Republic of Macedonia
Ministry of Health

HEALTH SECTOR MANAGEMENT PROJECT (HSMP)

TECHNICAL ASSISTANCE
IN
DESIGNING AND IMPLEMENTING HOSPITAL PAYMENT REFORM

COSTING METHODOLOGY REPORT

August 2008

KAROL Consulting

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COSTING METHODOLOGY REPORT

1. BACKGROUND

1.1. Purpose of this report

This report is intended to introduce readers to the principles of hospital service costing, with particular emphasis on DRG funding implementation. We are aware that the HIF has, over the past several months, been working on the analysis of DRG data with the view to an early introduction of a new hospital payment system which is to be based on casemix data. Hospital DRG activity data became first available to the HIF in February 2008, but these data are of questionable quality and appear to be fairly imprecise in their ability to describe the casemix of the reporting hospitals.

This report will establish a methodology of how to utilise the improved DRG activity data in the development of DRG costings – and subsequently, the formulation of a hospital payment system which will encourage improved allocative and technical efficiencies in the hospital sector.

1.2. What do we mean by 'cost'?

Cost is different to price. In the context of this discussion, 'cost' can be defined as an outlay or expenditure of money, time, labour or other resources to produce a nominated health service product, such as a DRG, for example. The calculation of actual costs however, is not a simple matter and in many instances it is based on best estimates and averages across the hospital system.

In the process of designing a hospital payment system and deciding how much we should pay and what health product we should pay for, we are aware of one key constraint which is, that health sector resources are limited and we must make best use of the available resources to achieve the best health outcomes we can – in other words, we must maximise value for money. In order to make the right decisions with respect to the products we may want to pay for, we must have accurate information on the costs of these products.

Also, if we are to make the right choices about what to pay for we must recognise that there are different ways of producing a given health product such as a hip-replacement for example, and the costs for each method will be different as they will call for different resource inputs. The two approaches to delivering health products can be described as follows:

> **Method 1 – Best Practice:** where there are no resource constraints and we do the very best that current technology permits.
>
> **Method 2 – Standard Practice:** where there are resource constraints and we follow the best evidence based protocols within these constraints

If the purchaser is to choose which of these two methods to pay for, it must first know how much each product would cost, and this requires an analysis of the costs of production.

To be able to analyse costs of individual health products such as hip replacement, we must know the costs of the individual resource inputs that are bundled into the product. The resource inputs for a hip replacement will include doctor time, nursing time, drugs, theatre time, medical devices, consumables, hotel etc. Once we have identified the individual resource inputs we calculate their costs and

aggregate these input cost to find the cost of the final product. The calculation of the current costs of health products is is called the analysis of actual average cost.

Once we calculate, the actual average costs of hip replacements being undertaken currently by hospitals in Macedonia we can model the costs of the different methods discussed above. For example, the actual average cost of a hip replacement in Macedonia may be $14,800, while the estimate of the of the Best Practice hip replacement method may be $20,000 and the cost of the Standard Practice method may came to $15,500. Armed with this information, the purchaser is now better placed to make decisions as to what type of product to pay for and how much to pay for it.

Because it is a starting point for all costing, this report will focus on the development of a method of calculating the actual average costs of health service products as categorised by DRGs.

1.3. Importance of Costing

The costing of hospital services is often neglected in the implementation of casemix based payment systems. Priority is usually placed on coding and generation of accurate and comprehensive DRG activity data. This is largely because the methodologies analysing activity patterns are well established and standards for DRG classification and coding are well documented. As long as the patient records are accurate and are coded appropriately into the grouper, the casemix data will be quite acceptable for the purpose of defining hospital production. If difficulties are encountered, the Australian DRG methodology has capacity to identify potential problems in coding – and remedial action can be effectively taken.

Costing of healthcare products on the other hand, has been described as more of an art than a science. The reason for this is that in most instances, the understanding of production cost has not been a requirement in hospital administrative environments. But without the understanding of costs, pricing is not possible. If prices are difficult to set, then payment models that fairly pay for what hospitals produce cannot be formulated.

In calculating costs, we must also bear in mind the purpose of the calculation in the context of DRG implementation. It must be remembered, that the purpose of the introduction of an prospective DRG outputs based payment system is to improve system efficiency and effectiveness which implies that overall, better health outcomes are delivered to the population for a given health expenditure.

1.4. Legal basis in Macedonia

The Macedonian Government has passed a by-law authorising payment of hospitals by DRGs from 1st of July 2008. This by-law allows for adjustment of hospital funding according hospitals' activity measured by weighted DRGs.

The by-law states that from 1st July, which is nominated as the starting date of DRG implementation and the new payment model, hospital payments can vary up 20% or down 20% from the current budget. According to the law, the amount of the budget variance depends on the hospital efficiency as measured by a DRG data generated efficiency index. It is understood that hospitals that operate more efficiently than the average would be rewarded by additional funding, while those whose efficiency is below the average would receive less funding. The actual index based payment formula is yet to be designed.

1.5. Focus areas

Several meetings were held with the HIF and the DRG Finance Working Group to discuss the financial aspects of payment systems and DRG costing between April and July. The meeting participants included Ms Romela Popovic Trajkova the HIF Director of Finance and Ms Branka Katuševska, who leads the HIF payment and contracting section.

A number of matters were discussed and the following are the key issues and questions which will be prioritised in the course of the consultancy:

1. ***What should be the aim of the project with respect to hospital payment at the project conclusion in April 2009?***

   It was agreed that at the end of the project the HIF should have sufficient confidence in the DRG activity and costing data to enable it to plan budgets and make payments according to these data.

2. ***What is the most appropriate way to begin using DRG activity data for hospital payments in the short term?***

   This matter is of some importance to the HIF as, according to the DRG by-law mentioned above, the HIF should be taking DRG data into consideration when making payments to hospitals from 1 July 2008.

3. ***How to define the value of DRGs to be paid in Macedonia for payment to hospitals?***

   The calculation of DRG values will be the outcome of the costing work undertaken by this project. As in most projects of this nature, the values generated will be best estimates based on the hospital financial data available during the course of the project. The methodology for the costing will be discussed later in this report.

4. ***How the current Macedonian DRG grouper can be reworked to provide usable outputs that can be used for calculations of appropriate payment to Macedonian hospitals.***

   The issue of the DRG grouper has been discussed in our previous reports and correspondence. The situation at the writing of this report, is that the Macedonian grouper that is currently on the web has shortcomings in that it is not able to calculate DRG complexities (the Consultant has provided technical advice on the subject and the resolution of the problem is now awaiting the finalisation of business arrangements). While problems with the Macedonian grouper functionality is being addressed, Macedonian hospital DRG data that is being generated post July 1, will be analysed by the project using the Croatian Grouper.

5. ***What is the impact of DRGs on the overall hospital payment model and how can a system of outpatient packages be developed that will be relevant to the conditions prevailing in Macedonia***

   If the request for additional contract work is approved, this topic will be covered by this project. It should be noted that there are many options for outpatient payments but the appropriate solution should be simple, easily to implement and easy to maintain.

6. ***How do we harmonize the existing hospital payments system with a new model of prospective payment.***

   As discussed below, the current payment system which is based on elements such as the historical budget, business plans and quality indicators will be phased to a new payment model which will categorise hospital output in terms of DRGs, and which will pay hospitals according to their production measured by DRGs.

7. ***How do we collect on an individual and facility level the necessary data on utilization, cost, revenues and quality of care.***

The project will establish a data collecting framework which, in addition to grouper generated activity data, will collect costing, quality and other input data.

8. ***Current capabilities of hospitals and the capabilities that will be required to operate under the DRG based outputs payment system.***

   This is the subject of the project activities that will build the capacity and skills of people involved in the utilisation of the DRG system. The activities will include training in costing, financial management, and contracting.

2. CALCULATING COST WEIGHTS

2.1. The concept of cost-weights

For DRGs to be used for payment purposes, a price needs to be assigned to each DRG. This is usually done by assigning a cost relativity (or cost weight) with a base price multiplier.

A weight is a relative measure of any one, or all, of the resources consumed (e.g. bed-days, theatre time, drugs, diagnostic procedures, physiotherapy and nursing treatment) in treating a patient. The DRG weight for utilisation of that resource is simply a ratio that compares the average resource utilisation within a given DRG with the average resource utilisation by all patients for all DRGs..

$$\text{Weight} = \frac{\text{Average resource consumption per DRG}}{\text{Average resource consumption for all cases}}$$

All weight measures are translatable into dollar values, and can then be aggregated to provide overall cost-weight ratios per DRG.

To facilitate comparisons if this sort, and to highlight relativities rather than absolute differences in these average weights, the figures can be further manipulated by setting the average of all the averages to one, and adjusting the other weight ratios relative to unit. This means that DRGs with a weight of more than one are more costly to treat than the average patient, and DRGs with a weight less than one are less costly than average. This practice is known as normalization. The whole range of weights for individual hospitals can then be averaged to give a Complexity Index (or average cost weight) which can then be used for comparisons between hospitals.

2.2. Developing valid cost-weights

The fundamental requirement of a DRG based payments system therefore, is the development of the DRG cost-weights that fairly reflect the actual costs of each of the DRGs that are to be used for payment. The development of national cost-weights independently at the beginning of an implementation program is generally not feasible as it requires the ability to allocate actual expenditures accurately to each patient or DRG and then comparing the costs of all DRGs to build a cost-weight index.

All countries that decide to implement DRGs borrow a cost-weight index from other countries and over time, adapt it so that it more accurately reflects the local cost structures. Macedonia, like other countries in the region will also follow this approach, although it is anticipated that due to the project's focus on costing, it is likely to develop more valid cost-weights before their neighbours.

In summary, therefore, the process of cost-weight development can follow two main paths. Firstly, cost weights can be adopted from elsewhere and adjusted to local conditions, or secondly, they can be estimated using available local payment or expenditure data. In practice, DRG cost-weight development uses both these approaches in parallel and the actual methodology depends, to a large extent, on the availability of good costing data.

2.2.1. Borrowing and adopting cost weight from other jurisdictions

This is a fairly simple process and involves the use of cost-weights from another jurisdiction and rebasing them to the casemix of the host country. In the case of Macedonia, as will be discussed in other sections of this report the average cost-weight calculated from February DRG data is 3.18 and this compares to the average Australian cost-weight value of 1. This means that if we are to obtain the value of the average Australian cost-weight in Macedonia we must first divide the Australian cost-weights by 3.18. This calculation will be undertaken elsewhere in this report.

Macedonia has of course options of AR-DRG based cost-weights other than the Australian version to start the process of calculating cost-weight values. Other cost weights that may be appropriate as a start may be those in use in Slovenia which begun implementing AR-DRGs in 2002.

2.2.2. Costing approach

There are two main costing approaches that can be adopted for purposes of estimation of average costs by diagnosis related group (DRG) and the establishment of cost weights for output-based funding. These are:

2.2.2.1. Top down approach

This approach is also referred to as cost-modelling and step-down costing. It was developed in parallel with the initial development of the DRG system at Yale University and uses a series of indicators to allocate all direct and overhead cost, to all DRGs. The basic information comes from the hospital's central accounts.

The top down approach begins with an estimate as to what fraction of the hospital's overall expenditure is consumed by inpatients. Then this is applied to the cost centres, such as wards, medical salaries, operating room, pharmacy, radiology and pathology, social work and other allied health services. Patient costs are distributed according to predetermined service weights, based on the relative costs of nursing, pathology, imaging, intensive care and operating theatres, over all the DRGs.

It should be noted that similar to the cost-weight adoption approach above, this method would use service-weights from other jurisdictions and these weights may not accurately reflect the cost structures of the host country.

2.2.2.2. Bottom-up approach

This approach is also referred to as patient level costing, clinical costing and activity based costing. It involves the collection of data about the use by each individual service such as pathology, radiology, physiotherapy and nursing. The resource usage is then costed as accurately as possible using the actual input cost data that may be available at the hospital. This bottom up method can be used to aggregate costs to individual patients, groups such as DRGs, and to clinical or other service units within hospitals.

Unlike the cost weight borrowing approach, and the top-down approach, the bottom-up method can generate accurate national cost weight from first principles – but requires extensive cost data collection across the hospital system as a whole.

3. COSTING METHODOLOGIES FOR ACTUAL AVERAGE COSTS

Before we discuss the specific DRG costing and payment methodologies in Macedonia, we describe below in more detail the basic theory of costing methodologies that should applied in Macedonia over time.

3.1. Top-down: the Step-Down method

The Step-down cost-finding method is based on allocating those costs that are not directly paid for (support service cost centres) to those products or services to which payment may be attached (eg DRGs). In the first instance, it calculates indirect costs such as overheads and then adds them to the direct costs for support cost centres services, such as utilities, and then allocates the costs of the support services to products that attract payment such as outpatient care services.

An allocation base is the item used to allocate costs, based upon its relationship to why the costs occurred. Some common allocation bases are listed in Figure 1. The better the cause-and-effect relationship between why the cost occurred and the allocation basis, the more accurate the cost allocation. Because of their causal relationship to costs, allocation bases are also called cost drivers.

Figure 1 Some Common Allocation Bases

Costs to be Allocated	Allocation Basis
Billing office	Number of bills
General Administration	Direct cost of department Number of full-time-equivalent employees (FTEs)
Laboratory (frequently charged directly to patients rather than being allocated)	Weighted average cost of tests Number of tests
Medical records	Number or records accessed
Nursing	Nursing hours Acuity-weighted hours
Purchasing	Number of purchase orders
Rent, utilities, cleaning	Square meter of area occupied

An example of a step down process is the allocation of costs of three support centres to which payment is not attached to three patient service provision centres which generate revenue. The three responsibility support centres may be utilities (allocated according to sq. m. of occupied space), administration (allocated per direct costs), and laboratory (allocated according to the number of tests), while the three patient services to which revenues may be attached are outpatient services, paediatric inpatient services, and oncology inpatient services.

The goal of the step-down method is to allocate the costs of the support cost centres (utilities, administration, and laboratory) fairly among each of the three product categories. There are four steps to allocate the non-directly paid for costs:

1. Determine an allocation base and compile basic statistics.
2. Convert basic statistics for the step-down.
3. Calculate allocation percentages.

4. Allocate costs from the support centres to each of the product centres below it (thus, the "down" in "step-down").

Figure 2 below, demonstrates the method for step 3 and step 4.

After all the costs of the services that are not directly paid for have been allocated to those services that are paid for, the totals are summed (see last column in Figure 4). Rather than the $200,000 it costs to deliver Outpatient services when only direct costs are considered, the fully allocated costs are

Figure 2 Step- Down Method of allocating costs

	Step 3 - Compute Allocation %			Step 4 - Allocate Costs				
	Utilities %	Administration %	Laboratory %	Direct Costs $	Utilities $	Administration $	Laboratory $	Fully Allocated Costs $
Utilities				50,000	(50,000)			
Administration	10			100,000	5,000	(105,000)		
Laboratory	20	20		175,000	10,000	21,000	(206,000)	
Outpatient Services	20	23	25	200,000	10,000	24,000	51,500	285,500
Paediatric Inpatient Services	25	23	45	200,000	12,500	24,000	92,700	329,200
Oncology Inpatient Services	25	34	30	300,000	12,500	36,000	61,8000	410,300
TOTAL	100%	100%	100%	$1,025,000	$0	$0	$0	$1,025,000

$285,500. Similarly, paediatric inpatinet services changed from $200,000 to $329,200, and oncology services changed from $300,000 to $410,300 when allocated costs are included. Thus, the fully allocated cost reflects both the original direct costs as well as all allocated costs, but the total cost, $1,025,000, remains the same as before. The step-down method is useful for pricing and reimbursement-related decisions, not so much for controlling cost. The following points of methodology should be considered when applying the step-down approach:

1. in finding the fully allocated costs, the order in which the services are allocated makes a difference in the final costs. for example, if administration were placed ahead of utilities in the allocation order, the costs of outpatient, paediatric, and oncology services would he different than in the example. There are two (sometimes conflicting) rules of thumb to help choose a reasonable order:
    a. rank-order the centres being allocated from highest dollar amount to lowest dollar amount (according to this rule, in the example, Laboratory and then Administration should have been listed ahead of Utilities); or
    b. list the centres, from highest to lowest, in an order that reflects the number of other centres they affect. It was for this reason that the centres were ordered as they were in the example, with Laboratory being last.

2. The allocation basis used to allocate costs makes a difference in the final costs. If the number of full time employed staff (fte's) instead of direct dollars were the allocation basis tier administration, and there were a low correlation between the two, then the costs of outpatient, paediatric, and oncology services would be different.

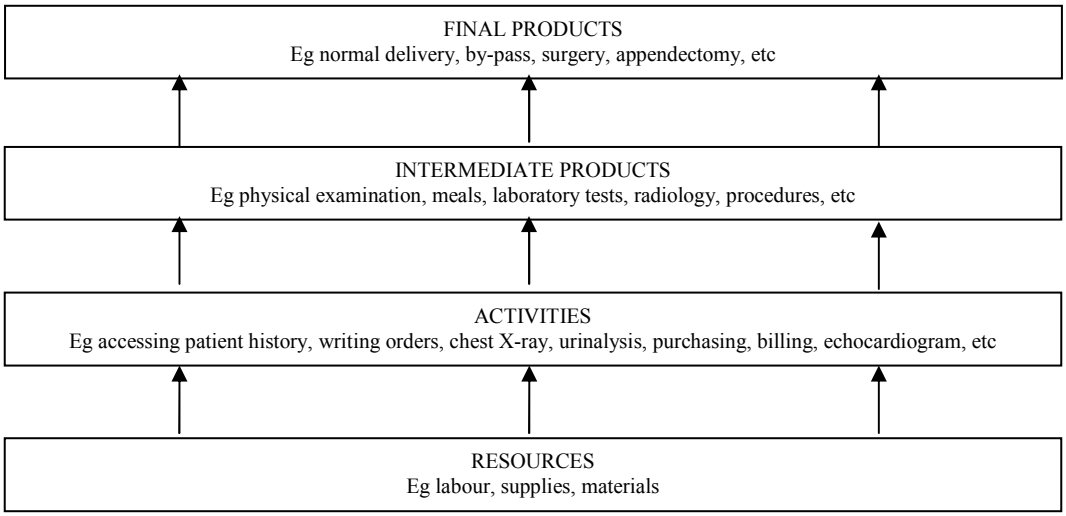
3.2. Bottom-up: activity-based costing

3.2.1. Principles of Activity-based costing

This approach is based on the paradigm that activities consume resources and products consume activities. Therefore, if activities or processes are controlled, then costs will be controlled. Similarly, if the resources for an activity can be measured, a more accurate picture of the actual costs of services can be found, as compared to traditional cost allocation.

Activity-based costing is called a bottom-up approach (Figure 3) because it finds the cost of each service at the lowest level, the point at which resources are used, and aggregates them upward into products.

Figure 3 Bottom-Up nature of Activity Based Costing



An example of intermediate products for a normal delivery for example is shown in Figure 4. The service "Normal Delivery" comprises three intermediate products (or processes): prenatal visit, labour and delivery, and postpartum care. Each of these intermediate products comprises a number of activities. For example, the prenatal visit includes urinalysis, complete blood count (CBC), vital signs, recent history, etc. Each of these activities might also include a portion of what are usually considered indirect costs, such as those associated with ordering supplies, medical records, or financial counselling.

Figure 4 Examples of intermediate products and activities for a normal delivery

NORMAL DELIVERY INTERMEDIATE PRODUCTS		
Prenatal Visit Activities	**Labor and Delivery Activities**	**Postpartum Care Activities**
• Urinalysis • CBC • Vital signs • Weight • Recent history • Prenatal education • Other	• External fetal monitoring • Coaching • Epidural • Maternal monitoring • Other	• Maternal monitoring • Exercise therapy • Postpartum education • Other

The activity-based costing model relies on an understanding of three key terms: direct costs, indirect costs, and cost drivers. Direct costs are costs (e.g. nursing costs) that an organization can trace to a particular cost object (e.g. a patient). Indirect costs are costs that an organization is not able to directly trace to a particular cost object and are often referred to as overheads. For example, many healthcare organizations have great difficulty tracing to a particular patient or service, such items as the cost of the finance department, rent, or information systems. Thus, a cost is direct or indirect not by its nature, but by the ability of the organization to trace it to a cost object.

An important difference between top-down cost allocation and activity-based costing is how each handles indirect costs. As discussed above, top=down cost allocation methods usually deal with indirect costs by allocating them to cost objects using relatively broad estimates of cause and effect relationships. Activity-based costing on the other hand, attempts to overcome this problem by more directly tracing costs to their cost objects and/or finding more precise cost drivers. Cost drivers are those things that cause a change in the cost of an activity.

For example, under traditional step-down costing, purchasing costs might be bundled with other administrative costs and allocated to a service based on the relative size of its budget. Under activity-based costing, it is more likely that the costs of purchasing would he allocated to that service more precisely on the basis of the number of purchase orders emanating from the service, or more precisely, by measuring the number of minutes spent processing purchase orders from that department.

3.2.2. Activity-based costing as an efficiency improvement tool

If the DRG system is to bring greater efficiencies to the hospital sector there must be continuous improvement of hospital operations and if managers to be able to drive this improvement, they must be informed. In healthcare, as with other businesses, the key is understanding the interrelationships of activities and taking actions to minimize waste and eliminate non-value added costs and this is where, activity-based costing and activity-based management can add great value.

Activity-based costing provides a better and more detailed cost model by allocating costs to activities based on the resources they consume. As discussed above, the model links processes and resources. For example, the psychology department may assign case managers to specific clinical departments. In the step-down costing model the case manager cost is allocated to other departments based on a broad allocation base such as patient days. Such an allocation method assumes that psychology service is a generic commodity that is the same for a maternity patient without post natal depression as one with depression, or an oncology or a HIV patient - and this is not the case.

The activity-based costing model would look at each patient population and examine the case management process for each. The process would examine questions such as:

- What are the activities involved?
- How much case management time is consumed by each activity?
- What other resources are consumed?

From the above analysis a more detailed cost allocation emerges. More importantly, the relationship between activities and resources is clearer, making cost reduction easier. Adding to the process appropriate quality, patient satisfaction, outcomes, and clinical performance measures makes the efficiency motivated process improvement more intelligent and less likely to reduce the quality of care.

Literature on the subject[1] suggests that activity-based costing can assist hospital managers achieve their aims to make their institutions more efficient and effective because:

[1] Robert Luttman & Associates Online Articles, Activity Based Costing, (http://www.robertluttman.com/activity_based_costing.html).

- It is able to provide information required for performance improvements related decision making
- It recognizes that cost and quality are the direct result of the activities providers undertake to deliver services to their patients.
- It is business-process and end-product focused, and invites cooperation, rather than competition, between functional departments.
- It is developed based on the process knowledge and insight of those directly involved in the delivery of the service (doctors, nurses, therapists, et al, participate and contribute to its development).

In addition, activity-based costing will make sense to those charged with the responsibility for improving performance and provides them with transparent information on the cost ramifications of their decisions and the method can assist in:

- Developing Standard Costs and evaluating the cost implications of alternative clinical pathways
- Streamlining care delivery practices across the care continuum
- Decision-making regarding management levels and spans of control
- Enhancing staff utilization

3.3. Australian DRG Costing

The Australian Department of Health and Aging regularly publishes National Hospital Cost Data Collection Cost Reports and the most recent is for the year 2006-07. The report provides detailed cost data for all DRGs and as a sample, the costings for DRG *O60C - Vaginal Deliver - Single without complications* is displayed below.

DRG Description	**O60C - Vaginal Deliver - Single without complications**		
Cost Weight	0.93		
Number of Separations (cases)	26,920		
Total Number of Days	57,276		
ALOS (Days)	2.13		
Cost centres ($)	**Direct Costs**	**Overhead Costs**	**Total**
1. Medical Ward	430	35	
2. Nursing Ward	1,448	229	
3. Non-Clinical Salaries	321		
4. Pathology	23	6	
5. Imaging	6	1	
6. Allied Health	22	14	
7. Pharmacy	45	7	
8. Critical Care	11	3	
9. Operating Rooms	29	7	
10. Emergency Department	17	6	
11. Supplies	128	140	
12. Special Processing Suites	1	0	
13. Prostheses	2		
14. On-Costs		265	
15. Hotel		165	
16. Depreciation		101	
Total Average Cost per DRG ($)	**2,483**	**979**	**3,462**
	72%	**28%**	**100%**

The following is a brief explanation of some of the items listed above.

Cost Weight - measure of the average cost of a DRG, compared with the average cost of all DRGs. The average cost of all DRGs is given a cost weight of 1.0.

Number of Separations - a separation is termed to be one complete episode of care for a given patient.

Number of Days - is the sum of lengths of stay of the separations for a given DRG.

Non Clinical Salaries – this bucket contains all other costs of service provision for each inpatient separation; the costs are primarily other salaries and wages such as patient care assistants.

Pathology - this item reports costs recorded from diagnostic clinical laboratory tests for the diagnosis and treatment of patients.

Imaging - this item contains costs for diagnostic and therapeutic images produced under the direction of a qualified radiographer or suitably qualified technician and reported by a medical practitioner (radiologist).

Allied Health – the item reports costs delivered to clinical services by qualified health professionals (exclusive of medical and nurse trained personnel) who have direct patient contact and provide services in Audiology, Dietetics/Nutrition, Occupational Therapy, Optometry, Orthotics, Physiotherapy, Podiatry, Social Work, Psychology, Speech Pathology and other Allied Health.

Pharmacy - costs associated with the provision of pharmaceuticals including purchasing, production, distribution, supply and storage of drug products and clinical pharmacy service.

Critical Care – this item is the combination of intensive care and coronary care costs.

Operating Rooms - reports costs for a health care facility under sterile conditions, where significant surgical procedures are carried out under the direction of suitably qualified medical practitioners.

Emergency Department - displays costs reported for health care facilities designed and equipped specifically to provide an environment where patients presenting in an unscheduled manner can be triaged, assessed and treated.

The points to note from the above is that each DRG has been costed according to some 16 cost items. The direct costs and overhead costs of each of these items were valued separately and then summed to provide the total cost. Of interest is that overhead costs make up some 28% of the total cost of the normal delivery DRG which in Australia costs AUD3462 (MKD126,300).Approach in Macedonia

3.4. Current HIF analysis and related activities

The Consultant examined the DRG analyis undertaken by the HIF and found that very good analytical structures are already in place which can form the basis for developing a DRG funding model for inpatient payments to hospital.

The key elements of the HIF analytical and modelling activities are as folows:

- **Hospital by hospital activity target setting as part of the payment system.**

  The activity targets are established in the hospital Business Plans that set activity goals in terms of patients per department and categorised according to ICD classifications. The hospitals then attach a weight to the activities according to the existing points based payment system which subsequently allows the calculation of the prospective hospital budget.

As currently, the categorisation of activity is not consistent across the hospital sector, an opportunity exists for DRGs to be used to define hospital activity goals in the business plans. Once weighted activity goals are established, cost weights can be applied to establish hospital budgets based on casemix.

- **Analysis of DRG activity data**

  The HIF has taken the initiative and begun analysing DRG activity based on February data. The results of this analysis for general hospitals in Macedonia is included in Attachment 2. The analysis has calculated hospital acute budgets, the average cost per inpatient, the casemix indexes for all the hospitals and calculated weighted activity. The calculations take account of invoicing claims as well as cost reporting of staff, drug and consumable cots for each inpatient episode grouped.

- **Cost data reporting required from all hospitals according to a standard chart of accounts and reporting protocol.**

  The chart of accounts report is included in Attachment 1 and includes the following line items: operating expenses including - salaries, maintenance, heating, communication, transport, minor purchases; capital equipment maintenance and up keep; interest; loan repayment; co-payment to be transferred to HIF; building investments; furniture; car, equipment; and contingency

  On the revenue side, hospitals also report how much revenue they receive from HIF and how much they receive from other sources against each of these line items. An issue that needs to be addressed by this consultancy is how to include non-HIF hospital revenue in the overall hospital budgets. This is important if the performance of Macedonian hospitals is to be accurately benchmarked against peers in other places – or in some cases agains each other if their revenue sources differ.

- **Notional revenue based on invoice claims**

  The current points based invoicing system is used to validate the budget allocations to hospitals. It is understood that the invoice claims are generally in concert with the actual hospital expenditures and the average variance between the expenditure and invoice claims is within 10%.

3.5. Australian nomenclature

DRG countries have in many instances, developed their own nomenclatures as is the case in Australia where, the cost per casemix-adjusted separation is used as an indicator of the efficiency of acute care hospitals.

The cost per casemix-adjusted separation is a measure of the average recurrent expenditure for each admitted patient, adjusted using AR-DRG cost weights for the resources expected to be used for the separation. The formula used to calculate the cost per casemix-adjusted separation is:

$$= \frac{\text{Total recurrent hospital expenditure} \times \text{IFRAC}}{\text{Total separations (number of inpatient admissions)} \times \text{Average cost weight}}$$

where:

- **recurrent expenditure** - is as defined by the recurrent hospital expenditure (excluding capital works)
- **IFRAC** (admitted patient cost proportion) - is the estimated proportion of total hospital expenditure that relates to admitted patients (inpatients)
- **total separations** - is the same as the number of inpatient admissions/discharges
- **average cost weight** - is a single number representing the relative expected resource use for the separations.

The average cost weight (also known as casemix index or CMI) for a hospital or group of hospitals is calculated as the number of casemix-adjusted separations divided by the number of separations. It represents in a single number the overall relative expected use of resources by a hospital. For example, a hospital with an average cost weight of 1.08 has an 8% more costly casemix than the national average (which by design is 1.00).

The average cost weight for a group of hospitals is multiplied by the total number of separations for that group to produce the number of casemix-adjusted separations (the denominator). The term 'cost per casemix-adjusted separation' derives from this use of the number of separations adjusted by relative costliness.

3.6. Recent analysis in Macedonia

3.6.1. Work by HIF

The HIF has undertaken an analysis which sets out a basis for a methodology for the calculation of hospital budgets based on DRGs. The analysis (Attachment 2 provides data for general hospitals) includes the following data items and calculations for all hospitals and clinics based on February 2008 data:

- Total monthly hospital budgets – these are based on plans and not actual hospital expenditures

- Inpatient budgets – these are obtained from three main sources namely, business plans, invoice claims and special hospital cost reporting undertaken in parallel with the reporting of DRG data. In most cases, the three methods produced fairly consistent inpatient budget amounts for the general hospitals

- The inpatient budget ratio (admitted patient cost proportion –IFRAC) – the variability of this figure is considerable with general hospital Kocani 38% and General Hospital Struga 85%. The reasons for this variability should be researched.

- Number of admitted patients (total separations) – these figures were sourced from the data generated by the DRG grouper and should be compared against other statistics to ensure their accuracy.

- Average cost weights from all hospitals – calculated using February DRG activity data and Australian cost-weights. Again, these figures are quite variable ranging between 1.96 for General Hospital Kavadarci and 5.52 for General Hospital Gostivar. (the reason for these variations is most probably the lack of PCCL functionality of the Macedonian grouper.

The main results of the HIF analysis are as follows:

- The average cost of admissions to hospitals and clinics in Macedonia ranges from MKD22,728 and MKD24,076 depending on the method of calculation – by definition, the cost of the average DRG will be in the same range.

- The average hospital cost weight (CMI) for hospitals and clinics in Macedonia is 3.18.

3.6.2. Analysis of general hospital data

For the purpose of demonstrating the methods used in Australia to calculate the cost per casemix-adjusted separation and examining the impact on hospital payments, the Consultant used the HIF data for general hospitals (which excludes Bitola and Prilep) and undertook an analysis which is documented in Table 1 below.

The analysis first calculated the following indicators for the general hospitals:

- Total number of separations for the month: - 7833
- Average cost weight (CMI) for the group of general hospitals:-3.05 (as compared to 3.18 for the total hospital sector) – the individual general hospital average cost weights were then rebased by dividing them by the average, 3.05.
- cost per casemix-adjusted separation for each general hospital was calculated
- the average cost per admission in a general hospital was MKD13,513 (compared to the range of MKD22,728 and MKD24,076 when all hospitals and clinics are included; and compared to MKD28,429 in the Basic Benefits Costing Study mentioned below)
- number of casemix-adjusted separations

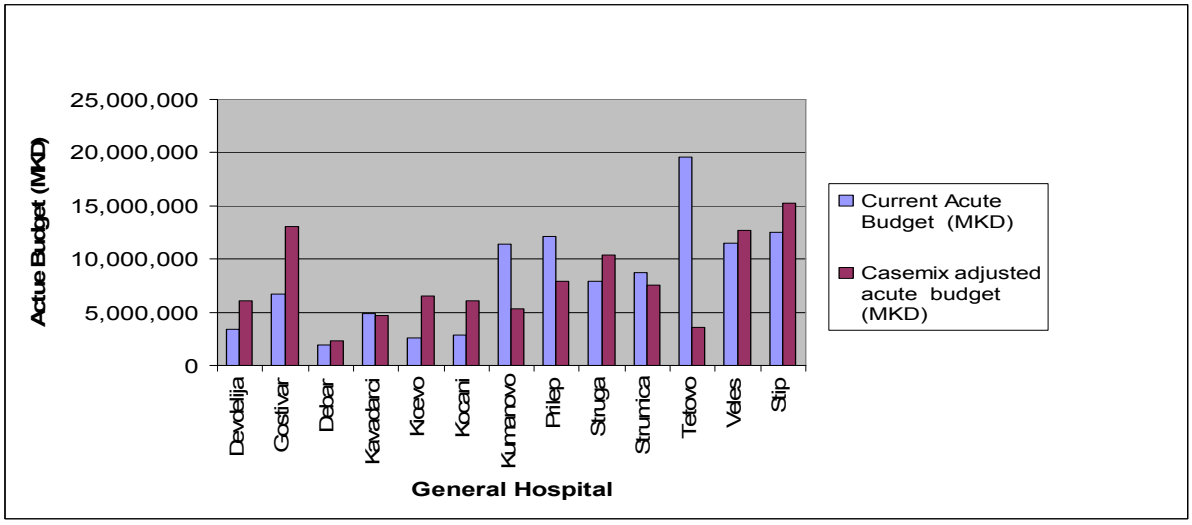
Table 1 Analysis of February 2008 general hospital DRG data

General Hospitals	Total recurrent hospital expenditure (MKD)	Admitted patient cost proportion (IFRAC)	Total separations	Average hospital cost weights (not rebased)	Average hospital cost weights (rebased)	Cost per case adjusted separation (MKD)	Acute Budget (MKD)	Number of casemix adjusted separations	Hospital casemix budget (MKD)
Devdelija	8,020,068	0.42	351	3.88	1.270	7,553	3,368,429	445	6,026,338
Gostivar	16,707,964	0.4	533	5.52	1.807	6,937	6,683,186	963	13,018,995
Debar	4,504,274	0.42	226	2.28	0.746	11,212	1,891,795	168	2,280,103
Kavadarci	8,951,754	0.54	539	1.96	0.641	13,973	4,833,947	345	4,674,725
Kicevo	6,247,370	0.41	603	2.46	0.805	5,273	2,561,422	485	6,563,925
Kocani	7,449,594	0.38	464	2.96	0.969	6,294	2,830,846	449	6,077,443
Kumanovo	24,803,681	0.46	595	2.03	0.664	28,847	11,409,693	395	5,344,711
Prilep	23,287,807	0.52	710	2.52	0.825	20,669	12,109,660	585	7,917,172
Struga	9,256,476	0.85	1024	2.30	0.753	10,202	7,868,005	771	10,421,710
Strumica	18,214,087	0.48	697	2.45	0.802	15,635	8,742,762	559	7,556,315
Tetovo	32,142,412	0.61	171	4.75	1.555	73,716	19,606,871	265	3,594,189
Veles	16,588,605	0.69	859	3.34	1.093	12,183	11,446,137	939	12,695,529
Stip	20,484,300	0.61	1058	3.25	1.064	11,097	12,495,423	1,125	15,215,289
Totals	**196,658,392**	**6.79**	**7833**	**39.70**			**105,848,175**	**7,503**	**101,386,444**
Averages		**0.52**		**3.05**			**13,513**		

Using the above information, the Consultant then calculated what the hospital budgets may have been if hospitals were paid 100% by casemix based on the data provided by the hospitals. The results are shown in Figure 5, and as expected from the data provided are very variable. The reason is that the February data which is used in the analysis is thought to be inaccurate and most likely not comprehensive.

Although this exercise has little purpose in structuring actual payments it can demonstrate to hospitals the importance of good data as it will be the basis for their payment in the future.

Figure 5 Comparison of February 2008 Casemix and current inpatient budgets in selected general Hospitals



3.6.3. BBP costing study

As reported in the Inception Report, Oxford Policy Management undertook a benefits package costing study which has resulted in the calculations of average admission costs in general hospitals per specialty. These costs are shown in Table 2.

Table 2 General Hospital - costs per episode by specialty

	Cost per admission (denars)		
	average	low	high
Dermatology	34,518	27,042	45,744
Surgery	23,225	6883	30,295
Obstetrics and Gynaecology	15,629	6611	24,629
Medical Ward	34,358	12,545	58,966
Infective care	49,930	22,197	40,183
Child health	12,049	6087	62,579
Trauma and orthopaedics	26,552	12,715	49,370
Psychiatry and neurology	34,508	22,258	45,081
ENT	25,097	16,569	46,883
Opthalmology	25,075	14.045	35,033

Source: Oxford Policy Management Draft Report

Based on the above calculations, the cost of an average admission in Macedonian General Hospitals is MKD28,429 which is some 20% more than the HIF analysis (section 4.3.1 above).

The reasons for the discrepancy are not clear but may be due to some differences in costs included in the analysis. For example, one approach might include all of capital costs while the other may include only actual replacement expenditure on high cost equipment. Of significance is that this variation in result underlines the importance of establishing clear specification of which costs are to be included in the analysis and adjusting for different combinations of cost items.

3.7. Costing software products

As mentioned above, costing is a fundamental element of a DRG based hospital payment system and various computer packages are available to assist in the calculation of hospital product costs and the modelling of hospital budgets. Over time, Macedonia should invest in hospital costing software but this decision should be made as part of the overall Integrated Health Information System strategy. Also, any initiative to install costing software should go hand in hand with the development of standardised hospital accounting and financial reporting systems and capability.

To reflect the main costing methods, the software products can be categorised into two main categories: cost modelling and patient or clinical costing.

3.7.1. Cost Modelling

Cost-modelling applications are essentially designed to cost hospital products using the step-down method, to the patient class by cost component level, for example - a breakdown of DRG costs by nursing, medical, imaging, drugs, prosthesis, allied health, teaching and research, and so on.

Cost modelling applications can be powerful tools for hospitals, or health departments, that wish to understand product costing in hospitals without the far more significant commitment of resources and time required to implement patient or clinical costing that is discussed below.

3.7.2. Patient, clinical and activity based costing

The next level of costing software up from cost modelling are patient costing systems that are designed to cost hospital products to the patient episode by cost component, for example, the drugs cost component could be broken down into, say, HIV drugs, high cost drugs and other drugs.

Clinical costing systems provide more activity based information. For example, they can cost sub-episodes such as ward or ICU episodes within an acute inpatient episode. They also allows costing down to very detailed levels as may be defined by the user - for example, cost by drug item, or pathology test, or by surgeon by operation, or cost per day by component.

Depending on the level of their sophistication, these systems can provide hospital managers and clinicians with the ability to:

- Analyse the cost of resources consumed by patients for each day of stay (nursing, medical, operating theatre, pharmacy, medical supplies, pathology, imaging, and so on)
- Analyse cost data at a variety of levels; cost data can be analysed by patient diagnosis or procedure, patient classification, cost centre (such as ward or operating theatre), department or specialty
- Benchmark the cost of delivery of services to patient cohorts
- Conduct utilisation reviews for different patient cohorts; for example: time on ward, time in theatre, time in specialised procedure suites, diagnostic tests, prescribed drugs, and so on
- Monitor adherence to or variance from established clinical pathways or protocols
- Monitor profit and loss at the individual patient level by funding model
- Undertake ‘what if’ scenario development – providing a tool through which changes in environmental factors can be modelled into the future. This enables hospitals to answer questions such as: what happens if I lift the occupancy of this ward?, shorten a waiting list?, increase the capacity of my theatre?, and so on.

4. CHANGES TO PROVIDER PAYMENTS

4.1.1. Harmonised transition from existing payment line items to DRG prospective payment

The existing payment process is largely historical supported by a claims system that is intended to reconcile the funding that the hospitals received with what they really did. The existing method of monitoring activity, and reconciling actual activity to performance targets is well established. The existing monitoring and analytical processes and tools provide a good framework for the implementation of DRG activity monitoring for benchmarking, target setting and funding of inpatient services.

With the commitment to introduce payments based on DRGs, a reporting system has been developed based on the monthly claims received and this has been integrated with available expenditure data to compare work done with payments claimed and funding provided. The results of February 2008 data reporting and analysis for general hospitals are provides at Attachment 2.

The transition to a DRG funding or payment system for acute care can readily be developed on the basis of what is now done with activity, payment claim and case data on a monthly basis. A question to be considered, however, is whether this should continue on a monthly basis or be reconciled on a quarterly basis. An important factor to consider here is to what extent data can be collected to a reasonable cut-off time. Two weeks from the end of a reporting period to final consolidation of the data base is usually considered optimal. This allows time to resolution of edit queries and decision processes on acceptance or rejection of contentious claims. It also allows time for correction for queries raised by the edits and on line audits processes. It is normal to reject cases for payment which have not satisfied the edits and audits processes by the cut off date. In an initial implementation phase another alternative is to pay such cases but at a minimum payment rate.

4.1.2. Data collection status and transition requirements

As discussed above, data are currently collected from all 51 hospitals and clinics on activity, costs and payments claimed. Payments are currently made according to pre-agreed cash flows that are largely historically based. However, activity is monitored by the HIF on the basis of episode level throughput. Targets are set in Business Plans for activity levels and compliance with achieving these targets are one of a number of indicators that determine up to 20% of the payments hospitals receive.

Given the understanding of working to targets, it should be feasible to set DRG related throughput targets and link the achievement of these targets to 20% of the payment made to hospitals. The simplest way to approach this is to use DRG weighted throughput targets as the basis for 20% of the reimbursement. The percentage of the payment related to the DRG can then be increased over a period of three to four years to closer to 100% - the rate at which this will be achievable will relate mostly to the accepted accuracy of the activity data and the cost weights being used.

The choice to retain a proportion of the payment as block funding (which may still be acquitted to activity levels) depends largely on the method of choice for funding fixed costs, to cover inefficiencies of scale related to distributive imperatives. For example if a small rural hospital is operating at a level that does not allow it to obtain the efficiencies of scale of a larger city hospital, a proportion of its funding may be provided irrespective of level of throughput because the choice is made to provide those services in that location.

In terms of the initial actions for the transition from the current approach to inpatients funding arrangements to a DRG based prospective payment system a summary of initial steps is outlined in Table 3.

Table 3 Summary of key elements of methodology for DRG implementation

	FROM	TO
1	**ACTIVITY TARGETS**	
	Specialty by specialty targets set by the providers unilaterally.	MDC related targets – adjusted for specialty relevant to: • health outcome priorities and • performance improvement goals.
	ACTIVITY LEVEL TARGETS LARGELY BASED ON INCREMENTAL INCREASES IN HISTORIC ACTIVITY LEVELS MEASURED BY POINTS SCORE.	**ACTIVITY LEVEL TARGETS SET BASED ON PRIORITIES.** **MEASURES BASED ON WEIGHTED DRGs.**
2	**COST REPORTING**	
	Monthly cost reporting General public accounts related cost centres.	Quarterly and annual costs collation and disaggregation to product related cost centres.
	MANAGEMENT INPUTS UNIT COST CENTRES.	**MANAGEMENT AND PRODUCT UNIT COST** CENTRES. For example:- • Drugs by patient or ward or clinical unit • Pathology by patient or ward or clinical unit • Nursing by patient, or ward or clinical unit.
3	**CLAIMS**	
	Claims tracking of activity based on input products utilisation for each patient episode.	Development of current claims data reporting system for use primarily for:- • outpatient FFS-relevant claims • supply chain functions such as tendering • product registration and utilisation audit • costing of bundled payment categories for payment price setting and benchmarking. Data on utilisation of inputs by patient may continue to be used for funding services where an episode based approach is not available or inappropriate. They are also extremely valuable for supply chain functions, purchasing and drug and medical device approvals functions.
	INPUTS ORIENTED (FEE-FOR-SERVICE FFS) CLAIMS	**OUTPUTS ORIENTED (ACTIVITY UNITS) CLAIMS**
4	**ACTIVITY MONITORING**	
	Activity monitoring by unweighted units of discharge or consultations.	Activity monitoring by weighted units of output.
	NO COMPLEXITY AND SEVERITY WEIGHTING.	COMPLEXITY/AND SEVERITY WEIGHTED MEASUREMENT AND REIMBURSEMENT.

	FROM	TO		
5	**PAYMENTS**		**Yr 1**	**Yr 3**
	Historically based cashflow (70%) Claims monitoring against targets (20%) Quality indicators (10%)	Fixed costs related cashflow payments.	70%	20%
		Quality performance payments (see #6)	10%	10%
		DRG throughput payment (activity related payments based on targets)	20%	70%
		Variation from target production allowed for payment at the target levels.	+ / - 5%	+ / - 2%
	NO OVERPRODUCTION LIMITS.	**PRICE PENALTIES FOR BOTH UNDER- AND OVER-PRODUCTION PAYMENTS IN RELATION TO TARGETS ACTIVITY.**		
6	**QUALITY**			
	Quality indicator payment adjustments set by provider specified goals and targets	Quality indicators set based on targeted priorities • Waiting experience of patients • DRG's to ICD benchmarked sentinel performance indicators such as ICD coded surgical complication rates. • Cost effectiveness indicators		
	QUALITY INDICATOR MONITORING WITH ONUS ON PROVIDER TO DETERMINE MINIMUM TARGETS BASED ON A SET OF RUDIMENTARY QUALITY INDICATORS ONLY. **COMBINATION OF THROUGHPUT AND QUALITY STANDARDS IN SINGLE BONUS SYSTEM.**	**INCREASING THE USE OF QUALITY INDICATOR TARGETS WITH GREATER REFERENCE TO BEST PRACTICE INDUSTRY STANDARDS RATHER THAN HOSPITAL SPECIFIC REFERENCE POINTS.** **SEPARATION OF QUALITY PAYEMENTS FROM THROUGHPUT PAYMENTS.**		
7	**OUTPATIENT PAYMENT**			
	Outpatient reporting of activity a largely manual process and large proportions of outpatient activity data is unavailable for statistical analysis. Specifically: • summarised activity counts only available by hospital. • payments by block grants largely historically based • some use of global consultation counts for activity monitoring against targets.	Outpatients accounted for and activity levels targets specified by episode counts at clinic and specialty levels. • Electronic reporting at consultation unit level so that payments can be made based on throughput by outpatient clinic type rather than global payment for all hospital outpatient activity. • Unchanged payment arrangement Yr 1 but shadow monitoring of casemix payment for six months of year 1. Target payments (20% of outpatient funding) referenced to weighted activity rather than simple counts of consultations. This will allow a phasing in of activity based funding. • Improved monitoring of weighted activity based on consultations by clinic as the unit of activity. • Throughput payment phased in Yr 2 and 3.		
	FUNDING GLOBAL WITH SMALL ADJUSTMENT UNWEIGHTED THROUGHPUT AGAINST TARGETS.	**PHASING IN OF LARGELY WEIGHTED THROUGHPUT BASED FUNDING SYSTEM FOR INCREASING PROPORTION OF ACTIVITY FROM YEAR 2.**		

5. CONCLUSIONS AND RECOMMENDATIONS

Good progress

Macedonia is well placed to progress to a phased DRG payment implementation for inpatient services commencing immediately. Impressive energy and momentum have been achieved and need to be maintained. There is a good recognition of the limitations in precision of the currently available data and grouping processes. However there are solid remedies and enhancement processes in train which are expected to produce useable credible grouped data starting on 1 July 2008.

There is an immediate need to use the available data for payment modelling and phased implementation. This will help to maintain the momentum towards a focus on improving efficiency and quality of services. It will also provide the incentive for rapid data enhancement efforts in both the hospitals and the HIF so that the statistical DRG tools will have the level of precision required for fairly differentiating between hospitals' case complexity.

Costing capability

The real leverage for efficiency in hospital outputs based funding comes from the development of the ability within hospitals to analyse their own average costs for each DRG by inputs cost buckets and compare these with the industry norms. It is recommended that this capability be established in at least a few major hospitals as soon as possible.

DRG cost weights

A combination of the weights developed from claims data and the Australian cost weights can be developed as a reasonable representation of valid Macedonian DRG relativities. Accurate cost weight development in dependent on accurate coding and grouping. At the early stage of coding development it may be advisable to cross validate (or recalculate) the Macedonian reporting rates of the complexity level splits using the Australian complexity level ratios.

Macedonian cost-weight development can also be validated using the points based invoicing system (as a proxy for cost) as well as the three element (labour, drugs and consumables) cost reporting that was required by the HIF for the month of February and will again be collected in the forthcoming months.

The Macedonian cost-weights can also be compared to those used in other regional countries such as Romania, Croatia and Slovenia.

Costing process

The process that should be followed from this point is as follows:

- Undertake a stock take of the available hospital costing data which will be available from the hospital charts of accounts, benefits package costing study
- Identify limitations in the accuracy and detail of available financial and activity data and decide how to address the problems – eg using proxies from other jurisdictions or undertaking costing surveys
- Using available data begin the process of step-down costing to determine the average costs per case type focusing in the first instance on the high volume high cost DRGs to ensure that attention is paid to categories where savings will be the most meaningful (Attachment 3 indicates that in terms of total ALOS, some 70 DRGs make up 55% of the total days spent in Australian hospitals - and many of these are

psychiatric DRGs). Specifically, the costing process will comprise the follow main activities:

1. Nominate the cost centres to which the costs will be allocated and separate between product cost centres and overheads
2. Determine the allocation formulae as to how overhead costs will be allocated to the product cost centres such as medical ward. nursing ward, non-clinical salaries, pathology or imaging
3. Allocate product cost centres to final products such as DRGs – this will be involve a process of estimation based on available data.

- To be credible any calculation of cost must also reconcile to the actual expenditure of hospitals on the set of services or products being costed. The total of all the costs of the products being costed should therefore be consistent with the total expenditure figures reported in the hospitals' financial systems and annual reports.

Outpatient Payments

The HIF expressed strong interest in developing a DRG based payment system for outpatient care in Macedonia. Because Macedonian hospitals provide extensive outpatient specialist services, it is important to ensure that the payment system for these services fairly reflect the work that is done and provides incentives for appropriate care and maintenance of patients in the outpatient setting. The consultant will address this issue in more detail once work on the acute DRGs has been settled.

The possible models for outpatient payment may include that used in the State of Victoria, Australia. We have requested HIF to provide us with the list of outpatients departments per medical speciality (eg cardiology, endocrinology etc). The next step is to classify each of the specialties into procedure based and consulting services or packages. The main idea is that this services bundles are paid in all hospitals according to a fee schedule that fairly reimburses the hospitals for their work and provides the right incentives for appropriate and efficient care. This approach will required a collaborative approach were the key stockholders are involved namely clinicians, medical professional associations, Hospitals, HIF and patient representatives.

Payment and efficiency

It is important to maintain the current momentum and provide incentives to improve DRG data. To that end, it is recommended that as planned by the HIF, DRG activity levels are increasingly used to distribute a proportion of the hospital revenues as soon as practicable.

Concentrated efforts will need to be continued in involving hospitals in examining the cost modelling. The payment system will need to be seen as fair and equitable and not shift an unreasonable amount of risk to the providers from the payers. There will need to be a clear opportunity for individual efficient hospitals to benefit in terms of retaining a substantial share of the savings from their efficiency achievements. These savings are expected to be used to increase their share of marginal growth in future target settings.

Hospitals should be given the incentive to carry out more activity by allowing retention of immediate savings from cost efficiencies before prices are reduced to reflect the cost reductions in the following year. For the same reason prices should also be set to reflect average cost across the whole system so that efficient hospitals will be automatically rewarded with an operating surplus.

The payer and the community can also expect to reap efficiency dividends as average costs and prices drop across the total system – as costs drop activity can increase with the same budgets and more value can be produced by the hospital system.

Feasibility of DRG implementation

Given that the implementation of DRGs in Macedonia is already a formal policy enacted in the by-laws governing the funding of health services, it is not appropriate to refer to the cost impact study that has been assigned to this project as a feasibility study - instead we will refer to it as a cost impact evaluation. There are various models for such an evaluation but the intention of this one is understood to be to:

- Make transparent the costs of implementing the DRG activity measurement tool as a health service monitoring, funding or payment mechanism. This would include the estimate of resources required to operate and maintain the DRG system in Macedonia.
- Provide some reasonable estimates of the potential efficiency and productivity gains that can be expected from using this mechanism based on experiences in implementations in other settings and taking account of similarities and differences in the Macedonian circumstances.

Literature demonstrates that Australia as well as other countries are gaining efficiencies from the use of DRG funding mechanisms. Information contained in Attachment 4 provides some experiential results on which some reasonable expectations may be based for such efficiency gains.

Analysis framework

The monitoring and analysis framework already in place in the HIF will provide a solid basis for collating the information for a DRG payment framework and providing the necessary feedback to hospitals. The Ministry of Health and Public Health statistical personnel involved with the monitoring on hospital activity should also be involved in this work and draw on the same data sets and standards for their health service activity analysis work.

ATTACHMENT 1 - HOSPITAL CHART OF ACCOUNTS REPORTING

Expenditure reporting is undertaken according to the following line items:

1. Total Expenditure

2. Non material expenses
    a. gross salary
    b. gross salary supplements
    c. other non material employees expenses (food, transportation etc)
    d. other non material employees expenses (financing expenses)
    e. contributions for pension fund
    f. contributions for health insurance
    g. contributions for working
    h. other contributions

3. Daily Expenditure

4. Maintenance, heating, communication and transport
    a. Maintenance services
    b. Heating
    c. Communication
    d. Transport

5. Minor purchasing goods
    a. administrative items
    b. uniforms, bed sheets, shoes for workers
    c. food
    d. drugs and medical products
    e. educational materials
    f. Cleaning and maintenance products
    g. other materials for special purpose

6. Capital equipment maintenance and current up keeping

7. Agreed services
    a. Number of permanent and contract or part time employees
    b. Insurance contributions
    c. Other extra expenditure

8. Other expenses

9. Co-payment to be transferred to HIF

10. Interest rate related expenditure

11. Building investments

12. Other building investments

13. Furniture, transportation car, equipment and devices
    a. furniture cost (purchasing)
    b. transportation car cost (purchasing)

c. equipment cost (purchasing)
d. engineering equipment cost
e. library cost

14. Other non-financial cost

15. Loan repayment

16. Contingency and no defined expenditure

17. Subsidies and transfers

Hospitals report how much they receive form HIF and how much they receive from other sources against each of these line items.

Operating expenses including - salaries, maintenance, heating, communication, transport, minor purchases; capital equipment maintenance and up keep; interest; loan repayment; co-payment to be transferred to HIF; building investments; furniture, transportation car, equipment and devices; and contingency

ATTACHMENT 2 – HIF ANALYSIS IF FEBRUARY HOSPITAL BUDGET AND ACTIVITY DATA

Генерал Хоспиталс	Тотал монтхлs хоспитал будгет (МКД)	Инпатиент Будгет басед он бусинесс план (МКД)	Ацуте царе цост фром хоспиталс пер 3 цатегорs ХИФ цост сурвес (МКД)	Инпатиент ратио Ъ ИФРАЦ (Цол 4/Цол 3)	Инвоице цлаимс прицес (МКД)	Нумбер оф адмиттед патиентс (фром гроупер инпут)
2	3	4	5	6	7	8
Devdelija	8,020,068	3,338,578	3,677,954	42%	3,356,408	351
Gostivar	16,707,964	6,703,392	7,695,062	40%	6,644,404	533
Debar	4,504,274	1,903,720	2,239,046	42%	1,958,250	226
Kavadarci	8,951,754	4,853,766	5,482,325	54%	6,567,975	539
Kicevo	6,247,370	2,585,595	3,011,728	41%	3,235,391	603
Kocani	7,449,594	2,816,794	3,225,563	38%	3,571,473	464
Kumanovo	24,803,681	11,327,217	12,691,907	46%	10,102,312	595
Struga	23,287,807	12,224,479	14,382,569	52%	13,460,943	710
Strumica	9,256,476	7,834,291	9,392,879	85%	8,128,144	1024
Tetovo	18,214,087	8,788,672	8,978,743	48%	9,400,262	697
Veles	32,142,412	19,715,365	23,663,614	61%	20,344,081	171
Stip	16,588,605	11,477,995	12,769,853	69%	12,106,492	859
Devdelija	20,484,300	12,417,524	13,844,734	62%	13,351,769	1058

Генерал Хоспиталс	Авераге цост пер патиент Ъ пер бусинесс план (Цол 4/Цол 8)	Авераге цост пер патиент - пер инвоице (Цол 7/Цол 8)	Авераге цост пер патиент - пер 3 цатегорs ХИФ цост сурвес (Цол 5/Цол 8)	Авераге цост њеигхт (цасе миц индец)
2	9	10	11	13
Devdelija	9,512	9,562	10,479	3.88
Gostivar	12,577	12,466	14,437	5.52
Debar	8,424	8,665	9,907	2.28
Kavadarci	9,005	12,185	10,171	1.96
Kicevo	4,288	5,365	4,995	2.46
Kocani	6,071	7,697	6,952	2.96
Kumanovo	19,037	16,979	21,331	2.03
Struga	17,218	18,959	20,257	2.52
Strumica	7,651	7,938	9,173	2.3
Tetovo	12,609	13,487	12,882	2.45
Veles	115,295	118,971	138,384	4.75
Stip	13,362	14,094	14,866	3.34
Devdelija	11,737	12,620	13,086	3.25

ATTACHMENT 3 – DRGS PER TOTAL LENGTH OF STAY*

			Total Episodes	Length of Stay (days)	
Z60A	1.	REHABILITATION + CSCC	53,074	1,245,901	
Z64A	2.	OTH FCTR INFL HEALTH STATUS	68,372	1,088,262	
L61Z	3.	ADMIT FOR RENAL DIALYSIS	807,514	807,514	
P67D	4.	NEO,ADMWT >2499G-SIG OR PR-PRB	205,719	637,486	
U61A	5.	SCHIZOPHRENIA DISORDERS+MHLS	16,430	573,186	
Z60B	6.	REHABILITATION - CSCC	29,956	500,708	
U63B	7.	MAJOR AFFECTIVE DSRD A<70-CSCC	27,899	432,916	
O60B	8.	VAGINAL DELIVERY -CSCC	126,673	424,536	
A06Z	9.	TRACHEOSTOMY OR VENTILATION>95	9,687	317,178	
B63Z	10.	DMNTIA&CHRNIC DISTURB CRBRL FN	11,779	316,803	
U61B	11.	SCHIZOPHRENIA DISORDERS-MHLS	15,634	309,539	
O01C	12.	CAESAREAN DELIVERY -CSCC	59,623	288,796	
R63Z	13.	CHEMOTHERAPY	285,385	285,385	
I04Z	14.	KNEE REPLACEMT & REATTACH	28,860	229,545	
E65A	15.	CHRNIC OBSTRCT AIRWAY DIS+CSCC	26,892	228,169	
G44C	16.	OTHER COLONOSCOPY, SAMEDAY	192,283	192,283	
F62B	17.	HEART FAILURE & SHOCK - CCC	28,835	173,977	
J64B	18.	CELLULITIS A>59 -CSCC / A	40,295	166,162	
U63A	19.	MJR AFFECT DSRD A>69/+CSCC	6,360	161,731	
E62A	20.	RESPIRATRY INFECTN/INFLAMM+CCC	14,552	159,125	
E62B	21.	RESPIRATRY INFECTN/INFLAM+SMCC	24,233	157,422	
C16B	22.	LENS PROCEDURES,SD	155,063	155,063	
U67Z	23.	PERSONLTY DSRD&ACUTE REACTIONS	21,920	154,998	
E65B	24.	CHRNIC OBSTRCT AIRWAY DIS-CSCC	27,585	149,382	
G67B	25.	OESPHS, GASTR&MIS DIG A>9-CSCC	68,221	147,977	
B70A	26.	STROKE +CCC	7,524	144,481	
G45B	27.	OTHER GASTRPY+N-MJR DIG DIS,SD	144,398	144,398	
I03C	28.	HIP REPLACEMENT - CSCC	17,711	136,427	
F74Z	29.	CHEST PAIN	82,271	129,015	
F62A	30.	HEART FAILURE & SHOCK + CCC	10,450	123,766	
P67C	31.	NEO,ADMWT >2499G-SIG OR PR+OTP	24,299	123,193	
I08A	32.	OTHER HIP & FEMUR PROC + CSCC	7,803	120,074	
U64Z	33.	OTH AFFECT & SOMATOFORM DSRD	13,331	118,508	
I03B	34.	HIP REPLAC+CSCC/HIP REVSN-CSCC	9,851	118,402	
N04Z	35.	HYSTERECTOMY FOR NON-MALIGNANC	27,901	115,849	
G02A	36.	MJR SMALL & LARGE BOWEL PR+CCC	6,653	114,972	
E62C	37.	RESPIRATORY INFECTN/INFLAMM-CC	30,836	113,312	
D40Z	38.	DENTAL EXTRACT & RESTORATIONS	106,452	108,818	
I68B	39.	NON-SURG SPINAL DISORDERS -CC	23,649	107,446	
L63B	40.	KDNY & UNRY TRCT INF A>69/+SCC	18,004	102,340	
U60Z	41.	MENTAL HEALTH TREAT,SAMEDY-ECT	101,652	101,652	
O66A	42.	ANTENATAL&OTH OBSTETRIC ADM	41,718	101,017	
J11Z	43.	OTHER SKIN, SUBC TIS & BRST PR	85,660	97,790	
I68A	44.	NON-SURG SPINAL DISORDERS +CC	10,341	97,452	
B70B	45.	STROKE +SCC	8,510	92,407	
Z64B	46.	OTH FCTR INFL HEALTH STATUS,SD	89,471	89,471	
I18Z	47.	OTHER KNEE PROCEDURES	74,965	88,352	
G46C	48.	COMPLEX GASTROSCOPY,SD	88,026	88,026	
Z40Z	49.	FOLLOW UP +ENDOSCOPY	85,931	87,203	
T60A	50.	SEPTICAEMIA + CSCC	9,258	86,933	
G67A	51.	OESPHS, GASTR&MIS DIG A>9+CSCC	14,76	85,843	
O01B	52.	CAESAREAN DELIVERY +SCC	13,498	85,666	
O60A	53.	VAGINAL DELIVERY +CSCC	17,078	81,955	
G02B	54.	MJR SMALL & LARGE BOWEL PR-CCC	9,761	80,817	
F71B	55.	N-MJR ARYTHM&CONDCTN DSRD-CSCC	34,901	79,169	
F42B	56.	CRC DSRD-AMI+IC IN PR-CMPDX/PR	48,727	79,110	
R61B	57.	LYMPHMA &N-ACUTE LEUKAEMIA-CCC	15,760	77,866	
E71B	58.	RESPIRATORY NEOPLASMS +SMCC	11,550	77,424	
O05Z	59.	ABORTION+ OR PROC	74,831	77,218	
B81B	60.	OTHER DSRD OF NERVOUS SYS-CSCC	10,687	76,415	
G60A	61.	DIGESTIVE MALIGNANCY + CSCC	9,253	76,400	
K60A	62.	DIABETES + CSCC	9,678	76,041	
V62A	63.	ALCOHOL USE DSRD & DEPENDENCE	8,617	75,714	
O60C	64.	VAGINAL DEL SINGLE UNCOMPL	29,761	75,497	
K01Z	65.	DIABETIC FOOT PROCEDURES	3,491	74,123	
B60B	66.	ESTAB PARA/QUAD+/-OR PR-CCC	6,073	71,760	
N07Z	67.	OTH UTERN & ADNEXA PR FOR NMAL	60,207	71,090	
Z63A	68.	OTHER AFTERCARE + CSCC	6,381	71,028	
Q61C	69.	RED BLOOD CELL DISDERS - CSCC	50,302	70,792	
F60A	70.	CRC DSRD+AMI-INVA INVE PR+CSCC	8,734	69,282	
				13,588,561	**55%**

		Total Episodes	Length of Stay (days)	
G66B	71. ABDMNL PAIN/MESENTRC ADENTS-CC	42,139	67,809	
B70C	72. STROKE -CSCC	9,037	66,892	
O61Z	73. POSTPARTUM & POST ABORTN-OR PR	23,382	66,525	
H08B	74. LAP CHOLECYSTECTMY-CDE-CSCC	34,649	64,776	
I10B	75. OTHER BACK & NECK PROCS - CSCC	12,986	63,957	
P66C	76. NEO,ADMWT 2000-2499G-SG OR+OTP	5,555	63,855	
I08B	77. OTHER HIP & FEMUR PR -CSCC	8,115	62,203	
E71A	78. RESPIRATORY NEOPLASMS +CCC	5,077	61,831	
U65Z	79. ANXIETY DISORDERS	11,676	61,036	
B81A	80. OTHER DSRD OF NERVOUS SYS+CSCC	4,266	61,025	
901Z	81. EXT OR PR UNREL TO PDX	6,044	60,618	
K60B	82. DIABETES - CSCC	17,913	59,927	
G07B	83. APPENDICECTOMY - CSCC	21,495	59,127	
F06A	84. CORONARY BYPASS-INV INVES+CSCC	5,703	58,977	
U66Z	85. EATING & OBSESSV-COMPULSV DSRD	2,780	58,361	
G11B	86. ANAL & STOMAL PROCEDURES -CSCC	40,788	58,195	
G09Z	87. INGUINAL&FEMORAL HERNIA PR A>0	40,128	58,184	
F72B	88. UNSTABLE ANGINA - CSCC	23,997	57,550	
I13C	89. HUMER,TIB,FIB,ANK PR A<60-CSCC	18,421	57,295	
I30Z	90. HAND PROCEDURES	44,736	56,898	
F42A	91. CRC DSRD-AMI+IC IN PR+CMPDX/PR	14,560	56,663	
E75A	92. OTHER RESP SYS DX A>64+CC	7,717	55,022	
B60A	93. ESTAB PARA/QUAD+/-OR PR+CCC	1,605	54,768	
Z60C	94. REHABILITATION, SAMEDAY	53,946	53,946	
F71A	95. N-MJR ARYTHM&CONDCTN DSRD+CSCC	8,854	53,388	
N06Z	96. FEM REPR SYS RECONSTRUCTIVE PR	17,471	53,327	
J64A	97. CELLULITIS A>59 + CSCC	5,059	52,364	
Z61Z	98. SIGNS & SYMPTOMS	14,496	52,358	
M02B	99. TRANSURETHRAL PROSTECTOMY-CSCC	15,993	52,059	
I65A	100. CON TIS MAL,INC PATH FX +CSCC	4,734	51,861	
G01A	101. RECTAL RESECTION +CCC	2,980	51,621	
U62A	102. PAR&ACUTE PSYCH DSRD+CSCC/MHLS	2,740	51,238	
B67A	103. DEGNRTV NERV SYS DIS+CSCC	2,837	50,866	
X60C	104. INJURIES A	35,766	50,701	
B76B	105. SEIZURE - CSCC	23,568	49,783	
B64B	106. DELIRIUM-CCC	5,942	49,744	
I75A	107. INJ SH,ARM,ELB,KN,LEG A>64+CC	4,233	49,527	
J60A	108. SKIN ULCERS	3,815	49,188	
F60B	109. CRC DSRD+AMI-INVA INVE PR-CSCC	14,371	49,074	
J08B	110. OTH SKN GRF&/DBRDMNT PR-CSCC	32,348	48,942	
F15Z	111. PERC CRNY INTERVENT-AMI+STENT	20,420	48,905	
E69C	112. BRONCHITIS & ASTHMA A	28,725	48,511	
P67B	113. NEO,ADMWT >2499G-SIG OR PR+MJP	6,946	48,035	
L63C	114. KDNY & UNRY TRCT INF A<70-CSCC	19,088	47,760	
F08A	115. MJR RECONSTRC VASC PR-PUMP+CCC	2,673	47,623	
O01A	116. CAESAREAN DELIVERY +CCC	4,508	47,522	
F73B	117. SYNCOPE & COLLAPSE - CSCC	21,248	47,493	
L64Z	118. URINARY STONES & OBSTRUCTION	27,301	47,295	
G01B	119. RECTAL RESECTION -CCC	4,767	47,195	
O66B	120. ANTENATAL&OTH OBSTETRIC ADM,SD	46,890	46,890	
D63B	121. OTITIS MEDIA & URI - CC	26,834	46,811	
F10Z	122. PERC CORONY INTERVENT+AMI	10,723	46,692	
I16Z	123. OTHER SHOULDER PROCEDURES	27,731	45,967	
T61A	124. PSTOP&PSTTR INF A>54/+CSCC	6,625	45,665	
I69B	125. BNE DIS&SP ARTH A>74/+CSCC	8,193	45,516	
X62A	126. POISNG/TOXC EFF DRUGS A>59/+CC	13,090	45,188	
960Z	127. UNGROUPABLE	2,618	45,030	
J06A	128. MAJOR PR MALIG BREAST CONDTNS	12,412	44,917	
B02A	129. CRANIOTOMY + CCC	2,353	44,508	
R61A	130. LYMPHMA &N-ACUTE LEUKAEMIA+CCC	2,910	44,032	
X60A	131. INJURIES A>64 + CC	6,495	43,677	
G42A	132. OTH GASTROSCOPY+MJR DIGEST DIS	7,709	42,586	
B66A	133. NERVOUS SYSTEM NEOPLASM+CSCC	3,341	42,540	
Z63B	134. OTHER AFTERCARE - CSCC	8,876	41,972	
L41Z	135. CYSTOURETHROSCOPY, SAMEDAY	41,297	41,297	
G45A	136. OTHER GASTRPY+N-MJR DIGEST DIS	10,082	41,209	
F12Z	137. CARDIAC PACEMAKER IMPLANTATION	9,344	40,481	
F73A	138. SYNCOPE & COLLAPSE + CSCC	7,291	40,403	
F08B	139. MJR RECONSTRC VASC PR-PUMP-CCC	5,178	40,283	
			3,567,490	**15%**
	TOTAL LENGTH OF STAY		**24,586,508**	

* Number of separations for each AR-DRG version 5.1 with greater than 49 separations, by hospital type, Australia, 2004-05. (Australian Institute of Health and Welfare)

ATTACHMENT 4 – DISCUSSION OF BENEFITS OF DRGS

Discussion[2]

Improved technical efficiency at the episode level arising from the use of casemix for funding has been demonstrated in a number of countries (Duckett, 1999). DRGs can also be used as a tool to promote allocative efficiency through setting volume caps for hospitals. In addition, DRGs can assist in quality management, for example through identifying inappropriate admissions and enabling casemix adjusted indicators.

The DRG system is now used extensively for hospital funding and measurement purposes in the United States, Europe, Australia and elsewhere (Reid, Palmer and Aisbett, 2000). The United States has been using it for case payment since 1983 and Australia for resource allocation, while Singapore commenced using it as the basis for payment system in 1999. A number of countries have adapted the DRG system for application within their own inpatient health care system with their own developmental strategies (Wiley, 1999).

The strategies of developing DRGs in Europe included (Rodrigues, 1993):

- Assessing the technical feasibility of assigning DRGs on the basis of hospital discharge abstract databases.
- Evaluating whether the servicing and cost patterns implied by any particular DRG grouper corresponds to those prevailing in that jurisdiction and whether the DRGs as assigned explains in sufficient degree the observed variability in resource use.

Following the introduction of DRGs in the United States DRG information systems have been adopted for case payment, resource allocation or hospital comparisons in many developed countries. Most Australian states are using casemix systems for funding hospitals or area health services and for management and monitoring purposes within hospitals (Roberts et al., 1999).

The information gained from classifying inpatient episodes into DRGs can be used for many purposes. In health administration, the data can be used to fund hospitals; plan service developments, such as new service strategies to improve access and quality of care, monitor services performance and compare costs of patient care from one hospital to another. It can also be used as a basis for funding hospitals and is seen as encouraging efficiency and productivity (Donati, 1997). Clinicians and managers can use casemix data to evaluate quality of care, as DRGs provide a framework to ensure some consistency in the comparison of indicators such as readmission rates, resource utilisation and outcomes (Department of Health Housing Local Government and Community Services, 1993).

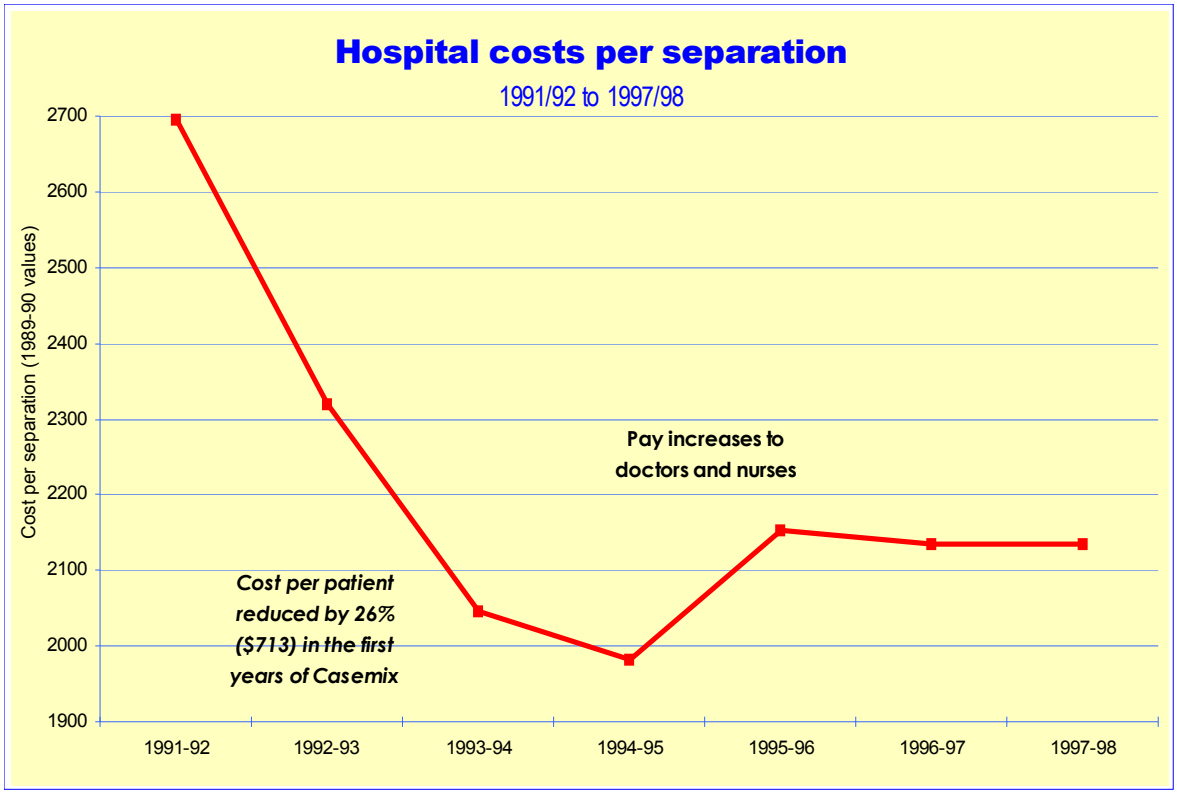
References

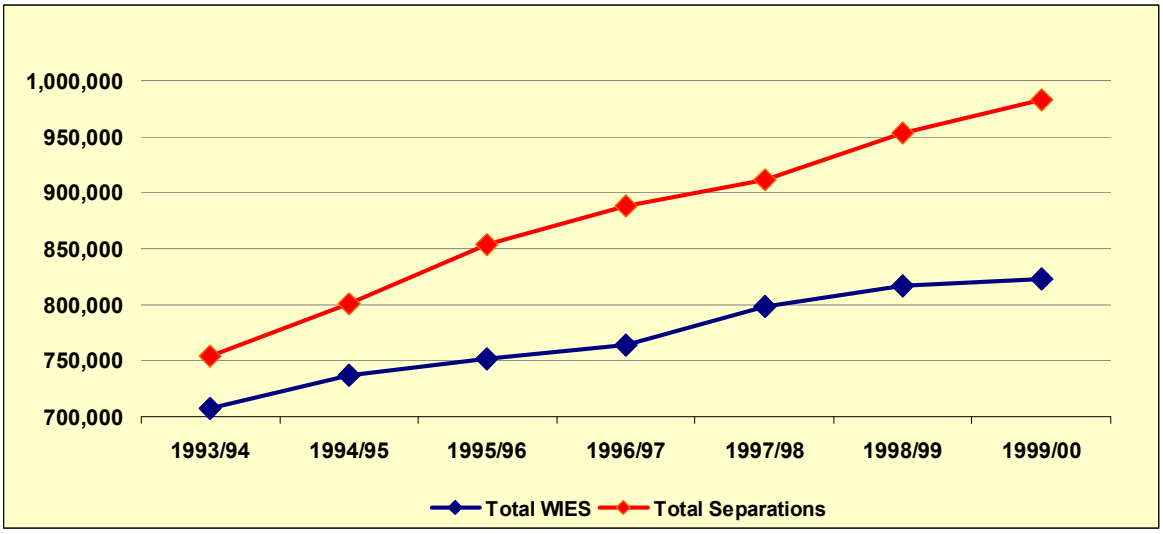
- Department of Health Housing Local Government and Community Services (1993). Casemix: A new direction in health care management. The National Casemix Education Series, Part A.
- Donati E. (1997). Impact of casemix on home & community care services. Unpublished MHSc thesis. School of Behavioural Health Sciences. Melbourne, La Trobe University.
- Duckett S.J. (1999). Is there a Y2K problem for casemix? Casemix Quarterly. 1(3). Duckett S.J. (2000). The development of Australian Refined Diagnosis Related Groups: The Australian inpatient casemix classification. Casemix Quarterly. 2(4).

[2] Gong Z, Duckett SJ, Legge DG, Pei L, Describing Chinese hospital activity with diagnosis related groups (DRGs). A case study in Chengdu. Health Policy. 2004

- Reid B.A., Palmer G.R. & Aisbett C. (2000). The Performance of Australia DRGs. Australian Health Review. 23(2), 20-31.
- Roberts R., Hirsch N., Innes K. & Truran D.L. (1999). Casemix classification issues and change from ICD-9-CM to ICD-10-AM coding. Casemix Quarterly. 1(2).
- Rodrigues J.M. (1993). DRGs: Origin and dissemination throughout Europe. in: Casas M. & Wiley M.M., (ed.) Diagnosis Related Groups in Europe: Uses and Perspectives. Berlin, Springer
- Wiley M.M. (1999). Development and localisation of casemix applications for inpatient hospital activity in EU member staes. Australian Health Review. 22(2), 69-85

Efficiency gains on Victoria, Australia as a result of the introduction of the DRG system





ATTACHMENT 5 - GLOSSARY

Activity-based Costing*	A method to estimate costs of a service or product by measuring the costs of the activities it takes to produce that service or product.
Actual average costing*	This method of costing measures of the resource consumption that is required to produce the current level of hospital output. It uses the total institution cost as one of its calculation parameters.
Acute hospitals	Establishments which provide at least minimal medical, surgical or obstetric services for admitted patient treatment and/or care, and which provide round-the-clock comprehensive qualified nursing service as well as other necessary professional services.
Additional diagnoses	Diagnoses or conditions that affect a person's care in terms of requiring therapeutic treatment, clinical evaluation, diagnostic procedure, extended length of hospital stay or increased nursing care and/or monitoring. Additional diagnoses include comorbidity conditions (co-existing conditions) and/or complications (conditions that arose during the episode of care).
Administrative and Staff engaged in administrative and clerical duties	Civil engineers clerical staff and computing staff are included in this category. Medical staff and nursing staff, diagnostic and health professionals and any domestic staff primarily or partly engaged in administrative and clerical duties are excluded.
Administrative expenditure	All expenditure incurred by establishments (but not central administrations) of a management expenses/administrative support nature such as any rates and taxes, printing, telephone, stationery and insurance expenses (including workers' compensation).
Admitted patient	A patient who undergoes a hospital's formal admission process.
Admitted patient cost proportion	The ratio of admitted patient costs to total hospital costs, also proportion known as the inpatient fraction or IFRAC.
Allocation Base*	A statistic used in step-down costing (e.g. square feet, number of full-time employees) used to allocate costs, based upon its relationship to why the costs occurred.
Available beds	Beds immediately available for use by admitted patients as required.
Average length of stay	The average number of patient days for admitted patient episodes. Patients admitted and separated on the same day are allocated a length of stay of one day
Cost Centre*	Organisational units responsible for providing services and controlling their costs
Cost Driver	That which causes a change in the cost of an activity.
Cost Object	Anything for which costs are being estimated, such as a population, a test, a visit, a patient, or a patient day.
Cost weights	Cost weights represent the costliness of a DRG relative to all other DRGs such that the average cost weight for all separations is 1.00. A separation for a DRG with a cost weight of 5.0 therefore, on average, costs 10 times as much as a separation with a cost weight of 0.5.
Diagnostic and health professionals	Qualified staff (other than qualified medical and nursing staff) engaged in duties of a diagnostic, professional or technical nature (but also including diagnostic and health professionals whose duties are primarily or partly of an administrative nature). This category includes all allied health professionals and laboratory technicians but excludes civil engineers and computing staff.
Direct costs*	Costs which can be traced to a particular cost object – ie. those costs which can be directly attributed to the particular cost centre or patient. For example, the cost of drugs incurred by a doctor or paediatrics may be directly attributed by the pharmacy system. Hence, drugs could be a direct cost of paediatrics.

Domestic and other staff	Staff engaged in the provision of food and cleaning services. They include domestic staff, such as food services managers, primarily engaged in administrative duties. This category also includes all staff not elsewhere included (primarily maintenance staff, tradespersons and gardening staff).
Domestic services expenditure	The costs of all domestic services including electricity, other fuel and power, domestic services for staff, accommodation and kitchen expenses but not including salaries and wages, food costs or equipment replacement and repair costs.
Drug supplies expenditure	The cost of all drugs including the cost of containers.
Episode of care	An episode of care is as a phase of treatment for an admitted patient. It may correspond to a patient's entire hospital stay, or the hospital stay may be divided into separate episodes of care of different types. See Separation.
Fixed costs*	Fixed costs are not affected by in-year changes in activity. For example costs such as rent and rates.
Food supplies expenditure	The cost of all food and beverages but not including kitchen expenses such as utensils, cleaning materials, cutlery and crockery.
Full time equivalent	Full time equivalent units are on-job hours worked and hours of staff paid leave (sick, recreation, long service, workers' compensation) by/for a staff member (or contract employee where applicable) divided by the number of hours normally worked by a full time staff member when on the job (or contract employee where applicable) under the relevant award or agreement.
IFRAC	The ratio of admitted patient costs to total hospital costs, also known as the admitted patient cost proportion.
Indirect costs*	Indirect costs are those costs which cannot be directly allocated to a particular cost centre but can usually be shared over a number of them. Indirect costs need to be allocated to the relevant cost centres. For example, there may be no method of directly allocating laundry costs to a particular cost centre and therefore laundry costs are an indirect cost to a number of cost centres. Common indirect costs include finance department, rent, utilities and information services.
Interest payments	Payments made by or on behalf of the establishment in respect of borrowings (e.g. interest on bank overdraft) provided the establishment is permitted to borrow.
Length of stay	The length of stay of a patient is calculated by subtracting the date the patient is admitted from the date of separation. All leave days, including the day the patient went on leave, are excluded. A same day patient is allocated a length of stay of one day.
Major Diagnostic Categories (MDCs)	A high level of groupings of patients used in the AN-DRG classification.
Medical and surgical supplies expenditure	The cost of all consumables of a medical or surgical nature (excluding drug supplies) but not including expenditure on equipment repairs.
Non-admitted patient occasion of service	Occurs when a patient attends a functional unit of the hospital for the purpose of receiving some form of service, but is not admitted. A visit for administrative purposes is not an occasion of service.
Non-admitted patients	Patients who receive care from a recognised non-admitted patient service/clinic of a hospital.
Other personal care staff	This category includes attendants, assistants or home assistants, home companions, family aides, ward helpers, wards persons, orderlies, ward assistants and nursing assistants, engaged primarily in the provision of personal care to patients or residents, who are not formally qualified or undergoing training in nursing or allied health professions.
Other recurrent expenditure	Recurrent expenditure not included elsewhere in any of the recurrent expenditure categories.

Other revenue	All other revenue received by the establishment that is not included under patient revenue or recoveries (but not including revenue payments received from State or Territory Governments). This would include revenue such as investment income from temporarily surplus funds and income from charities, bequests and accommodation provided to visitors.
Overhead costs*	Overhead costs are indirect costs of support services that contribute to the effective running of a health care facility. Overhead costs may include the costs of general administration, finance and the general maintenance of grounds and buildings. They need to be apportioned on a consistent and logical basis. Where such services are shared with other facilities, care should be taken to ensure the relevant proportions are identified to the relevant services. These proportions must be reviewed annually as utilisation of these services will vary.
Patient days	The number of full or partial days' stay for patients who were admitted for an episode of care and who underwent separation during the reporting period. A patient who is admitted and separated on the same day is allocated one patient day.
Patient revenue	Revenue received by, and due to, an establishment in respect of individual patient liability for accommodation and other establishment charges.
Patient transport	The direct cost of transporting patients excluding salaries and wages of transport staff.
Payments to visiting medical officers	All payments made to visiting medical officers for medical services provided to hospital (public patients) on a sessionally paid or fee-for-service basis.
Principal diagnosis	The diagnosis established after study to be chiefly responsible for occasioning the patient's episode of care in hospital.
Principal procedure	The most significant procedure that was performed for treatment of the principal diagnosis. If no procedure is performed for treatment of the principal diagnosis, other procedures can be reported as the principal procedure. In order, these are a procedure performed for treatment of an additional diagnosis procedure related to an additional, a diagnostic/exploratory procedure related to the principal diagnosis or a diagnostic/exploratory diagnosis.
Recoveries	All revenue received that is in the nature of a recovery of expenditure incurred. This would include: • income received from the use of hospital facilities by salaried medical officers exercising their rights of private practice and by private practitioners treating private patients in hospital; and • other recoveries such as those relating to inter-hospital services where the revenue relates to a range of different costs and cannot be clearly off-set against any particular cost.
Recurrent expenditure	Expenditure which recurs continually or frequently (e.g. salaries). It may be contrasted with capital expenditure, such as the cost of hospital buildings and diagnostic equipment, for which expenditure is made infrequently.
Repairs and maintenance expenditure	The costs incurred in maintaining, repairing, replacing and providing additional equipment, maintaining and renovating building and minor additional works.
Salaried medical officers	Medical officers engaged by the hospital on a full time or part time salaried basis.
Same day patients	Same day patients are admitted patients who are admitted and separate on the same date.
Semi-fixed costs*	Semi-fixed costs are fixed for a given level of activity but change in steps, when activity levels exceed or fall below these given levels. For example costs such as nursing staff.
Separation	The term used to refer to the episode of care, which can be a total hospital stay (from admission to discharge, transfer or death), or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute to rehabilitation). 'Separation' also means the process by which an admitted patient completes an episode of care by being discharged, dying, transferring to another hospital or changing type of care.

Specialised service	A facility or unit dedicated to the treatment or care of patients with particular conditions or characteristics.
Step-down costing*	A cost finding method based on allocating those costs that are not directly paid for to those products or services to which payment is attached. The method derives its name from the stair-step pattern that results from allocating costs.
Variable costs*	Variable costs vary directly with changes in activity. For example costs such as drugs. Total variable cost = Variable cost per unit x Number of units of activity.
Visiting medical officer	A medical practitioner appointed by the hospital board to provide medical services for hospital (public) patients on an honorary, sessionally paid, or fee-for-service basis.

Source: Unless marked with *, definitions are from Australian Casemix Glossary; those definitions marked with * are from literature including the HSMP Basic Benefits Package Costing Assessment - Health Providers Manual.