Implementing DRGs in Slovenia: why the Australian variant was selected

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Abstract

Slovenia is embarking on an ambitious health sector reform program, a small part of which involves implementing the categorization of acute inpatients by DRG for payment purposes. I summarise the leading DRG variants, and describe the process of selecting one of them.

I argue that the Slovenian decision to use the Australian DRG variant as a starting point was sensible in terms of cost, speed of implementation, and usefulness of the resultant information. More time and effort could have been spent on the appraisal process, but I suspect it would not have led to a different outcome.

The context: health sector reform and hospital inpatient payment in Slovenia

Slovenia began independence in 1990 with a health system that performed reasonably well in terms of equity and cost-effectiveness. The main goals for most of the first decade were economic stability and retention of social solidarity. However, several minor changes were made to take advantage of market forces including partial privatisation of general medical practice and establishment of a small number of non-government voluntary health insurers.

The transition to a social democracy was successful by any standards, and by the late 1990s there was a desire to contemplate more significant changes in the health sector. By 2002, a reform program was under way that included re-structuring of compulsory and voluntary insurance (Hindle 2003), development and implementation of clinical practice guidelines and clinical pathways, redesign of health sector information systems, encouragement and facilitation of coordinated care, and modification of resource allocation processes including care provider contracting predominantly on an outputs basis.

Slovenia has long made use of a budget-share output-based funding model to pay hospitals for inpatient care. Thus the government determines the total funding, and it is then shared among hospitals in proportion to a target level of activity. In the early 1990s, activity was measured mainly in terms of medical procedures – for each of which crude payment relativities had been defined. In 1993, these elements were bundled to form a simple classification of days of inpatient care, and in 1999 a simple per case classification was introduced (Albreht et al 2002).

It was decided that a more sophisticated per case classification was required and research began in June 2002. At that time, several related decisions were taken including the need to differentiate between acute and other kinds of inpatient episodes, to establish a separate funding pool for intensive care, and to eliminate different payment rates for same-day and overnight stay acute inpatient care. This paper describes the process of selection

of an acute inpatient classification system. Brief mention is also made of changes in hospital data to support DRG assignment, acquisition of computer software to support classification, and initiation of data production in hospitals on 1 January 2003.

The process of appraisal

A ten-year reform strategy was agreed during the early part of 2002, which made specific mention of the need to establish per case payment for acute inpatient care according to a suitably sophisticated casemix classification. The strategy document noted that classification was essential, and that an iso-resource classification was required (although it would not be sufficient by itself and therefore more would need to be done including definition of cost-effective care through illustrative clinical pathways for high-volume case types). It was noted that there are several optional systems for classifying acute inpatient care, such as Disease Staging and Patient Management Categories. However the DRG system is preferable because it is the de facto international standard, would be easier to implement, is supported by more tools, and provides more opportunities for comparison across countries.

Slovenian hospitals already had relatively good information systems when the decision to implement DRGs was taken. Routine hospital discharge systems included the main data fields required to begin classifying patients by DRG. ICD-10 was being used to code diagnoses, along with a unique Slovenian classification for procedures. Nevertheless there were some concerns, such as the limited experience in product costing and unsuitable coding practices (particularly with respect to selection of the principal diagnosis and ensuring all significant secondary diagnoses were listed).

Initial decisions of the project team

A small implementation team was formed, which initially thought that at least 18 months would be required, and that pilot testing would be needed in a small number of hospitals before any national system could be implemented. However, the team rapidly reached two important conclusions. First, the aim should be to implement changes at all hospitals without piloting, since there was little that could be learned at pilot sites. Second, the best way to learn was by doing: if we waited until there were better discharge data, hospitals would have little reason to bother to improve. In short, a system should be put in place without delay and improved through use in funding.

Brief consideration was given to the possibility of developing a uniquely Slovenian variant of the DRG system from scratch, as has happened in a few countries including Austria, the Netherlands, and Croatia. However, consultations with various parties led to a consensus view that this was not an option worth considering in view of the time and cost. For example, Austria is estimated to have spent millions of dollars over nearly 20 years (Hofmarcher & Riedal 2003). One might argue that Austria's problems were an inevitable consequence of starting many years ago when the knowledge and technology were more limited. Croatia is in some senses a better comparison because it only began the process seriously three years ago. However, there is insufficient evidence as yet to be able to judge the level of success in Croatia, and many difficulties remain to be overcome.

Thus it was decided that an existing variant would be selected. However, that variant must be capable of easily being adapted to suit Slovenia's particular needs as they were identified.

Identification of potentially useful DRG variants

The project team looked at the literature, and selected ten variants for evaluation mainly on the basis of a single criterion – that there was documentation of successful use in hospital payment. These were in turn rated against the criteria listed in Figure 1 by use of a variety of sources of information.

For a subset of the variants that appeared to be the most interesting, the team contacted the owners of the intellectual copyright and asked whether they wished to be considered as providers of DRG logic to Slovenia. By logic, I mean the descriptions of each of the DRG classes.

If owners wished to be considered, they should provide information on the history and current structure of the classification, the source data elements used in assignment (including details of the classifications of diagnoses and procedures), information on copyright (including restrictions that might apply if the Slovenian government wished subsequently to modify the logic), any evaluations (and in particular reports of comparative studies involving more than one variant), the range and number of current users, types of documentation (and what materials could be made available for appraisal and testing purposes), what DRG grouper (class assignment) software products were available (and their copyright features), the range of platforms for DRG grouper software, and various other details including costs. In the event, only three of the potential suppliers provided a comprehensive set of responses within the specified time.

Figure 1: criteria relevant to the rating of the DRG variants

Attribute	Explanation
Overall clinical acceptability clinicians	Whether the structure of the DRG classes is likely to seem intelligent to practising
Handling of secondary diagnoses sensible	Whether the way that comorbidity and complications data are used is clinically
Cost homogeneity	Whether each DRG class is likely to be relatively homogeneous in terms of costs
Cost of obtaining the right to use the DRG logic	Whether the short and long term costs to Slovenia are likely to be acceptable
Ease of modification of the DRG logic	Whether it will be easy and of low cost to modify the logic to suit Slovenia's needs in future
Whether the number of classes is suitable	Whether there are enough classes to measure hospital differences, but not too many to cause operational complexities
Transparency of assignment	Whether the documentation is open and clear, so that the reasons for particular assignments can be understood
Attitude of owner of copyright	Whether the owner of copyright is likely to be collaborative, helpful, and sympathetic to Slovenia's objectives
Initial responses of copyright owner	Easy and fast provision of access to the classification specifications and explanatory material
User documentation	Whether the system is well documented, and supported by helpdesks
Base software	Whether good software is likely to be available and reasonably priced
Skills development	Whether the owner of copyright is likely to support skills transfer
Clinical coding systems	Whether the variant uses source data systems (like diagnosis and procedure codes) that are relevant to Slovenia
Startup cost	A reasonable price for intellectual copyright licensing
Ongoing costs	Documentation, computer software, logic updating, etc

Some options were quickly eliminated from detailed consideration. For example, the International Refined DRG variant was considered unsuitable because it has been used in only a very limited way for the purpose of health system funding in contexts similar to that of Slovenia (including South Africa), and an international for-profit company owns the copyright and the team doubted it could obtain the level of access required at a reasonable cost. The same concerns about copyright applied to All-patient DRGs and All-patient refined DRGs although they have been selected for use recently in several countries including Belgium.

The NordDRG variant attracted some interest because it was developed jointly by the health authorities of Denmark, Finland, Norway, and Sweden – and they have similar hospital systems to that in Slovenia. However, the team had some concerns that could not be adequately addressed partly because little documentation of experiences could be found in the technical literature. For example, there were difficulties in precisely identifying the changes in classification logic that had been made relative to its parent (a leading US variant, HCFA-DRG, as described below). Another concern was the suitability of the diagnosis and procedure classifications: NordDRGs use a mapping from ICD-10 and the Nordic procedure classification (NCSP) to the ICD-9-CM codes used in the HCFA-DRG variant. In other words, the ICD-10 and NCSP codes are entered by the hospitals, and then linked to the nearest equivalent ICD-9-CM codes before the DRG code is assigned. Neither pair of classifications was judged ideal for Slovenia, and the team had been informally advised of problems with the mapping between them.

French DRGs were eliminated mainly because information was difficult to obtain from the owner of the copyright. More important, there had been many recent criticisms of the structure of French DRGs by users and a proposed major review indicated likely imminent change.

Among the transition economies, Hungary has perhaps had the most experience with DRGs (European Observatory 1999). Its own variant, a development of an early HCFA version, has been extensively modified through use and now has 758 classes. However, it was not considered a leading candidate for several reasons including the unsuitable underlying procedure classification, and the very limited English-language documentation. Another factor was that there have been frequent reports of problems in its use for payment. While this is mostly unrelated to the classification structure, it might have raised concerns among the Slovenian clinicians whose involvement was to be stimulated.

The Austrian DRG variant (Leistungsorientierte Krankenanstaltenfinanzierung or LKF) has some interesting features. However, Hofmarcher and Riedal (2003) claim there has been excessive expansion of procedure classes (374 of the total of 850 in the latest version) as a consequence of partly inappropriate financial incentives in the payment system. Unlike in most other countries, Austria's DRG variant was not designed to support per case payment: each inpatient episode involves a fixed payment reflecting 'procedure' cost together with a per day payment – thus creating incentives to prolong lengths of stay. In the event, this variant was ruled out at an early stage mainly because of the lack of experience of its use outside Austria and the unsuitability of its procedure classification.

At the end of this stage, three variants had been identified that seemed to merit further and more detailed consideration: Canadian DRGs (Case Mix Groups, CMGs), Australian DRGs (Australian Refined DRGs, AR-DRGs), and US Federal government DRGs (HCFA-DRGs). Therefore detailed reports were compiled on each, of which the following are summaries.

The US federal government variant (HCFA-DRG)

HCFA stands for the Health Care Financing Administration, the US federal government agency responsible for payment of health care providers for services under the government insurance scheme for the elderly (Medicare). HCFA has recently been renamed the Centres for Medicare & Medicaid Services, but I will use HCFA here because of its familiarity. Many countries have taken the HCFA-DRG variant for their own use, including Portugal, Spain (in part) and Italy.

Version 2, which had 470 classes, was introduced as the basis for payments under Medicare in 1983. The 19th version was introduced in 2001, but it had only 503 classes in spite of the long period of use. HCFA has been cautious about making changes, mainly because its dominant interest is to use DRGs to distribute money among hospitals. Unlike Australia and Canada, few changes have been made simply to improve clinical logic.

Charges data for all patients are routinely compiled and used as the main basis for DRG refinement. Clinical panels are formed when it is considered necessary—and usually when a change in DRGs is under consideration as a consequence of modifications in clinical practice that affect costs.

HCFA only uses DRGs to pay hospitals – and not to pay for complete inpatient episodes that include medical costs. Like Canada (and unlike Australia or Slovenia), most medical services are billed separately (and using a quite different payment model). Medical charges data are not used at all in DRG design, and this has affected the structure of the DRG classification at the margins.

There is no direct ceiling on total payments to hospitals, unlike in other countries including Australia and Slovenia. The payment per case is fixed each year, but the number of patients by casemix class is only indirectly controlled (mainly by retrospective auditing of appropriateness of admission to hospital). This means that adjustments to the DRG classification and associated payment weights must be made with great care, in order to avoid the risk that total payments will be excessive. The main consequence is that changes are much less frequent than in other countries, where total payments are controlled in a more direct way.

Much use is made of age splits, but almost always the split is at age 17. There is only one other age split, for diabetes at age 35. Virtually all the splits on presence of significant comorbidities or complications (CCs) are binary – with CC or without CC. Because the target population is mostly elderly, the HCFA variant continues to be relatively weak with respect to childhood. For example, only seven classes of neonates are identified, and they have been hardly changed for many years.

Diagnoses and procedures are coded using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). HCFA believes that many of the weaknesses in the DRG classification are a direct consequence of weaknesses in ICD-9-CM. In its report to the US Federal government in 2002, it stated that a more sophisticated and detailed classification system, such as ICD-10-PCS, should be adopted.

There are many competing suppliers of DRG groupers, and add-on software packages for code editing and payment optimisation. The HCFA-DRG logic is in the public domain, as required by Federal government legislation, and anyone can develop software. However, HCFA has recently decided to give an exclusive contract to Health Information Systems (a division of 3M) for some aspects. This may present problems with respect to accessibility to such components as documentation, at least at a reasonable price, given the lack of open competition.

In summary, the team concluded that the main advantage of the HCFA-DRG variant might be that it has been vigorously evaluated and refined. It has been used for many years for payment, and has been under close scrutiny. Another advantage might be its low cost, at least in terms of any payments in relation to copyright. However, there would be some significant costs associated with producing technical documentation, users' guides, and software. In total, there might not be any large savings, compared with paying for copyright to use the Canadian or Australian variants.

The team concluded there were several significant weaknesses. They included use of an out-of-date diagnosis classification, simplistic and sometimes imprecise use of significant secondary diagnoses, and a lack of clarity with regard to copyright.

The Australian DRG variant (AR-DRG)

This variant is owned by the Australian federal government and is used by all health care agencies in Australia. It is also used exclusively in Germany, New Zealand and Singapore. A few other countries are using it on a trial or local basis.

Studies were conducted in 1989-90, for the purpose of determining a standardisation strategy. In 1991, the Australian government endorsed a plan to take ideas from several US variants and create a uniquely Australian variant (the Australian National DRG or AN-DRG system and later the Australian Refined DRG or AR-DRG system).

Version 1, which was released in 1992, had 527 classes and many distinctive features. All Australian changes have been made under advice from a national committee of practising clinicians. Use is also made of data that are collected in annual costing surveys supervised by the Australian government.

Version 4, released in 1999, has 661 classes and this was the version considered for use in Slovenia. The main difference, compared with the HCFA-DRG variant (and many others including French and Nordic DRGs) is that all CCs are considered. Complexity is based on a weighted sum of CCs, rather than simply according to the presence or absence of one or more CCs.

Diagnoses are coded using ICD-10-AM, an Australian adaptation of the international standard, ICD-10. Procedures are coded using the Australian Classification of Health Interventions, which is an Australian development and part of the "AM" in ICD-10-AM. The combined set of diagnosis and procedure classifications is probably as good as any in the world. It was developed through a process involving extensive and intensive clinical consultations.

There are five competing suppliers of DRG groupers. The Australian government has a sophisticated set of analytical programs that assist with investigation of possible changes in DRG logic, and generation of revised logic specifications for software producers.

The Australian government has exclusive copyright. It has sold the intellectual copyright to Germany, but charges an annual fee to New Zealand. It sold a four-year license to Singapore. Romania also has a license to use ICD-10-AM and AR-DRG.

The team concluded that the main strengths of AR-DRGs were use of high-quality diagnosis and procedure classifications, sophisticated use of significant secondary diagnoses, progressive refinement to improve clinical meaning (and not only cost explanation) as a consequence of ongoing inputs from clinical experts, and its rigorous testing through use as a basis for payment for ten years. The main weakness was judged to be its high cost on the basis of an initial quote from the Australian government.

Canada's Case Mix Groups

In Canada, most of the DRG-related work has been undertaken by the Canadian Institute for Health Information (CIHI), a not-for-profit agency funded by the national, provincial and territorial governments. Canada has used several variants of DRGs over the years to categorise acute inpatient episodes. However, a national standard has existed for more than a decade – Case Mix Groups (CMGs). No other countries have adopted CMGs as their national standard, although several are evaluating them. CMGs have been used in small-scale studies in several countries including Slovenia.

The first version of CMG was introduced in 1983. It was almost the same as HCFA-DRG version 3, and had 472 classes. Many changes were made in later versions.

In some respects, the CMG logic does not differ greatly from the original HCFA logic. The principal diagnosis is used to assign cases to a major diagnostic category (MDC). Principal diagnosis is defined as the most costly treated condition (unlike in the Australian and HCFA variants, where it is the main reason for admission). Each MDC is split into surgical and medical partitions, and then clusters of related procedures or related diagnoses are formed to create 477 CMGs.

However, a unique feature is that each CMG may now be split into up to 3 age classes, and up to 4 complexity levels (giving a maximum of 12 classes within any one CMG). Age splits are standard across all CMGs (0-17, 18-69, 70+). This results in over 4500 final classes.

Complexity is measured in a sophisticated way*. Significant secondary diagnoses are split into co-morbidities and complications, account is taken of whether the diagnosis is 'home' or 'out' (in other words, whether it is closely related to the principal diagnosis), and more secondary diagnoses usually lead to a higher complexity level.

CIHI claims that the resultant groups are effective in terms of the main target patient categories – the very young, the elderly and the medically complex. It claims that this new logic is more sensitive with respect to the type and number of co-morbid conditions, the time of onset of co-morbid conditions, conditions affecting multiple body systems, and the effects of age. The logic is clearly more sophisticated than that in the HCFA-DRG variant, and is at least equal to that used in Australian DRGs in many respects.

CMGs currently use ICD-9 for diagnoses, and ICD-9-CM for procedures, as the basis for definition of the classes. A change to better classifications will take place in the near future. In particular, Canada is implementing its own adaptation of ICD-10, called ICD-10-CA, for diagnoses. It has also created an improved procedure classification called the Canadian Classification of Health Interventions (CCI).

CIHI is the sole owner of CMG logic. It produces and distributes CMG grouping and analytical routines, typically on an annual license basis. It is also the sole source of a variety of products that users can acquire in order to build their own data systems. For the most part, prices are in proportion to hospital size.

The cost weights for CMGs are computed from actual patient cost data from Canadian hospitals. However, unlike Australia, no routine product costing surveys have been established thus far. Not all types of hospitals are fairly represented in the existing data.

A project began in 2002, which is intended to review all CIHI's casemix classifications. For CMGs, the main expected change is a switch to the use of ICD-10-CA and CCI. The improved classification is not expected to be completed until 2004.

The team concluded that the most important strengths of CMG were its intelligent use of data on significant secondary diagnoses, and definition of principal diagnosis on the basis of actual treatment cost rather than reason for admission. There were no important weaknesses, excepting the possibly lengthy delay in adjusting to use of modern diagnosis and procedure classifications and uncertainty about pricing because CIHI did not give a quote.

Review of the leading options by clinical experts

Expert clinicians were identified and provided with longer descriptions of the three leading options as summarised above. They were also provided with copies of the DRG logic for each of the variants for their own specialty and asked to review them with colleagues before a one-day workshop. During the workshop, participants were asked for their views about the options and to express a view about the desirability of selecting and implementing one of them.

In total, the expert clinicians rejected the HCFA variant as being significantly less useful than the two other shortlisted options. By a significant majority, they concluded that the Australian variant better met the technical requirements than the Canadian and should therefore be selected subject to acceptable pricing negotiation outcome and licence conditions. However, the Canadian variant might be reconsidered if it had a significant pricing advantage.

Many concerns were expressed during the workshop. One related to the tight timetable: some clinicians argued that, although they were inclined to believe the advice of the project team, they needed more time if they were to be sure the detailed logic suited their specialties. Their concerns would be alleviated if they could be sure there would be an ongoing process of review and refinement, and that the views of practising clinicians would be influential.

* Update: CIHI has recently discovered some issues related to the categorisation of complexity and has established a process to review the methodology.

A related concern was whether there would be sufficient time for hospitals to make preparations to produce and make use of DRG data. There could be unintentional shifts in funding between hospitals, clinical departments, and patients.

With regard to classification logic, questions were raised about the possible lack of discrimination in paediatrics, stroke, and dermatology; and about the weaknesses of ICD-10 in terms of discrimination of levels of severity of the principal diagnosis. The updating process attracted considerable interest – and particularly how new technologies might be rapidly incorporated into the assignment logic.

Much discussion related to the likely effects of use of DRGs as the basis for payment. For example, there was interest in the extent to which there would be clarification of the boundaries between same-day and overnight stay episodes. Similarly, there was concern as to whether it was wise to increase control over acute inpatient care in the absence of similar precision of measurement for outpatient services – and the consequent risk that costs and clinical problems might be shifted in an unplanned and unintended way. Other concerns related to the method of development of cost (and hence payment) relativities, how intensive care will be handled, how the special functions of teaching hospitals will be addressed, and the risk of prejudice to quality of care.

Most of the issues that were raised had been covered in background documentation – and in particular in the ten-year reform strategy and its annexes. It was therefore possible to convince the participants that they were involved in a carefully designed process. While mistakes might have been made, few issues had been overlooked and there was an ongoing process of consultation whereby they might be addressed.

Implementation

In August 2002, the government accepted the project team's recommendation that Australian DRGs be implemented, and a contract was negotiated with the Australian government at an extremely reasonable price. Under the agreement, the Slovenian government may use the DRG logic and associated documentation, make modifications according to its needs, and distribute revised classifications to any user in Slovenia.

The Australian government also made available the ICD-10-AM diagnosis and procedure classifications, although Slovenia had previously decided it would use its own ICD-10 diagnosis classification and its own procedure classification. Like Germany, it would map from the Slovenian codes to the Australian codes.

It was decided that DRG data production would begin on 1 January 2003, and that the results would be used at the margins in the setting of year 2003 hospital budgets. Thus the remaining implementation tasks had to be handled at high speed. Inter alia, it was necessary to create the diagnosis and procedure mapping tables, revise some data definitions (such as principal diagnosis) and issue formal notification to all hospitals, make minor changes in the discharge data set, conduct a competitive tender for provision of DRG grouper software, run education courses in coding for DRGs and installation and operation of the software, and update coding guidelines. In addition, a set of DRG cost relativities was created by use of results from a product costing study at a small sample of hospitals – and augmented by use of Australian cost relativities where appropriate.

That all the work was completed on time reflects creditably on those involved – and particularly on the practising clinicians who gave their time and enthusiasm to the task. In some respects, the clinicians were over-achievers. One example concerns the diagnosis and procedure classifications. During the early stages of mapping between the Slovenian and the Australian procedures, the clinicians raised a simple question: why not simply adopt the much better Australian classification rather than mapping so that the Slovenian classification would remain in use? This suggestion was accepted and the mapping task changed into a large and complicated task of translation from English to Slovene.

At a later stage, clinicians recommended that Slovenia's out-of-date version of ICD-10 diagnoses should be replaced in total with Australia's version. This suggestion was also implemented.

Comparisons with the experiences of other countries

It is hard to compare for many reasons – such as differences in timing and intended purposes to be served by DRG implementation. For example, Slovenia implemented DRG reporting systems much more rapidly than Portugal. However, Portugal completed implementation more than ten years earlier than Slovenia. Not only was there little experience on which Portugal might draw, but its hospitals lacked the routine discharge abstracting systems that Slovenia had in 2003. The same may be said of Hungary, which also started many years earlier than Slovenia.

However, there are a few bases for comparison, and they mostly suggest Slovenia was relatively successful. For example, it avoided the superficially attractive option of building a local version. It did not replicate the Australian error of becoming involved in a copyright dispute with a commercial company – that led to a slow-down in innovation for five years until the ties could be broken.

It avoided the many errors made in Germany that resulted from the absence of a cohesive team. For example, Slovenia did not experience the significant delays and disputes in creation of mapping tables that have been reported (Roeder, Rochell & Hindle 2002; Hindle 2002). It seems that having a less cohesive team has been a constraint in Austria as well – it has had to manage the preferences of each state as well as multiple insurance companies (Hofmarcher & Riedal 2003).

Slovenia did not overvalue the advantage of HCFA versions being in the public domain. The team was probably correct in concluding that the low initial costs would be more than outweighed by the cost of adaptation (including assignment software development, diagnosis and procedure mapping, and establishment of analytical routines to manage updates).

Slovenia's experiences differ little from those of Singapore, Romania and New Zealand, which decided to take Australian DRGs. Slovenia made the decision and implemented it more rapidly, but it had the advantage of learning from what had been done elsewhere. There are some similarities with experiences in Scandinavian countries, where significant advantages resulted from the sharing of development costs.

Conclusions

In selecting the DRG variant, the team relied mainly on group value judgments because objective techniques are impractical. One factor is that many of the performance dimensions are incommensurate: for example, how can one compare (say) the benefits of rapid implementation with those of statistical performance in terms of homogeneity of the classes? There is also a problem of intangibility: how can one measure the value of having a classification that clinicians believe is sensible?

Some of the performance attributes can be objectively measured, such as the homogeneity of classes by use of the coefficient of multiple determination (R^2). Account was taken of such statistics where they were available from other studies (for example, Reid, Palmer and Aisbett 2000; Palmer and Reid 2001; Forgione and D'Annunzio 1999; Hindle and Lenz 2000; Roeder, Rochell, Juhra & Mueller 2001). However, there is hardly any good information on comparative performance of DRG variants, and there are very few descriptions of the process of variant selection that are similar to the paper being presented here.

We decided not to attempt our own statistical analyses. We could have undertaken a comparative study whereby all available Slovenian acute inpatient data would be processed using the various candidate DRG systems, but this would have consumed a large portion of the scarce research resources. Moreover, the results might have been difficult to interpret in view of the weaknesses in the data at present – such as the under-recording of secondary diagnoses.

There is also the matter of opportunity cost. As noted earlier, the same team that was responsible for DRG implementation is also working on clinical guidelines, clinical pathways, classification and payment models for

home and community care, and so on. It is impossible to be sure that sufficient resources were allocated to DRG implementation, but we are also sure that no-one else has the evidence to prove we were wrong.

For these and other reasons, I can make only a few elementary suggestions about methodology. First, the process needs to be open and consultative. If we had not consulted so widely, we would probably have missed the idea of changing completely to better diagnosis and procedure classifications – and chosen instead to map from the existing classifications.

Second, the objectives must be carefully specified. As a simple example, clinicians were generally stimulated by the idea that the main goal was to ensure their work was clearly defined as an input to resource allocation. They would have been much less favourably inclined to participate in the process if the team had taken the line used in several other countries – that the aim was to improve efficiency or reduce clinical practice variations.

Third, if clinicians are to play the main role, every effort should be made to avoid the use of jargon, and to avoid giving the impression that complicated ideas of economics or statistics needed to be addressed. Indeed, the team continually stressed that classification of patients is largely a clinical matter.

As an aside, the Slovenian work has made hardly any use of the term 'casemix' (or its equivalent in Slovene). There has been much talk about better measurement of work, improved coding, more transparent methods of resource allocation, and so on but this is possible without the need to refer to casemix. My point is not that casemix is an irrelevant concept, but rather that there may be increased risks of confusion. It is still common for Australians to refer to 'implementation of casemix', when the writer usually means the use of DRGs to allocate acute inpatient funding – but when there can be other quite different meanings or interpretations. Indeed, the first item listed in a Google search of the web for casemix and Australia provides a definition that is incorrect: that 'casemix is a system' to describe 'the output of a hospital' (health.qld.gov.au /publications/ infocirc/6292.htm). Singapore followed the Australian example and produces the eighth-listed Google item that says "… casemix is not a new concept and has been used in the USA Medicare system since 1983" (http://app.moh.gov.sg/faq/faq03.asp). I suspect that casemix became a popular term (as did TQM and clinical governance in their day) because it was believed to give status to the user as a leader in the use of entirely new ideas about which clinicians would need expensive expert advice.

Fourth, the risk of actual or perceived bias must be recognised and minimised. In our case, there were team members who had worked on DRG variant selection in Australia, and had assisted with implementation of the Australian variant in other countries. It was also true that they had assisted with the implementation of the HCFA variant elsewhere. It is unclear whether the risk was adequately controlled. At least, it was openly discussed, and the final recommendation to the government came from Slovenian clinicians rather than technical advisers.

In total, a process was set in place where people with a mix of experience, clinical intelligence and interest were free to brainstorm and argue. This was the main reason why implementation of DRG data production was completed in about six months at low cost – and to the satisfaction of most parties. Although the first sets of DRG statistics contain many errors, there is a clear methodology for improvement and there are significant incentives for hospitals to apply it.

We cannot prove that the best variant was chosen. Indeed, it is possible that any of the leading variants would have been suitable: perhaps there are many different starting points that lead to the same endpoint. Moreover, there are many weaknesses that need to be alleviated in terms of coding, estimation of DRG cost relativities, and so on. However, we can say with confidence that the journey has begun without the delays and friction that have often occurred elsewhere.

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