



Comparing the USA, UK and 17 Western countries' efficiency and effectiveness in reducing mortality

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Summary

Objectives To test the hypothesis that the USA healthcare system was superior to the NHS and 17 other Western countries in reducing feasible mortality rates over the period 1979–2005.

Design Economic inputs into healthcare, GDP health expenditure (GDPHE) were compared with clinical outputs, i.e. total 'adult' (15–74 years) and 'older' (55–74 years) mortality rates based upon three-year average mortality rates for 1979–81 vs. 2003–2005. A cost-effective ratio was calculated by dividing average GDPHE into reduced mortality rates over the period.

Setting Nineteen Western countries' mortality rates compared between 1979–2005.

Participants Mortality of people by age and gender.

Main outcome measures A cost-effective ratio to measure efficiency and effectiveness of healthcare systems in reducing mortality rates. Chi-square tested any differences between the USA, UK and other Western countries.

Results Input: The USA had the highest current and average GDPHE; the UK was 10th highest but joint 16th overall, still below the Western countries' average. Output: Every country's mortality rate fell substantially; but 15 countries reduced their mortality rates significantly more than the US, while UK 'adult' and 'older' mortality rates fell significantly more than 12 other countries. Cost-effectiveness: The USA GDPHE: mortality rate ratio was 1:205 for 'adults' and 1:515 for 'older' people, 16 Western countries having bigger ratios than the US; the UK had second greatest ratios at 1:593 and 1:1595, respectively. The UK ratios were >20% larger than 14 other countries.

Conclusions In cost-effective terms, i.e. economic input versus clinical output, the USA healthcare system was one of the least cost-effective in reducing mortality rates whereas the UK was one of the most cost-effective over the period.

Introduction

The US presidential and mid-term elections evoked considerable controversy about the reforms of the American healthcare,¹ while British visitors were struck by the frequent mention of the apparent failings of the NHS. As all healthcare systems are run by human beings, there will be imperfections and errors in most¹ but the concerns expressed by the English Chief Medical Officer of the 'need for safer surgery' was seen as authoritative evidence of an inadequate NHS.² However, in a recent meta-analysis of studies mainly from North America also concerned with 'adverse events' in theatre,³ the predominantly US results, when compared with the Association of General Surgeons of Great Britain & Ireland outcomes, were significantly worse.⁴

Nonetheless, the protagonists of current US healthcare were by inference suggesting that their system is at least as good if not superior to others.

This led us to ask the question how cost-effective and productively efficient is the US healthcare system, compared with the other Western countries and the UK in particular?

The vast sums of money spent by every Western country on health, that is gross domestic product health expenditure (GDPHE),⁵ means the question is relevant to every country.

To assess the different countries' productive efficiency and cost-effectiveness of their healthcare system we use a simple economic model. To determine cost-effectiveness, a nation's GDPHE is used as the economic input, against the clinical outputs, to examine how effective the nation was in reducing all feasible 'adult' (15–74 years) and 'older' (55–74 years) mortality rates, feasibility within the context of the current art and science of medicine. Consequently, mortality rate is chosen as the main clinical output because feasibly reducing mortality is the ultimate goal of all health systems. Indeed the British government believes reducing cancer deaths in people <74 years is a reasonable goal,⁶ so we examine all 'adult' (15–74 years) and 'older' (55–74 years) people's mortality rates, the latter age band where the greatest 'gains' might be expected.^{6–8}

It is acknowledged that mortality is influenced by other socioeconomic and policy factors rather

than just health expenditure.^{9–13} Yet mortality rate is a rationale comparative measure to compare a nation's healthcare, as the only way to judge one's own health system's 'output' is to assess it against other comparable Western nations.

There are four null hypotheses from the period 1980–2005. There will be no statistically significant differences between the USA, the UK and the other Western countries in:

1. reducing all 'adult' (15–74) mortality rates;
2. reducing 'older' (55–74) mortality rates;
3. USA GDPHE: reduced mortality rate ratios will be as good as most other countries;
4. UK GDPHE: reduced mortality rate ratios will not be as good as most of the other countries.

Methodology

Baseline and index years (1979–1981 vs. 2003–2005)

The index year of 2005 was chosen, as it is the latest year American World Health Organization (WHO) mortality data can be uniformly compared with other countries.¹⁴ Annual mortality rates vary slightly and to offset this three average mortality rates are used, with the baseline 3 years of 1979–1981, contrasted with three-year index years 2003–2005, to match the latest available international GDHPE data.⁵ The combined male and female mortality rate of each country is given in rates per million (pm).¹⁴ The latest Australia, Italy and Portugal data were for 2001–2003, and for Canada and New Zealand 2002–2004 so these countries' mortality is contrasted with the same years in the UK and USA. The time difference of Belgium and Denmark's latest mortality rates, 1997 and 2001, was too great for proper comparison and are excluded from the study, leaving 17 Western countries to compare with economic 'inputs' and clinical 'outputs' from the UK and USA.

Effectiveness: economic health inputs

GDPHE data from 1980 up to 2005 are the primary economic input, given as total percentage of

GDPHE and the separate sources of finance, 'Public', from State and National taxes or insurance, and 'Private', via personal or employers insurance⁵ from which an average GDPHE for 1980–2005 is calculated.

Effectiveness: clinical (mortality) outcomes

Combined gender mortality rates per million (pm) are extrapolated from WHO data¹⁴ for the years 1979–81 and 2003–2005 and are shown in three 20-year age bands: 15–34, 35–54 and 55–74 years, from which an all 'adult' (15–74 years) mortality rate is calculated.

USA and UK 'adult' (15–74) and 'older' (55–74) mortality rates are compared with each of the other countries, and chi-square tests are used to determine any significant differences between them over the period. Standard deviations (s.d.) for mortality rates are calculated: +1 or –1 s.d. are considered clinically significant.

Cost-effectiveness ratio

Cost-effectiveness is taken as the relation between economic input and clinical output based upon a calculation of a ratio of the average GDPHE and the reduced mortality rate over the period. The greater the ratio the more cost-effective is that country's reduction of mortality rate. It is recognized that the value of 1% of GDP will vary between countries, but it is a comparative measure of a nation's priority to healthcare. The former Prime Minister Thatcher once said 'we can only have the services we can afford'.¹⁵ Comparing nations' GDPHE shows how much different nations 'afforded'.

To place these rates in a more 'clinical' context, the numbers of reduced deaths are calculated for the USA and UK if the current population's death rates had died at same rate as in 1979–1981.

Results

Economic inputs – GDPHE 1980–2005

Countries are ranked by the highest average GDP over the period (1980–2005) (Table 1).

Total GDPHE: In 1980 the highest GDPHE percentages were in Sweden (9%), USA (8.8%) and

Germany (8.7%), the lowest being 5.3% in Spain and 5.6% in both Portugal and the UK.

By the end of the period GDPHE had risen in every country, except Ireland, the current highest being the USA (15.3%), Switzerland (11.6%) and France (11.1%), and the lowest being Finland and Ireland (7.5%) and Japan (8%). The Western countries current average of 9.7% is above the UK's 9.3%, which is 10th highest of 19 countries.

The highest average (1980–2005) total GDPHE was led by the USA at 12.2%, Germany at 9.7% and Switzerland at 9.3% with all Western countries averaging 7.4%.

Spain was lowest at 6.8%, Japan at 7.0%, with Finland, Ireland and the UK at 7.1%, all below the average 7.4% of the other countries.

Sources of GDPHE: Only Greece (5.8%) and the USA (8.4%) had higher 'Private' GDPHE than 'Public' funded GDPHE. However, it should be noted that the USA 'Public' GDPHE of 6.9% was higher than the average Western countries' 'Public' at 6.87%, being higher than eight other countries' 'Public' GDPHE.

The UK 'Private' GDPHE was lower than the average GDPHE but its current 'Public' GDPHE of 7.1% was higher than the average GDPHE of the other countries.

Clinical outputs: reduced mortality rates 1980–2005

Table 2 presents total combined male and female mortality rates per million (pm) of the population between 1979–1981 and 2003–2005 ranked by the highest current 'adult' (15–74) and 'older' (55–74) mortality rates. The current and previous year's rank order are shown in column one.

'Adult' (15–74) mortality rate

Every country's rates fell more than 27%, except Portugal, which fell only 17%. Initially the three highest 'adult' rates were in Ireland 10,374 pm, Austria 9762 pm and the UK 9682 pm, with the USA fifth at 9158 pm. The lowest were Switzerland 5651 pm, Spain 6499 pm and Japan 6782 pm.

Four countries' 'adult' rates were 1 s.d. (1201 pm) above the mean 8236 pm: Ireland, Austria, the UK and New Zealand; while Japan,

Table 1**Average and current GDP health expenditure (ranked by average 1980–2005 GDPHE)**

Country	GDPHE 1980	Current GDPHE Public	Current GDPHE Private	Current Total GDPHE	Total GDPHE average 1980–2005
1 USA	8.8	6.9	8.4	15.3	12.2
2 Germany	8.7	8.2	2.5	10.7	9.7
3 Switzerland	7.4	6.9	4.0	11.6	9.3
4 Sweden	9.0	7.7	1.4	9.1	8.8
4 France	7.0	8.9	2.2	11.1	8.8
6 Canada	7.1	6.9	2.9	9.8	8.7
7 Netherlands	7.2	5.7	3.5	9.2	8.4
7 Greece	6.6	4.3	5.8	10.1	8.4
9 Australia	7.5	6.4	3.1	9.5	8.3
10 Italy	7.0	6.8	2.1	8.9	8.2
10 Norway	7.0	7.6	1.5	9.1	8.2
12 Austria	7.5	7.7	2.5	10.2	8.1
13 Portugal	5.6	7.4	2.8	10.2	7.7
14 New Zealand	5.9	7.0	2.0	9.0	7.2
15 UK	5.6	7.1	2.1	9.3	7.1
15 Ireland	8.3	5.8	1.7	7.5	7.1
15 Finland	6.3	5.9	1.6	7.5	7.1
18 Japan	6.5	6.6	1.4	8.0	7.0
19 Spain	5.3	5.9	2.3	8.2	6.8
Western countries average	7.1	6.9	2.8	9.7	7.4

Average GDPHE 1980, 7.0; 1 s.d. = 1.1
Average [1980–2005] 8.3; 1 s.d. = 1.5
Current GDPHE average 9.7; 1 s.d. = 1.7

Switzerland and Spain were 1 s.d. below the mean.

By 2003–2005 the USA 'adult' MR was highest at 6660 pm, followed by Portugal 6483 pm, Finland 5692 pm, with the UK falling from third to fifth highest at 5475 pm, and now within the mean; the lowest being Japan 4182 pm, Switzerland 4355 pm and Sweden 4373 pm. Currently only the USA and Portugal mortality rate is 1 s.d. above the mean, and Japan, Sweden and Switzerland 1 s.d. below the mean.

'Older' (55–74) mortality rate

Initially, the three highest 'older' mortality rates were Ireland 26,738 pm, the UK 24,961 pm and New Zealand 24,203 pm; the USA was fifth highest at 22,199 pm.

The smallest reductions were in Portugal (18%) and the USA (28%). The UK mortality rate fell 45%, only Ireland at 48% and Australia at 47%

had bigger declines, as the UK 'older' mortality rate fell from second to sixth highest.

Initially, Ireland, the UK and New Zealand were 1 s.d. above the mean (20,607 pm, 1 s.d. = 3505 pm) and Japan and Switzerland being 1 s.d. below the mean. Currently only the USA and Portugal are 1 s.d. above the mean (12,950 pm 1 s.d. = 1386 pm), the UK within the mean and again Japan, Switzerland and Sweden now 1 s.d. below the mean.

International comparisons

USA vs. other countries: Over the period only Portugal had a significantly lower reduction of 'adult' mortality rate than the USA (Table 3). Conversely, marked with [†] in the table, 14 countries' 'adult' mortality rates had significantly greater reductions than the USA.

With regard to 'older' people, the USA mortality rate declined significantly more than

Table 2**Gender combined mortality rates (pm) by age 1979–1981 and ratio of change 1979–81 vs. 2003–2005**

<i>Countries current and previous ranks</i>	<i>Adult (15–74)</i>	<i>15–34</i>	<i>35–54</i>	<i>Older (55–74)</i>
1 USA – 5	9158	1222	4054	22,199
2001–2003	6959	919	3387	16,570
2002–2004	6739	913	3159	16,145
2004–2005	6660 + 1 s.d.	910	3149	15,919 + 1 s.d.
Ratio of change	0.73	0.74	0.78	0.72
2 Portugal – 13	7787	1107	3571	18,685
2001–2003	6483 + 1 s.d.	968	3140	15,341 + 1 s.d.
Ratio of change	0.83	0.87	0.88	0.82
3 Finland – 8	8437	944	3582	20,784
2004–2005	5692	642	2870	13,601
Ratio of change	0.68	0.68	0.80	0.65
4 Germany – 12	7887	803	3251	19,609
2003–2005	5492	464	2319	13,693
Ratio of change	0.70	0.58	0.71	0.70
5 UK – 3	9682 + 1 s.d.	679	3406	24,961 + 1 s.d.
2001–2003	6182	615	2317	15,453
2002–2004	5931	600	2272	14,920
2003–2005	5471	567	2207	13,638
Ratio of change	0.57	0.83	0.65	0.55
6 New Zealand – 4	9620	1086	3570	24,203 + 1 s.d.
2002–2004	5544	771	2108	13,754
Ratio of change	0.58	0.71	0.59	0.57
7 Ireland – 1	10374 + 1 s.d.	743	3618	26,738 + 1 s.d.
2003–2005	5433	559	1904	13,835
Ratio of change	0.52	0.75	0.53	0.52
8 France – 9	8162	1065	3825	19,591
2003–2005	5383	613	2794	12,742
Ratio of change	0.66	0.58	0.73	0.65
9 Netherlands – 11	7898	618	2881	20,196
2003–2005	5328	400	2022	13,563
Ratio of change	0.68	0.65	0.70	0.67
10 Austria – 2	9762	1098	4077	24,112
2004–2005	5302	581	2144	13,180
Ratio of change	0.54	0.53	0.53	0.55
11 Canada – 10	8000	999	2759	20,239
2002–2004	5178	570	2045	12,918
Ratio of change	0.65	0.57	0.74	0.64
12 Italy – 7	8684	734	3690	22,127
2001–2003	5105	567	1909	12,837
Ratio of change	0.59	0.77	0.52	0.58
13 Norway – 14	7505	745	2794	18,976
2003–2005	5098	628	1921	12,746
Ratio of change	0.68	0.84	0.69	0.67
14 Greece – 16	7200	709	2435	18,455
2003–2005	4970	572	2040	12,302

(Continued)

Table 2
Continued

<i>Countries current and previous ranks</i>	<i>Adult (15–74)</i>	<i>15–34</i>	<i>35–54</i>	<i>Older (55–74)</i>
Ratio of change	0.69	0.81	0.84	0.67
15 Spain – 18	6499 – 1 s.d.	758	2900	18,348
2003–2005	4913	527	2180	12,032
Ratio of change	0.76	0.70	9.75	0.66
16 Australia – 6	9154	1016	3577	22,869
2001–2003	4826	656	1843	11,966
Ratio of change	0.53	0.65	0.52	0.53
17 Sweden – 15	7496	732	2923	18,834
2003–2005	4373 – 1 s.d.	462	1741	10,915 – 1 s.d.
Ratio of change	0.58	0.63	0.60	0.58
18 Switzerland – 9	5651 – 1 s.d.	823	2229	13,901 – 1 s.d.
2003–2005	4353 – 1 s.d.	653	1735	10,672 – 1 s.d.
Ratio of change	0.77	0.79	0.78	0.77
19 Japan – 17	6782 – 1 s.d.	646	2802	16,890 – 1 s.d.
2003–2005	4182 – 1 s.d.	386	1770	10,390 – 1 s.d.
Ratio of change	0.62	0.6	0.63	0.62
Adult average was 8236 pm, 1 s.d. = 1201; current 5144 pm, 1 s.d. = 593				
'Older' average 20,607 pm, 1 s.d. = 3507 pm; current average 12,950 pm, 1 s.d. = 1386 pm				

Portugal and Switzerland, whereas 15 other countries, including the UK, had substantially ($P < 0.001$) greater reductions than the USA.

UK vs. other countries: With regard to 'adult' mortality rates, five countries had greater mortality rate reductions than the UK, while 11 other countries had significantly lower falls than the UK, including the USA (Table 4).

With respect to 'older' mortality rates, Australia, Austria, Ireland, Italy and New Zealand had significantly greater falls than the UK, who in turn had significantly bigger reductions than Canada, Finland, France, Germany, Greece, Japan, Netherlands, Norway, Portugal, Spain, Switzerland and the USA.

Cost-effectiveness: the average GDPHE – 'adult' and 'older' reduced mortality rate ratios

The GDPHE: Reduce mortality rate ratios were calculated by dividing the level of reduced mortality rate by the average GDPHE.

Table 5 shows the results, ranked by the GDPHE: 'older' (55–74) ratios.

The biggest ratios, indicating the greatest cost-effectiveness, were in Ireland, UK and New Zealand at 1:1817, 1:1490 and 1:1451, respectively.

The narrowest ratios were in Switzerland (1:347), Portugal (1:434) and the USA (1:515). Thus Ireland, the UK and New Zealand had almost three times the cost-effectiveness ratio of the lowest three countries, in effect doing more with proportionately less over the period.

However, rates can obscure the reality of proportion of lives saved as exemplified in translating the UK and USA reduced rates into numbers of people.

There are now 176,258 fewer 'adult' deaths in the UK, which includes 127,631 fewer 'older' people than in 1979–1981 and 543,467 fewer 'adult' deaths in the USA, of which 307,983 were 'older' (55–74).

Discussion

Principal finding

The null working hypotheses can be rejected, as the majority of other countries had significantly

Table 3
USA vs. other Western countries' average adult deaths (chi-square results and P value)

Country 1980–1981 vs. latest year	Average 15–74 mortality rate USA vs. other Western countries	55–74 mortality rate USA vs. other Western countries
Australia	235.5 (<0.0001)	544.1 (<0.0001)
Austria	155.1 (<0.0001)	327.8 (<0.0001)
Canada	28.61 (<0.0001)	72.93 (<0.0001)
Finland	10.1783 (<0.005)	56.49 (<0.0001)
France	16.83 (<0.001)	40.16 (<0.0001)
Germany	3.3173 (<0.1) †*	3.0444 (<0.1) †*
Greece	4.5373 (<0.05)	21.93 (<0.0001)
Ireland	200.2 (<0.0001)	490.88 (<0.0001)
Japan	42.16 (<0.0001)	8.35 (<0.0001)
Italy	117.0 (<0.0001)	278.4 (<0.0001)
New Zealand	110.4 (<0.0001)	275.8 (<0.0001)
Netherlands	9.8398 (<0.005)	18.63 (<0.001)
Norway	7.9041 (<0.005)	17.91 (<0.001)
Portugal	11.56 (<0.001)*	40.50 (<0.0001)*
Spain	2.4341 [†]	32.57 (<0.0001)
Sweden	78.27 (<0.001)	179.8 (<0.0001)
Switzerland	4.9716 (<0.05)*	17.01 (<0.001)*
UK	78.98 (<0.0001)	220.0 (<0.0001)

*The USA had greater reduced mortality rates than other countries

†P value not significant

greater mortality rate reductions than the USA in relation to both 'adult' and 'older' people, which was generally the converse for the UK.

While in regard to the cost-effectiveness ratios, only Portugal and Switzerland had worse GDPHE:mortality rate ratios than the USA showing that most other countries achieved more with proportionately less.

Conversely, apart from Ireland the UK GDPHE: reduced mortality rate ratios were substantially better than any other country.

Nonetheless, every country had reduced its mortality, and while there are many inter-related factors that would contribute to these improvements^{9–13} these results are grounds for cautious satisfaction.

Strengths and weaknesses

The source of data can be said to be the most authoritative available in regard to mortality rates but there are a number of qualifying aspects that must be recognized.

First, it is that the USA is a continent and on a range of socioeconomic and health factors there is considerable variation between the States, not least marked ethnic variations.^{1,5} Although most Western countries have regional economic variations, few have the variation of, for example, California, which is larger than many Western countries, and Arkansas, et cetera. A second factor is life or cultural styles of the USA, in particular the availability of firearms, which impacts upon mortality rates such as homicide and suicide, far more than any other Western country,^{16,17} placing an extra burden upon USA services. Finally, it might be argued that as the dominant healthcare system in America is 'private' via direct insurance means that as a substantial minority of Americans are not fully insured^{1,18} therefore such people are not really part of their care system as they are not in the 'treatment' group or in the actual system. However, they are part of the wider medical system, i.e. Medicare and Medicaid as well as the concern of public health policy.¹ However, it should be noted that in countries like Switzerland, with high average GDPHE and below the mean mortality rate, such countries can only have relatively marginal improvements, whereas the USA, with high average GDPHE but relatively high initial mortality rate, had greater opportunity for improvement, but their mortality rate worsened and is now significantly above the Western mean. This is exactly the opposite of the relatively most 'cost-effective' countries, such as Ireland and the UK, whose mortality rate was initially higher than the mean but is within the mean of the other Western countries. Hence the argument that for such countries there may be even greater gains if their GDPHE was closer to that of the average of the countries reviewed, although it is recognized there will, as in the case of Switzerland and Japan a point of relative diminishing returns, where greater expenditure only brings marginal improvements.

Meaning of the study

USA results

The USA results are perhaps not a surprise as a recent UNICEF report showed that in terms of material wellbeing the USA general population was below OECD inequality average, being 23rd out of 24 countries reviewed; were 19th, with

Table 4
UK vs. other countries' mortality rates (chi-square results and P value)

Country 1980–1981 vs. latest year	Average 15–74 mortality rate USA vs. other Western countries	55–74 mortality rate USA vs. other Western countries
Australia	57.36 (<0.0001)	121.9 (<0.0001)
Austria	13.02 (<0.001)	0.0036 [†]
Canada	5.1372 (<0.05)*	18.41 (<0.001)*
Finland	29.93 (<0.0001)*	69.88 (<0.0001)
France	39.84 (<0.0001)*	61.21 (<0.0001)*
Germany	45.02 (<0.0001)*	157.9 (<0.0001)*
Greece	38.26 (<0.0001)*	86.51 (<0.0001)*
Ireland	26.84 (<0.0001)	52.97 (<0.0001)
Japan	2.5176 [†]	16.07 (<0.001)*
Italy	9.447 (<0.005)	18.52 (<0.001)*
New Zealand	6.7019 (<0.01)	11.5505 (<0.001)
Netherlands	28.86 (<0.0001)	100.6 (<0.0001)
Norway	31.22 (<0.0001)*	97.51 (<0.0001)*
Portugal	137.1 (<0.0001)*	206.4 (<0.0001)*
Spain	93.34 (<0.0001)*	67.53 (<0.0001)*
Sweden	0.3305 [†]	0.1234 [†]
Switzerland	101.6 (<0.0001)*	299.5 (<0.0001)*
USA	78.98 (<0.0001)*	220.0 (<0.0001)*

*The UK had greater mortality rate reduction than other Western countries

[†]P value not significant

regard to educational wellbeing, and for health and wellbeing 22nd, and currently the USA child (0–14) mortality is the highest among Western countries.¹² Consequently, on these measures the US healthcare system is the least effective and efficient of Western countries and probably reflects structural political and socioeconomic factors.

How can the poor USA results be explained bearing in mind the notion that market forces are assumed to lead to greater effectiveness and productive efficiency. On the other hand, Adam Smith (1776), the protagonist of the 'market', said that in some spheres, such as health and education, the state could more effective than the market alone.¹⁹ One economic factor, long-known, is that that these inefficiencies would be expected within a dominant 'Private' healthcare system as based mainly upon private insurance, what might be called the uncertainty principle, that is intrinsic to health, in terms of patient illnesses there is asymmetric information, so the

'unknowns' can only be partially prepared by the insurer, hence the built-in 'uncertainty', as they are bound to have less information than the 'customer', who are accepted on an open assumption of a modicum of healthiness.^{19–22} Due to asymmetric information insurers charge high premiums in order to make up for a few individuals that require unexpectedly very expensive medical treatment. A relatively huge bureaucratic burden is needed to monitor the costs, behaviour and risks of customers, as well as the immense legal costs required to control payment.²³ This may be a factor contributing to the relatively worse US clinical outcomes are these integral market failures when applied to healthcare at a national level. Another linked the problem is that described as adverse selection, where those who take out health insurance are more likely to be those of greatest risk, so insurance companies raise premiums, but relatively deprives the person of average health as they 'pay' for the less healthy, which can discourage those with average health, the better bets, from taking out insurance.^{19–22} Indeed the problem of underinsurance and the uninsured are another significant aspect of this market failure, adding to US mortality.^{11,13,18,23–25} Paradoxically therefore, a mainly 'Public' health system, such as the majority of other countries, including the NHS, are at a national level, likely to have less productive inefficiency, as it avoids the inherent market failures related to profit-making, necessary in the 'Private' insurance system. Although theoretically a 'Private' system, such as the USA, relies on competition to reduce costs, but because of these inherent market failures of 'asymmetric information' and 'adverse selection' factors, there will always be inherent market weaknesses within the whole system,^{20–22} which may go some way to explain the differences in the observed cost-effectiveness results of the USA and the UK.

UK results

With regard to the 'better than expected' UK clinical outcomes, it must not be forgotten that despite the UK having among the biggest reductions in mortality, UK 'adult' rates are fifth highest among Western countries and their 'older' rates sixth highest, so there can be no grounds for complacency, although starting significantly above the

Table 5**GDPHE: reduced death ratios 1980–2005 (ranked by greater GDPHE: 55–74 mortality rate ratio)**

Country and rank	Average 15–74 reduced deaths (rpm)	Average GDPHE: death ratio	55–74 Deaths reduced (rpm)	55–74 Deaths: GDPHE ratio
1 Ireland	4941	1:696	12,903	1:1817
2 UK	3951	1:557	10,576	1:1490
<i>Numbers saved</i>	<i>162,264</i>		<i>121,190</i>	
3 New Zealand	4076	1:566	10,449	1:1451
4 Austria	4460	1:551	11,194	1:1382
5 Australia	4328	1:521	10,903	1:1314
6 Italy	3579	1:436	9290	1:1133
7 Finland	2255	1:318	7183	1:1012
8 Japan	2600	1:380	6500	1:929
9 Spain	1586	1:233	6316	1:929
10 Sweden	3123	1:355	7919	1:900
11 Canada	2822	1:324	7321	1:841
12 Netherlands	2570	1:306	6633	1:790
13 France	2779	1:316	6849	1:778
14 Norway	2407	1:294	6230	1:766
15 Greece	2230	1:265	6423	1:765
16 Germany	2395	1:247	5916	1:610
17 USA	2498	1:205	6286	1:515
<i>Numbers saved</i>	<i>415,702</i>		<i>238,642</i>	
18 Portugal	1304	1:169	3344	1:434
19 Switzerland	1298	1:140	3229	1:347

UK 1979–1981 population (age bands) 41.069 m and 11.459 m
 USA 166.414 m and 37.964 m
 rpm = rates per million

mean now within the mean of the other countries. On the other hand, compared with most other countries, unlike the USA, the UK achieved significantly bigger clinical reductions and with below average and current GDPHE economic input.

Implications for clinicians and policymakers

It is acknowledged that the precise reasons of the differences between countries' outcomes are beyond the competence of this paper and would require nation-specific analysis. Overall however, it is reiterated that every country has seen major falls in its death rates and longevity has increased over the past 25 years,⁵ so despite the huge sums going to health, on reflection, this health expenditure has been well spent, especially when these rates are translated into the numbers of people who have not died, as more than 170 thousand people in the UK and more than half a million in

America are alive today, who would not have been 25 years ago.

The UK results appear to be at odds with the recent high profile debate about cancer survival rates,²⁶ yet in terms of actual cancer mortality rates <74, rather than the more ambiguous 'survival' rates,^{27,28} the UK had better results than the USA, which appears to be linked by major additional funds going to cancer care.^{29–31}

It is hoped these results might be a boost to patients and their families in every Western country but especially those using the NHS, and that some recognition goes to UK frontline staff, who over the past 25 years, have achieved more with relatively less.

Unanswered questions and future research

This study cannot account for the variables that may have contributed to the differences between

countries. In particular, to what degree might the role of predominately public healthcare systems, compared to the mainly private healthcare system, influenced the results? Future research should look at possible socioeconomic factors, in particular the potential contribution of differential levels of relative poverty and whether there are variations between adult and children's outcomes.

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