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# RCN Policy Unit

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### **Nursing and Payment by Results: Understanding the cost of care**

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# Nursing and Payment by Results: Understanding the cost of care

## Executive Summary

### Introduction

NHS England has been reimbursing providers for acute care using an activity based casemix payment system called Payment by Results (PbR) since 2003. PbR uses Healthcare Resource Groups (HRGs) as a means of classifying patients' treatment episodes for reimbursement. They are developed by clinical working groups from national data and are designed to group together episodes that are clinically coherent and consume similar amounts of resource<sup>1</sup>.

Within PbR although efforts have been made to engage clinicians in the gathering of data, nursing costs are still treated purely as a workforce cost which is aggregated to the unit or department level and allocated on the basis of the amount of time the patient spent in that unit (for e.g. theatre hours or bed days). Within that 'pooled cost', there is little recognition of variations in nursing effort/inputs, patient dependency, and skill. The detailed focus on classifying activity is predominantly medical procedural costs and diagnosis.

The PbR tariff (or price list) pays an average price for care based on national reference costs. Providers with costs over and above the tariff have to find ways to cut costs. In addition, the Tariff can be a powerful incentive with which Government may drive the design and delivery of care by changing the price paid for any given procedure.

The recent economic downturn has brought NHS costs very much back into focus. Because of the nature of the tariff coupled with an absence of a more complete understanding of nursing costs and their contribution to the overall process of patient care, the RCN believes that nursing workforce numbers and skill mix may be subject to inappropriate cuts as was seen during the 'NHS deficits crisis' of 2006/7<sup>2</sup>.

In the above context, the RCN commissioned a study to begin to establish baseline data on nursing activity within acute and long stay quality assured ward settings. In short the study was designed to:

1. Identify nursing costs based on nursing time and grade needed for selected HRGs by collecting patient and nursing activity data from 'best practice' settings.
2. Establish, if any, the connections between HRG costs and nursing activity to construct an HRG and associated nursing care dataset for common HRGs in the Leeds University nursing database.
3. Compare selected HRG nursing costs (derived from nursing data obtained from best-practice settings) with the reimbursement providers receive under the PbR tariff.

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<sup>1</sup> Department of Health (2009) '*NHS Costing Manual 2009*'. London

<sup>2</sup> RCN (2007) '*Keep Nurses Working, Keep Patients Safe*'. RCN national campaign

### What did the study find?

Data was gathered on 60 wards for all patients during six shifts in which nursing activity studies took place (approx.100 patients per ward; 117,400 nursing activities during 360 early, late or night shifts totalling 3,668 nursing care hours).

Each patient was assessed up to three times a day by the primary nurse using the Leeds University patient dependency rating scale (which ranges from 1=independent to 4=fully dependent on nurses). The HRG study ward dependencies were compared with the larger Leeds dataset for benchmarking and data extraction purposes (see Appendix 1). All ward staff (including RNs, HCAs, ward clerks and housekeepers) were observed every ten minutes for up to 60 hours throughout six shifts including nights and weekends in each ward. Thirty-two activity descriptions were used to record nursing interventions:

- a) direct (face-to-face) patient care (e.g. giving medication); 56,725 face-to-face nursing interventions were observed in 60 HRG study wards.
- b) indirect care, away from the bedside (e.g. updating patient records). Around 28,923 indirect nursing interventions were observed in 60 HRG study wards.
- c) non-nursing duties (e.g. non patient administration, general cleaning), totalling 18,987 activities, were observed in the HRG study wards. This figure may seem high, but up to 40% of the ward establishment in some cases were HCAs and ancillary staff.
- d) personal time (e.g., drinks, breaks); 12,704 activities were observed.

A range of different wards were covered by the study and data obtained for each as described above. The results were then converted to a daily nursing cost<sup>3</sup>. A selection of results has been presented below but a full copy of the methods and results can be sent on request. The table below summarises the results from 6 main ward types:

Ward type	Most commonly observed HRG in the study wards	Daily HRG reimbursement ( <i>assuming average LoS</i> )	Actual Nursing costs per day	% of daily reimbursement
Palliative care wards	HRG S21 - convalescent or other relief care (non elective)	£323	£158	49%
Medical wards	HRG E11 - Acute myocardial infarction with complications (non-elective)	£1368	£71	5%
Orthopaedic wards	HRG H80 - Primary hip replacement (elective)	£381	£80	21%

<sup>3</sup> See appendix 3 for a complete breakdown of how observed activity was converted into a daily nursing cost weighted for patient dependency

Stroke care wards	HRG A22 - Non-transient stroke or cerebro-vascular accident >69 or with complications (non-elective)	£311	£93	30%
Elderly care wards	HRG A38 - Alzheimer's disease (non-elective)	£104	£69	66%
Surgical care wards	HRG P13 - Other gastrointestinal or metabolic disorders with complications (non-elective)	£432	£97	23%

### Implications for Nursing and PbR

It is important to point out that as far as we are aware, this study is the first time patient dependencies and related nursing activity and quality have been aligned to HRGs. It is necessarily a small sample of activity over a limited period of time and so results cannot be generalised to a wider population of patients, however, it does raise some important issues to consider.

A quick review of the results might lead one to conclude that PbR adequately reimburses providers for nursing care costs. The RCN believes that this *may* not be the case. If the actual cost of nursing care as found in the study is 30, 40 or even 60% of the daily reimbursed HRG rate, is there enough left to pay for other direct, indirect and overhead costs?

Or to put it another way, after paying for medicines, procedures and other in-direct and overhead costs, is there enough left over to invest in the best nursing workforce for the patient's needs?

In the absence of data which clearly illustrates the *actual* nursing contribution, providers may be tempted to cut nursing numbers to achieve reduced costs. Clinical areas such as elderly care and palliative care wards look particularly vulnerable given the high proportion of the reimbursement absorbed by nursing care costs in the study.

This situation is further compounded by the way in which reference costs for PbR HRGs are compiled. National reference costs are derived from a range of providers. Broadly speaking there are three main categories of cost:

1. Direct costs (expenditure allocated/coded to the care centre or unit, to the patient or both. Medicines & procedures are a good example);
2. Indirect costs (expenditure allocated more generally which is not specific to the patient or care centre such as laundry and food); and
3. Overhead costs (expenditure such as business services, finance, IT etc)

Crudely put, PCTs pay Trusts against the activity reported and then Trusts allocate that against their known costs – direct (coded) costs, indirect costs and overheads.

Currently the nursing contribution to care within PbR is represented by a simple reference to how much it costs to employ groups of nurses in that speciality. There is no incentive or opportunity within that system to look at what those nurses actually do, how they do it, or how those costs relate to best practice. More importantly there is no data to explore and explain variations in costs or outcomes.

Why does this matter for nursing and patient care? It is already clear that there is a connection between nursing inputs and the quality of care<sup>4</sup>. In the absence of data on nursing inputs, providers may cut nursing workforce numbers inappropriately and impact upon patient outcomes. Other impacts could include:

- Future tariff design within PbR may diminish the nursing contribution leaving commissioners with few incentives to look at nurse-led models of care or invest in nursing services and the development of advanced roles.
- Future workforce planning may be hampered by broad or ill-defined notions of the contribution each constituent part makes to the cost effectiveness of multidisciplinary teams.

To combat the above, a connection must be made between best practice care pathways, workforce design and the financial incentives inherent within PbR. Without this connection, estimated HRG nursing costs are less accurate because they are based on an assumption that beds are occupied by patients with uniform nursing needs, which is clearly not the case

For the future it is essential that further detailed work is carried out on nursing activity but not just for the purpose of creating a more sophisticated activity-based reimbursement system.

The aim of such an exercise would be to develop a system which will enable more accurate analysis of service needs against provision which could help providers allocate existing resources more effectively as well as provide evidence for increases in resource allocations where appropriate.

**Royal College of Nursing  
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<sup>4</sup> See Peter Griffiths et al report '*State of the art metrics for nursing: a rapid appraisal*' (2008) for a useful discussion on this assertion

## Nursing and Payment by Results: Understanding the cost of care

### Introduction

NHS England has used Health Resource Groups (HRGs) as a currency for reimbursing providers for the care they deliver since 2003. Simply put, HRGs classify patients' treatment episodes for a reimbursement tariff designed to pay health providers for treatment and care. They are also used for benchmarking and audit purposes. A process of classifying each episode of care is carried out (Coding) which places patients into clinically similar case groups assuming they consume similar health resources. However, provider costs for the same treatments often vary significantly.

It has become apparent to the RCN that whilst this system offers many potential benefits for improving our understanding of the care pathway in an acute and long stay setting, it also has some potential pitfalls for nurses and nursing care.

In the current economic climate, the funding allocated to public services is under particular scrutiny and services such as the NHS face substantial efficiency savings as part of contributing its part towards a reduction in public sector borrowing<sup>5</sup>. Therefore, systems that reimburse care providers within the NHS are highly likely to be used by Government as a powerful tool to drive providers to focus on and reduce costs even more.

For example, during 2006/7 the RCN gathered significant evidence from around NHS England that some 20,000 posts were frozen or lost in response to reductions in overall funding<sup>6</sup>. Where that focus on costs was crudely defined, specialist nurses and nurse leaders at ward and organisational who play a significant role in assuring the quality of patient care and promoting self care were found to be particularly at risk. The answer to the question of whether or not a service was delivered 'within tariff' was a frequent determinant of the future investment in that service. Issues about patient preference, professional decisions and quality were frequently subordinate to such concerns.

Whilst there are other factors that may influence provider decisions to cut workforce numbers, it is clear that the development and use of activity-based payment systems in the NHS has an impact on Nursing care and investment in nursing services.

The RCN commissioned this study, 'Nursing and Payment by Results', to begin to address the invisibility of nursing activity and costs within Payment by Results (PbR) and to provoke further discussion with professionals and policy makers about the way forward. This report summarises the results of that study conducted by Keith Hurst of Leeds University which looked at the relationship between actual nursing activity in a number of acute/long stay care settings; patient dependency; and reimbursement under the HRG based system known as PbR.

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<sup>5</sup> See HM Treasury budget report (2009) '*Building Britain's Future*'. HMSO, London

<sup>6</sup> RCN (2006) '*Keep Nurses working, keep patients safe*'. RCN Campaign

## Background

Case-mix activity based payment systems such as PbR are not unique to the UK. Many countries around the world use Diagnosis Related Groups (DRGs) to classify their patients. In NHS England, HRGs replaced DRGs and have been built specifically for the NHS activity based case-mix payment system, 'Payment by Results', therefore, is currently an England only initiative, although HRGs and other elements of PbR have been used in Northern Ireland.

The PbR system replaced NHS block contracts in 2003 in which NHS Trusts were paid whether work was completed or not. In PbR, money follows the patient pathway, "rewards efficiency and effectiveness and encourages patient choice and service responsiveness"<sup>7</sup>.

A major weakness with HRGs (and DRGs) is that their costs are based on a costing model that focuses predominantly on medical diagnosis and its prescribed interventions. Whilst this is not a problem in itself, when coupled with the fact that Nursing costs components are crudely aggregated (at least in NHS England), rather than systematically coded, it results in a system of reimbursement that does not consider patient dependency, or actual nursing activity. Neither does PbR recognise service quality since underlying data were not drawn from best-practice sites.

In other words, whilst overall nursing workforce costs are included to a degree, the actual contribution of nursing teams at all levels is largely 'invisible', as is the effect of patient dependency on the amount or intensity of effort required by those nurses to deliver the care required.

Why is this important for nursing? The tariff (or price list) is fixed so it is imperative that costs are accurately understood and apportioned. The PbR tariffs are based on average costs hence Trusts may win or lose depending on their efficiency relative to the tariffs. In reality, costs may vary for several reasons (such as demographics) and so there is a risk that a Trust may lose or gain under PbR for reasons other than efficiency or quality.

In addition, once providers have been reimbursed under PbR, they are free to allocate those resources in whatever manner they wish. Diagnosis and procedure costs are clearly directly coded to the patient and 'visible' within PbR so it is arguably easier for providers to allocate resources to cover those costs.

Nursing costs however are not 'visible' and in effect risk being resourced by 'what is left over' from the reimbursement of medical diagnosis and procedure costs unless data is provided arguing for a greater share of the funds. In the absence of that data and as nursing is the major ward cost and there is likely to be pressure to reduce these costs in particular.

It is therefore important that Nurse Managers have access to accurate nursing information for sustaining the quality of care and its associated nursing skill mix costs. Ward nursing

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<sup>7</sup> Department of Health (2004)

cost information in particular is vital for ensuring that providers do not shift costs by varying nursing skill mix or by altering care models inappropriately.

Existing methods for separating nursing costs from other HRG components have ranged from non-existent, to fixed nursing costs (ignoring patient dependency or nursing workload) to sophisticated DRG nursing costs drawn from patient generated workload and staffing data.

However in the UK, there is a paucity of nursing activity data and its contribution to overall costs; there is even less information on nursing's contribution to quality. In the midst of significant pressure to understand costs and incentivise activity-based on quality, nursing in the UK finds itself under scrutiny from several directions.

Nursing needs to develop a more sophisticated understanding of its contribution to care from different perspectives to enable managers and nurses to take part in discussions about the future of systems, which seek to classify, quantify, incentivise and deliver high quality patient care.

As far as we are aware, this study is the first time patient dependencies and related nursing activity and quality have been aligned to HRGs. Without this connection, estimated HRG nursing costs are less accurate because they are based on an assumption that beds are occupied by patients with uniform nursing needs, which is clearly not the case

## **What was the aim of the study?**

In the above context, the study was designed to:

1. Identify nursing costs based on nursing time and grade needed for selected HRGs by collecting patient and nursing activity data from 'best practice' settings.
2. Establish, if any, the connections between HRG costs and nursing activity to construct an HRG and associated nursing care dataset for common HRGs in the Leeds University nursing database.
3. Compare selected HRG nursing costs (derived from nursing data obtained from best-practice settings) with the reimbursement providers receive under the PbR tariff.

As nursing inputs are linked with quality of care<sup>8</sup>, the data that informs the PbR tariff should preferably be based on nursing costs drawn from quality-assured wards. The HRG nursing cost component also raised certain questions, which the study sought to answer, namely:

1. Is it possible to determine optimum staffing and related costs for common HRGs?
2. Can optimum staffing be converted into nursing costs and made transparent in the PbR tariff?

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<sup>8</sup> *Op cit*



The study was overseen by a Steering Group<sup>9</sup> which ensured that the study site selection, data collection processes, and analysis of the results met best practice standards as far as possible.

In each study ward, specially trained nurse assessors (auditors) collected data on patient age, diagnoses, co-morbidities and treatments; their dependency scores; and any nursing care received by the patient over a 48 hour period.

Data gathered included the patients' age, diagnosis, co-morbidity and treatment (which were later converted into a HRG codes). Data were gathered for all patients during six shifts in which nursing activity studies took place (approx. 100 patients per ward; 117,400 nursing activities during 360 early, late or night shifts totalling 3,668 nursing care hours).

Each patient was also assessed up to three times a day by the primary nurse using the Leeds University patient dependency rating scale. The HRG study ward dependencies were compared with the larger Leeds dataset for benchmarking and data extraction purposes (see Appendix 1). The Leeds rating system was used because the study's HRG-related dependency data could be compared with dependency data collected in the same way from one thousand wards for benchmarking purposes.

All ward staff (including RNs, HCAs, ward clerks and housekeepers) were observed every ten minutes for up to 60 hours throughout six shifts including nights and weekends in each ward. Thirty-two activity descriptions were used to record nursing interventions:

- a) direct (face-to-face) patient care (e.g. giving medication); 56,725 face-to-face nursing interventions were observed in 60 HRG study wards.
- b) indirect care, away from the bedside (e.g. updating patient records). Around 28,923 indirect nursing interventions were observed in 60 HRG study wards.
- c) non-nursing duties (e.g. non patient administration, general cleaning), totalling 18,987 activities, were observed in the HRG study wards. This figure may seem high, but up to 40% of the ward establishment in some cases were HCAs and ancillary staff.
- d) personal time (e.g., drinks, breaks); 12,704 activities were observed

Indirect care, non-nursing duties and 'non-productive' time (e.g., meal breaks) form the 'ward overhead', which features as a separate part of the nursing workload calculation and ward cost (see Appendix 2).

Nursing and ward quality data were gathered in each HRG ward the main purpose of which was to include only 'best-practice' wards and to exclude data from substandard wards from the HRG nursing dataset. This meant testing a range of nursing standards covering patient assessment; care plans; implementing care plans; evaluation; ward resources; policy and procedures.

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<sup>9</sup> See p17 For a full membership list of the study steering group

Substantive posts, plus bank, agency and overtime were converted into full-time equivalents, and so formed each ward's 'actual' nursing establishment. Time-out (lost time) such as annual, sickness, compassionate, maternity and study leave were also collected as they feature significantly in HRG cost calculations.

The most common HRGs in the specialities studied (medicine, long-stay elderly care, elderly acute care, stroke, palliative care, special needs and orthopaedic and surgical) were selected for analysis. To date, 6,295 patients, each with an HRG code, related dependency, activity and quality information were analysed (see Appendix 3 for further detail).

As a result of this study, the RCN has built a substantial database that includes patient and nursing data from 60 wards to date. Without these data, HRG nursing costs could not be estimated. However, this study has only just scraped the database's surface. Patient dependency, nursing activity and quality data, and the HRG information have been stored in such a way that further analysis on the information can be conducted from a range of other perspectives.

A full description of the methods used to address the above aims can be found at Appendix 1.

## **What did the study find?**

### **Introduction**

It is important at this point to draw attention to the significance of the patient dependency case mix with regards nursing care costs and its connection with PbR tariff reimbursements.

As far as the RCN is aware, this study is the first time patient dependencies have been aligned to HRGs. Without this connection, it is suggested that estimated HRG nursing costs are less accurate because they are based on patients with identical needs. Although HRG reimbursement varies with the severity of the patients' diagnosis, it is not clear to what extent that variation takes into account the intensity of nursing care required as the patient's dependency changes.

The process for arriving at a daily rate for nursing care is fully illustrated in Appendix 3. Nursing costs per day were chosen as opposed to nursing costs over the whole period of activity in question because we did not have the time or resources to plot 6,295 patients' care pathways.

A range of different wards were covered by the study and data obtained for each as described above. A selection of results has been presented here but a full copy of the methods and results can be sent on request.

### **Palliative Care wards**

The most commonly occurring HRG on this particular ward in the study was HRG S21 – convalescent or other relief care (non elective). The average length of stay for this HRG is 5.8 days and the overall reimbursement £1876 therefore give a daily reimbursement of

£323 (assuming average length of stay). Using the data from the study wards, the nursing costs consumed 49% of that reimbursement or £158 per day.

The case mix shows that almost all the patients observed were rated dependency 3 or 4 – therefore requiring the most intensive levels of nursing care. Such a high level of dependency is also likely to be relevant to other practitioners such as physiotherapists who are likely to have a significant role in improving mobility and self care.

Even with significant nursing inputs, on face value it looks as if there might be sufficient reimbursement for providers to enable them to deliver effective patient care for this HRG. However the above figures do not include other costs faced by the provider such as medical costs, procedures, therapies and so on. In all the HRGs studied, it was difficult to establish AHP inputs (because most activity takes place off the ward) and their impacts on costs although that data maybe more easily gathered given the more discreet nature of the inputs.

### **Stroke care wards**

The most commonly occurring HRG on these wards was HRG A22 non-transient stroke or cerebro-vascular accident >69 or with complications (non-elective) which was observed as having a high percentage of dependency 3 and 4 patients.

Out of a daily reimbursement rate of £311 (assuming average length of stay of 13.2 days) £93 or 30% would have been consumed by nursing care costs. This is surprisingly low considering the dependency of the patients concerned. This may be explained by the significant emphasis on multidisciplinary inputs and a significant role for physiotherapists, speech therapists and so on. Whether the reimbursement meets other therapist costs is not clear and a potential subject for further study.

### **Orthopaedic wards**

The tariff for HRG H80 - Primary hip replacement (elective) pays £381 a day for the primary hip replacement (elective) HRG assuming an average length of stay of 13.7 days. Looking after these patients in best-practice surgical wards costs £80 each day. That is, nursing costs absorbed 21% of the daily payment tariff and 32% of the long-stay payment.

Again it appears that observed nursing costs sit well within the tariff payment, but they exclude, for example, surgery and prosthesis expenditure, which are likely to be substantial.

### **Elderly Care wards**

HRG A38 - Alzheimer's disease (non-elective) was a very common observed HRG although it is unclear if Alzheimer's disease was the eventual actual diagnosis. This may not have been resolved until later after any acute episode or symptoms had been managed. The dependency mix shows again that 68% of patients were rated as dependency 3 or above.

Not surprisingly on these study wards nursing costs consumed 66% of the daily tariff reimbursement with an average length of stay of 40 days. This represents a significant

proportion of the costs, which leaves little for funding drugs, diagnostics, and the significant input of other professions such as physiotherapists and occupational therapists all of whom have an important role in terms of reducing length of stay and any associated risks such as slips, trips and falls.

### **Medical wards**

The most commonly observed HRG (HRG E11 - acute myocardial infarction with complications (non-elective)) may suggest a high level of resource allocation given the life threatening nature of the condition and the specialised level of knowledge required.

The observed case mix shows a fairly low level of patient dependency with over 60% of the patients being classed as dependency 1 or 2. The reimbursement of £4787 per patient (or daily rate of £1368 assuming an average length of stay) is likely to be almost entirely consumed by expensive drugs, diagnostics and medical time.

Whilst the observed nursing care component only consumed 5% of the HRG costs, it is important to identify whether that 5% would be sufficient to provide the skill mix to provide the right level of expertise and knowledge to support the care of patients with these conditions.

The lower level of activity observed might also be explained by context of care and in particular the use of various technologies to monitor the patient. It is also possible that the nurses involved here would need a high degree of medical knowledge, technical ability to interpret a range of physiological indicators and trends as well as have proficient communication skills to deal with the anxiety that is likely to be present in many patients admitted under this HRG.

It is already the case that providers frequently say that they do not have sufficient funds to invest in advanced nurse practitioners who are able to add significant value to patient care through patient education and information to lead towards better self care. The absence of data about the contribution of such practitioners towards successful patient outcomes would make a case for investment even harder given the predominant medical focus of this care pathway.

### **Surgical wards**

The most commonly observed HRG for this environment during the study was HRG P13 - other gastrointestinal or metabolic disorders with complications (non-elective). The currently tariff pays £432 a day. The cost of nursing care for the patients in the study looking after these patients in best-practice surgical wards costs £97 each day, 22% of the daily payment tariff.

In some sense this was an unusual HRG to be the most commonly observed as it does not directly relate to a surgical procedure i.e. time in theatre. The dependency of the patients within this HRG were predominantly assessed at level 2 (52% of observed patients) with 30% assessed as level 3. This suggests that patients in this category were relatively self caring or required a low level of nursing inputs. Repeating the exercise for a more complex HRG could reveal different results.

### Study limitations

First and foremost it is important to state again that this is a small scale study, looking at a limited number of patients over a 48 hour period. It is worth noting that currently there are over 1,400 HRGs – the study deals only with the 6 most commonly occurring in the study wards. With more resources and a bigger sample, it might be possible to track an entire patient care episode thus further illustrating the changes in patient dependency over time in relation to costs. This would be a valuable exercise to attempt to explain variations in cost over time.

Moving forward, understanding the nursing contribution to patient care will be problematic for a number of reasons. Primarily the UK is far behind other countries in establishing coding practices and systems that are detailed enough to capture nursing activity.

Developments in the electronic patient record have been painfully slow in many respects and confidence that such records will assist understanding and documenting patient care is reportedly low<sup>10</sup>. Because of this, systems that have been designed to capture activity are treated with suspicion particularly when they are launched around a stated intent to control costs and increase efficiency – in short the profession has, it seems, yet to be convinced that there is significant merit in understanding more about nursing activity by routine data collection.

The study's design is limited by the above but also by practical considerations around what is achievable at this stage of the journey. Ward nursing costs are influenced by several factors including

- (i) patient dependency and workload;
- (ii) registered to unregistered staff ratio,
- (iii) time-out and temporary (bank/agency) workers who may be less productive and more expensive to employ;
- (iv) nursing students who consume RN time;
- (v) ward layout, bay wards tend to have higher nursing costs than Nightingale-type wards; and
- (vi) day case influence, where bed occupancy is lower at night and at weekends but staffing is less flexible.

These cost drivers were not controlled in the HRG study<sup>11</sup>.

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<sup>10</sup> See for example Greenhalgh, Trisha, et al. (2008) 'Introduction of shared electronic records : multi-site case study using diffusion of innovation theory' *BMJ* . 337 (7677): 1040-1044 or Hendy, Jane, et al (2007) 'Implementing the NHS information technology programme : qualitative study of progress in acute trusts' *BMJ*. 334 (7608): 1360-1364 (30 June) for discussions about the importance of clinical engagement and attitudes of staff in the development of eHealth and the EPR

<sup>11</sup> Ward nursing cost variations have been discussed in detail by: Audit Scotland (2002); Ballard et al., (1993); Bloom et al., (1997); Creegan et al., (2003); Dix, (2002); Evans, (2003); Fagerstrom and Rauhala, (2007); Harless and Mark, (2006); Hurst, (2006); National Audit Office/Department of Health. (2006); Northcott, (2002); and Welton et al, (2006).

## Discussion

This section discusses the issues raised by the study according to their possible impact on Nursing care (and nurses) and any impact on the future of PbR.

### Implications for nursing

The study suggests that the cost of nursing activity consumes a major part of many of the HRGs studied. Even with the study limitations, this should lead us to ask how nursing care is observed, recorded and communicated for the purposes of costing and coding health care within the acute setting.

Why is this important for nursing? Reference costs for PbR HRGs are compiled from national reference costs which in themselves are derived from a range of different providers who may or may not be delivering high quality care. There are three categories of cost:

1. Direct costs (expenditure allocated/coded to the care centre or unit, to the patient or both. Medicines & procedures are a good example);
2. Indirect costs (expenditure allocated more generally which is not specific to the patient or care centre such as laundry and food); and
3. Overhead costs (expenditure such as business services, finance, IT etc)

Crudely put, PCTs submit resources to the Trust against the activity reported and then Trusts will allocate that against their known costs – direct (coded) costs, indirect costs and overheads.

The nursing contribution to care within PbR is represented by a simple reference to how much it costs to employ groups of nurses in that speciality. There is no incentive or opportunity within that system to look at what those nurses actually do, how they do it, or how those costs relate to best practice. More importantly there is no data to explore and explain variations in costs or outcomes per HRG.

In essence the nursing contribution to a range of costs including direct patient care, procedure costs, administration of medicines, providing patient information and so on are all effectively invisible.

A quick review of the results might lead one to conclude that PbR adequately reimburses providers for nursing care costs. The RCN believes that this *may* not be the case. If the actual cost of nursing care as found in the study is 30, 40 or even 60% of the HRG reimbursement, is there enough to pay for other direct, indirect and overhead costs? Or to put it another way, after paying for medicines, procedures and other in-direct and overhead costs, is there enough left to invest in the best nursing workforce for the patient's needs?

The study shows that some HRG nursing costs are close to or exceed two-thirds of what the tariff pays. In other words, actual nursing costs may exceed the current allocation made by providers within the tariff. Clinical areas such as elderly care and palliative care

wards look particularly vulnerable given the high proportion of the reimbursement absorbed by nursing care costs in the study.

Why should a clearer understanding of nursing activity and costs be developed within a fixed price payment system such as PbR? It is already clear that there is a connection between nursing inputs and the quality of care<sup>12</sup>. In the absence of data which clearly illustrates the *actual* nursing contribution, providers may be tempted to cut nursing numbers to achieve reduced costs.

One of the most promising opportunities to address the above comes from Lord Ara Darzi's NHS review (England) – the Next Stages Review (NSR, 2008) – which contains several recommendations for the NHS's future direction, the most significant of which is the renewed focus on quality.

Partly arising from the NSR and in order to inform decision making from the bedside to the Board Room, a series of metrics for measuring the quality of care have been launched. These metrics are designed to help providers benchmark existing care pathways and from there monitor variations in outcomes.

It is not clear however how this links to the existing incentives contained within PbR. This should be a concern to policy makers and providers of care.

There are signs of investment in making this connection through the development of best practice tariffs led by the DH PbR team. However it is becoming clear that a lack of basic data on nursing *activity* within the NHS (which may or may not be connected with patient care *quality*) may hamper both the efforts to develop best practice tariffs and the nursing profession's efforts to demonstrate its effectiveness in more concrete terms in a difficult economic climate. In practical terms, this has already had an impact on the nursing workforce.

In 2006/7, the RCN believed that cuts to overall staffing numbers could have reduced service quality, and mounted a national campaign to highlight nursing contribution's importance in terms of creating sustainable services to patients<sup>13</sup>. It became apparent for many nursing areas such as specialist nursing, that the absence of basic activity data and costs was hindering informed decision making during service redesign leading to a focus on crude cost control measures.

The absence of data on the nursing contribution will continue to influence the nursing workforce. Potential impacts include:

- Future tariff design within PbR may diminish the nursing contribution leaving commissioners with few incentives to look at nurse-led models of care or invest in nursing services.

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<sup>12</sup> *Op cit*

<sup>13</sup> RCN (2007) '*Keep Nurses working, keep patients safe*' RCN national campaign

- Future workforce planning may be hampered by broad or ill-defined notions of the contribution each constituent part makes to the cost effectiveness of multidisciplinary teams.

For the future it is essential that further detailed work is carried out on nursing activity but not just for the purposes of creating a more sophisticated activity-based reimbursement system.

A connection must be made between best practice care pathways, workforce design and the financial incentives inherent within PbR. Without this connection, estimated HRG nursing costs are less accurate because they are based on an assumption that beds are occupied by patients with uniform nursing needs, which is clearly not the case

In some respects there are already some emerging connections being developed by providers (See Commissioning for Quality and Innovation - CQUIN<sup>14</sup>) but it is uncertain how the nursing profession is being engaged with this or on what nursing data this activity is based. In the absence of better nursing data, care components, which contribute most to a quality outcome for patients and commissioners, could be misunderstood or underestimated.

A more sophisticated economic analysis could and should be aligned to patient level information such as patient reported outcome measures. This requires more detailed nursing activity data and a sustained commitment to developing data on the nursing contribution to patient care across the NHS. Whilst the benefits will be some time in the making, it would seem there is a growing urgency to address this.

### **Implications for the development of PbR**

Well recognized and long-standing patient coding problems exist in the NHS (Benson, 1990; Britton et al., in press) and Payment by Results highlights the need for precise information, in particular accurate hospital episode statistics on which commissioning, service planning and financial survival depend. The RCN study points to several possible issues:

- Trust staff caring for acutely ill patients are *potentially* appropriately reimbursed under PbR, whereas long-term condition patients reimbursements may not cover actual costs. More comparison between long-term care HRGs with acute HRGs is required to confirm to what degree this is an issue for Trusts.
- Further, the role and impact of advanced nursing practice on costs, which have already been shown to have positive outcomes for patients in certain settings should be considered in future PbR tariff design. There is potential for incentivising care models, which are not only good for patients but which might also reduce staff costs in certain settings.
- If the absent or the poor quality data is already impacting investment in high quality nursing care, what impact is being felt by other parts of the

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<sup>14</sup> See Dept of Health (2008) 'Using the Commissioning for Quality and Innovation payment framework' at [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_091443](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_091443)



multidisciplinary team such as associated therapists, healthcare support workers, medical technicians?

- Given the gap between actual activity and reimbursement, are resources being inappropriately allocated and thus not always incentivising the most effective care pathways or models?

One way to address some of these issues in the short to medium term would be to look at a range of HRGs where the tariff could be ‘unbundled’ in light of more accurate nursing activity data to establish whether current reimbursement accurately reflects actual patient need and dependency.

Historically, DRG-based nurse staffing methods estimated the nursing resource required for specific DRGs. Unfortunately these methods did not reflect patient’s day-to-day nursing needs (Twigg and Duffield, 2009).

This consolidates the argument, therefore, to base PbR reimbursement also on nursing costs and to ensure reimbursement is fair. Moreover, if it’s possible to plot HRG patients’ dependency pathways then it may be possible to estimate the nursing cost for each HRG treatment and care phase, which may be useful for unbundling the tariff.

## Conclusions

Whilst recognising the study’s limitations, it suggest that an understanding of nursing care processes within a fix priced case-mix activity based payment system might be an important addition to the existing understanding of hospital patient care costs.

It is worth pointing out again that the observed care costs referred to above as a percentage of the tariff reimbursement do not include other substantial medical, diagnostic, and pharmaceutical costs, which may consume all or most of the tariff aside from nursing costs. However, there are several challenges that face the implementation of a system that addresses the issues outlined above.

- Firstly, any system put in place to address the paucity of nursing data should not place a disproportionate data gathering burden on clinicians.
- Secondly, the data gathered must make sense to clinicians in the context of holistic patient care.
- Thirdly, there must be a feedback mechanism in place. The objective of this mechanism should be to encourage ownership of the analytical process and the data derived from the care given in order to better understand variation and thus to seek improvement.

The aim of such an exercise would be to develop a system which will enable more accurate analysis of service needs against provision which could help providers allocate existing resources more effectively as well as provide evidence for increases in resource allocations where appropriate.

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## Appendix 1: Study methods

The UK research governance committee (COREC as was, now the NPSA) agreed that the project was clinical and organisational audit, and service development rather than research; ethics approval, therefore, was not needed. Informed consent was obtained from staff and patients and clinical and non-clinical managers gave approval to undertake the study.

A Project Steering Group was convened which oversaw:

1. The selection of 60 hospital wards (across ten different Trusts) and data collection from those wards.
2. Meeting hospital managers, explaining, elaborating and agreeing project aims, objectives and methods.
3. Appointing project coordinators in each site to act as a liaison between the hospital and principal investigator (PI, Keith Hurst).
4. Recruiting and educating local nurse assessors (ward auditors) to collect inpatient data.
5. Obtaining approval to collect data.
6. In each study ward, collecting patient age, diagnoses, co-morbidities and treatments; their dependency scores; and any nursing attention received.
7. In each study ward, collecting nursing quality; funded and actual staffing; and lost time.
8. Aligning data described in 6 and 7 above to form a composite HRG nursing dataset.
9. Converting HRG nursing data into a nursing cost per day to compare costs with PbR tariff payments.
10. Writing reports explaining the project's method and findings to inform and influence relevant stakeholders.

The Leeds University nursing database is one of the UK's largest patient and nursing activity and quality datasets but it is not possible to align patient dependency, nursing workload, cost and quality data retrospectively to HRGs for estimating HRG nursing costs. The study, therefore, aimed to modify the Leeds nursing information collection systems so that patient dependency data and related nursing workload activity from high-quality 'best practice' hospital wards were linked to HRGs costs. The PI recruited study wards by approaching hospital managers interested in HRG nursing issues but increasingly managers contacted the PI asking to join the project. Consequently, about one new ward was added to the Leeds University nursing database each week.

The aim was to include wards where the commonest HRGs were found, and to recruit sufficient wards in case some were excluded if nursing standards were not met. Staff in 60 acute and long-stay wards representing a mix of specialities in secondary and tertiary, mainstream and foundation hospitals in ten trusts participated in the study.

## Data Collection

Data were collected by co-ordinators in each site. Assessors (ward auditors) collected patient and nursing data. These on-site auditors with a good understanding of local nursing policy were used, but they did not assess the ward in which they worked. Approximately 55 Agenda for Change (AfC) band 5 (or higher) nurses were trained to collect the following data:

- 2) Patients' age, diagnosis, co-morbidity and treatment, later converted into a HRG codes. Data were gathered for all patients during six shifts in which nursing activity studies took place (approx. 100 patients per ward; 117,400 nursing activities during 360 early, late or night shifts totalling 3,668 nursing care hours).
- 3) Each patient was assessed up to three times a day by the primary nurse using the Leeds University dependency rating scale. Consequently, patient dependency data and HRG codes were aligned. The HRG study ward dependencies were compared with the larger Leeds dataset for benchmarking and data extraction purposes (see Appendix 1). The Leeds rating system was used not only because the study's HRG-related dependency data could be compared with dependency data collected in the same way from one thousand wards for benchmarking purposes but also because it incorporates nurse-assessment accuracy checks. The Leeds dependency categories and how they are converted into workload, staffing and costs are shown in Appendix 3.
- 4) All ward staff (including RNs, HCAs, ward clerks and housekeepers) were observed every ten minutes for 48 hours throughout six shifts - including nights and weekends in each ward. Thirty-two activity descriptions were used to record nursing interventions:
  - a) direct (face-to-face) patient care (e.g. giving medication); 56,725 face-to-face nursing interventions were observed in 60 HRG study wards.
  - b) indirect care, away from the bedside (e.g. updating patient records). Around 28,983 indirect nursing interventions were observed.
  - c) non-nursing duties (e.g. non patient administration, general cleaning), totalling 18,987 activities, were observed. This figure may seem high, but up to 40% of the ward establishment in some cases were HCAs and ancillary staff.
  - d) personal time (e.g., drinks, breaks); 12,704 activities were observed .

Nurse auditors worked as non-participant observers in each HRG study ward. Direct (face-to-face) care, logged by staff grade delivering care, was assigned to: (a) the patient's dependency score, and (b) his or her HRG-based diagnosis and treatment code.

Indirect care, non-nursing duties and 'non-productive' time (e.g., meal breaks) form the 'ward overhead', which features as a separate part of the nursing workload calculation and ward cost (see Appendix 3).

- 5) Nursing and ward quality data were gathered in each HRG ward. This meant testing between 500 and 1000 nursing standards (depending on occupancy) covering patient

assessment; care plans; implementing care plans; evaluation; ward resources; policy and procedures.

One third of patients (representing the ward's case mix) were assessed in each HRG ward. Assessors judged nursing standards by:

- a) observing nursing care;
- b) auditing nursing records; and
- c) interviewing patients, relatives and staff.

Service quality data were collected alongside nursing activity information. The main purpose was to include only 'best-practice' wards and to exclude data from substandard wards from the HRG nursing dataset.

- 6) Substantive posts, plus bank, agency and overtime converted into full-time equivalents, formed each ward's 'actual' nursing establishment.
- 7) Time-out (lost time) as: annual; sickness; maternity; study; and compassionate leave were also collected as they feature significantly in HRG cost calculations.

The Leeds University workload-quality data collection instruments, modified to include HRGs, were piloted before the main study. Few changes were needed since the Leeds workload-quality system is well tested. Some changes to the HRG data collection sheet were made primarily to facilitate the ward auditor's task, and to enable the HRG study ward data to be benchmarked against (up to) 1000 existing wards in the Leeds University database.

### **Data Analysis and Datasets**

Data were sent to the PI and his colleagues who allocated and checked HRG coding and procedures: 60 wards from 12 specialties in ten trusts participated.

The most common HRGs in the specialities studied (medicine, long-stay elderly care, elderly acute care, stroke, palliative care, special needs and orthopaedic and surgical) were selected for analysis. A four-step HRG coding procedure was used to minimise coding mistakes.

Also, several reliability and validity exercises were undertaken to test if nurses 'up-coded/gamed'. All HRG nursing data were stored in a relational database. The HRG study outputs included:

- a) patient dependency mix for each HRG;
- b) nursing time converted into HRG nursing costs;
- c) HRG nursing costs and PbR tariff elective/non-elective and long-stay (trim point) payments comparisons

To date, 6,295 patients, each with an HRG code, related dependency, activity and quality information were analysed (see Appendix 4 for further detail).

## Appendix 2: Study ward patient and Leeds database dependencies

This appendix illustrates the distribution of dependency scores in the study wards as compared to those gathered for the much larger Leeds database. It shows that dependency profile of the study wards is similar to that of the Leeds database wards.

Specialty		Dep. 1	Dep. 2	Dep. 3	Dep. 4	$\chi^2$ , df, p
<i>Long-stay elderly care wards</i>	Average patients in 10 HRG wards	0.6	5.8	10.2	3.5	1.38, 3, NS
	Average patients in 134 Wards (Leeds database)	2.6	5.2	10.5	5.3	
<i>Acute-elderly care wards</i>	Average patients in 3 HRG wards	2.7	7.8	11.7	2.2	0.64, 3, NS
	Average patients in 30 Wards (Leeds database)	2.1	10.2	11.2	3.7	
<i>Medical wards</i>	Average patients in 7 HRG wards	2.3	10.7	6.4	2.9	0.60, 3, NS
	Average patients in 97 Wards (Leeds database)	4.5	11.3	7.0	2.8	
<i>Orthopaedic wards</i>	Average patients in 3HRG wards	1.8	4.9	7.4	1.1	0.64, 3, NS
	Average patients in 78 Wards (Leeds database)	3.9	8.6	8.0	1.8	
<i>Stroke wards</i>	Average patients in 2 HRG wards	0.1	2.8	11.5	8.2	2.9, 3, NS
	Average patients in 14 Wards (Leeds database)	1.5	5.6	10.0	5.3	
<i>Surgical wards</i>	Average patients in 4 HRG wards	3.2	11.6	7.6	2.9	0.32, 3, NS
	Average patients in 101 Wards (Leeds database)	3.8	9.5	5.6	2.2	
<i>Special needs</i>	Average patients in 3 HRG wards	0.0	1.0	2.0	4.3	1.6, 3, NS
	Average patients in 70 Wards (Leeds database)	4.0	5.5	8.0	11.5	
<i>MAU</i>	Average patients in 2 HRG wards	0.6	5.4	2.5	0.5	0.22, 3, NS
	Average patients in 18 Wards (Leeds database)	2.0	10.0	4.8	1.6	



### Appendix 3: developing a daily rate for actual care costs

This report refers in several places to a daily rate for nursing care and compares them with the per diem rate allowed under tariff.

This appendix illustrates the process for converting patient numbers and dependency mix into a ward establishment and nursing cost. In this case the non-transient stroke HRG has been used as an example (using two Stroke Wards from the study)

**Step 1.** Obtain average number of patients in dependency categories 1 to 4; for example:

<b>Dependency Category</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>Total</b>
<b>Number of patients</b>	0.1	2.8	11.5	8.2	22.5

Dependency category 1 patients are virtually independent of nurses. Dependency 4 patients, on the other hand, are dependent on nurses for most if not all their needs.

**Step 2.** Record the average amount of direct care time given to each dependency category per day (using data only from quality assured wards):

<b>Dependency Category</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Daily time in minutes</b>	24	79	214	245

The daily times (in minutes) were obtained from observing nursing care in the two stroke wards. In short, the lowest dependency (1) patient gets half an hour of hands-on care each day. The most dependent (4) patient, on the other hand, receives four hours of nursing care a day. Because this care is direct or hands-on care, the 'ward overhead' needs adding later.

**Step 3.** Convert the times in Step 2 above into ratios by dividing dependency category 1 minutes into dependency 2 minutes, dependency 1 into dependency 3 and dependency 1 into dependency 4:

<b>Dependency Category</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Ratios</b>	1	3.3	8.9	10.2

Calculations using care ratios make the remaining task easier and more meaningful. In short, it becomes clear that dependency 4 patients get ten times more nursing care than dependency 1 patients (which reflects the 4's higher dependency).

**Step 4.** Multiply the ratios by the average daily number of patients in each dependency category to obtain the Workload Index (WLI):

<b>Dependency Category</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>Total</b>
<b>Ratios</b>	1	3.3	8.9	10.2	
<b>Number of patients</b>	0.1	2.8	11.5	8.2	22.5
<b>Workload index/Acuity</b>	0.1	9	102	83	195

**Step 5.** In other words, the WLI/acuity is equal to the nursing work needed to care for 195 dependency 1 patients. Dividing WLI by the occupancy gives the bed workload. The WLI (195) and the bed acuity (8.7) are good benchmarks. Both values are required because nursing workload is meaningless if the number of occupied beds is not known.

**Step 6.** The nursing time required for a dependency 1 patient, as illustrated above, is 24 minutes per day. The direct care time for all patients is:

$$195 \text{ (WLI)} \times 24 \text{ minutes} = 4680 \text{ minutes} / 60 \text{ minutes} = 78 \text{ hours per day.}$$

**Step 7.** The study shows that in these stroke wards that nurses spend 55% of their time in direct nursing care. Adding the indirect care component (or ward overhead), therefore, involves:

$$78 / 55 \times 100 = 142 \text{ hours per day} \times 7 \text{ days} = 993 \text{ hours per week.}$$

**Step 8.** Nurses in the two stroke wards took meal and drink breaks averaging 3% of their working day. As you might expect, this time was included in the activity analysis but it is not part of the 37.5 hour week. Three per cent, therefore, is deducted:

$$993 \text{ hours} - (993 \times 0.03) = 963 \text{ hours}$$

**Step 9.** The nursing hours calculated so far assume that ward staff do not take annual or sick leave, etc. Nurses in the two stroke wards account for a 22% time-out value. An allowance for paid and unpaid leave, therefore, is added:

$$963 \times 1.22 = 1175 \text{ hours}$$

**Step 10.** Convert the total nursing hours for the week into whole time equivalents:

$$1175/37.5 \text{ hours} = 31.3 \text{ WTEs.}$$

This specimen ward, therefore, requires slightly more than 31 whole-time nurses to care for patients 24 hours a day seven days a week.

**Step 11.** The stroke ward establishment and staff mix is then converted into daily nurse costs per patient as in represented in the chart below:

<b>Grade Mix (AfC)</b>	<b>WTE's</b>	<b>Proportion</b>	<b>Per Bed</b>	<b>Salary &amp; 'oncosts'</b>	<b>Bed Cost Per diem</b>
Senior WS/CN (7)	1.0	3%	0.04	£41,344	£5
Junior WS/CN (6)	2.8	9%	0.13	£35,957	£12
Senior RN (6)	6.0	19%	0.27	£35,957	£26
Junior RN (5)	11.1	36%	0.50	£29,722	£40
Senior HCA (4)	4.4	14%	0.19	£22,879	£12
Intermed HCA (3)	2.8	9%	0.12	£20,923	£7
Junior HCA (2)	2.9	9%	0.13	£18,498	£6
<b>Total</b>	<b>31.0</b>	<b>100%</b>	<b>1.38</b>		<b>£110</b>

#### **Appendix 4: Specialities (fully) analysed in the HRG Study (to date)**

The table in this appendix shows the number of patients in each study ward as a percentage of the overall population observed. Only the higher percentages were reported in this study. However a longer period of time may reveal that other areas would be worthy of study too.

<b>Specialty</b>	<b>Patients</b>	<b>%</b>
Acute elderly	326	6
Critical Care Units	51	1
Elderly	1423	23
Elderly Mentally Infirm	135	2
Medical	812	14
Admission Units	289	5
Orthopaedic	330	6
Paediatric	20	1
Palliative care	1695	28
Special needs	69	1
Stroke	231	4
Surgical	538	9
<b>Total</b>	<b>5919</b>	<b>100</b>