Using endoscopic procedures for AN-DRG assignment: Australia leads the way

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Abstract

The study reported in this article sought to develop Australian National Diagnosis Related Groups (AN-DRGs) using endoscopic procedures in Major Diagnostic Category (MDC) 6 (Digestive System) and MDC 7 (Hepatobiliary System and Pancreas) through statistical analysis of the Australian Casemix Clinical Committee's recommendations. Five ANOVA were undertaken on final recommendations for gastroscopy and colonoscopy in MDC 6. The Reduction in Variance (RIV) for the AN-DRGs in version 3 relative to version 2 increased by up to 14.6%, representing RIV of between 25.28% to 32.30%. For all ANOVAs, F>100, alpha < .0001, Coefficient of Variation (CV) was generally lower in version 3 by between 0.4% to 22.9%, except for AN-DRGs for other gastroscopy for major gastro-intestinal disease, which increased by 8.7%. Two ANOVA for Endoscopic Retrograde Cholangio-pancreatography Procedures (ERCP) recommendations resulted in RIV of up to 18.67%, F>100, alpha < .0001 and CV up to 0.8091. MDC 6, in AN-DRG versions 3 and 3.1, has 11 AN-DRGs following the surgical hierarchy involving gastroscopy and colonoscopy. Patients assigned will not have an operating room procedure; they will have a non-operating room procedure that is either a complex therapeutic or other (diagnostic or therapeutic) procedure. Similar AN-DRGs are in MDC 7 for

ERCP. Version 3.1 has expanded the definition of Common Bile Duct Exploration (CDE) to include ERCP. There is no separate AN-DRG for laparoscopy cholecystectomy.

Introduction

The Australian Casemix Clinical Committee (ACCC) was established in 1990 by the Australian Health Ministers' Advisory Council to coordinate the clinical evaluation of DRGs. During December 1993, the ACCC completed its evaluation of the second version of AN-DRGs and presented recommendations for version 3 to the then Commonwealth Department of Human Services and Health. The Casemix Branch of the Department of Human Services and Health analysed these recommendations, with input from a Technical Reference Group. The aim was to ensure that AN-DRGs are suitable for a range of purposes, including hospital payment, management, quality assurance and utilisation review. This article focuses on classification revisions using endoscopic procedures as classification parameters for AN-DRGs in MDC 6 (Digestive System) and MDC 7 (Hepatobiliary System and Pancreas). Endoscopic therapeutic procedures are performed as alternatives to surgical treatment of several disorders of the digestive system. However, AN-DRGs version 2 classified such admissions in the medical partitioning into AN-DRGs which include admissions with no therapeutic procedures. This results in a systematic bias against those hospitals which provide endoscopic procedures, as the additional cost of treatment can be considerable.

The ACCC noted that there was a significant cost difference in colonoscopy and gastroscopy therapeutic procedures. The complexity of the procedures was also considered to be a significant influence on cost and differential risk of morbidity and mortality. The ACCC therefore recommended the creation of new AN-DRGs for gastroscopy and colonoscopy procedures in the medical partition of MDC 6 and therapeutic Endoscopic Retrograde Cholangio-pancreatography Procedures (ERCP) in the medical partition of MDC 7. It also recommended creating a new DRG, Laparoscopic Cholecystectomy, and expanding the definition of Common Bile Duct Exploration (CDE) to include ERCP therapeutic procedures. This article covers statistical analyses of these ACCC recommendations, international casemix classification developments and the rationale for new AN-DRGs in versions 3 and 3.1.

Endoscopy procedures as classification parameters

The ACCC considered several alternatives to the structure in AN-DRGs version 2 using both cost and length of stay data. The importance of distinguishing various types of therapeutic procedures, the influence of the principal diagnosis, complications and co-morbidities (CCs) were explored. The ACCC analysis found that for both MDC 6 and MDC 7, complications and co-morbidities are an important influence on average length of stay (ALOS).

Further, colonoscopy and gastroscopy therapeutic procedures should be distinguished since there is a significant difference in the cost of procedures. The principal diagnosis remains an important factor as average length of stay varies for principal diagnosis, although there appears to be primarily two groups, namely, AN-DRGs 320 to 328 (Major Digestive System Disease) and AN-DRGs 329 to 334 (Other Digestive System Disease). It is important to differentiate between complex and other ERCP therapeutic procedures because of cost differences and differential risk of morbidity/mortality. Further, use of the procedure for malignancy and the presence or not of complications and co-morbidities affects average length of stay. The ACCC report includes Recommendation 6.2, which was proposed by the Gastroenterology Clinical Group. It states that:

6.2.1 A new group of AN-DRGs be created for endoscopic therapeutic procedures in the medical partition of MDC 6:

i) Gastroscopy – Therapeutic for Major Digestive Disease with CC

ii) Gastroscopy – Therapeutic for Major Digestive Disease without CC

iii) Gastroscopy – Therapeutic for Other Digestive Disease with CC

iv) Gastroscopy – Therapeutic for Other Digestive Disease without CC

v) Colonoscopy – Therapeutic with CC

vi) Colonoscopy – Therapeutic without CC

6.2.2 New AN-DRGs be created for ERCP therapeutic procedures in the medical partition of MDC 7:

i) ERCP Complex Therapeutic Procedures with CC/for malignancy

ii) ERCP Complex Therapeutic Procedures without CC/not for malignancy

iii) ERCP Other Therapeutic Procedures with CC/for malignancy

iv) ERCP Other Therapeutic Procedures without CC/not for malignancy

International findings support the concept of using non-operating room procedures as casemix classification parameters. Using the presence or absence of complications and co-morbidities to subdivide groups of diagnoses into DRGs

does not necessarily adequately allow for severity of illness because of the limitations of complication and co-morbidity lists and since diagnosis codes often do not have the descriptive power to separate out high-cost groups of patients.

Hughes, Liechtenstein and Fetter (1990) recommended that some non-operating room procedure codes could serve as markers of more complicated illnesses and more costly admissions and be used as modifiers of medical DRGs. Such higher cost admissions may be due to high labour and/or equipment costs and because the procedure initiates an intensive process of care, particularly in expensive tertiary care hospitals.

Further, the procedure may be only performed on severely ill patients and thus serves as a marker for high resource-use patients; for example, non-operating room procedure of intubation or mechanical respiratory assistance used on patients for DRG 121 (Acute Myocardial Infarction), DRG 127 (Congestive Heart Failure) and DRG 89 (Pneumonia) (Hughes Liechtenstein & Fetter 1990). The crucial determinant of whether the procedure should be a DRG modifier is that the procedure is uniformly associated with a certain level of complexity. The authors identify the following criteria for procedure selection.

- The procedure should identify a group of high-cost patients who are severely ill. This high-cost group should be one that is not easily identified by specific diagnosis codes.
- The procedure should serve as a marker for severity of illness and complexity of care and should not be used only because it is expensive to perform.
- There should be consensus regarding the application and the indications for the procedure.
- There should be consensus on the timing of the procedure so that it cannot be bundled or unbundled in response to economic incentives. Scheduling of the procedure is rarely elective.
- There should be a minimum of perverse economic incentives that would result from having an increased payment associated with the procedures that have minimal inconvenience, discomfort or risk for the patient.

These selection criteria were applied to the ACCC recommendations, with reference to the Gastroenterologist Submission and medical advice. The ACCC recommendations would be generally endorsed. The only area of departure from the criteria relates to the scheduling of the procedure, which is generally elective.

Laparoscopic cholecystectomy

ACCC Recommendation 7.2 states that a new category be formed for laparoscopic cholecystectomy only (procedure code 5123) as a partition of AN-DRG 367 (Cholecystectomy w/o Common Bile Duct Exploration (CDE)). The ACCC indicated that version 2 AN-DRG 367 included both laparoscopic and open cholecystectomy. However, the former has a lower average length of stay but higher consumable costs. Laparoscopic cholecystectomy is increasingly being used as an alternative to open cholecystectomy and has resulted in a new DRG in the United States. Cases with laparoscopic cholecystectomy and a common bile duct procedure would still be classified into AN-DRG 365 (Cholecystectomy w CDE w CC) and AN-DRG 366 (Cholecystectomy w CDE w/o CC) where there would be no differentiation between the open and laparoscopic procedure.

Cholecystectomy with Common Bile Duct Exploration

ACCC Recommendation 7.3 states that the definition of CDE be expanded to include ERCP therapeutic procedures, such as endoscopic sphincterotomy. The definition of CDE in the AN-DRG version 2 grouper comprised open procedures only, excluding a variety of laparoscopic procedures which are often performed as an alternative to the open procedure. Under version 2 these cases were assigned to AN-DRG 367 (Cholecystectomy w/o CDE). ERCP is often performed immediately after cholecystectomy for complications such as pancreatitis, cholangitis or bile leak requiring longer length of stay and incurring additional costs of ERCP consumables of $1400. Of the 20 000 cases assigned to AN-DRG 367 (average length of stay of 7.8 days), approximately 500 cases included an ERCP with an average length of stay of 14 days. The average length of stay for AN-DRG 366 is 12.7 days and for AN-DRG 365 is 18.0 days.

Method

National hospital morbidity data for all public hospitals held by the Commonwealth Department of Human Services and Health for 1991–92 were used to analyse the ACCC recommendations. The statistical criteria used by the Commonwealth are as follows.

- Improved homogeneity: Two or three level partition of a group leads to at least 5% reduction in variance (RIV) and a large F statistic, approximately 100. Also, the impact of the partition on the overall system meets a minimum threshold and statistical significance.

- National group size: New groups that are created from an existing group contain at least 200 cases and at least 10% of the original group cases.
- Difference in resources: New groups that are created from an existing group differ in average length of stay by at least two days or at least 100% (the average length of stay of the higher group is at least twice that of the smaller group). Additionally, the 90% confidence interval for the new groups should be distinct (intervals do not overlap).
- New group homogeneity: New groups that are created from an existing group must have a coefficient of variation (CV) no higher than 1.3 times the CV of the original group (no more than 30% worse in internal variation).

The key results of the statistical analyses of ACCC recommendations utilising endoscopic therapeutic procedures for the medical partition of MDC 6 and MDC 7 are summarised in Table 1.

Results

Table 1: ANOVA results – Use of endoscopy procedures as classification parameters in MDC 6 and MDC 7

MDC rec no.	No. current DRGs	No. new DRGs	Old RIV	New RIV	RIV % difference	Old F	New F	F % difference	Old CV	New CV	CV % difference	Alpha
6.2.1 i-ii	9	11	24.89	25.61	+2.9	2537.26	2110.17	–16.8	0.5099	0.5081	–0.4	<.0001
6.2.1 iii-iv	7	9	29.59	30.06	+1.6	14328.9	10959.96	–23.5	0.4706	0.4608	–2.1	<.0001
6.2.1 v-vi	16	18	29.97	30.38	+1.4	7585.38	6822.79	–10.1	0.4465	0.4370	–2.1	<.0001
6.2.2 i-ii	9	11	18.47	18.67	+1.1	935.29	759.56	–18.8	0.8102	0.8027	–0.9	<.0001
6.2.2 iii-iv	9	11	18.47	18.62	+0.8	935.29	756.67	–19.1	0.8102	0.8091	–0.1	<.0001

Five separate ANOVA were undertaken to analyse these recommendations, using average length of stay as the dependent variable (Table 1). The RIV explained by the proposed version 3 structure for the analyses above ranged from 18.62% to 30.38%, representing an increase of between 0.8% and 2.9%. All F statistics exceeded 100, with alpha <.0001. The CV was lower by up to 2.1% in the new structure relative to the version 2 AN-DRG structure so that the criteria for new group homogeneity were easily met. There was generally little inappropriate overlap of confidence intervals for average length of stay and all group sizes exceeded 200. However, some overlap of confidence intervals occurred for Recommendation 6.2.1 v-vi (Colonoscopy) for four same-day AN-DRGs.

The Technical Reference Group endorsed all the recommendations relating to Gastroscopy and ERCP but did not agree with the recommendations for colonoscopy. The Group argued that the diagnostic and therapeutic endoscopic procedure codes could both be used in defining the new DRGs for colonoscopy. The proposals could be modified to differentiate between 'extensive therapeutic endoscopic procedures' and 'other endoscopic procedures' (therapeutic and diagnostic). The ACCC endorsed this revision and further recommended that gastroscopy also be defined by both diagnostic and therapeutic endoscopic procedure codes. The ACCC requested that the Commonwealth analyse the revised Recommendation 6.2.1 as follows.

6.2.1

i) Extensive Therapeutic Gastroscopy for major GI disease with CC

ii) Extensive Therapeutic Gastroscopy for major GI disease without CC

iii) Extensive Therapeutic Gastroscopy for non-major GI disease with CC

iv) Extensive Therapeutic Gastroscopy for non-major GI disease without CC

v) Other Gastroscopy for major GI disease with CC

vi) Other Gastroscopy for major GI disease without CC

vii) Other Gastroscopy for non-major GI disease with CC

viii) Other Gastroscopy for non-major GI disease without CC

ix) Extensive Therapeutic Colonoscopy with CC

x) Extensive Therapeutic Colonoscopy without CC

xi) Other Therapeutic Colonoscopy with CC

xii) Other Therapeutic Colonoscopy without CC

The statistical results from the analysis are shown in Table 2.

Table 2: ANOVA results for ACCC revisions – Using diagnostic and therapeutic endoscopic procedures as classification parameters in MDC 6

MDC rec no.	No. current DRGs	No. new DRGs	Old RIV	New RIV	RIV % difference	Old F	New F	F % difference	Old CV	New CV	CV % difference	Alpha
6.2.1 i-ii	9	11	24.89	25.28	1.6	2537.26	2073.62	–18.3	0.5099	0.5066	–0.6	<.0001
6.2.1 iii-iv	7	9	29.59	29.60	0.0	14328.90	10749.55	–25.0	0.4706	0.4686	–0.4	<.0001
6.2.1 v-vi	9	11	24.89	28.52	14.6	2537.26	2456.82	–3.2	0.5099	0.5542	8.7	<.0001
6.2.1 vii-viii	7	9	29.59	31.29	5.7	14328.90	11504.09	–19.7	0.4706	0.3630	–22.9	<.0001
6.2.1 ix-xii	16	20	29.97	32.30	7.8	7585.38	6711.78	–11.5	0.4465	0.3799	–14.9	<.0001

Five separate ANOVA were undertaken to analyse these revised recommendations (Table 2). The increase in RIV for version 3 relative to version 2 ranged from 0% to 14.6%.

The RIV explained by the version 3 structure ranged from 25.28% to 32.30%, much higher than the analyses shown in Table 1 for the original ACCC recommendations. All F statistics greatly exceeded 100, ranging from 2073.62 to 11 504.09, with alpha < 0.0001. The CV was generally lower than the comparable version 2 DRGs, ranging from 0.4% to 22.9% lower. The only increase in CV (8.7%) occurred for AN-DRGs for other gastroscopy for major gastro-intestinal disease.

The structure was endorsed, although extensive therapeutic colonoscopy should not be split by complications and co-morbidities due to an insufficient number of cases for the category 'Extensive Therapeutic Colonoscopy with CC'.

Table 3: ANOVA results – Laparoscopic cholecystectomy and cholecystectomy with CDE

MDC rec no.	No. current DRGs	No. new DRGs	Old RIV	New RIV	RIV % difference	Old F	New F	F % difference	Old CV	New CV	CV % difference	Alpha
7.2	3	4	21.61	21.76	+0.7	3277.70	2203.06	–32.8	0.8891	0.8865	–0.3	<.0001
7.3	3	3	22.12	23.19	+4.8	3393.26	3609.21	+6.4	0.8851	0.8787	–0.7	<.0001

Laparoscopic cholecystectomy

A one-way ANOVA with three levels was undertaken on the version 2 structure of AN-DRGs 365, 366 and 367. The results are reported in Table 3 for Recommendation 7.2. The version 3 structure was also analysed. AN-DRG 367 (Cholecystectomy w/o CDE) was partitioned into two sub-groups, namely, Laparoscopic Cholecystectomy Only and Open Cholecystectomy. The RIV explained by version 3 was 21.76%, an increase of 0.7% over version 2. F was greater than 100, with alpha < 0.0001. Coefficient of variation decreased by 0.3% from 0.8891 to 0.8865. The partitioning of AN-DRG 367 resulted in 134 cases splitting in the Laparoscopic Cholecystectomy AN-DRG and 24 137 for Open Cholecystectomy. The two sub-groups were statistically significant. The average length of stay was 3.33 for Laparoscopic Cholecystectomy and 5.00 for Open Cholecystectomy, with no overlapping confidence intervals. These average lengths of stay were significantly lower relative to AN-DRGs 365 and 366. Group size for the new partition exceeded 200 only for the Open Cholecystectomy partition (24 137). Group size was only 134 for the Laparoscopic Cholecystectomy split. This recommendation was not implemented by the Department of Human Services and Health. The number of cases in the new AN-DRG was too small (Commonwealth Department of Human Services and Health 1994).

Cholecystectomy with Common Bile Duct Exploration

A one-way ANOVA with three levels was undertaken on the version 2 structure for AN-DRGs 365, 366 and 367. There was a large range in average length of stay from 4.93 (AN-DRG 367) to 17.85 (AN-DRG 365). There was no overlap of confidence intervals in the version 2 structure. The version 3 proposals were also analysed. The definition of CDE was expanded to include ERCP therapeutic procedures.

A one-way ANOVA with three levels was undertaken on the proposed structure. The results of the statistical analyses for Recommendation 7.3 are shown in Table 3. The RIV for version 3 was 23.19%, an increase of 4.8% over version 2, $F > 100$, alpha < 0.0001. Coefficient of variation decreased by 0.7% at 0.8787. The new groups were statistically different from each other on average length of stay; there was no overlap in confidence intervals. All group sizes exceeded 200, which was an improvement on the version 2 structure where group count was only 158 for AN-DRG 365. The Technical Reference Group and the Department of Human Services and Health endorsed the ACCC recommendation. In the United States, the Health Care Financing Administration has not considered expanding the definition of CDE to include ERCP procedures (Antioch, Zhang & Raw et al. 1995).

Discussion

Use of endoscopy procedures as classification parameters

The ACCC and Technical Reference Group recommendations for gastroscopy and colonoscopy were accepted and are incorporated into versions 3 and 3.1 AN-DRGs. In MDC 6 there is a group of 11 AN-DRGs which follow immediately after the surgical hierarchy and involve gastroscopy or colonoscopy procedures. Patients assigned to one of these AN-DRGs in MDC 6 will not have an operating room procedure. Rather they will have a non-operating room procedure that is considered to be a complex therapeutic gastroscopy, other gastroscopy, complex therapeutic colonoscopy, or other colonoscopy. Similarly, in MDC 7 there are a group of four AN-DRGs which involve ERCP procedures. There is one group of non-operating room procedures for ERCP complex therapeutic procedures and another for ERCP other therapeutic procedures (Commonwealth Department of Human Services and Health 1994; Commonwealth Department of Health and Family Services 1996). The definition of CDE has been expanded to include ERCP therapeutic procedures in version 3.1.

International developments

A review of international approaches to casemix classification systems was undertaken to determine whether endoscopy procedures have been used as classification parameters. AN-DRG version 3 appears to be the only casemix classification system reviewed that uses endoscopic procedures for DRG assignment of medical cases with digestive, hepatobiliary and pancreas diseases.

In the United States, the Health Care Financing Administration has not evaluated a proposal that gastroscopy, colonoscopy or ERCP procedures be used as parameters for DRG determination (Department of Human Services and Health 1990, 1991, 1992, 1993).

However, during its annual review of DRG structure in MDC 4 (Diseases and Disorders of the Respiratory System), the Health Care Financing Administration recommended modifications applying other endoscopic procedures for DRG assignment.

In the Federal Register, June 4 (1992 FR 23620), the Health Care Financing Administration proposed the reassignment of endoscopic excision or destruction of lesion or tissue of lung (32.28) and closed (endoscopic) biopsy of bronchus (33.24). The only endoscopic procedure performed on the respiratory system used in assignment to a surgical DRG was closed endoscopic biopsy of lung (procedure code 33.27), assigned to DRG 76 or 77 (Other Respiratory System OR Procedures with or without CC).

In the medical DRGs in MDC 4, cases with either 32.28 or 33.24 had *higher* charges and lengths of stay than did other cases assigned to these DRGs. The Health Care Financing Administration proposed that these codes be designated as non-operating room procedures that affect DRG assignment to DRGs 76 and 77 in MDC 4. If either code appeared with a principal diagnosis in MDC 17 (Myeloproliferative Diseases and Disorders, Poorly Differentiated Neoplasms), the case would be assigned to DRG 408 (Myeloproliferative Disorders or Poorly Differentiated Neoplasms with other OR Procedure) as is procedure code 33.27. However, the reassignment of the two codes would have a more significant negative impact on small rural hospitals than initially anticipated. Since these hospitals did not have an opportunity to comment on the significant impact on their payments, the Health Care Financing Administration did not adopt the proposed modification (Antioch, Zhang & Raw et al. 1995).

A review of All Patients DRGs (AP-DRGs) versions 10.0 and 11.0 found no proposals for new AP-DRGs to be created for endoscopic therapeutic procedures for diseases and disorders of the digestive and hepatobiliary system and pancreas (3M 1992).

In the United Kingdom, Healthcare Resource Groups (HRGs) include endoscopic procedures of the gastro-intestinal tract which are included within procedure groups. However, the United Kingdom system does not use such procedures as key variables for defining Healthcare Resource Groups. However, the United Kingdom experience is instructive for developments in Australia, providing insight into new codes for consideration after AN-DRG version 3.

Several of the United Kingdom endoscopy codes for therapeutic endoscopic duodenal procedures and endoscopic therapeutic stomach procedures provide greater specificity for surgical method and approach compared to ICD-9-CM procedure codes (National Casemix Office 1993).

Laparoscopic cholecystectomy

The ACCC had recommended that a new category be formed for laparoscopic cholecystectomy only, as a partition of the existing AN-DRG 367. This new AN-DRG would be called Laparoscopic Cholecystectomy w/o CDE. Cases of laparoscopic cholecystectomy with CDE would continue to be assigned to AN-DRGs 365 and 366. That is, there would be no distinction between an open and laparoscopic approach. This recommendation was not implemented, given the small sample size.

The United States Health Care Financing Administration has adopted a modification to the DRGs in MDC 7 through creating two new DRGs for laparoscopic cholecystectomy: DRGs 493 and 494 (Laparoscopic Cholecystectomy without Common Bile Duct Exploration (CDE) with and without CC), effective 1 October 1993. Prior to this modification, when a cholecystectomy was performed with a principal diagnosis in MDC 7, the case was assigned to DRGs 195 through 198. Similar to AN-DRG 367, these DRGs included both laparoscopic cholecystectomy and open cholecystectomy. The DRG determination depended on whether CDE was performed and the presence of complications and co-morbidities. The Health Care Financing Administration analysis indicated that the majority of laparoscopic cholecystectomy cases were classified in DRGs 197 and 198 (Cholecystectomy without CDE with and without CC). The average length of stay and the average standardised charge for the laparoscopic cases in these DRGs was much lower than the charge for the open cholecystectomies. The Health Care Financing Administration therefore decided to assign cases in MDC 7 with procedure code 51.23 without CDE to DRGs 493 and 494. Those cases with laparoscopic cholecystectomy and CDE remain in some DRGs 195 and 196 (Antioch, Zhang & Raw et al. 1995).

AP-DRGs have included specific laparoscopic cholecystectomy DRGs in MDC 7 since version 9.0. In version 9.0, laparoscopic cholecystectomy is only split on with/without common bile duct exploration (CDE), whereas open cholecystectomy is split on both exploration of the common bile duct and presence/absence of complications and co-morbidities. In changes to the Health Care Financing Administration DRGs, effective 1 October 1993, two new DRGs were created for laparoscopic cholecystectomy: 493 (Laparoscopic

Cholecystectomy without CDE with CC); and 494 (Laparoscopic Cholecystectomy without CDE without CC). These Health Care Financing Administration changes were also adopted for AP-DRGs version 11.0, effective 1 January 1994. AP-DRG 787 (Laparoscopic Cholecystectomy with CDE) has been retained in version 11.0 (Antioch, Zhang & Raw et al. 1995).

Case Mix Groups (CMGs) is the casemix classification system used in Canada. CMGs are based on ICD-9 and the Canadian Classification of Diagnostic Therapeutic and Surgical Procedures.

The Hospital Medical Records Institute manages approximately 70% of hospital discharge data in Canada, which are grouped into CMGs (Antioch 1994). CMGs include 24 MCCs, which are the equivalent of MDCs found in DRG derivative classifications. The CMG classification defines the principal diagnosis as the condition that accounts for the greatest proportion of resource usage and is referred to as the 'most responsible diagnosis'. There were no laparoscopic or endoscopic partitions in the 1993 CMGs in MCC 6. MCC 7 (Diseases and Disorders of Hepatobiliary System and Pancreas) did include a CMG for laparoscopic cholecystectomy (CMG 309).

In the United Kingdom the National Casemix Office has considered whether to identify laparoscopic surgical procedures (particularly cholecystectomy) as separate Healthcare Resource Groups. It found that whilst length of stay is reduced, the disposal and theatre costs are increased by a similar amount, and that the overall cost of laparoscopic and open procedures is sufficiently similar to warrant retaining them within the same group (Antioch, Zhang & Raw et al. 1995).

In general, given the differences in international casemix classification systems, it is essential that any cross-national studies on hospital utilisation and costs using any casemix classification systems should specify the version of the grouper used and the various codes applied in the grouping process, such as procedures, diagnoses, complications and co-morbidities (Antioch, Selby Smith & Hailey 1995).

Conclusion

Australian DRGs appear to be leading the way internationally. It is the only casemix classification system reviewed that uses endoscopic procedures for DRG assignment of medical cases with digestive, hepatobiliary and pancreas disease.

The use of endoscopy procedures such as colonoscopy as diagnosis and therapeutic procedures is likely to grow, given it remains the gold standard for

visualisation, biopsy and removal of colonic neoplasms. This view has been reinforced by the Australian Cancer Society and the Australian Gastroenterology Institute (Antioch, Walsh & Selby Smith 1997). It is vital that developments in high technology be reported in the DRG grouper to reflect appropriate costing of patients and facilitate quality assurance and utilisation review.

Determining best practice in medicine for treatment for cases involving the use of colonoscopy, gastroscopy and ERCP procedures will be greatly facilitated by undertaking economic evaluation studies of related treatment and diagnosis protocols. Continued improvements in the hospital classification systems to measure resource and costs for such procedures will greatly enhance such studies and enable improved development of clinical practice guidelines in the longer term.

Antioch, Butler and Walsh (1996) emphasise that cost-effectiveness studies will facilitate the work of the National Health and Medical Research Council in developing best practice guidelines, in consultation with relevant medical associations.

Appendix

ANOVA
A statistical test for the equality of several population means using sample averages. Can be used to determine whether individual AN-DRGs are homogeneous and significantly (statistically) different from other AN-DRGs in terms of costs or average length of stay.

CV Co-efficient of Variation.
A measure of the variability in the data, with values typically in the range of 0.3–1.5. It can also be calculated as a percentage. It is calculated by dividing the sample standard deviation by the arithmetic mean.

RIV Reduction in Variance.
A measure of the magnitude of variance reduction. It is equal to the Sum of Squares Between Groups (that is, between DRGs) divided by the Total Sum of Squares. The more distinct each group (or DRG) is from other DRGs and the overall mean, the larger is the Sum of Squares Between Groups and the higher the RIV value. An RIV of 1 (100%) implies that the classification has explained 100% of the variance, while RIV values of 0 (0%) mean that no variance has been explained.

Note

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