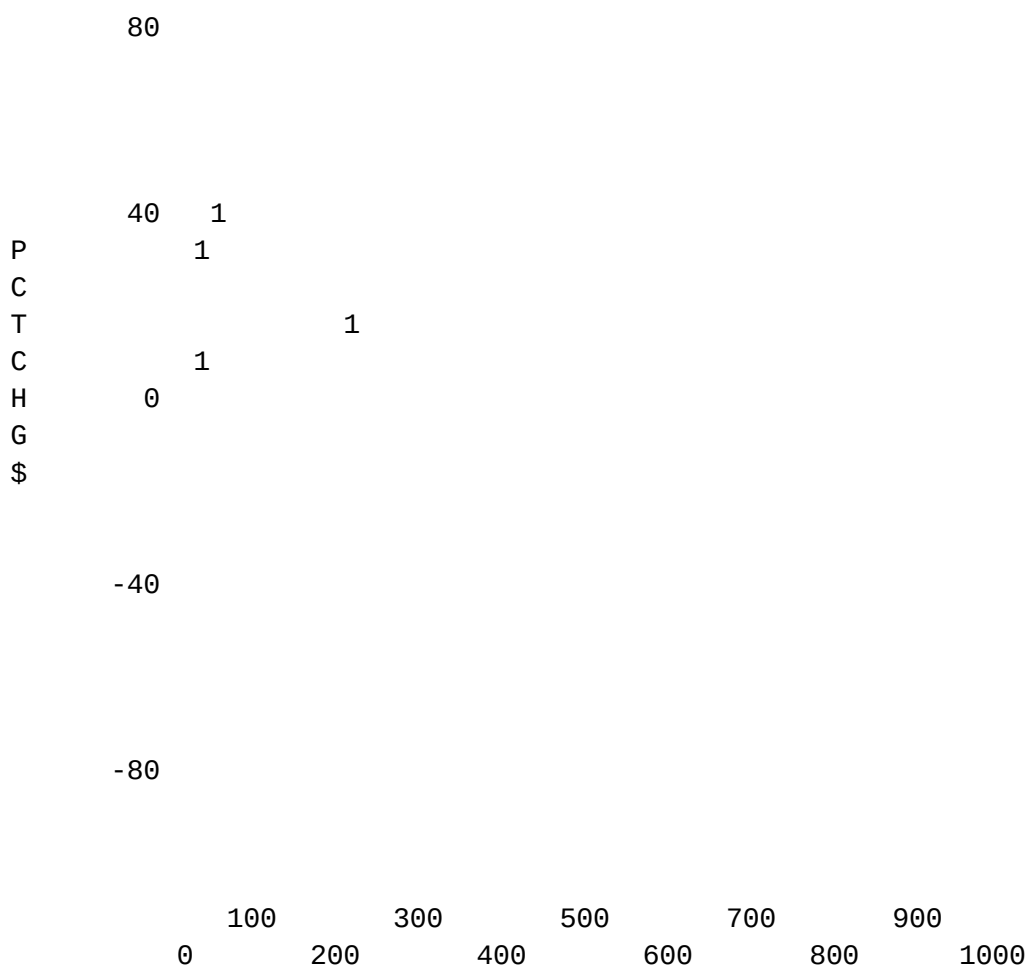
Plot of Percent Change in Cost with DRG Size (N of Cases)



6 of 8 DRGs included.

MDC24: Error DRGs

Plot of Percent Change in Cost with DRG Size (N of Cases)



4 of 5 DRGs included.

APPENDIX K

DRGs with > 50% of Cases Trimmed Out

DRG	Description	% Tr Out	N of Inlier Cases*
29	Spinal disords & injuries	52.48	16.8
33	Multiple sclerosis & cerebellar ataxia	56.47	95.0
43	Hypertensive encephalopathy	66.67	1.0
323	Complicated peptic ulcer w CC	52.86	26.8
428	Osteomyelitis	52.78	57.3
816	Oth infectious & parasitic diseases dx w C	70.59	10.0
833	Neuroses exc depressive	53.62	46.5
834	Disord of personality & impulse control	52.96	47.8
837	Childhood mental disords	50.74	25.0
910	Burns, transf to another acute care facili	89.47	2.0

Number of DRGs = 10

*Non-integer values due to mean substitution of case costs for hospitals reporting <5 months of data.