Morbidity variation and RAWP

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Abstract

Study objective—Resource allocations from the central government to the English health regions are determined by population levels adjusted by relative standardised mortality ratios (SMRs). The White Paper *Working for Patients* proposes that allocations should in future be based on capitation adjusted by some other measures of health. The aim of this paper was to investigate the effect of using morbidity data in the weighting algorithm instead of relative SMRs.

Design—Morbidity data were obtained from the Health and Lifestyle Survey, 1986. Three different measures of self reported morbidity were used (Long Standing Illness, Any Declared Condition, Any Handicap). Population weightings were calculated by national average bed use for these conditions and again for SMRs.

Setting—This was a national survey using data from all the English health regions.

Main results—All three measures of morbidity showed a wider variation between regions than SMRs, and the weighted populations showed a correspondingly wide variation (approximately double that obtained when using SMRs).

Conclusion—The weighting of populations will be crucial in determining resource allocations to budget holders, whether in the hospital or primary care sector. However without a prior agreement on what counts as "need", the choice of these alternative measures will be arbitrary.

The White Paper *Working for Patients* proposes that the use of the present RAWP (Resource Allocation Working Party) formula for allocating resources from Central Government to English Health Regions should be discontinued. Instead, allocations should be based on capitation weighted for health and age distributions.¹

The choice of alternative measurements of "need"—whether based on mortality (standardised mortality ratios), on morbidity, or on something else—will be crucial in determining resource allocations to budget holders, in the hospital and primary care sectors, following the implementing of the NHS Review. This paper investigates the effects of using morbidity data on the regional distribution of illness in England derived from the Health and Lifestyle Survey² on the distribution of hospital resources.

The background to the analysis reported below is that the relative ranking of the regions in terms of these (SMR) levels has changed little since the RAWP formula was introduced (See Table I).

This means that the relative rankings of the "targets" for resource allocation have not changed significantly.

The Resource Allocation Working Party decided to use mortality measures, arguing that relative mortality was probably a good proxy for relative morbidity. This has been disputed subsequently many times: for example, one of the current authors has shown how the correlation between the rates of both permanent and temporary sickness with mortality was quite low.³ The RAWP team did explore the possibility of using morbidity but argued that there were no appropriate data available. In particular, they argued that the General Household Survey data were inappropriate because "the nature of the sampling frame does not permit compilation of statistics in terms of NHS boundaries".⁴

A more serious objection might be that even with large samples, the number of responses would be insufficient to produce precise estimates. While this is an important consideration for subregional RAWP—for which precise estimates for each district health authority would be required—it is less serious when considering the application of the RAWP formula to allocations from the Centre to the regional health authorities. With a 1000 interviews per region and a population reporting, for instance, 20% long standing illness, or some similar measure, the standard error of a simple random sample would be less than 1% (it would be slightly but not significantly different given the actual sampling design of the General Household Survey).

Perhaps the main reason for rejecting the use of General Household Survey morbidity data is that the variations are much wider with morbidity than mortality. As the first General Household Survey report showed, the dispersion for males was from 82 to 123 (a 50% increase between the lowest and the highest after standardisation for age and sex), and for females it was from 79 to 119 (also a 50% variation), compared to variations of 27% and 20% in standardised mortality ratios. If self reported morbidity had been used as a basis for resource allocation, there would have been an even more pronounced shift to the North, despite the moaning minnies concentrated in East Anglia (see Table II).

Recent morbidity data

Since 1972, the General Household Survey has not published data broken down by economic region.⁵ The data from The Health and Lifestyle Survey can be reorganised according to economic region. Table III compares the General

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Table I Standardised mortality ratios in regional health authorities 1971 and 1984

	Males				Females			
	1971 (RAWP)	Rank	1984 (OPCS)	Rank	1971 (RAWP)	Rank	1984 (OPCS)	Rank
Northern	110	(3)	114	(1)	107	(3=)	112	(1=)
Yorkshire	106	(4)	105	(5)	107	(5)	107	(4)
Trent	101	(6)	102	(6)	102	(6)	102	(6)
East Anglia	88	(13=)	90	(12=)	92	(12)	93	(10=)
NW Thames	94	(8=)	91	(10=)	97	(7)	92	(13)
NE Thames	97	(7)	98	(7)	95	(11)	94	(8=)
SE Thames	93	(11)	96	(8)	96	(8=)	95	(7)
SW Thames	94	(8=)	89	(14)	96	(8=)	93	(10=)
Wessex	89	(12)	90	(12=)	91	(13=)	89	(14)
Oxford	88	(13=)	91	(10=)	91	(13=)	93	(10=)
South Western	94	(8=)	92	(9)	96	(8=)	94	(8=)
West Midlands	103	(5)	105	(4=)	107	(3=)	104	(5)
Mersey	113	(11)	109	(3)	110	(1)	108	(3)
North Western	112	(2)	112	(2)	109	(2)	112	(1=)
England	100		99		100		100	

Sources: DHSS Resources Allocation Working Party, 1976; OPCS Mortality Statistics, Area, 1984.

Table II Persons by sex and region: standardised mortality ratios* (SMRs) compared with observed rates as % of expected rates: (a) = Long standing illness; (b) = Limiting long standing illness. Standard economic regions, Great Britain, 1972

	Males				Females			
	Observed as % of expected		Observed as % of expected		Observed as % of expected		Observed as % of expected	
	SMR† (a)	(b)	SMR† (a)	(b)	SMR† (a)	(b)	SMR† (a)	(b)
North	110	123	126	109	102	102		
Yorkshire & Humberside	106	114	114	107	118	114		
North West	112	103	105	110	98	101		
East Midlands	99	106	106	101	100	96		
West Midlands	105	103	107	102	102	105		
East Anglia	87	82	84	92	119	117		
South East	92	89	85	93	93	92		
Greater London Council	98	90	85	96	101	98		
Outer Metropolitan Area	89	95	92	93	79	87		
Outer South East	88	83	76	89	93	89		
South West	91	88	96	95	90	93		
Wales (South East)	111	115	115	106				
Wales (Remainder)	106			99	111	111		
Scotland	111	87	86	112	85	87		

*Source: Registrar General's Statistical Review of England and Wales for the Year 1972, OPCS (London: HMSO, 1974), part I, table 19; and The General Household Survey 1972, OPCS (London: HMSO, 1975), p.193, table 5.4.

†England and Wales = 100

Household Survey results from 1972 with the Health and Lifestyle Survey results of 1984. The variations in self reported morbidity can be seen to have narrowed slightly among males (from a 50% variation from lowest to highest in 1972 to about a 38% variation in 1984), but remained the same for females. More significantly, the regional pattern is now clearer: for both males and females the top five (worst) regions include the North, East Midlands, West Midlands and Greater London, and East Anglia is bottom for both.

Of course, for the purpose of health service funding, the country is divided up into regional health authorities rather than economic regions. The data from the Health and Lifestyle Survey have been reorganised accordingly and the results

Table III Percent self reported morbidity (long standing illness) in standard economic regions 1972 and 1984 (ranks in brackets). GHS=General Household Survey; HLS=Health and Lifestyle Survey

	Male		Female	
	1972 GHS	1984 HLS	1972 GHS	1984 HLS
North	24.9 (1)	36.4 (4)	22.7 (4)	30.9 (5)
York/Humberside	22.8 (3)	32.1 (8)	24.9 (2)	37.9 (1)
North West	20.4 (5)	32.3 (7)	21.5 (7)	30.5 (6)
East Midlands	20.6 (4)	35.2 (3)	21.6 (6)	31.5 (4)
West Midlands	19.3 (6)	38.3 (1)	20.8 (8)	37.3 (2)
East Anglia	17.8 (8)	28.4 (11)	26.3 (1)	25.4 (11)
South East	17.3 (10)	32.0 (9)	19.6 (10)	28.9 (7)
Greater London Council	17.8 (8)	33.6 (5)	22.5 (5)	35.4 (3)
South West	17.8 (8)	33.0 (6)	20.4 (9)	25.8 (10)
Wales	23.6 (2)	29.0 (10)	23.9 (3)	28.4 (8)
Scotland	16.7 (11)	34.3 (4)	17.2 (11)	28.0 (9)
Rank correlation	0.134		0.162	

Sources: The General Household Survey, 1972, OPCS (London: HMSO, 1975) p.93, table 5.4; Cox B et al, The Health and Lifestyle Survey.⁴

are presented and compared with the relative SMRs in table IV.

If using SMRs the dispersion for males is from 89 to 114 (a variation of 28%) and for females from 89 to 112 (a variation of only 26%); using these morbidity rates, the variation for males is from 23.8 to 37.1 (a variation of 56%) and for females from 24.9% to 32.9 (a variation of 32%). There is a larger dispersion using morbidity than mortality data, especially for males.

In contrast with the earlier comparison for Standard (economic) Regions there are substantial differences here between the patterns of morbidity and mortality: for example among males, Oxford and Wessex have very similar SMRs but are at opposite ends of the range of reported morbidity levels.

Given the sensitivity of the rankings to the choice of measure, similar computations have been carried out for three rather different morbidity measures which can be derived from the Health and Lifestyle Survey. The three chosen are: Long Standing Illness, Any Declared Condition, Any Handicap (see² for definitions).

Results are reported in table V in terms of internally standardised morbidity rates devised by applying Health and Lifestyle Survey national figures to the sample age distribution in each regional health authority. The earlier pattern of wide dispersion is repeated for each of the measures even after standardisation.

The distribution of mortality (SMRs) and morbidity (Health and Lifestyle Survey, three measures) are very different and, according to which one is used as a proxy of "need", the resultant patterns will be very different.

Using morbidity data to determine regional revenue allocations

The revenue targets for the regional health authorities are calculated by allocating the gross national allocations to seven service areas, allocating the amounts for each of the service specific areas to the regional health authorities according to a service specific formula, and then recombining the allocation for the seven service areas to produce a revenue target. The current "Distance from Targets" is given in table VI.

Ideally, we would like to follow the same procedure but this would involve an additional and separate set of assumptions about what are the appropriate morbidity measures to use for each of

Table IV Comparison of SMRs with Health and Lifestyle Survey (HLS) rates of morbidity (long standing illness) in regional health authorities

	Males		Females	
	SMR 1984 (rank)	HLS 1984 (rank)	SMR 1984 (rank)	HLS 1984 (rank)
Northern	114 (1)	36.3 (2)	112 (1=)	30.0 (6)
Yorkshire	105 (4=)	25.7 (13)	107 (4)	31.8 (5)
Trent	101 (6)	34.5 (4)	102 (6)	32.9 (1=)
East Anglia	90 (12=)	27.9 (11)	93 (10=)	24.9 (13)
NW Thames	91 (10=)	31.4 (9)	92 (13)	32.9 (1=)
NE Thames	98 (7)	34.6 (3)	94 (8=)	32.9 (1=)
SE Thames	96 (8)	31.5 (8)	95 (7)	28.5 (7)
SW Thames	89 (14)	28.3 (10)	93 (10=)	24.0 (14)
Wessex	90 (12=)	37.1 (1)	89 (14)	27.2 (10)
Oxford	91 (10=)	23.8 (14)	93 (10=)	25.5 (11)
South Western	92 (9)	32.9 (6)	94 (8=)	25.1 (12)
West Midlands	105 (4=)	32.8 (7)	104 (5)	32.1 (4)
Mersey	109 (3)	26.9 (12)	110 (8)	28.2 (8)
North Western	112 (2)	33.0 (5)	112 (1=)	27.7 (9)
	100	32.9	100	

Sources: OPCS Mortality statistics, Area, 1984. Health and Lifestyle Survey; authors' own calculations.

Table V Standardised morbidity ratios (various)

Region	Morbidity measures					
	Long standing illness		Any disability		Any handicap	
	M	F	M	F	M	F
Northern	113.4	100.5	104.1	96.2	139.7	117.7
Yorkshire	81.5	106.1	95.8	100.3	101.8	98.5
Trent	108.6	112.0	106.0	105.1	100.0	110.5
East Anglia	87.5	85.2	109.5	109.5	109.2	96.8
NW Thames	101.6	110.4	104.3	101.8	108.3	116.7
NE Thames	107.0	112.0	92.6	98.7	89.0	106.5
SE Thames	100.8	99.2	94.2	94.4	96.9	103.3
SW Thames	87.6	82.3	76.4	91.1	77.2	81.3
Wessex	112.6	91.2	93.4	104.3	93.8	89.9
Oxford	76.3	87.3	100.3	95.4	67.1	78.8
South Western	99.6	83.6	98.4	102.1	107.2	99.1
West Midlands	106.5	111.4	108.5	93.1	112.7	104.0
Mersey	81.8	96.4	94.1	110.4	114.9	83.7
North Western	102.6	94.7	108.3	104.1	94.2	90.0

Source: Health and Lifestyle Survey; authors own calculations.

Table VI Distance from targets and RAWP distribution

Region	Main service provision	(%)	Target	Post allocation distance from target
Northern	679 482	6.65	694 330	-2.14
Yorkshire	767 680	7.52	784 400	-2.21
Trent	926 641	9.07	957 579	-3.22
East Anglia	400 572	3.92	416 351	-3.79
NW Thames	748 568	7.33	708 358	5.68
NE Thames	933 655	9.14	856 524	9.01
SE Thames	830 504	8.13	808 535	2.72
SW Thames	690 592	6.76	688 769	0.26
Wessex	564 636	5.53	568 477	-0.68
Oxford	440 700	4.31	448 971	-1.84
S Western	672 786	6.59	679 663	-1.07
W Midlands	1 088 488	10.66	1 113 091	-2.21
Mersey	542 546	5.31	541 747	0.15
N Western	928 848	9.09	948 385	-2.06
Total RHAs	10 215 098		10 215 098	0.00

Source: DHSS, 1987/88 Cash Limits Exposition Booklet London: HMSO, FA2B, January 1987.

the seven service areas (non-psychiatric inpatients, non-psychiatric outpatients, community health, mental illness, mental handicap, ambulance, and administration).

As the majority of the allocation (about 55%) is to the non-psychiatric service sector, we have chosen to illustrate the impact of replacing the mortality index (SMR) with one of the morbidity measures (Long Standing Illness, Any Declared Condition, Any Handicap) by calculating the resource allocation for the non-psychiatric service sector only. The basic method is to calculate a population weighted by national average bed use

for the conditions and then to weight again by the standardised mortality ratios.

The impact of these weighted populations on the revenue targets is shown in table VII. The effects of this procedure vary considerably depending on the morbidity indicator used. Whilst Wessex regional health authority gains by using morbidity rather than mortality (SMR) measures, Oxford tends to lose. A rationale for choosing the "appropriate" measure of "need" from, for instance, the alternatives in table VII is not obvious.

Table VII Effect of using morbidity weights instead of SMRs on revenue targets (£) 1987-88

Using SMRs	Revenue targets (£)			
	Long standing illness	Any disability	Any handicap	
Northern	694 330	707 804	633 369	823 089
Yorkshire	784 400	760 624	767 614	786 895
Trent	957 579	902 769	1 021 052	1 034 542
East Anglia	416 357	384 868	474 545	446 918
NW Thames	708 358	777 223	726 771	810 252
NE Thames	856 524	910 637	775 952	798 639
SE Thames	808 535	881 695	808 804	869 583
SW Thames	688 769	604 306	582 716	555 826
Wessex	568 477	681 953	757 198	606 453
Oxford	448 971	391 352	438 791	331 799
South Western	679 663	703 163	752 390	769 488
West Midlands	1 113 091	1 168 263	1 033 505	1 123 921
Mersey	541 747	478 334	537 889	447 377
North Western	948 385	869 106	910 348	798 508

Source: As table VI.

Conclusion

Three elements of the morbidity data from the Health and Lifestyles Survey have been reorganised into NHS Regional areas and their dispersions compared to the distribution of mortality (SMRs). The effects of this on the location of individual Regions in the distribution are marked. Similarly, the effect of these morbidity measures, when applied only to non-psychiatric hospital allocations, on the distribution of resources is also marked.

The selection of measures of "need" to determine resource allocations has been revised following the RAWP Review and the NHS White Paper. While the latter includes the retention of SMRs with a different weight in determining the allocation to the regions, it is not clear which criteria will be used to determine the budgets of districts and general practitioners. If possible, a direct measure of need—such as current or potential health status—should be used. But the choice of what "best" measures the need for health services is crucial.

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- 2 Cox B, Blaxter M, Buckle AL *et al*. *The Health and Lifestyle Survey*. London: Health Promotion Research Trust, 1986.
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