

An edited version of this article was published as: Jones R (2008) Financial risk in health purchasing: Risk pools. *British Journal of Healthcare Management* 14(6), 240-245. Please use to cite.

Financial Risk in PBC: Specialised services and other risk pools

Dr Rod Jones (ACMA)
Healthcare Analysis & Forecasting, Camberley
hcaf_rod@yahoo.co.uk

The published version is available at www.bjhcm.co.uk or via Athens

Jones R (2004) Financial risk in healthcare provision and contracts. Proceedings of the 2004 Crystal Ball User Conference, June 16-18th, 2004. Denver, Colorado, USA.

Jones R (2008) Financial risk in practice based commissioning. *BJHCM* 14(5): 199-204.

Jones R (2008) Financial risk in health purchasing Risk pools. *BJHCM* 14(6): 240-245.

Jones R (2008) Financial risk at the PCT/PBC Interface. *BJHCM* 14(7): 288-293.

Jones R (2009) Emergency admissions and financial risk. *BJHCM* 15(7): 344-350.

Jones R (2009) The actuarial basis for financial risk in practice-based commissioning and implications to managing budgets. *Primary Health Care Research & Development* 10(3): 245-253.

Further articles in this series can be found at: www.hcaf.biz

Key Points:

1. The point of minimum financial risk is reached by placing between 20% and 40% of the inpatient budget into the risk pool.
2. Allocating only 5% of the budget to a risk pool requires a population base equivalent to the whole of England to achieve a $\pm 1\%$ tolerance on the risk pool.
3. Moving 35% of the PBC inpatient budget into a PCT held budget leads to between 3% and 8% risk associated with the PCT retained budget for the largest and smallest PCTs in England respectively, i.e. only risk pools consisting of groups of PCTs are sufficiently large to mitigate financial risk.
4. Lists of HRG which are potential candidates for inclusion into a wider risk pool are provided.

Introduction

Part one of this series has explored the financial risk associated with the size of a practice based commissioning (PBC) group. A process for determining the point of minimum possible financial risk was illustrated by excluding high cost admissions from the core PBC budget (Jones 2008). By implication such exclusions will be aggregated into some form of a risk pool held on behalf of the PBC group.

DH guidance suggests that only 5% of high cost admissions need to be segregated into a risk pool and hence blocked back to the host PCT – who is assumed to have the financial stability to handle this risk (DH, 2006a). It is entirely reasonable to expect

An edited version of this article was published as: Jones R (2008) Financial risk in health purchasing: Risk pools. *British Journal of Healthcare Management* 14(6), 240-245. Please use to cite.

that the risk pool should not itself be a source of financial risk. This paper aims to investigate the financial risks associated with the level of contributions into a risk pool, looks at the overlap with the issue of commissioning of specialist services and presents a framework for choosing which HRG should be retained in the PBC core budget.

Methods

The methods have been described in part one of this paper (Jones 2008). As in part one the analysis assumes that the fair share budget for the PBC group is actually known with precision. Issues associated with the real world budget, retained cost savings and wider PCT financial risk will be addressed in part three.

The extent of inter-area variation exhibited by various HRG was evaluated at Lower Super Output Area (LSOA) level. A LSOA has about 1,500 heads of population and there are around 5 LSOA per electoral ward. Data covered all admissions in 2005/06 for the residents of six adjacent local authorities having a combined total of over 500 LSOA. This area is primarily serviced by five acute sites with appreciable levels of admissions at 15 other sites. To uphold rules regarding small numbers only the observed average and standard deviation for all LSOA at HRG level were supplied for further analysis. The statistical test applied to detect HRG with high inter-LSOA variation relies on the fact that the standard deviation associated with a Poisson distribution is always equal to the square root of the average. Hence when simple Poisson randomness is operating the ratio of the observed standard deviation divided by the square root of the average will be close to 1. HRG where this ratio was greater than two were selected as exhibiting highly non-Poisson behaviour.

A Framework for the core PBC budget

The whole principle of PBC is that GPs can collectively influence the volume of admissions to particular HRGs to release cost savings for re-investment in primary care. There are two components to the scope of influence

- Conditions over which a GP has no influence over the onset of a condition, i.e. a GP cannot stop a patient developing a cataract or the onset of appendicitis. In these conditions the incidence is the statistical outcome of individual risk factors including genetic disposition, diet, lifestyle, climate, etc.
- However some of these conditions are amenable to secondary influence via GP initiated thresholds which can be applied to conditions such as varicose veins, hernias and even to cataracts.

The choice to include/exclude rests on a balance of the above factors and on the need to reach the point of minimum acceptable financial risk in the PBC budget.

Table 1 gives examples of particular conditions which could be construed to fall within or outside the control of a GP. Table 1 is deliberately vague because it implies a process for evaluating each HRG to determine into which category it will fall. The key point is that there is a rational process of evaluation based on the fact that the point of minimum financial risk is achieved by active exclusion. In part one of this series this process of exclusion was illustrated using price as the indicator. Table 1 implies a wider framework may be available than just price alone.

An edited version of this article was published as: Jones R (2008) Financial risk in health purchasing: Risk pools. *British Journal of Healthcare Management* 14(6), 240-245. Please use to cite.

Table 1: Conditions over which a GP has or does not have direct ‘control’

Degree of Control ↓	Admission Type	
	Elective	Non-elective
Little Direct Control (exclude from PBC)	GP cannot influence onset of the condition, i.e. hernias, etc	Pregnancy & Child birth, conditions such as appendicitis, trauma, some types of fracture, etc
A Degree of Control (include in PBC)	More discretionary procedures such as arthroscopy, joint replacements, endoscopy, etc	Some respiratory conditions and ‘long term conditions’ managed by community matrons.

High Cost Individuals

While Poisson statistics is very good at estimating the variation associated with the ‘arrival’ (via primary care diagnosis) of a ‘new’ patient with chronic conditions such as diabetes, renal disease, cancer, etc it cannot be used to estimate the number of repeat attendances or multiple admissions for that individual (Glynn, 1996).

Table Two: HRG showing very high variation due to individual patients

Admission Type	HRG Chapter	Individual HRG’s
Elective	Nervous	A08, A10, A11, A13, A18, A23, A37
	Respiratory	D51, D53, D98
	Digestive	F06, F37, F45, F56
	Hepatobiliary & Pancreatic	G25, G98
	Musculoskeletal	H22, H24-H26, H98
	Skin, breast & burns	J10, J12, J37, J43, J98
	Endocrine & metabolic	K09, K04, K08, K10
	Urinary tract & male reproductive	L20, L21, L98, L51, L48
	Female reproductive	M01, M98
	Diseases of Childhood	P06, P07, P12, P13, P22-P24, P98
	Haematology & Others	S04-S06, S08, S11, S19, S24, S27, S98
	Mental Health	T07
Non-elective	Respiratory system	D40
	Endocrine & metabolic system	K10
	Diseases of Childhood	P07, P23

This type of variation will manifest itself in very high admissions for a particular HRG in one area and disproportionately low admissions in another since a single individual in one location can have many attendances/admissions. Analysis of data covering the six local authority areas gives the list of HRG in Table 2. This list is exceedingly conservative since it only includes HRG where the ratio of observed to expected standard deviation was greater than two. Simulation shows that this ratio will have a maximum value of 1.05 when averaging over 530 data points if the variation is due to pure Poisson variation. Many of the HRG in Table 2 are part of a pair of HRG with an age or other split separating the two parts of the pair. For example, HRG D51 Respiratory Failure without complications has a matching part

An edited version of this article was published as: Jones R (2008) Financial risk in health purchasing: Risk pools. *British Journal of Healthcare Management* 14(6), 240-245. Please use to cite.

D50 Respiratory Failure with complications which may have had a ratio of less than 2 but more than 1.05 and hence may also be a candidate for exclusion.

Given the highly conservative approach it is suggested that all of the HRG in Table 2 should be excluded from the baseline budget of any PBC group since the arrival of a new high cost individual will have unexpected costs over which a GP has little control. Note that all V3.5 HRG ending in the digits 98 are cancer related but cancer related treatments also occur in other HRG. Version 4 seeks to place far more cancer related events into a single HRG chapter.

Table Three: Low volume/High cost HRG for potential exclusion

Admission Type	HRG Chapter	Individual HRG's
Elective	Nervous	A05, A06, A12, A31, A99
	Mouth, Head & Neck	C26, C45, C59, C60, C99
	Respiratory	D04, D12, D18, D23, D37, D41, D42, D43, D44, D45, D48, D99
	Cardiac	E07, E11, E17, E28, E99
	Digestive	F02, F48, F61, F81, F99
	Hepatobiliary and Pancreatic	G11, G12, G22, G99
	Musculoskeletal	H01, H03, H30, H35, H41, H43, H49, H82-H88, H99
	Skin, breast & burns	J20, J26, J29, J39, J41, J99
	Endocrine & metabolic	K11, K13, K17
	Urinary & male reproductive	L11, L14, L49, L50, L99
	Female reproductive	M04, M99
	Maternity	N04, N10
	Vascular	Q1, Q4, Q98, Q99
Spinal	R04-R06, R08, R11, R98, R99	
Haematology, Palliative & Others	S99	
Mental Health	T02-T06, T08-T13, T15-T17	
Non-Elective	Nervous	A05, A11, A32
	Eyes & periorbita	B20, B21, B23
	Mouth, Head & Neck	C31, C35, C42, C45, C54, C60, C99
	Respiratory	D02-D05, D12, D31, D48
	Cardiac	E07, E13, E17, E39
	Digestive	F02, F03, F12, F51, F71, F72
	Hepatobiliary and Pancreatic	G02, G03, G05, G11, G12, G16, G20, G22, G26, G27, G99
	Musculoskeletal	H01, H03, H04, H07-H09, H29, H35, H47, H70, H72, H81, H82
	Skin, breast & burns	J01, J05, J06, J11, J20-J22, J26, J43, J46, J47, J50
	Endocrine & metabolic	K01, K03, K18, K19, K20, K22
	Urinary & male reproductive	L03, L11, L14-L16, L25, L26, L28, L29, L33, L34, L38, L42, L50, L68
	Female reproductive	M03, M04, M08, M99
	Maternity	N10
Vascular	Q04, Q05, Q99	
Spinal	R08, R09, R11, R12, R14, R19, R99	
Mental Health	T05, T08, T13, T15, T16, T17	

An edited version of this article was published as: Jones R (2008) Financial risk in health purchasing: Risk pools. *British Journal of Healthcare Management* 14(6), 240-245. Please use to cite.

Low Volume HRG

A very low volume HRG has been arbitrarily defined as having an incidence of less than 1 per 100,000 head of population per annum (assuming that 100,000 heads is around the minimum size for financial stability). Some 187 emergency and 224 elective HRG fall into this group. The aim of such a low cut-off point is to exclude only the rarest conditions or procedures. As a further check these HRG were divided into low cost (less than £2,000) and high cost (greater than £2,000). Only the high cost HRGs are given in Table Three. Note that all HRG ending in the digits 99 are for complex elderly admissions where there is a significant co-morbidity.

Given that the number in any one year is beyond the direct control of a GP, i.e. their incidence is a result of small number random processes, it is suggested that they be excluded from the baseline budget. Their inclusion would do very little to contribute to the overall size of the budget and will only result in high financial risk as has been shown in part one (Jones 2008).

HRG where price varies due to classification differences

There are a surprisingly high number of HRG where different trusts can classify the attendance/procedure/test in different ways, i.e. outpatient versus day case or even outpatient/ward attendee/A&E procedure versus emergency admission (ISD 2007, Jones 2007). These differences result in differential cost pressures for PBC groups primarily serviced by different acute sites.

Some of these HRG will have been detected in the test for inter-area variation; however, this test was only run for one particular location and hence only covers a limited number of acute Trusts.

This type of price ambiguity occurs most commonly in so-called day case admissions in Oncology, Radiology, Nephrology (Renal Medicine), Rheumatology and Haematology, i.e. in patients with a chronic condition which can be subject to flare up or where treatment can be delivered in an outpatient setting but when the patient stays for longer than 2 hours. It also occurs for so-called 'emergency' admissions where the patient is admitted and discharged on the same day. Local analysis will be required to flush out these issues.

HRG sensitive to winter conditions

Everyone associated with healthcare will be aware that the effect of a 'bad' winter can lead to serious bed shortages and unexpected pressure on budgets.

Fortunately on a handful of respiratory conditions are sensitive to the environmental & viral conditions associated with such 'bad' winters (Damiani & Dixon, 2001)

These HRG are as follows:

- D13 & D14 – Lobar, atypical or viral pneumonia
- D15 – Bronchopneumonia
- D39 & D40 – COPD or Bronchitis
- D21 & D22 – Asthma
- D41 - Unspecified lower respiratory infection
- D99 – Complex elderly with respiratory primary diagnosis

An edited version of this article was published as: Jones R (2008) Financial risk in health purchasing: Risk pools. *British Journal of Healthcare Management* 14(6), 240-245. Please use to cite.

- P01 – Asthma or recurrent wheeze (in children)
- P03 – Upper respiratory tract disorders (in children)
- P04 – Lower respiratory tract disorders (in children)

The above HRG may or may not be considered for inclusion into a wider risk pool although in many instances they are amenable to primary care management and for that reason could/should remain in the baseline PBC budget. This is especially the case for COPD where a forecast tool developed by the UK MET Office can lead to a 45% reduction in admissions (MET Office, 2008). Inclusion of these HRG into the core PBC budget will lead to financial pressures in especially ‘bad’ winters. While all PBC groups will be subject to pressure in that year there will be regional differences due to the prevailing weather conditions, etc (Damiani & Dixon, 2001; MET Office 2001) - factors which are not included in any capitation formula.

Having established a framework for those HRG which can lead to financial risk we now need to turn to the question of the risk pool, its risk and how it may be managed.

The Risk Pool

The DH recommendation is to remove between 3% and 5% of total budget into a risk pool (DH 2006a) and it is at this point that clinicians need to apply their own judgement. In the light of the results of part one PBC group members will need to consider if 5% of total budget is sufficient to cover the wider statutory duty of NHS organisations to break even. Indeed simulation shows that a risk pool with 4.7% of budget has a potential financial risk of $\pm 96\%$ for 10,000 head and $\pm 9.6\%$ for 1,000,000 head.

What is the size of the risk pool covering a sufficient population base so that the pool itself does not become a source of additional risk to its individual contributors?

Table Four explores the resulting financial risk associated with a risk pool aggregated over various head of population.

Table Four: Financial risk associated with the risk pool

Proportion of budget in the risk pool	Population covered by the risk pool			
	10,000	100,000	1,000,000	10,000,000
5%	96%	30%	9.6%	3.0%
6%	81%	27%	8.4%	2.6%
8%	66%	21%	6.9%	2.2%
9%	63%	21%	6.6%	2.0%
10%	60%	18%	6.0%	1.9%
11%	54%	18%	5.7%	1.8%
13%	45%	15%	4.8%	1.5%
15%	42%	13.5%	4.2%	1.4%
20%	33%	11.1%	3.6%	1.1%
27%	27%	9.3%	3.0%	0.9%
35%	21%	7.2%	2.4%	0.7%

An edited version of this article was published as: Jones R (2008) Financial risk in health purchasing: Risk pools. *British Journal of Healthcare Management* 14(6), 240-245. Please use to cite.

Table Four demonstrates that greater than 1,000,000 head of population are required in the risk pool for the total range in costs to be within $\pm 3\%$. We are after all dealing with very low volume and high cost events. The implication is that the risk pool should be aggregated at Strategic Health Authority (SHA) rather than PCT level to minimise the total risk to which individual practices and groups are exposed. Most importantly it should be noted that a risk pool covering all of England is required to reduce the full range cost to $\pm 1\%$.

When dealing with financial risk size does confer great benefits and PBC groups are not exempt from such considerations. This explains why most private insurance organisations have more than one million members. Indeed the statutory duty to break even and the governments' desire that every NHS organisation should make a surplus should lead to an even more cautious risk strategy than pursued by private health insurers since they have the option to achieve break even over much longer time frames, to increase premiums as required and to refuse insurance to high risk individuals.

There are major advantages to a risk pool of greater than the DH recommended figure of 5%. Not only is the core risk considerably reduced but the volatility in the risk pool is also considerably reduced when its cumulative value exceeds £20M.

The results of the simulations suggest that the risk associated with retaining 35% of the inpatient budget in a PCT held risk pool leads to between 3% and 8% risk associated with the PCT retained budget for the largest and smallest PCTs in England respectively. This represents a seriously high risk to the host PCT.

The aggregation of risk pools up to a population base similar to that of a SHA is common sense since it avoids the duplication of resources involved in administering the risk pool. Indeed a national risk pool would make eminent sense and it is at this point that there appears to be wider overlap between the PBC/PCT risk pool and the commissioning of specialist services.

Specialist services are defined as low volume treatments such as burns care, neurosciences, organ transplants, etc which need a critical mass of patients in order to make the treatment centres cost effective. A specialist service treatment centre will typically cover a population of 1,000,000 (DH, 2006b). The commissioning of specialist services and the risk pool for PBC both appears to need a population of greater than 1,000,000 head to achieve a viable size, for roughly similar reasons. From April 2008 the commissioning of specialist services will occur at Strategic Health Authority level (DH, 2006b). However there are several areas of difficulty to be overcome.

Firstly the list of services covered by specialist commissioning is rather narrow and excludes many 'higher cost' HRG that a PCT may wish to place into a wider risk pool. Next, the wide variations in admission rates between different areas (which may have more to do with how acute sites count and code than real admission rates *per se*) present a challenge to anyone seeking to establish an inter-PCT risk pool. All parties feel they are paying for someone else's excessive admissions. Lastly, no one has done it before, perhaps, because only a few appreciated just how high the risk in healthcare purchasing really was.

An edited version of this article was published as: Jones R (2008) Financial risk in health purchasing: Risk pools. *British Journal of Healthcare Management* 14(6), 240-245. Please use to cite.

At this point a key comment needs to be made. A risk pool is a financial instrument used to reduce exposure to otherwise higher risk, i.e. similar in principle to an insurance policy. It does not absolve the participants of the need to manage instances of excess admissions from a variety of causes. Indeed this management role is within the scope of the SHA Specialist Commissioning groups. Along with other PBC/PCT interface issues part three will discuss the use of financial risk instruments (similar to an insurance policy) to deliver a stable financial environment within which PBC can flourish.

Conclusions

The financial risk inherent in managing healthcare services in a capitation funded environment is very high. PBC groups are not large enough to carry the risk associated with many HRG and the formation of larger risk pools is recommended. There are however impediments to the formation of such pools and PCTs and PBCs groups should be aware of the potential consequences to budgetary management. These issues are addressed in part three.

References

- Department of Health (2006a). Practice Based Commissioning: practical implementation. 28 November, 30 pages.
www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_062703
- Damiani, M & Dixon, J (2001) Managing the pressure. Emergency hospital admissions in London, 1997 – 2001. Kings Fund Publishing, London, 31 pages.
- MET Office (2001) Forecasting the nations health, July
http://www.metoffice.gov.uk/health/evalreport_0001/Health_evaluation_2.pdf
- MET Office (2008) Healthy outlook COPD forecast alert scheme.
http://www.metoffice.gov.uk/health/copd_forecasting.html
- Department of Health (2006b) The Carter Review Group Report. Review of Commissioning Arrangements for Specialised Services, May.
- Glynn R.J (1996) Ways of measuring rates of recurrent events. *British Medical Journal*; 312 (10th Feb): 364-367.
- ISD (2007). Information Services Division, NHS Scotland. Emerging Statistics for Outpatient Procedures/Operations. 27th Feb.
www.isdscotland.org/isd/4454.html
- Jones, R (2007) A level playing field? A discussion document for PCT's which explores the implications of how events get counted at acute trusts. Available from hcfa_rod@yahoo.co.uk
- Jones, R (2008) Financial risk in practice based commissioning. *British Journal of Healthcare Management* 14 (3), 346-351.