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Implementing PBMA

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- Programme budgeting and marginal analysis (PBMA) is an ideal framework for bringing together clinicians and managers, medicine and finance.
- PBMA can provide health gain, supporting work on allocative efficiency (allocating resources across programme areas to gain the maximum benefit). This is the priority for commissioners.
- PBMA can improve healthcare delivery by supporting work on technical efficiency (achieving a given end at the least cost). This is the principal domain of providers.
- The pursuit of efficiency in healthcare is ethical because, at its heart, it is seeking to minimise avoidable distress, disability and death. It is about making sure that a finite amount of resource is deployed against an infinite amount of need in a way that maximises health gain.
- Further information on the thinking behind PBMA appeared in the previous bulletin, *What is PBMA?*

PBMA in eight steps

STEP 1

Choose a set of meaningful programmes with which to work – perhaps age groups, disease groups or clinical directorate groups. Now that primary care trusts (PCTs) are the channel for most NHS resources in this area, it is necessary for them to keep track of all expenditure, not just a few areas of interest.

A PCT might, for example, have an ambitious and well-reasoned case for investment in 12 key programmes based on specialties or disease groups over a five-year period and look back at the end of that time and point to success. But what about the minor specialties (such as rheumatology, incontinence services or ophthalmology) that were not part of the grand plan?

And if elderly people and young people are the priorities, who will watch the working age population (which coincides with peak reproductive activity and therefore family planning and maternity services)?

Similarly, there are risks in launching a spending strategy

for intermediate services without simultaneously specifying the investment strategy for primary care and hospital services. ‘Opportunity cost’ is important here. More benefit may have been given up or foregone than was gained from the investments made.

If programme budgeting is to be a tool for communicating long-term purchasing intentions, it is important that every healthcare professional working in the area should be able to see their place in the strategy, and every potential patient should be able to recognise that their age group and their clinical need are covered.

The fact that healthcare programmes overlap also needs to be considered. A comprehensive set of programmes covering all specialties is desirable, but so is a view of ‘fair shares’ for different age groups, and for the hospital setting relative to other settings.

For example, support for a proposed neonatal intensive care development would represent a simultaneous investment in the paediatric programme, in new-born

child age programme and in the hospital services programme. A bid for a new Macmillan nurse would impact simultaneously on the cancer programme, adults programme and the community services programme. An increased investment in family planning clinics (gynaecology and community programmes) might lead quite quickly to savings in maternity care (obstetrics and hospital programmes). The cumulative effect of all these investment (and disinvestment) plans might be substantial swings between programmes, some of which might deviate from agreed priorities, and therefore prompt a rethink before decisions were made.

One way of handling these overlapping programmes is to adopt a simple matrix approach, relating one set of comprehensive programmes to another – for example, age groups versus disease groups, each adding up to the full annual expenditure in the bottom right-hand corner of the spreadsheet. Examples are shown in Table 1 (opposite) and Table 2 (page 5).¹

STEP 2

Identify current activity and expenditure in those programmes (*programme budgeting*). Try to account for the total budget, to avoid the risk of omissions or double-counting (for example, if resources are shared between different parts of the same programme).

Look at Table 1 or 2.¹ This sort of big picture simplification can be extremely helpful later in making sense of resource swings following from pursuit of the health gain agenda. Answer the questions:

- Where are we starting from?
- Where does the money in our health economy currently go?

STEP 3

Be creative – consider possibilities for improvements and linkages in pathways and patterns of care, within and between programmes. These could be based on new research evidence, local experience or patient feedback.

STEP 4

Weigh up extra costs and increased benefits (or decreased benefits and reduced costs) of the improvements that were thought of in Step 3 (marginal analysis).

Health gains come in different forms, so a common unit of outcome or effectiveness for a programme is helpful, where possible. This may be readily identifiable – like ‘the prevention of premature death’ in lifesaving interventions – but not always. Even when empirical measurement is possible a qualitative explanation of the scale of trade-offs can be informative and make the process more open. The most generic of health gains measures is the quality-adjusted life-year (QALY) which enables comparison of health gains across disparate health interventions and programmes (see *What is a QALY?*).²

This is not about making cuts, but about redeploying all available resources to best effect.

STEP 5

Consult widely – there may be options, trade-offs and value judgements to explain. Local tax-payers, service users and service providers all have a legitimate stake in the choices to be made.

STEP 6

Decide on the change – and in a public sector service like the NHS, make that decision public. It is unlikely that there will be complete unanimity of views after the consultation process, but decisions will have to be made. PBMA is a good way to lay the whole process out to public scrutiny.

STEP 7

Effect the change. This is the essence of management – making it happen.

STEP 8

Evaluate your progress – check that the anticipated costs, savings and outcomes actually materialised. Then repeat the eight-step process.

Table 1. A PCT and provider cost map at typical county or strategic health authority level

Healthcare provision	PCTs (providers of primary care, commissioners of secondary care)					Total
	PCT 1	PCT 2	PCT 3	PCT 4	PCT 5	
Acute trust (1)	£			£		£
Acute trust (2)	£				£	£
Acute trust (3)		£			£	£
Acute trust (4)		£	£	£	£	£
Acute trust (5)			£	£		£
Mental health trust (1)	£			£	£	£
Mental health trust (2)		£	£			£
Ambulance trust (1)	£	£	£	£	£	£
Community services (1)	£			£		£
Community services (2)		£	£	£	£	£
Community services (3)		£	£			£
Out-of-county (1)	£	£			£	£
Out-of-county (2)		£	£	£		£
Voluntary organisation (1)	£		£	£		£
Voluntary organisation (2)	£	£	£	£	£	£
Voluntary organisation (3)	£	£		£		£
Partnership projects (eg, social services) (1)	£	£	£	£	£	£
Partnership projects (2)	£	£				£
Partnership projects (3)			£	£	£	£
General Medical Services	£	£	£	£	£	£
Primary care prescribing	£	£	£	£	£	£
PCT management costs	£	£	£	£	£	£
Total	£	£	£	£	£	£

PBMA in practice

Scenario 1: Shifting programme resources

Look at Table 2.¹ Imagine that the clinical director of paediatrics in a district general hospital (DGH) wants to invest an extra £150,000 in the neonatal unit, thereby preventing some newborns with relatively low dependency (and their mothers) having to be transported 50 miles to the regional neonatal intensive care centre. (STEP 3)

The table shows that there is already £2,728,700 in the 'paediatrics' row and 'birth to four years' column. The PCT commissioners have indicated that they are reluctant to add new investment into this area, since the column total shows that it already enjoys more than its weighted capitation share (145%). However, they are content for existing money to move between cells in the matrix if the clinical trade-offs can be justified. Let us assume that the director can find, by scanning across the 'paediatrics' programme she controls, sufficient savings in use of pathology, radiology and outpatients to generate £50,000 towards the target. (STEP 4)

Now the director scans up and down the 'birth to four years' column. She finds scope for a 15% decrease in 'ear, nose and throat surgery' without harm to patients, and further scope for disinvestment in routine patient transport. Together, these release a further £50,000. (This director is clearly an extraordinary diplomat, and enjoys very strong trust management backing!) (STEP 4)

Finally, she renegotiates the regional specialties contract to reflect the fact that some patients will not now need to travel to the regional centre for care – freeing up the remaining £50,000 she needs. (STEP 4)

In this simplified example, no new resource was needed to achieve the desired development. The decision to switch resources should be subject to assurances on greater health gain in the new dispensation than the old. Sacrifice would be involved for the 'loser' programmes, but that is the essence of opportunity cost – the benefit foregone in the best alternative use of resources.

Scenario 2: Clinical directorate programmes

In their regular clinical liaison meetings, a group of PCTs and the local DGH want to explore getting greater efficiency out of the current deployment of resources, but they also have some new money to spend once this is done. (STEP 2)

There are 20 clinical directorates at this hospital, and each one is invited to imagine it will receive a 10% uplift in budget. How would they spend the money – new staff, new treatments, new equipment, new procedures, new computers, new diagnostic tests or training courses? With the commissioners, they draw up a **wish list** that is costed and in priority order. They can justify, in qualitative if not quantitative terms, what the health gain is for each item – perhaps quality of life, length of life, improved patient experience or improved carer experience. (STEP 2)

They are then asked to imagine a 10% cut in budget. How would they achieve these savings – with job freezes, by no longer offering certain procedures, by diluting quality standards, or by moving to marginally less effective treatments that are much less expensive? Again, with the commissioners, they draw up a **hit list** that is costed and in priority order. (STEP 4)

They are then asked to assume a resource-neutral future. Are there any items that could be traded from the wish list and hit list? This is a useful preamble to discussing new investment. It helps to add incentive to the process if resources are kept within directorates – letting them reinvest their own generated savings. (STEP 4)

The next step is to compare the directorates' wish lists. Which items generate the greatest health gain per pound spent? These are first in line if new money is available for deployment into the hospital. (STEP 5)

Not all trade-offs are cash-releasing or cash-requiring. For example, converting a ward-based respiratory nurse into a community-based respiratory nurse specialist may be resource-neutral but achieve a swing

Table 2. A cost map for Hastings Health Authority 1992-93 (All figures in £000s)¹

Spend area	Age group in years (as in weighted capitation formula)								% of total
	0-4	5-14	15-44	45-64	65-74	75-84	85+	All ages	
General surgery	78.6	116.5	1,114.5	1,682.6	1,733.1	2,088.8	740.8	7,554.7	10.57
Urology	3.4	17.7	140	310.3	471	719.1	269.8	1,931.3	2.70
Orthopaedics	73.8	209.2	903.7	941.5	1,147.7	3,227	1,227.7	7,730.6	10.82
Ear, nose and throat surgery	118.2	403.3	363.8	165.5	86.2	92.1	28.4	1,257.5	1.76
Ophthalmology	45.7	32.8	59.4	173.2	372.6	588.9	285.5	1,558.1	2.18
Oral surgery	99.3	181	168.6	8.2	7	4.4	1.4	469.9	0.66
Pain relief	0	0	36.6	46.8	17.8	22.8	7.6	131.6	0.18
Obstetrics	0	1.1	3,272.1	3.9	0	0	0	3,277.1	4.58
Gynaecology	0.8	7.5	1,899.6	846.4	335.6	193.2	67.7	3,350.8	4.69
A&E	149.3	88.4	408.5	270.9	296.4	482	274.8	1,970.3	2.76
General medicine	1.8	0	895.3	1,994.5	2,693.2	640.8	63.3	6,288.9	8.80
Haematology	0	0	50	126.6	34.8	145.6	0	357	0.50
Rheumatology	0	0	92.6	177.8	66.8	19.4	7.8	364.4	0.51
Geriatrics	0	0	0	93.9	505.2	5,170.5	4,037.2	9,806.8	13.72
Paediatrics	2,728.7	843.5	47.6	0	0	0	0	3,619.8	5.06
Psychiatry	24.2	56.1	1,815.6	1,180	790.9	1,347.6	453.9	5,668.3	7.93
Regional specialties	228.8	138.5	660.7	1,069.4	745.7	312.3	130.8	3,286.2	4.60
Learning difficulty	0	42.9	280.7	150.5	17.8	1.4	0	493.3	0.69
Health promotion	6.1	11.5	38.5	23.3	13.8	9.8	3.3	106.3	0.15
Drug abuse	0	9.2	227.1	12.6	3.4	0	0	252.3	0.35
HIV/AIDS	0	20.8	166.6	20.8	0	0	0	208.2	0.29
Disablement	2.7	7.7	63.2	34.7	42.4	118.8	45.1	314.6	0.44
Joint finance	23.6	44.7	149.8	90.6	53.8	38.1	12.8	413.4	0.58
Community nursing	9.4	18.7	148.6	281.4	482	1,012.4	696.5	2,649	3.71
Community clinics	0.6	1.1	9	16.6	28.9	62.2	43.4	161.8	0.23
Community therapy	43.9	39.5	77.1	83.3	127.7	189.3	99	659.8	0.92
GP pathology	33.2	33.9	220	114.9	106.2	165.2	72.8	746.2	1.04
GP radiology	15.9	16.2	219.4	55.2	51	69.8	35	462.5	0.65
Hospice	0	0	129.3	78.4	46.5	32.8	11	298	0.42
Out of district	0	0	124.5	75.3	44.8	0	0	244.6	0.34
Extra contract cases	360.9	118	989.8	560	264.3	258	51.2	2,602.2	3.64
Ambulance	132.6	88.2	568.3	294.5	273.6	369.1	184.9	1,911.2	2.67
Management costs	76.2	144.2	482.8	292.2	173.4	122.8	41.6	1,333.2	1.87
Total	4,257.7	2,692.2	15,823.3	11,276	11,033.6	17,504.2	8,893.1	71,479.9	100
Capitation allocation	2,931	2,788	8,506	8,578	14,225	22,516	11,866	71,408	
Variance: actual/capitation (%)	145	97	186	131	78	78	75	100	

between secondary care and primary care budgets. Generally, trade-offs within clinical directorates are easier to agree and to deliver than those between organisations, but where patient interest is foremost the territorial tendencies ought to be set aside. All these steps can be tackled without specialist economic advice, but formal economic appraisal adds rigour to the process and is most useful where judgements are tight or consensus is difficult to reach.

Scenario 3: Patient pathways as programmes

Another approach to programmes is to look at an entire patient pathway for a particular condition such as angina, breast cancer, or fractured neck of femur including osteoporosis. Pathways of this sort span primary care and intermediate care (generally a PCT responsibility), and secondary care and tertiary care (generally a hospital trust domain). An ambitious project might also take in ambulance transport, social services, the private sector and voluntary sector. **(STEP 1)**

Taking diabetes and its complications as an example, a group of PCTs and their local hospital might look at expenditure in primary care (for example, oral hypoglycaemics, insulin and its delivery devices, GPs and nurses with a special interest, diabetes registers and primary care clinics) and secondary care (for example, diabetes inpatient care, special groups like adolescents and pregnant women, cardiovascular and lipid problems, and those with renal, ophthalmic and peripheral vascular complications). **(STEP 2)**

Using the same approach as in Scenario 2, and looking at the patient pathway as a whole, a representative group could establish a wish list, hit list and trade-offs. Even where there is assumption of growth money for a national service framework, the redeployment (disinvestment/reinvestment) opportunities should be pursued first. **(STEP 3)**

The Hastings Health Authority cost map

In 1993, Hastings Health Authority wanted to see where all its NHS financial resources were deployed. This was before the merger with Family Health Service Authorities (FHSAs), so

all costs related to hospital and community health services (HCHS). It was decided to create a simple two-way matrix of age groups against spend areas (see Table 2).¹ Today, a PCT might want to do the same, but adding in the primary care elements of spending.

The objectives were to:

- Simplify – to get a complex £71.4 million budget onto a single sheet
- Inform – to get a feel for the sums involved and where they were deployed
- Plan – to assist in deciding where redeployment was appropriate and where to top up with new funds
- Co-ordinate – to link up the different parts of the health system around a common understanding of the financial status quo
- Communicate – to have a means of sharing the current picture and future plans with partners in the NHS, social services, the voluntary sector and public representative bodies.

Why were age groups chosen as programmes?

- Each health authority (HA) had a different age profile and, therefore, a unique pattern of demand for healthcare.
- Age profiles may change rapidly. In Hastings, there were predictions of particularly rapid increases at the extremes of age (under-fours and over-85s) and decreases in some of the other age bands.
- Resources were allocated to health authorities on the basis of age-weighted capitation (and still are in some PCTs).
- It was a good way to capture all expenditure, since even budgets such as management overheads could be ascribed pro rata to age groups, and there were good data on hospital activity by age.

Why were 'spend areas' chosen as programmes?

- It would show where the money was going in terms of the major contract headings (largely clinical specialty headings).
- Because of the internal market in the NHS, there was a financial audit trail that made such tracking possible.
- It is another good way to capture all expenditure. Unless all expenditure is reconciled to the bottom right-hand corner

of the spreadsheet, it is difficult to be confident of the figures.

- This sets the scene for marginal analysis and looking for new investment/disinvestment.

Why were disease groups not chosen as programmes?

The use of disease groups as programmes was given much thought, but was rejected because:

- Co-morbidity, the problem of multiple diseases in one individual, is very common. For example, if a man with diabetes has renal failure and blindness and is then admitted with a heart attack, where does that episode get coded and costed? It is more pragmatic to ascribe the cost of the episode to the admitting specialty team
- Patients present with symptoms and signs, not diagnostic labels. A lump in the breast is not always cancer; pain in the chest may mimic heart disease but be due to a perforated stomach ulcer
- It was found to be better to look at the impact of specific diseases on the chosen cost map, and see the spread over clinical specialties (heart attacks, for example, were found chiefly in cardiology, geriatrics, and general medicine, but also in respiratory medicine, nephrology and general surgery).

What was the immediate impact of the cost map?

- Everybody could see the big picture. The spreadsheet was widely disseminated and presented to publicly elected representatives (local authorities and community health councils) and clinical groups. The public responded with interest and requested further versions in successive years so that they could follow trends, chiefly in the elderly and mental health programmes.
- The HA allocated new money to certain programmes, such as health promotion, which were perceived to be underfunded. Other programmes were frozen, like the 'birth to four years' age group, which was found to be receiving well above its allocation share (and rising) at the expense of elderly groups.
- In the hospitals, clinicians could begin to understand and accept the opportunity costs of their services and discuss relative priorities on the basis of health gain rather

than taking turns or pulling rank.

- When HAs later merged with each other and with the FHSAs, this work assumed even greater importance in terms of understanding the big picture.
- When the new, enlarged HAs began to divide up into localities, then primary care groups (PCGs), then ultimately PCTs, the approach was helpful again.

General points

- It is not essential to draw up a comprehensive cost map at the outset, but it does help to set the broad context and reinforce the concept of opportunity cost.
- When creating programme groups, whether by age, disease, specialty or any other classification, try, where possible, to use existing classifications rather than inventing new ones; for example, the existing weighted capitation groups for age breakdowns, or healthcare resource groups (HRGs) or International Classification of Diseases 10th Revision (ICD-10)³ chapters for disease breakdowns.
- It helps to get away from a perspective on organisations, activity or medicines budgets per se (inputs and outputs) and look instead at outcomes.
- The objective is to move from a resource-led, clinically informed discussion to a clinically led, resource-informed discussion.
- It is not the map that matters, but the journey. The driving force for PBMA is patient care and health gain, not financial spreadsheet reconciliation.
- Mapping trends over time, whether these arise by design, diktat or default, can be informative – just as a film tells a fuller story than a snapshot.
- The pursuit of efficiency in healthcare is ethical because, at its heart, it is seeking to minimise avoidable distress, disability and death. It is about making sure that a finite amount of resource is deployed against an infinite amount of need in a way that maximises health gain.

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