

**Criteri di riparto**  
**Fondo Sanitario Nazionale 2014**

**Regione Campania**

Il Sole **24 ORE**

**Sanita**

## Introduzione

L'attuale sistema di riparto del Fondo Sanitario Nazionale (FSN) utilizza come unici criteri per l'attribuzione delle quote tra le diverse Regioni e Province autonome la popolazione residente e la diversa struttura per età. Tuttavia l'attuale sistema di pesatura per età, come ribadito nel corso degli anni, risulta non appropriato per una corretta ripartizione del FSN tra le Regioni e le Province Autonome. Questo limite ha condotto all'attribuzione, nell'anno 2010, da parte dei Presidenti delle Regioni e Province Autonome, dell'incarico all'AGENAS per l'individuazione di nuovi criteri che sono stati oggetto di uno specifico documento prodotto dall'Agenzia dal titolo: *Riflessioni sui criteri da utilizzare per il riparto del fabbisogno sanitario*". La discussione sviluppata nei riparti successivi non ha prodotto un accordo per il cambiamento dei criteri di riparto, tuttavia è stata espressa la necessità di sviluppare una proposta di criteri di riparto da adottare individuando i fattori che hanno incidenza sui determinanti delle condizioni di salute e tra essi quelli economici, sociali, ambientali e demografici.

Nel Patto per la Salute 2014-2016 è indicata la necessità di rivedere e riqualificare gli attuali criteri attraverso nuove modalità di pesatura secondo i criteri già indicati dall'art. 1 comma 34 della legge 662/96 e nello specifico "*popolazione residente, frequenza dei consumi sanitari per età e per sesso, tassi di mortalità della popolazione, indicatori relativi a particolari situazioni territoriali ritenuti utili al fine di definire i bisogni sanitari delle regioni ed indicatori epidemiologici territoriali*". Dei criteri indicati nella legge 662/96 solo i primi 2 vengono attualmente utilizzati e la proposta della Regione Campania è di includere nei criteri un indicatore basato sui tassi di mortalità e uno sullo stato socio economico come proxy dello stato di salute della popolazione e dei suoi bisogni sanitari. Questi due indicatori sono da tempo utilizzati in diversi paesi europei ed extra-europei per ridurre le disuguaglianze di salute.

### *La mortalità*

Il sistema inglese considera a partire dal 1976 un sistema di allocazione delle risorse che utilizza tra i vari criteri la mortalità come indice dei bisogni di salute (1). L'obiettivo è "equal opportunity of access for those at equal need". La mortalità introdotta per la prima volta nel sistema inglese per ridurre le disuguaglianze di salute e raggiungere una maggiore equità di risorse nell'attribuzione dei fondi nazionali alle diverse realtà locali è stata poi utilizzata anche da altri paesi europei (Belgio, Inghilterra, Scozia, Irlanda del Nord, Norvegia) ed extra-europei (Australia, USA) (2). La mortalità è considerata una buona proxy della morbidità. La mortalità riflette la morbidità cumulativa e l'esperienza sociale in una zona, e ha dimostrato di fornire misure più stabili e complete di morbidità rispetto ai tassi di utilizzo delle risorse sanitarie (3). Inoltre, la mortalità è una misura indipendente dalla fornitura di assistenza sanitaria, può essere decomposta per età e sesso, ed è normalmente disponibile e periodicamente aggiornabile per area di residenza (2). Indicatori di mortalità (come gli SMR) hanno anche dimostrato di essere una variabile statisticamente significativa per spiegare i tassi di utilizzazione dell'assistenza sanitaria (4). Non meno importante è ricordare che i rapporti della WHO (2009) "How can health systems respond to population ageing?" e della Commissione Europea (2010) "Projecting future health care expenditures at European level: drivers, methodology and main results." sottolineano come, da una consistente mole di ricerche, stia emergendo un'immagine diversa del rapporto tra invecchiamento della popolazione e spesa sanitaria. Viene contestata la convinzione, ampiamente diffusa, di una relazione meccanicistica tra invecchiamento della popolazione e spesa sanitaria. L'età non è più considerata un buon predittore della spesa sanitaria, e stime della spesa sanitaria basate semplicemente sull'età sono ritenute misleading. Un ormai rilevante numero di studi rileva le criticità di questo approccio, suggerendo che la spesa sanitaria è determinata più dalla prossimità di un individuo al decesso che dall'età per se. La ricerca consolidata sui cosiddetti "death related costs" dimostra, infatti, che la "prossimità del decesso" è un predittore di spesa sanitaria più importante dell'invecchiamento. Una gran parte dei costi sanitari dell'intera vita di un individuo ricadono nell'ultimo anno di vita, e soprattutto nelle poche settimane antecedenti il decesso. Infine, i "death related costs" sono più bassi nelle età più avanzate (10-12).

### *Lo stato socio economico*

Nel 2008, l'OMS CSDH (5) ha concluso che le disuguaglianze di salute sono dovute a disuguaglianze nelle condizioni della vita quotidiana e dei driver fondamentali che danno loro origine. La gamma di fattori che determinano la salute e il benessere

interagenti includono: circostanze materiali, l'ambiente sociale, fattori psicosociali, comportamenti e fattori biologici. A loro volta questi fattori sono influenzati dalla posizione sociale determinata da istruzione, occupazione, reddito, genere, etnia e razza (figura 1). Il documento della Commissione Europea *"Health inequalities in the EU"* del 2013 (6) evidenzia una forte associazione nei paesi europei tra disuguaglianze sociali e aspettativa di vita. Un altro documento della Commissione Europea *"Economic implications of socio-economic inequalities in health in the European Union"* del 2007 (7) conclude che l'impatto economico delle disuguaglianze socio economiche sulla salute è significativo. Il documento stima che il 20% dei costi dei sistemi di assistenza sanitaria nell'Unione europea è dovuto a disuguaglianze socio economiche. Il documento sottolinea che le stime rappresentano valori annuali e che fintanto persistono disuguaglianze di salute queste perdite continueranno ad accumularsi nel corso degli anni. Il documento dell'OMS *"Challenging Inequity Through Health Systems"* del 2007 (8) individua una serie di azioni, che devono svolgere i Ministri della Sanità e i capi di Governo, per rafforzare i sistemi sanitari e affrontare le disuguaglianze di salute. Una di queste azioni è la riallocazione delle risorse destinate ai servizi sanitari in modo che tengano conto di queste differenze nel bisogno di salute. Nell'allocazione delle risorse destinate al servizio sanitario sono numerosi i paesi europei (Belgio, Olanda, Irlanda del Nord, Inghilterra, Svezia) ed extra-europei (Australia, USA, Nuova Zelanda) che utilizzano informazioni sullo stato socio economico per garantire una maggiore equità nell'accesso alle risorse sanitarie (2). Il sistema inglese nel 1999 ha introdotto un nuovo obiettivo nell'allocazione delle risorse: *"to contribute to the reduction in avoidable health inequalities"*. Per meglio conseguire questo obiettivo è stato introdotto nel 2002 una modifica al sistema di allocazione che destina maggiori risorse alle aree più svantaggiate. Un recentissimo articolo pubblicato su BMJ (9) ha valutato gli effetti sulla salute di questo sistema di riallocazione delle risorse evidenziando che l'aumento delle risorse destinato alle aree più svantaggiate ha ridotto la differenza di mortalità tra aree ricche e deprivate. In particolare è stato evidenziato che le risorse aggiuntive destinate alle aree più svantaggiate hanno prodotto maggiori miglioramenti nella mortalità rispetto a quelle destinate alle aree meno svantaggiate. Per questo motivo concludono

gli autori che interrompere questo sistema di riallocazione delle risorse provoca un aumento delle disuguaglianze di salute.

### **Analisi in Italia della mortalità e stato socio economico**

I criteri aggiuntivi sopra identificati sono stati calcolati per le regioni italiane identificando come anno di riferimento il 2011.

Per quanto riguarda la mortalità, in accordo con la letteratura e le altre esperienze europee, è stato scelto il rapporto standardizzato di mortalità (SMR) minore di 75 anni (Tabella1). Mentre per quanto riguarda lo stato socio economico, in accordo i documenti sopra riportati e le altre esperienze europee, sono stati scelti tre indicatori relativi all'educazione, al tasso di disoccupazione e al reddito medio. Il livello di educazione è stato definito come percentuale della popolazione in età 25-64 anni che ha conseguito come titolo di studio più elevato il diploma di scuola secondaria di primo grado (Fonte ISTAT, rilevazione sulle forze di lavoro) (Tabella1). Il tasso di disoccupazione è stato definito come rapporto percentuale tra la popolazione di 15 anni e più in cerca di occupazione e le forze di lavoro. Queste ultime sono date dalla somma degli occupati e delle persone in cerca di occupazione (Fonte ISTAT, rilevazione sulle forze di lavoro) (Tabella1). Il reddito medio è calcolato sulle dichiarazioni dei redditi delle persone fisiche 2012 (anno d'imposta 2011, Fonte Agenzia Entrate) (Tabella1). Per poter elaborare un unico indice relativo allo stato socio economico partendo dai tre sopra descritti è stato utilizzata l'analisi delle componenti principali. Questa analisi è una metodologia statistica per la riduzione delle dimensioni. L'analisi delle componenti principali è particolarmente utile quando un certo aspetto non è direttamente quantificabile ma si dispone di più indicatori del medesimo. Utilizzando questa metodologia statistica è possibile ottenere un nuovo indicatore come combinazione lineare delle variabili di partenza avente varianza massima. A causa delle notevoli differenze nella numerosità della popolazione tra le diverse regioni l'analisi delle

componenti principali è stata pesata per la popolazione residente delle diverse regioni (anno 2011). L'analisi ha evidenziato una notevole correlazione tra i tre indici di partenza. La prima componente principale rappresenta il nuovo indicatore di stato socio economico e spiega 86% della varianza totale. Per poter meglio adattare il nuovo indicatore nel contesto del riparto del FSN è stato riscalo per ridurre la varianza e calcolato l'esponentiale. In questo modo il nuovo indicatore assume valori attorno al valore 1 con valori superiori per le regioni con maggiore svantaggio socio economico rispetto alla media nazionale e minore di 1 per le regioni con minore svantaggio (tabella1). In questo modo l'indicatore ha le stesse proprietà del SMR.

È stata eseguita un'analisi dell'associazione tra questi due criteri e l'attuale sistema di allocazione delle risorse definito come quota procapite calcolata per l'anno 2013. L'associazione è stata pesata rispetto alla popolazione residente in ciascuna regione (anno 2011). È stata osservata un'associazione negativa tra mortalità e quota procapite 2013 per regione di residenza ( $R^2 = 0.25$ , figura 2). Inoltre, è stata calcolata una correlazione negativa tra l'indice di svantaggio socio economico e quota procapite con minori risorse procapite assegnate alle regioni con maggiore svantaggio socio economico ( $R^2 = 0.45$ , figura 7).

L'attuale sistema di pesatura della popolazione solo per età non tiene conto delle disuguaglianze di salute presenti in Italia, ma attribuendo maggiori risorse procapite alle regioni con minore mortalità e maggiore vantaggio socio economico incrementa il divario di salute tra le diverse realtà italiane.

#### **Applicazione dell'età, mortalità e indicatore territoriale di fabbisogno (stato socio economico) come criteri di riparto del FSN**

La morbilità della popolazione, o in senso generico il suo stato di salute, dovrebbe essere la componente chiave per derivare le risorse sanitarie necessarie per le diverse popolazioni e aree geografiche. Tuttavia, in Italia, in comune con molti altri paesi, non esistono dati sufficientemente validi per rispondere a questa necessità. L'età, la

mortalità e l'indicatore territoriale di fabbisogno risultano quindi delle proxy dello stato di salute della popolazione. Di seguito sono indicate le modifiche proposte per il sistema di riparto del FSN:

*Ospedaliera:* attualmente nel riparto del FSN il 44% del fondo è allocato per questo livello di assistenza, il 50% di questo in base alla popolazione residente (popolazione non pesata) e il restante 50% in base alla popolazione pesata per età in base ai consumi (DRG). La proposta è pesare tutto il 44% del fondo destinato per questo livello di assistenza per i tre determinanti di salute: età, mortalità e indicatore territoriale di fabbisogno. Sono stati assegnati, in coerenza con la letteratura internazionale, i documenti della commissione europea e l'esperienza degli altri paesi pesi differenti ai tre fattori: 0.5 per l'età, 0.3 per la mortalità e 0.2 per indicatore territoriale di fabbisogno. La pesatura per età avviene, secondo la metodologia attuale, moltiplicando la popolazione per classe di età per i corrispondenti pesi derivati dall'analisi delle SDO. La pesatura per mortalità avviene moltiplicando la popolazione residente per SMR<75 anni corrispondente e la pesatura per indicatore territoriale avviene moltiplicando la popolazione residente per l'indice di svantaggio socio economico corrispondente.

*Specialistica:* attualmente nel riparto del FSN il 13.3% del fondo è allocato per questo livello di assistenza, in base alla popolazione residente pesata per età in base ai consumi (tessera sanitaria). In analogia con il livello di assistenza ospedaliero, la proposta è pesare tutto il 13.3% del fondo destinato per questo livello di assistenza per i tre determinanti di salute: età, mortalità e indicatore territoriale di fabbisogno. Sono stati utilizzati gli stessi pesi previsti per l'assistenza ospedaliera: 0.5 per l'età, 0.3 per la mortalità e 0.2 per gli indicatori territoriali di fabbisogno. La pesatura per età avviene secondo la metodologia attuale moltiplicando la popolazione per classe di età per i corrispondenti pesi derivati dall'analisi di consumi (tessera sanitaria). La pesatura per mortalità avviene moltiplicando la popolazione residente per SMR<75 anni corrispondente e la pesatura per indicatore territoriale di fabbisogno avviene

moltiplicando la popolazione residente per l'indice di svantaggio socio economico corrispondente.

#### **Applicazione e simulazione del riparto del FSN 2014**

In base ai criteri sopra definiti e alla metodologia descritta è stata effettuata una simulazione di riparto del FSN 2014. Per effettuare il riparto sono stati considerati i seguenti elementi:

- Popolazione residente per regione e classe di età al 01.01.2013
- Pesi specialistica ambulatoriale basati sui dati della tessera sanitaria anno 2010

Età	0	1 - 4	5 - 14	15 - 24	25 - 44	45 - 64	65 - 74	75+
Pesi	0.391	0.288	0.341	0.382	0.627	1.123	2.155	2.136

- Pesi ospedaliera basati sui dati delle schede di dimissione ospedaliera (SDO) anno 2009

Età	0	1 - 4	5 - 14	15 - 24	25 - 44	45 - 64	65 - 74	75+
Pesi	3.184	0.364	0.234	0.371	0.544	0.923	2.047	2.844

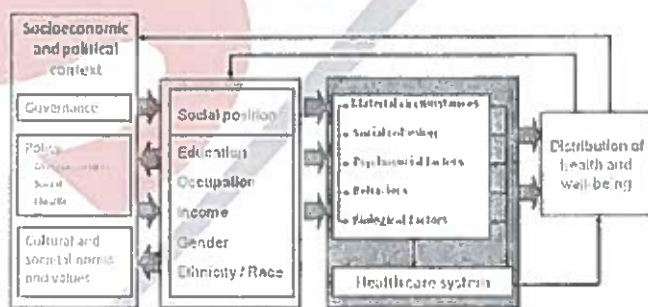
- Indice di mortalità SMR < 75 anni anno 2011.
- Indice di svantaggio socio economico anno 2011 calcolato secondo la metodologia sopra descritta.



Tabella 1

Regioni	SMR<75 anni	Percentuale istruzione non elevata	Tasso di occupazione	Reddito Medio	Indice svantaggio socio-economico
PIEMONTE	1.013	42.7	7.63	20.870	0.974
V D'AOSTA	1.064	48.3	5.25	21.260	0.976
LOMBARDIA	0.937	41.6	5.77	23.210	0.940
TOLZANO	0.881	46.3	3.34	21.200	0.958
TRENTO	0.851	34.2	4.46	20.300	0.930
VENETO	0.921	42.8	4.98	20.270	0.963
FRIULI	1.010	42.1	5.20	20.270	0.962
LIGURIA	1.053	37.1	6.29	21.000	0.945
EMILIA ROMAGNA	0.916	39.4	5.30	21.180	0.946
TOSCANA	0.907	45.0	6.47	20.100	0.982
UMBRIA	0.869	34.1	6.54	18.630	0.955
MARCHE	0.883	42.1	6.72	18.310	0.987
LAZIO	1.037	33.9	8.85	22.160	0.940
ABRUZZO	0.970	38.4	8.51	16.670	0.999
MOLISE	1.008	47.5	9.93	15.200	1.055
CAMPANIA	1.238	52.9	15.52	16.360	1.103
PUGLIA	0.976	54.1	13.12	15.390	1.100
BASILICATA	0.993	46.1	11.95	14.980	1.065
CALABRIA	1.040	48.4	12.73	14.230	1.086
SICILIA	1.112	53.2	14.38	15.600	1.104
SARDEGNA	1.055	53.5	13.52	16.840	1.088
ITALIA	1.000	44.3	8.41	19.660	1.000

Figura 1



Social determinants of health and health inequalities

Figura 2 - Mortalità e quota procapite per Regione anno 2013

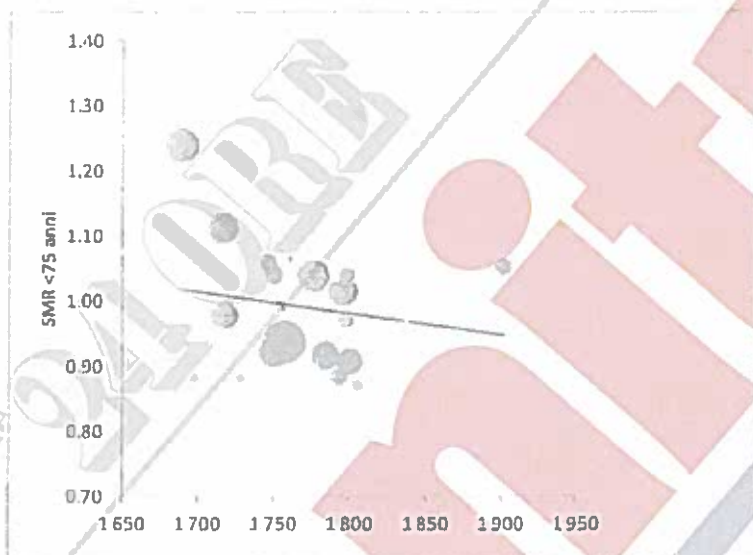
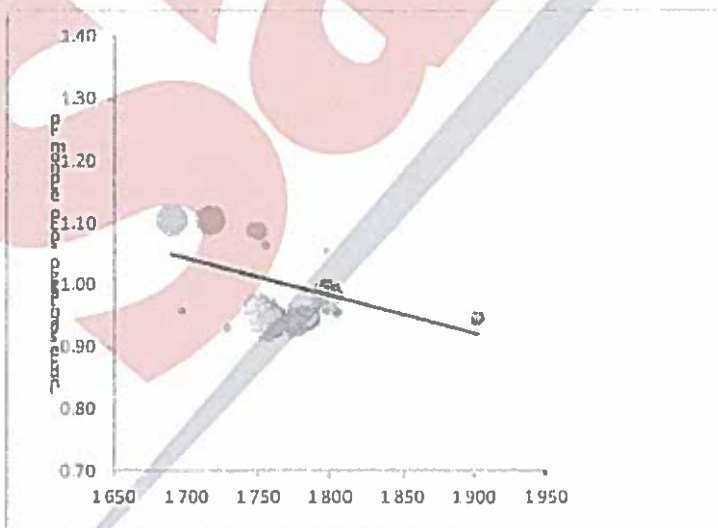


Figura 3 - Indice di svantaggio socio economico e quota procapite per Regione anno 2013



## Riferimenti

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Il Sole 24 ORE

Sanita

Reference # 1

E 2009.CZ

POLICY BRIEF 10

**How can health systems  
respond to population  
ageing?**

Bernd Rechel, Yvonne Doyle, Emily Grundy,  
Martin McKee



care expenditure in older age groups:

- the "costs of dying"
- the health care utilization rates of elderly people

However, this research needs to be seen in the context of overall lifetime expenditure. Evidence that health care expenditure is falling in older age groups is not inconsistent with an increase in overall lifetime expenditure. Furthermore, it is essential to differentiate costs of health care from those of social services and long-term care.

#### Costs of dying

Research on the so-called "costs of dying" shows that proximity of death is a more important predictor of health care expenditure than age itself. A large share of health care costs over the lifetime of an individual falls in the last year of life, particularly the last few weeks before death (62). The "costs of dying", however, are lower in the oldest age groups (63). For example, consumption of resources in English hospitals, measured as bed-days, is highest in those dying at the age of 45 years (64), and declines with each advancing decade over 65 years. In Australia it has been observed that those dying before the age of 75 consume more health care than those aged over 85 years (65). Older people tend to receive less intensive treatment than their younger counterparts at the end of their life (66), instead receiving more nursing and social care (56-67). There may be a number of reasons for this, including the view among some older people that they have already had a "good run" (68). However, there is also accumulating evidence of discrimination in allocation of more costly interventions based on age (69).

Despite this evidence, the costs of dying are often inappropriately attributed to ageing (70, 71). The high annual health care cost associated with older people is in large part the consequence of the fact that they are more likely to die within a year, that is, they are more likely to be close to dying than younger people. This is illustrated in Figure 4 which, using data from Finland, shows that the effect of dying accounts for an ever-increasing share of average costs by age, that is, around one third of total costs for persons aged over 95 are attributable to death-related costs.

This suggests that ageing may actually be associated with lower costs of dying. Furthermore, people who have been healthier in earlier life seem to consume fewer resources when they die (72, 73). However, a study using data from the United States Medicare Current Beneficiary Survey for the years 1992-1998 showed that while there are savings in postponing the last year of life, a longer lifespan also increases the probability of new and costly diseases arising, for example, Alzheimer's or cancer. The resulting expenditure may be greater than

## Reference # 2

urn:nbn:se:hhs:diva-1163 The possibility of predicting health care costs

<http://www.diva-portal.org/showRecord.jspx?pid=diva?371644>

Full-text not available in DIVA	
Author:	Ekman, Mattias (Stockholm School of Economics, Managerial Economics (C))
Title:	The possibility of predicting health care costs in the future from predicted changes in age structure and age-specific mortality: The case of Sweden
Department:	Stockholm School of Economics, Managerial Economics (C)
Publication type:	Manuscript (preprint) (Other academic)
Language:	English
URI:	<a href="http://urn:nbn:se:hhs:diva-1163">urn:nbn:se:hhs:diva-1163</a>
Permanent link:	<a href="http://urn.kb.se/resolve?urn:urn:nbn:se:hhs:diva-1163">http://urn.kb.se/resolve?urn:urn:nbn:se:hhs:diva-1163</a>
Subject category:	Economics and Business
SVEP category:	Business and economics
Keywords(en):	Ageing, mortality, age structure, health care expenditures
Abstract(en):	<p>In this paper, the possibility of predicting future health care costs from predicted changes in age structure and age-specific mortality is explored, based on data for the Swedish population. A linear relationship between age-specific mortality and agespecific health care costs is established for 1997. By combining this relationship with predictions of the future age structure and the future age-specific mortality rates, the Swedish health care costs in 2010 and 2030 are predicted. In order to test the validity of the method, the same methodology is applied retrospectively to data from 1985 in order to predict the health care costs in 1997. The results show that the method gives an underestimation of the actual costs. This should come as no surprise, since international research has shown that the age structure plays a relatively insignificant role for the level of health care expenditures. The most important factor for explaining differences in health care expenditures over time, and across countries, is the level of GDP per capita.</p>
In thesis:	Ekman, Mattias. Studies in health economics: modelling and data analysis of costs and survival. 2002.
Available from:	2010-11-22
Created:	2010-11-22
Last updated:	2011-06-07
Statistics:	17 hits

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## Reference # 3

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### Population Ageing and Health Care Expenditure

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#### Abstract

The WHO's most recent projections of the impact of population ageing on public expenditures suggest that health and long term care will account for about half of the increase in age-related social expenditures between 2000 and 2050. Projections of health care spending are subject, however, to more uncertainties than projections of pension expenditure. Making reliable forecasts of the magnitude of demographic change on national health expenditure is clearly important. This paper reviews the evolution of research in this area, examines evidence from recent work, and considers the implications of this work for health care policy and future research.

#### Background

The increasing number and proportion of people over the age of 65 in many countries of the world is paralleled by increasing concern over the impact of this trend on public expenditures. The OECD's most recent projections suggest that, in industrial countries with available information, population ageing will create a rise in age-related social expenditures from an average of under 10% of Gross Domestic Product (GDP) to almost 20% of GDP by 2050, with old-age pension payments and expenditure on health care and long term care each responsible for approximately half of this increase (Dang, Argente, & Orley, 2004). And as that study noted, projections of health care spending are considerably more uncertain than for pension expenditure, whereas current pension legislation provides at least a framework for estimating future benefits, there are no such rules for estimating future demand for and supply of health care. In addition, it is not clear exactly which demographic features have the strongest effect on health care spending: cases (as opposed to the number of people over a certain age), the number with given levels of disability or ill-health, and the number in the final years of their lives.

Partly in consequence of this uncertainty, methods of projecting the impact of demographic change onto health care spending vary substantially. Most projections have traditionally calculated per capita health care expenditure per capita by different age (or age and sex) groups, and then multiplied through by the projected number of people in each age group. However, a number of recent commentators have questioned this approach, suggesting that health care expenditure is driven more by the proximity of an individual to death than by their age per se.

Making reliable forecasts of the impact of demographic change on national health expenditure is clearly vitally important. So here I review the evolution of research in this area, then examine evidence from recent work, and conclude by considering the implications of this research for health care policy and for future research.

#### Ageing populations and health expenditure: the evolution of research

One of the earliest serious attempts to estimate the impact of demographic change on health care was made by Abel-Smith and Tomasson in 1950 as part of Appendix 1 of their study of NHS costs undertaken on behalf of the Chancellor



and colleagues have attempted to do this recently, using data from the US 1992-1998 Medicare Current Beneficiary Survey, which allowed them to classify individuals according to their functional status (whether or not they were institutionalized), and their self-reported health. They were also able to estimate the relation of health status at 70 years of age to anticipated life expectancy (using life tables) and to measure cumulative health care expenditures from the age of 70 until death for those individuals who died during the study period (Lubitz *et al.*, 2003). Not surprisingly, they found that elderly persons in better health had a longer life expectancy than those in poorer health, but they also found that cumulative health care expenditures up to death were similar. For example, a person with no functional limitation at 70 years of age had a life expectancy of 14.3 years and expected cumulative health care expenditures of about 126,000 US dollars (in 1998 dollars), whereas a person with a limitation in at least one activity of daily living had a life expectancy of 11.6 years and expected cumulative expenditures of about 133,000 dollars. These results suggested that improvements in healthy life expectancy might not necessarily mean health expenditures.

#### Implications for health care policy and future research

As a result of the substantial research that is sketched above, a much clearer picture is beginning to emerge of the relationship between ageing populations and health expenditure. The most clear lesson is that the widely held belief that there is a mechanistic relationship between an ageing population, annual growth in the demand for health care and in national health spending is incorrect. In a recent essay reviewing existing literature and reporting new results, Reinhardt has indeed claimed that this is a myth (Reinhardt, 2003). This is in large part because the question of inter-specific age is not a particularly good predictor of health expenditures, and since its projection (see 4 in age-specific health expan-

sure) will also tend to be misleading.

The second lesson is that the US data quite convincingly demonstrate that a substantial portion of health care expenditure is for chronic conditions, and that such costs are incorporated into projections of future health spending. This is indeed a question that is particularly relevant.

It is also clear that one to three is not the measure of health status. Of course at the individual level, need to design systems to provide. However, at the population level, even such measures of health status (such as functional independence and disability) allow a much clearer insight into the factors explaining demand for health care. There is evidence from studies from the work of Kenneth Manton and colleagues (Manton, Steplars, & Connor, 1998) that disability is in fact declining in at least the US elderly population, and this may not just lessen the upward pressure of demographic change on health expenditure, but may result in longer health life expectancy and potentially lower per capita demands on health and social services (Singer & Manton, 1993).

It is also important to bear in mind that changes in demographic structure and in health status are only part of a much larger set of influences on future health expenditure. As other commentators have recently pointed out, the future needs for long-term care cannot be projected in the same way as health care (Joffe & Fuchsman, 2002). In addition, there are likely to be continuing technical advances in the health care interventions available and in the methods for delivering them. Demographic change will also affect the health care work force, which is typically one of the largest national developed countries, and this will in turn affect the way in which care is delivered. And finally, expenditure on health care and long-term care is mainly paid out of out-of-pocket payments, out-of-pocket income and individual spending. The topic for future research is therefore continuing to expand.

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Reference # 4

# EUROPEAN ECONOMY

Economic Papers 417 | July 2010



**Projecting future health care expenditure at European level:  
drivers, methodology and main results**

Bartosz Przywara



### 3.5 Death-related costs

Another approach offering an alternative explanation of the differences in health care spending across age cohorts is linked to the existence of so-called death-related costs. As available data suggests, a primary factor behind the increase in costs as people become older is not the age itself, but the nearness of death. As shown in many studies, the largest part of life-long health care costs is borne in the ultimate period of a person's life, in the last few years or even months before one's death. According to this hypothesis, health expenditure on older age groups is high, not so much because their morbidity or disability rates are higher, but because a larger percentage of the persons in those age cohorts die within a short period of time.

There is a growing stock of empirical research analysing and quantifying the impact of these 'death-related costs'. The first to find a positive relationship between health care costs and the remaining time to death were Roos et al. (1987). Their findings were confirmed by a number of further studies by e.g. Lubitz and Filey (1993), Cutler and Meara (1999), Zweifel et al. (1999), Semp-Hansen et al. (2002), Baijjan and Lagergren (2004)<sup>21</sup>.

The time 'close to death' is defined differently in different studies. In most cases, the analysis covers only the last one or two years of life. Some authors, e.g. Zweifel et al. (1999) and Caisse Nationale (2003), argue that the correlation between time to death and health care spending exists only during the last two years of life and practically disappears once the time span broadens to three or more years from the moment of death. Such an assumption is rejected, however, by Baijjan and Lagergren (2004), who investigate impact on health care and long-term care spending further away from the moment of death. According to their findings, the impact, although much weaker, exists even up to six years before death.

Cutler and Meara (1999), Zweifel et al. (1999) and Steinmann et al. (2005), using respectively US and Swiss data, argue that, controlling for health status and proximity to death, age itself does not have an effect on health care spending. Instead, there is a transmission mechanism in which the intermediate variable between the age and health care consumption is health status (higher morbidity and disability incidence at higher ages) and proximity to death.

Another question refers to the pattern according to which death-related costs change with age of a person. The hypothesis of the constancy of per capita costs over the lifespan can be explained in the following way. While the medical treatment to save a young person's life is on average much more costly than the treatment needed to save an older person, many more young people die in accidents which impose little or no costs for health services. Therefore, the two effects may offset each other, at least partially.

However, this hypothesis has been challenged by many authors. Seshamani and Gray (2004a), using the British data, indicate that the age does matter, although do not question the importance of proximity to death as an explanatory variable for increase in health care spending. Brockmann (2002) strongly supports this critique, arguing that in Germany hospital care expenses on the elderly decrease significantly with age and the expenditure curve for non-surviving patients drops almost linearly until it flattens out at the highest ages. Furthermore, most available studies on European data agree on the direction of the evolution of the ratio of costs borne by a decedent and those borne by a survivor over the lifespan.

<sup>21</sup> A good overview of the existing empirical studies is provided in Kaifano (2006).

Although Madsen (2004), Busse et al. (2002), Ahn et al. (2005), Gabriele et al. (2005), Raedel et al. (2002) vary significantly in relation to the nominal value of the ratio, they all agree that it increases sharply from birth to the age of 10-20 when it reaches its peak and gradually falls thereafter to approach 1 at the highest ages for which data exist. Finally, Lubitz and Riley (1993) agree that the ratio decreases with age for the elderly (65+)<sup>24</sup>, but find no conclusive evidence as far as the whole lifespan is concerned. These observations, confirmed also by Grignon (2003) using French data and Levinsky et al. (2001) using US data, may be explained by three phenomena:

- health care rationing done by doctors, for either utilitarian (devoting limited resources on the treatment of younger age cohorts) or professional reasons (e.g. less knowledge about the treatment of the elderly, the higher probability of death among older patients);
- voluntary restraining from receiving health care by older people who find the investment in health will not pay back any more;
- generation effect which reflects differences in perceived needs, mentality and habits between older and younger generations.

Another key question is whether this ratio changes over time, but it remains unanswered, mostly due to the lack of longer time series needed for reliable intertemporal comparisons. Most researchers (e.g. Lubitz and Riley 1993, Garber et al. 1998) argue that the ratio remains broadly constant for each age group respectively. However, others, like Zweifel et al. (1999) show evidence of its strong decreasing trend over time.

Overall, the literature indicates that the higher share of a gender/age group is in its terminal period of life, the higher is its average health care and long-term care expenditure. This is an important conclusion for the possible consequences of population ageing on health care and long-term care costs.

The inclusion of death-related costs in calculating health care expenditure deserves a special consideration in the context of the ageing population. The rationale behind it stems from the fact that the last years of life, irrespective of how long people live, are associated with high health care costs, but as population ages the share of those in terminal phase of their life gets smaller and smaller in each age cohort. Consequently, the effect of ageing on spending is smoothed as decline in the number of people who, in a given age group, have few remaining years of life results in the fall in average health care cost for all age groups, except for the oldest age cohorts.<sup>25</sup>

<sup>24</sup> The opposite conclusion is drawn by Pouta et al. (1987). Using Canadian data, they conclude that total health costs among decedents increase with age. This result is probably due the data sources used which cover not only acute care and visits to physicians, but also stays in the nursing homes, which as an element of long-term care is very closely correlated with age.

<sup>25</sup> This observation shows that the proposed method is theoretically consistent with *dynamic equilibrium hypothesis*, according to which falling mortality rate (and thus growing life expectancy) for each age cohort is associated with a parallel decline in morbidity/disability rate, which results in a fall in health care spending in each age cohort.

#### Box 2 Death-related costs – empirical data

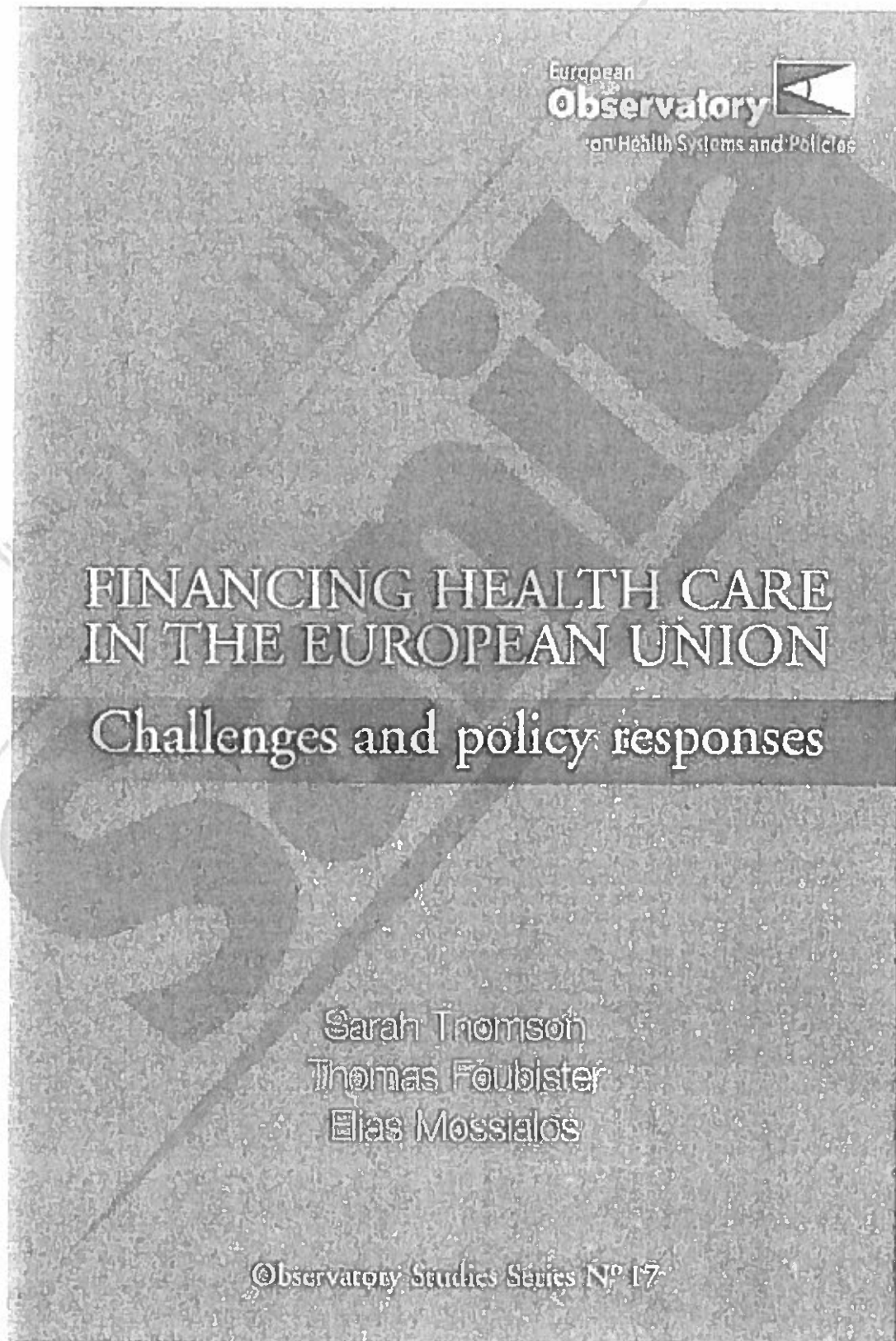
To quantify the significance of death related costs, data is needed on the difference in health care costs borne by decedents (people who are going to die within a predefined short period of time) and survivors (people who are not in their terminal phase of life). As mentioned above, some data are available in the academic studies, but only at the national or regional level. Unfortunately, given the lack of common methodology there are considerable differences between the datasets as regards technique of measurement, the degree of precision, sample size, time and space coverage, definition of decedent and survivor status, and other characteristics. Moreover, no study provides an estimate of death-related costs covering total health care spending (inpatient care + outpatient care + day care + home care). Instead, most studies provide data only on inpatient hospital care expenditure per capita which is then taken as a proxy for total health care expenditure per capita.

To address high risk of incomparability of the data gathered from academic sources, Member States gathered in the Ageing Working Group were asked to provide data on death-related costs available in their official databases. Thirteen Member States provided the data, whose general characteristics for males and females respectively are summarised in Table 4 and Table 5. In particular, it shows the ratio of spending on a person of a particular age who dies within one year compared with a person who survives that period. For example, spending on health care provided to an average male child aged 0-4 who dies within a particular year is on average 25.9 times higher compared with an average child of the same age who survives.

There appears to be a clear pattern of decline in the ratio of spending on decedents to survivors with age. Moreover, while the ratios diverge widely across countries at younger age cohorts, there is less dispersion amongst older age cohorts where most deaths occur. However, due to different methodologies of data gathering, calculation (e.g. ratio of decedents to survivors differs when calculated on the basis of per capita and per patient spending) and coverage (e.g. either only hospital patients or also other cases taken into account), the data varies significantly across the Member States. For example, Spain and Austria appear to be outliers for both males and females across all age cohorts, with a respectively much lower and higher ratio compared with other countries.<sup>24</sup>

<sup>24</sup> The Spanish case provides an example of how sensitive are the results to changes in the methodology of calculating death-related costs. The ratio used in the projections (ranging from around 7 for the age cohorts 5-9 to 1.3 for the 80+) is calculated by dividing per patient cost of decedents (patients) by the per patient cost of survivors (patients). Meanwhile, using a different methodology of dividing the per discharge cost of decedent (discharges) by the per capita cost of survival discharges, gives extremely different results, ranging from 228 for age cohort 10-14 to 7 for the 80+. Slightly different is the case of Austria. Given lack of precise information about costs borne by people dying outside hospitals, Austrian statistics include two sets of data according to two opposite (extreme) assumptions: in the first case deaths occurring outside hospitals are assumed not to generate any costs at all, while in the second case death cases outside hospitals are assumed to cause the same costs as those in hospitals. The ratio of costs borne by decedents to those of survivors shows similar decreasing pattern with age, but differs significantly in value between the two situations: while in the first dataset it ranges from 74.2 for age cohort 10-14 to 3.1 for the 85+, in the second dataset it amounts to 121.5 for the aged 10-14 and 7.3 for the 85+.

Reference # 5



**Keywords:**

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Table 2.3 *Contd.*

Country	Market structure	Pools (no)	Purchasers (no)	Risk-adjusted (re-allocation) (risk factors)
FR	Coexisting local, regional and pooling. Most are subject to regional purchasers. No national purchaser. 2000-2001	Minor pools (414)	Major pools (414)	Central Government allocates subsidies to municipalities based on capitation adjusted for age, smoking, employment and morbidity, with some additional criteria for chronic diseases and rehabilitation in hospitals. Subsidies account for 25% of municipal health care costs.
FR	Central pooling on any pooling. From 2001 pooling was national purchaser	National (1)	Health insurance schemes (3)	Allocation to health insurance schemes is based on capitation adjusted for age and sex, plus a 15% additional allocation to the population.
DE	Competing funds collect pool and purchase	Funds (200)	Funds (200)	Differences in competition rates help to varying income levels and expenditure are equalized via adjustment for age, sex, disability (10% of a fund's total cost) from 2000 funds will be pooled centrally and allocated based on capitation adjusted for age, sex and marital risk.
ES	Mostly all funds pool with competing countrywide-based funds collect pool and purchase	Mutual Funds (36)	Health insurers (30)	No
NO	Central pooling and pooling. Single fund purchaser	National (1)	National (1)	No
IE	Central pooling and pooling. Single purchaser. No pooling or regional pool	National (1)	Health insurance purchasers (1)	No
IT	Central and pooling. No competing funds or purchasers.	Regions (16)	Regional health insurers (16)	National authority has responsibility for allocations to the purchaser of regional population. Central has responsibility for capital and non-capital care costs.

Table 2.3 (cont.)

Country	Market structure	Pools (no)	Purchasers (no)	Risk-adjusted (re-allocation) (risk factors)
LV	Central collection and pooling, non-competing for desirable funds and private	National (1)	Regional funds (4)	Regional health care and health insurance, social security, regional health care and health insurance, social security
LT	Single health care pools and purchasers	National (1)	Regional funds (4)	Regional health care and health insurance, social security
LU	Central collection and pooling, non-competing for desirable funds and private	National (1)	Funds (6)	The French health insurance funds are risk factors because the health care insurance is not on a for-profit structure of funds
LI	Central collection and pooling, competing for desirable private	National (1)	Funds (15)	Age-adjusted basis, demographic adjusted for age, sex (the risk of age is through major insurance, although
LT	Central collection, pooling and with funds. No purchaser-poolable	Subtotal (1)	MSH (1)	no
PL	Central collection and pooling, single fund purchaser	Subtotal (1)	National funds (1)	no
PT	Central collection and pooling, non-competing for desirable private	National (1)	Regional and national insurers (2)	Multi-risk factors for age and sex. Regional primary care funds as part of national insurance funds, but competition does not exist for age, sex and other health risks based on the regional premium in type of insurance, areas and activities
SK	Central collection and pooling, non-competing for desirable funds and private funds purchaser	National (1)	National funds (2)	Age-adjusted basis, demographic adjusted for age, sex, gender, family size, education, occupation, region, and other factors
SI	Single fund collector, pooled purchaser	National (1)	Fund (1)	no

**Table 2.3 Contd**

Country	Market structure	Pools (no)	Purchasers (no)	Risk-adjusted (re-)allocation (risk factors)
SK	Compulsory funds collect, pool and purchase	Funds (8)	Funds (6)	85% of total purchasers are allocated a risk-adjusted risk adjustment factor.
ES	Central and local collection and pooling. Non-compulsory territorial purchasers. Some purchaser-provider splits.	Regions (17) and funds (3)	Regions (17) Funds (3)	Central Government allocates to the regions and the regions allocate to the population. 85% of the 'insured' have contributions to their funds financed by central Government (70%) and co-payments (15%). 10% co-pay 95% of the publicly insured expenditure on services. Funds cover 87%.
SE	Central and local collection and pooling. Non-compulsory territorial purchasers. Some purchaser-provider splits.	Counties (21) Municipalities (250)	Counties (21) Municipalities (250)	Central Government adjusts all around based on differences in average per capita health care costs plus age, sex, civil status, occupation, income, housing and groups with a high concentration of people with diseases.
UK-ENG	Central collection and pooling, non-compulsory for local purchasers.	National (1)	PCGs (157)	Department of Health allocates to PCGs based on an adjusted capitation formula.

Source: European Observatory on Health Systems and Policies/WHO Systems in transition series reports. Adapted with permission from World Bank (2007). Ministry of Health, MEX. Ministry of Health, MEX. Ministry of Health, MEX. Ministry of Health, MEX. Ministry of Health, MEX.

Reference # 6

TOWARDS  
THE  
DEVELOPMENT  
OF A  
RESOURCE  
ALLOCATION MODEL  
FOR PRIMARY,  
CONTINUING AND  
COMMUNITY CARE  
IN THE HEALTH SERVICES

Volume 1

Executive Summary

## 2. Review of resource allocation models used in other countries

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The different models used in other countries aim to distribute resources based on the relative needs of those countries' populations. The major differences between the models lie in how needs are defined and the data used to describe those needs, and also whether resources are allocated on an individual or small area basis. More detail on each of these models, and references for further reading, are provided in *Towards the Development of a Resource Allocation Model for Primary, Continuing and Community Care in the Health Services: Volume 2, Technical Report*.

### 2.1 England

Since 1977 the English NHS has used a weighted capitation formula to determine target shares of available revenue resources between NHS areas. With this formula, the budget for an area is based on its share of the English population and this is then weighted in order to take account of that population's needs for healthcare services, relative to other areas of England. The weightings adjust for age distribution, additional need over and above that relating to age and unavoidable cost in the provision of services. GP registers are used to define the populations within each small area, as well as other residents for whom national data is available. Measures of indirect need are employed, including utilisation of health services, socio-economic characteristics, health status and measures of the existing supply of health services. A separate formula is used to address health inequalities: this is based on disability free life expectancy.

### 2.2 Scotland

Scotland also uses a capitation system where the main determinant of resource allocation is population size, and where the intention is to minimise the impact of the extreme differences in population size between urban and rural health boards. The main objective of the Scottish model is to ensure that health funding is distributed on the basis of geographical pattern of health need. The data for populations within each health area are adjusted to take account of age and gender, morbidity and life circumstances, and unavoidable costs due to the remoteness of their home location. Postal-coded patient data from Censuses were used in the model to describe the population. A restricted number of important indirect need indicators were used, and were combined to create a composite, because the use of a large number of proxy need indicators had resulted in instability in subsequent outcomes.

### 2.3 Wales

Resource allocation in Wales was reviewed in 2001. This resulted in the introduction of a model that was based on measures of direct need, and was designed to improve overall health and reduce health inequalities. This novel approach involved an initial budget allocation to the various areas of service provision, followed by distribution within each small health area according to objectively measured levels of need. Estimates of direct health needs were based on a series of health condition indicators, which were developed from epidemiological and service-level data.

### 2.4 Northern Ireland

In Northern Ireland, a capitation formula is used to allocate resources according to population size, age and gender, estimates of additional needs of the population, and a special cost factor reflecting the impact of providing services to rural populations. Population and needs estimates are based on small area level and are defined by electoral boundaries. Each area budget is then divided into several care groups which are weighted according to age, gender and population need.

## 2.5 Sweden

Healthcare in Sweden is funded and managed at local, regional and county level. There are several different systems in operation across Sweden's 26 counties. In the early 1990s, market-style reforms were introduced by many Swedish councils. The Stockholm model is one example where individual-level data is applied using a unique personal identification number. This system provides actual costs of healthcare expenditure for each individual in the catchment population. Therefore, utilisation data can be linked to several socio-economic indicators, and this results in funds being allocated to those populations that are considered to be most in need.

## 2.6 Portugal

The Portuguese healthcare system is similar to the Irish one in that it is characterised by a public/private mix of healthcare finance and provision. In 2003, a capitation model was developed; this was adapted from the English model, and used census data to calculate population estimates. The Portuguese model includes population data at a district level. Needs estimates are based on diagnosis-related groups, adjusted for age and gender. Additional need is based on age-specific SMRs, potential years of life lost, and the Relative Mortality Index.

## 2.7 New South Wales

New South Wales is currently the only state in Australia that uses an explicit resource allocation system called the Resource Distribution Formula. Using a capitation model, the annual budget is first distributed among nine healthcare programmes, and is then distributed among the 17 area health services. The population of each area is weighted by age and gender, and adjustments are also made for people of Aboriginal origin, for people who are homeless, for private hospital care and also for rurality. Needs are estimated using a generic needs indicator which is derived from a formula that includes SMR, an index of educational/occupational status and a rurality index.

## 2.8 New Zealand

New Zealand uses a population-based funding formula that determines the share of funding to be allocated to different districts nationwide, and is based on the number of people living in each district. The projected population of each District Health Board is adjusted according to the national average cost of the health and disability support services used by different demographic groups. Service-based costs are weighted by age, gender, ethnicity and a deprivation index. An additional weighting is included for unmet needs; this aims to reduce disparities between population groups. Adjustments are also made for rurality and for overseas visitors.

## 2.9 Lessons from abroad

There is no single correct way to allocate resources, and there is no perfect model. What is required is a model that is comprehensible to non-specialists, and is acceptable to practitioners, politicians and the general public. It must also be flexible and robust in the sense that small changes in the model, and also in the data, will lead to small changes in resource allocation. In every system examined certain resources are excluded from allocation – usually resources for which the unit cost is very high.

**Reference # 7**

THE UNIVERSITY *of York*  
CENTRE FOR HEALTH ECONOMICS

**Approaches to Capitation and  
Risk Adjustment in Health Care:  
An International Survey**

*Nigel Rice  
Peter Smith*

**October 1999**

## 5. SUMMARY AND RECOMMENDATIONS

Capitation is without doubt here to stay. There is a remarkable degree of unanimity that – whatever the structure of the health care system – a policy of cost containment and devolved responsibility for health care entails the need to set prospective budgets on the basis of capitations. The question is therefore not whether to set capitations, but how to do so.

To some extent the preoccupations of capitation schemes will be determined by the health care systems they seek to serve. For example, systems with a competitive insurance market have the principal objective of minimizing cream-skimming, and must focus on the

individual, while systems with captive insurance markets tend to be concerned more with avoiding perverse incentives at a population level. Thus use of prior utilization data may be considered appropriate in the first type of system but unacceptable in the second.

The experience summarized in Table 1 indicates that there exists a wide variety of approaches to setting capitations. To a large extent the systems in use have been chosen on the basis of expediency, most notably in being strongly conditioned by the nature of the data available to policy makers. Thus many schemes have been constrained to the use of crude age and sex adjustments, in the full knowledge that such data are woefully inadequate, but that they are all that are available, and are better than nothing.

Our initial reflections on the proposed equity criterion indicate that the general framework for setting capitations is unlikely to be greatly affected by any change, although there will clearly need to be extensive examination of what constitutes a vulnerable population group, how its additional expenditure needs can be calculated, and what mechanisms should be put in place to ensure any additional funds are spent on that population. However, the change of equity criterion would clearly shift the research priorities of ministers, and the above recommendations should now be viewed within the context of such a change.

The optimal solution towards making capitations operational depends on reconciling a number of objectives, amongst which might be included:

- To further society's objectives for health care.
- To seek to make capitations as sensitive as possible to legitimate health needs factors.
- To seek to make capitations as independent as possible from illegitimate factors.
- To maximize the availability of good quality data on which the capitations can be based.
- To minimize the dysfunctional incentives introduced by capitations.
- To lower expectations as to the solutions that capitations can offer.
- To design health care systems that are impervious to the limitations of capitation schemes.
- To minimize the costs of administering the capitation scheme.

Addressing successfully all of these issues is a demanding task. The schemes reviewed here offer a wide spectrum of experience and lessons. It is clear that none can in any sense be held up as a model, and that the most appropriate approach is likely to be heavily dependent on the institutional framework within which capitation must operate. We nevertheless believe that the accumulated experience reported here is likely to offer almost all designers of capitation schemes considerable food for thought.



# Reference # 8

Ethicals

## Formula fever: allocating resources in the NHS

Simple formulas weighted for standardised mortality ratios may still work best

A new set of weighted population formulas are being used for allocating resources to health service providers. Since the 1970s the NHS has used formulas to provide a more equitable allocation of resources for hospital and community care. The Resource Allocation Working Party (RAWP) recommended that cash should be distributed on the basis of the size and age (or distribution) of an area's population, taking into account relative health care needs as indicated by its standardised mortality ratio. This highlighted the fact that the regions in the south of England were receiving more than their fair share of resources and required a greater contribution to the poorer and sicker north.

In the 1980s regression analysis was used to estimate the influence of geographical socioeconomic factors on health care use. Rawat's research at York University used more statistically appropriate formulas which also adjust prior for the effect of other forms of supply and consider income inequality rather than just age. The resulting indices of need for acute and specialist health services are more sensitive to the influence of socioeconomic factors and that they have implemented would have redistributed resources from richer to poorer districts. However, the previous government decided to allocate only around 20% of the cash using these new weights. Most of the community health services budget was excluded on the pretext that the research was based on hospital episodes, community health service data are not routinely recorded. The decision not to weight the community health services budget according to need reinforced the 'spare mechanical system'.<sup>1</sup> The effect was to dampen the redistributive effects of the York formula, resulting in lower care for poorer districts.<sup>2</sup>

The then Secretary of State was pressured into commissioning research on weighting community health needs by Professor the Lord Kingham and colleagues report the results of part of this research in 1993.<sup>3</sup> Along with other research on the use of community health services,<sup>4</sup> and a number of the major forces factor which takes into account geographical differences in the cost of providing care, this research is now used to allocate NHS cash to health authorities.<sup>5</sup>

The methods used are excessively crude, because of the general lack of good data and the dependence on a few providers for records of community health needs. The results are particularly important, however, for two reasons. First, they confirm that the government was indeed wrong to exclude community health services from needs weighting in the past two years. The results of the individual programmes and for all the community services aggregated, the correlation between the production of the new formulas and the 'raw' index is over 90%.<sup>6</sup> Secondly, the results again show the importance of the standardised mortality ratio. This measure summarises the cumulative social and health experience of people living in an area and is a sensitive indicator of general health care needs<sup>7</sup>

and a powerful predictor of community health care needs. It identifies over other variables which are derived from the census, that it is available directly on a standardised basis not negotiable.

The empirical work over the past years seems to have validated the original idea of the Resource Allocation Working Party to use a measure of the death rate as an indicator of relative need. There are no simple, reliable indicators of health care need, and no better has sophisticated econometric research based on the use of services made to date regarding the effect of poverty, because the underlying variables to which it is assessing health services. Because of this, a similar result could be produced by having a formula simply on population size and age, weighted by the under 75 year standardised mortality ratio.<sup>8</sup> This would be simpler and more transparent than combining the results of 10 different but tightly correlated instruments.<sup>9</sup>

We have become obsessed with the production of ever more refined empirically based formulas. The marginal increase in NHS equity resulting from these compared with formulas based on standardised mortality ratios is probably very small. Formula fever has distorted attention from the more important issue of how to allocated resources are spent. Health authorities and general practitioners should focus their attention on whether current spending policies are really seriously producing inequalities<sup>10</sup> and, if so, doing something about it at a local level.<sup>11</sup>

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Reference # 9

THE UNIVERSITY *of York*  
CENTRE FOR HEALTH ECONOMICS  
DEPARTMENT OF ECONOMICS AND RELATED STUDIES  
NHS CENTRE FOR REVIEWS AND DISSEMINATION  
YORK HEALTH ECONOMICS CONSORTIUM

**A Formula for Distributing  
NHS Revenues Based on Small  
Area Use of Hospital Beds**

Roy A. Carr-Hill  
Geoffrey Hardman  
Stephen Martin  
Suzanne Peacock  
Frederic A. Sheldon  
Peter Smith

The SMR has long been established as an important variable in explaining variations in health care resource use. It reflects the cumulative morbidity and social experience of an area and provides a more stable, unbiased and comprehensive measure of morbidity than most measures of utilization. By way of illustration, Table 4.1 shows the correlations of a variety of ward-based SMRs with some selected socio-economic variables. Note the high correlations of all variables with SMRs for ages up to 75, and the relatively low correlations for the 75+ age group. It has been well established that mortality rates are highly correlated with the incidence of chronic diseases which are known to justify health service intervention (Mays & Bevan, 1987). Furthermore, the dying are amongst the heaviest users of services. A US study has indicated that as much as 28% of Medicare expenditure is spent on those in the last year of life (Lubitz and Prihoda, 1982). In the UK, it is not possible to get comparative estimates for individuals, but 23% of non-psychiatric beds were occupied by people who died before discharge in England and Wales in 1984 (Sheldon, Davey Smith and Bevan, 1993). Hence variations in mortality not only indicate variations in morbidity, but also variations in the great need for services caring for those with conditions associated with a high number of fatalities.

**Reference # 10**

A CONCEPTUAL  
FRAMEWORK FOR  
ACTION ON THE SOCIAL  
DETERMINANTS OF  
HEALTH

World Health Organization  
Geneva  
2010

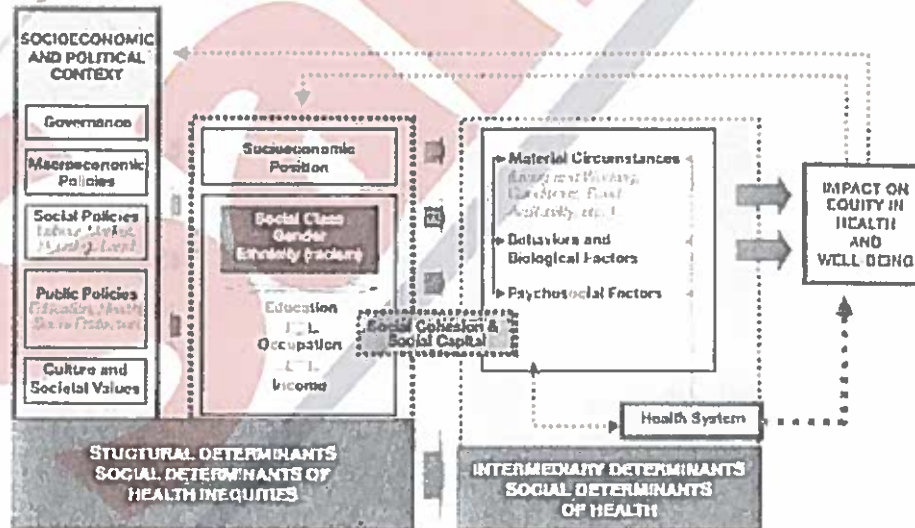
The first set of main structural factors and their proxy indicators include: Income, Education, Occupation, Social Class, Gender, Race/ethnicity.

Together context, structural mechanisms and the resultant socio-economic position of individuals are "structural determinants" and in effect it is these determinants we refer to as the "social determinants of health inequities." The underlying social determinants of health inequities operate through a set of intermediary determinants of health to shape health outcomes. The vocabulary of "structural determinants" and "intermediary determinants" underscores the causal priority of the structural factors. The main categories of intermediary determinants of health are: material circumstances, psychosocial circumstances, behavioral and/or biological factors and the health system itself as a social determinant.

- Material circumstances include factors such as housing and neighborhood quality, consumption potential (e.g. the financial means to buy healthy food, warm clothing, etc.) and the physical work environment.
- Psychosocial circumstances include psychosocial stressors, stressful living circumstances and relationships and social support and coping styles (or the lack thereof).
- Behavioral and biological factors include nutrition, physical activity, tobacco consumption, and alcohol consumption, which are distributed differently among different social groups. Biological factors also include genetic factors.

The CSDH framework departs from many previous models by conceptualizing the health system itself as a social determinant of health (SDH). The role of the health system becomes particularly relevant through the issue of access, which incorporates differences in exposure and vulnerability, and through intersectional action led from within the health sector. The health system plays an important role in mediating the differential consequences of illness in people's lives.

Figure A. Final form of the CSDH conceptual framework



Reference # 11



Anno 2013



### 3.9. Summary of evidence that has become available since 2006 on the relationship between social and health inequalities in the EU

In 2008, the WHO CSDH (1) concluded that social inequalities in health arise because of inequalities in the conditions of daily life and the fundamental drivers that give rise to them. The range of interacting factors that shape health and well-being include: material circumstances, the social environment, psychosocial factors, behaviours and biological factors. In turn, these factors are influenced by social position, itself shaped by education, occupation, income, gender, ethnicity and race. All these influences are affected by the socio-political and cultural and social context in which they sit (11).

A loose summary of this is the 'causes of poor health'. In recent decades much public health activity has focused on proximate causes of ill health, in relation to chronic disease, the 'lifestyle' aspects of lifestyle: smoking, diet, alcohol consumption, physical activity.

The CSDH perspective is that a very important contribution to the causes of these lifestyle causes of poor health resides in the broader social and political context. These causes start with the societies in which individuals, families and communities are located as they grow and develop. These societal-level factors and the macro processes operating on them influence the exposure of men, women and children to health-damaging and health-promoting conditions through the life course – from pregnancy and early years development, through educational experiences, relationship to the labour market and income levels during normal working ages and into later years. The influences that operate at each stage of the life course can either change the odds of being exposed to harmful or beneficial exposures, the level of exposure or help people beat the odds when exposed (11).

The political and historical situation in a country, its policies and practices, the cultural and social norms of a society and its government, at every level, set the context in which the social determinants operate and hence are potentially amenable to change. They vary across countries and societies. If correctly channelled, changes in policies, practices and norms can lead to reductions in health inequalities and improvements in health for all in a country, as well as greater community cohesion and well-being. If not, they can lead to widening inequalities and worse health and well-being. A social determinants framework provides an essential underpinning to considering policies aimed at taking action on these major causes of health inequalities within and between countries in Section 4.

When this review examined life expectancy in regions within EU Member States in relation to income levels, a difference of about 2 years in life expectancy at age 50 was identified between the poorest and the richest regions for Member States that joined the EU relatively recently, and a 1 year difference for Member States that joined the EU before 2004, a result at least reported here to be correlated with levels of social protection.

A number of other key socio-economic determinants also varied across EU Member States, namely: the size of the welfare state, income distribution and unemployment levels (2).



particular concern for health is the causal or contributory unemployment, the association with education levels at lower secondary level or below and those suffering material deprivation. Variability between Member States was also identified in correlates and behaviours such as the proportions smoking, overweight or obese.

To examine the extent of social inequalities in mortality across the EU, two analyses are presented in this section. The first was based on the responses to the EU-SILC self-perceived health status questions that enquire about general health and longstanding ailments (see Annex 1), the second on EU Member States for which mortality data are available by educational level.

The 2010 results show that whichever indicator of socio-economic status is considered – education, income or material deprivation – reporting of poor or very poor general health and longstanding health problems tends to be infrequent in the most advantaged group and increasingly common as disadvantage worsens. The steepest gradients and most linear relationships were those between material deprivation and adverse health outcomes.

The analysis of mortality in 2000-09 by educational level indicated that education gradients in life expectancy existed in all 14 Member States, but that they vary by sex, age and the overall level of survival. The steepest social gradients were those for male life expectancy at age 25 in Estonia, Czech Republic, Hungary, Bulgaria and Finland – countries with some of the highest levels of mortality in the EU.

The evidence synthesis of longitudinal observational studies also confirms Mackenbach's (14) earlier 2007 report: it shows that, 5 years on, health inequalities are still found in all EU Member States. Indeed, the reviewed studies which compared changes over time found more as well as health inequalities, particularly in Member States such as Estonia, Lithuania, Poland and Hungary in the east of Europe (56), but also in Nordic Member States (57).

This is in keeping with individual country studies, which have also highlighted widening – or at least not reducing – health inequalities, for example, Strand et al. (112) found evidence of increasing inequalities in Norway; as did Turkheimer et al. (123) in Finland, and evidence from England suggests very little change in the magnitude of inequalities there despite concerted policy action in the 2000s (84). It was also evident, both in the analyses undertaken in this review and in the other comparative studies identified, that large inequalities remain between EU Member States, with differences in between new and early EU Member states and between groups of countries in western Europe, eastern Europe and the Baltic states. Health inequalities are large in the east of Europe.

**Action on health inequalities must therefore remain a public health priority for the EU. This review has identified the clear existence of health inequalities by educational status for total mortality, stroke, ischaemic heart disease, general morbidity, diabetes and suicide.**



### 4.3. Country-level policies



Table 4.5. Policy types

Categorisation	Explanation
Explicit national HI response	A national policy formulated with the explicit purpose of responding to health inequalities; has explicit aims to reduce health inequalities through action on a broad range of the social determinants of health or by incorporating the issue into the mainstream of other policy areas.
Explicit regional HI response	A regional (or city) policy formulated with the explicit purpose of responding to health inequalities; has explicit aims to reduce health inequalities through action on a broad range of the social determinants of health or by incorporating the issue into the mainstream of other policy areas.
Standard health policy – explicit	A policy led by the health sector focusing on health-related issues other than health inequalities; has explicit and significant health inequality reduction aims and may take targeted and/or universal action(s) on the social determinants of health.
Other policy – explicit	A policy generally led by a non-health sector focusing on issues other than health inequalities; has explicit and significant health inequality reduction aims and may take targeted and/or universal action(s) on the social determinants of health.
Standard health policy – implicit	A policy led by the health sector focusing on health-related issues other than health inequalities; has no significant aims to reduce health inequalities but may take action on the social determinants of health in such a way as to reduce them.
Other policy – implicit	A policy generally led by a non-health sector focusing on issues other than health inequalities; has no significant aims to reduce health inequalities but may take action on the social determinants of health in such a way as to reduce them.
Standard health policy – no or an HI response	A policy led by the health sector focusing on health-related issues other than health inequalities; has no health inequality reduction aims and does not take action on the social determinants of health in a way likely to help to reduce them.
Other policy – no or an HI response	A policy generally led by a non-health sector focusing on issues other than health inequalities; has no health inequality reduction aims and does not take action on the social determinants of health in a way likely to help to reduce them.

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## Reference # 12



Health & Consumer Protection  
Directorate-General

Economic implications of  
socio-economic inequalities in health  
in the European Union



Table 4 Economic impact of socioeconomic inequalities in health, EU-25 member states, 2004

	Total value		Impact of health inequalities	
	In billion euro	As % of GDP	Share (%) of total	In billion euro As % of GDP
GDP of EU-25, 2004	10.451	100.0%		
<i>Health as a capital good: GDP income components</i>				
- wages and salaries	4.071	39.0%	2.77%	113 1.05%
- firm profits, mixed income etc	4.021	38.5%	0.66%	28 0.27%
- total income	8.092	77.4%	1.74%	141 1.35%
<i>Health as a consumption good</i>				
- mortality	n.a.	n.a.	n.a.	700 6.70%
- morbidity (40% of mortality)	n.a.	n.a.	n.a.	280 2.68%
- total health	n.a.	n.a.	n.a.	980 9.38%
<i>Health care costs</i>				
- physician services	157	1.5%	16.26%	26 0.25%
- hospital services	267	2.6%	22.07%	59 0.56%
- total health services	888	8.5%	10.96%	177 1.70%
<i>Social security benefits</i>				
- unemployment benefits	179	1.7%	2.71%	5 0.05%
- disability benefits	222	2.1%	24.71%	58 0.53%
- total benefits	401	3.8%	14.91%	80 0.57%

Notes on calculation

1. All estimates in the columns 1 and 2 refer to the 25 EU member states in 2004. Most data were obtained from the Eurostat website. Health care data are for 2003 available at OECD, for 18 countries. See Appendix D for details.
2. In column 3, the impact of health inequalities was estimated using the Population Attributable Risk approach, using all persons with at least upper secondary education as the reference group. The estimation procedure is explained in sections 4.3 and 4.5, and in Appendix D, sections 3 to 5.
3. The values in column 1 are multiplied with those in column 3 to obtain the estimates in column 4 and 5. The estimates for "health as a consumption good" were derived following the procedure outlined in section 4.4.

number of nights in hospital by 22% in all persons aged 16 years and older. Assuming that the impact of health on health care utilization is similar in children up to 15 years, we estimated the impact of health inequalities on health care costs at €26 billion for physician services, and €59 billion for hospital services. According to OECD data, physician visits and hospitalizations represent almost half of total health care costs (see data base at OECD website). Analyses of utilization of other health services (e.g. physical therapy, home care, mental health services) in the Netherlands demonstrated that an identical or even stronger association exists with poor general health and with low education (Kunst et al., 2007). If the empirical results for physician visits and hospitalizations were to apply to total health care, the total impact of health inequalities on health care costs would represent €177 billion euro, or around 26% of total health care costs in the EU-25.

#### 4.6. Conclusion

Our estimates suggest that the economic impact of socioeconomic inequalities in health is likely to be substantial. While the estimates of inequalities-related losses to health as a 'capital good' (leading to less labour productivity) seem to be modest in relative terms (1.4% of GDP), they are large in absolute terms (€141 billion). It is valuing health as a 'consumption good' which makes clear that the economic impact of socioeconomic inequalities in health is really huge; in the order of about €1,000 billion, or 9.5% of GDP. The separately calculated impacts on costs of social security and health care systems and health care support these conclusions. Inequalities-related losses to health account for 15% of the costs of social security systems, and for 20% of the costs of health care systems in the European Union as a whole. It is important to emphasize that all these estimates represent yearly values, and that as long as health inequalities persist, these losses will continue to accumulate over the years.

Reference # 13

# CHALLENGING INEQUITY THROUGH HEALTH SYSTEMS

Final Report  
Knowledge Network on Health Systems  
June 2007

WHO COMMISSION ON  
THE SOCIAL DETERMINANTS OF HEALTH



**Lead authors**

Lucy Gilson,

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with inputs and contributions from the members of the Knowledge Network

Yet there are inspiring examples of health systems that manage to champion social justice, even in low-income settings. A growing body of epidemiological, economic and other evidence, including both country-specific and cross-country investigations, also highlight what needs to be done within health systems to generate health and health equity gains. Although this evidence base has limitations, particularly evidence from low- and middle-income countries, and despite the fact that health system change is always complex, the *overall evidence we synthesize provides a surprisingly consistent and robust basis for action*. Even where evidence is thin, the challenges of inequity demand innovation and experimentation.

### What are the overarching features of health systems that address the social determinants of health inequity?

The Health Systems Knowledge Network concludes that the main features of health systems oriented to population health and health equity are:

- leadership, processes and mechanisms that leverage **intersectoral action** across government departments to promote population health;
- organisational arrangements and practices that involve **population groups and civil society organisations** (particularly those working with socially disadvantaged and marginalised groups) in decisions and actions that identify, address and allocate resources to health needs;
- health care financing and provision arrangements that aim at **universal coverage** and redistribute resources towards poorer groups with greater health needs; and
- the **revitalization of the comprehensive primary health care approach** as a strategy that reinforces and integrates other health equity-promoting features.

A range of epidemiological and other evidence demonstrates that **intersectoral action for health and social empowerment** both offer health and health equity gains. Intersectoral action for health offers particular benefits to the marginalized groups most affected by, and least empowered to take action on, elements of the physical and social environment that produce disease. At a population level, meanwhile, social empowerment interventions generate these benefits either by addressing the structural causes of ill-health or by empowering low-income groups, women and others to take control of their health, for example, by changing risky environments and using available health care.

Universal coverage is achieved when the whole population of a country has access to the same range of quality services according to needs and preferences, regardless of income level, social status or residency. Such systems offer particular benefits to the poor by improving their access to health care, protecting them from financial impoverishment and ensuring that the rich pay a higher proportion of the income to support health care provision. Universal coverage approaches also generally require less administrative capacity and are more sustainable than targeted approaches.

### RECOMMENDATION 3.

#### *Ministers of Health and senior health officials must gradually build up universal coverage*

In low income countries and post-conflict settings a vital first step towards universal coverage is to mobilise extra resources for health care – for example, by re-prioritising health care within government allocations, widening the tax base and improving tax collection, tackling corruption and securing increased international assistance.

The following five steps are then needed in all contexts, must even in post-conflict settings:

- reduce out-of-pocket payments by improving public sector user fees and developing innovative ways to limit other health care costs (such as drug and transport costs);
- widen geographical access to comprehensive services by investing in public primary and secondary services in currently under-served areas and strengthening referral linkages (strengthening maternal care will offer particular benefits for women);
- re-allocate government resources between geographical areas taking account of population health needs and all available funding sources;
- develop innovative strategies to improve the acceptability and quality of public sector health care; and
- enhance technical efficiency (especially in relation to pharmaceuticals).

# Reference # 14

BMJ



BMJ 2012;345:e83211. doi:10.1136/bmj.e83211 (Published 27 May 2012)

Page 1 of 5

## RESEARCH

### The impact of NHS resource allocation policy on health inequalities in England 2001-11: longitudinal ecological study

OPEN ACCESS

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#### Abstract

**Objective** To investigate whether the policy of increasing National Health Service funding to a greater extent in deprived areas in England compared with more affluent areas led to a reduction in geographical inequalities in mortality attributable to ischaemic

obscure health inequalities from a more affordable to healthcare. Deprivation policy may widen inequalities

#### Introduction

Expanding on the National Health Service in England as a whole has merged each year since its establishment, although this trend accelerated between 1999 and 2011. These additional resources led to an increased activity in hospitals and primary care, better waiting times, improved services, and improvements in the control of chronic conditions.<sup>1</sup> The role of the increase in expenditure funded across the country, with service as a result of greater increases than others

**Design** Longitudinal ecological study

**Setting** 204 lower local authorities in England, clustered by their baseline level of deprivation

**Intervention** Differences in NHS funds allocated to local areas resulting from the NHS resource allocation policy in England between 2001 and 2011

**Main outcome measure** Trends from early 1980s census provided and associated to health care in local authority areas in England. Using multivariate regression, we estimated the relative mortality that was associated with the allocation of additional NHS resources in local areas

Many countries experience widening inequalities in health, but in England, often as a result of differing levels of socioeconomic deprivation. One policy approach to deal with these spatial inequalities is to allocate health service resources in ways that take into account these differences in health need.<sup>2</sup> In England, central funding for the NHS raised through taxation is allocated to local commissioning organisations that provide or purchase primary, community, and secondary health services on behalf of their resident populations. The level of resources each commissioning organisation receives is determined by a central formula. Since the 1970s, several different formulas have been used in an attempt to allocate resources more equitably to the commissioning organisations, based on the level of need in their populations.<sup>3</sup> These local commissioning organisations then decide how these resources are used based on their assessment of the needs of their populations.

In 1999 the UK government introduced a new objective for the allocation of resources in the NHS in England: "to continue to the reduction in avoidable health inequalities."<sup>4</sup> To better achieve this objective a health inequalities component was

**Results** Between 2001 and 2011 the increase in NHS resources to deprived areas was associated with a reduction in the gap between deprived and affluent areas in mortality attributable to ischaemic heart disease per 100 000 population (95% confidence interval 2.1 to 4.0) and to a reduction in the odds per 100 000 (1.0 to 1.1). This equated to 2% of the total reduction of absolute inequality in mortality attributable to ischaemic heart disease. Each additional £1 000 of resources allocated to deprived areas was associated with a reduction in 4 deaths in males per 100 000 (1.1 to 4.9) and 1.6 deaths in females per 100 000 (1.1 to 2.4). The association between changes in NHS resources and not a reduction in mortality attributable to ischaemic heart disease was not significant.

**Conclusion** Between 2001 and 2011, the NHS health inequalities policy of increasing the proportion of resources allocated to deprived areas compared with more affluent areas was associated with a reduction in

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RESEARCH

What is already known on this topic

The new health expenditure data has allowed on policy, trends and a 2020 for the future. Health expenditure projection, and it is a good trend over the health care, in 1988 funding allocations to health care compared with other areas.  
This was the first time anywhere in the world that health expenditure accounts in health policy had distributed to the health care expenditure.  
It is not known whether this policy was successful in curbing the growth of health expenditure.

What this study adds

Between 2005 and 2018, the projected increasing trend of a higher rate of health care expenditure was observed with a reduction in health care expenditure in other areas.  
The association between health and health care expenditure was stronger in developed areas than in less developed areas.  
Health care expenditure in 2018 was higher in the developed areas and associated with a higher expenditure in health care expenditure in less developed areas. The lead in a narrowing of the gap between developed and less developed areas in health expenditure.

During 1991 was supported from National Health Research Institute for doctoral research fellowship (1991-1992-1993). Financial support of health research in health care expenditure in the health care system. The research for funding assistance to health care expenditure in the health care system is supported by the National Health Research Institute for the health care system. The National Health Research Institute for the health care system is supported by the National Health Research Institute for the health care system.

Conflicting interests: We state that we do not have any financial or personal relationships with other people that could appear to have influenced the design or conduct of this research or the interpretation of its results. We state that we do not have any financial or personal relationships with other people that could appear to have influenced the design or conduct of this research or the interpretation of its results.

Declaration of interest: The authors declare that they have no competing interests. The authors declare that they have no competing interests. The authors declare that they have no competing interests.

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