

March 1999 (Volume 40, Number 2)

For Debate – Does Health Care Save Lives?

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The contribution of health care to the health of a population has long been controversial. In the 1970s, McKeown and Illich argued that health care had made little contribution to population health and may actually be damaging it. There is, however, a growing body of evidence that health care now has a demonstrable effect on health at a population level, albeit subject to certain methodological limitations that affect the precision of the estimates of scale. In particular, there is emerging evidence that reduced access to high quality medical care may contribute to the east-west gap in mortality in Europe and to social inequalities in mortality in some industrialised countries. These findings apply both to overall measures of mortality amenable to medical care as well as to death rates in particular age groups and from particular conditions, where the association between policy and outcome tends to be clearer. These findings have implications for those who seek to promote health at population or individual level. Primarily, there needs to be a stronger link between public health and health care, with those in public health recognising that health care can make a difference and those in health care recognising the right of public health to challenge what they do.

Key words: death rate; health and welfare planning; health care; health promotion; health services research; iatrogenic disease; medical care research; mortality, public health

To many health care practitioners, the question of whether health care saves lives will seem ridiculous. Practising doctors and nurses will have seen patients who they believe would otherwise have died but who have been saved by health care interventions. The most obvious situation is a patient with a myocardial infarction who is defibrillated successfully after an episode of ventricular fibrillation but it is possible to think of many less dramatic examples. This perception of the importance of health care has led, in some areas, to a highly medicalised model in which, for example, the solution to a high death rate from heart disease is the provision of more invasive cardiological facilities rather than tackling factors such as smoking and nutrition.

In contrast, according to a view that is widespread among many public health professionals, health care makes little contribution towards levels of mortality in a population (1). The major determinants of health and disease, such as tobacco, nutrition, alcohol, and socio-economic inequalities, have remedies that lie outside the health care sector. This has led some to argue, albeit often implicitly, that public health should have little if anything to do with health services, instead concentrating on inter-sectoral action to tackle problems such as transport, education, and community development. Indeed, supported by international studies that have shown, if anything, an inverse association between inputs to health care and measures of health (2,3), it is arguable that investment in health services could even be damaging to health.

While, to some extent, these extreme views are caricatures, they do demonstrate the long standing division between curative and preventive medicine. This has ancient roots. The Greeks believing that Asclepius, the god of medicine, had two daughters, Hygeia, responsible for prevention, and Panacea (4), responsible for cure. However, this division is not simply a philosophical matter. It has major implications for how we address the patterns of health and disease in our societies.

So can we move beyond rhetoric to evidence about the contribution that health care might make to patterns of mortality? Can health care be considered a form of health promotion, or should it be regarded as a sickness service, simply acting as a sticking plaster for the failures of society, and, in many cases, actually making the patient worse? What are the implications for the relationship between public health and clinical professionals?

Health Care – Promoting Health of the Population? McKeown Revisited

The current argument about the contribution of health care to health was first developed in detail by McKeown (5). He showed that three-quarters of the decline in mortality in England and Wales between 1841 and 1971 had been due to a reduction in deaths from infectious disease and that three-quarters of this reduction had preceded the widespread introduction of immunisation or antibiotics.

Instead, he argued, the main influences on health had been nutrition, environment, and behavior. At about the same time, another argument was developed by Illich (6). He held that the problem was not that clinical medicine had a limited role to play in alleviating the burden of disease on humanity but rather that it was positively harmful, with patients suffering from the side-effects of prescribed drugs, hospital acquired infections, poorly performed surgery, and the consequences of following up spurious abnormalities found among the increasing batteries of laboratory investigations. According to this model, medicine was driven not by concern for the interests of the patient but rather for those of the health care providers, whether manifest through professional ambition, corporate greed, or simply an imperative to do something.

Although McKeown explicitly distanced himself from Illich, arguing that their two books had no more in common than the Bible and the Koran, "both [of which were] concerned with religious matters", the two have been linked by many commentators.

Inevitably, these arguments generated considerable controversy. At the risk of over-stating the positions held, the competing views can be divided into three broad groups. The first are those who contend that, while interesting, this interpretation has few implications for the practice of clinical medicine (7). The second consists of those who argue that the current level of health care provision in some countries is excessive (8,9), and that politicians should shift expenditure from health care to sectors such as education, housing, and employment (10). Finally, there are those who believe that these findings imply a need to change the focus of medicine so that it embraces the wider determinants of health, and not just curative services, with health care one, but only one of the determinants of health (11).

These arguments have important implications for public health and they continue to divide the public health community, most recently in the context of greater involvement by public health professionals in purchasing health care in some countries (12). As Dekker has noted, policies on health promotion and on health care reform have developed largely in isolation (13).

However, Illich and McKeown were both writing over twenty years ago and, it is arguable, things have changed, not least in response to the concerns that they raised. Although there have been many false dawns, especially in areas such as cancer treatment, there can be little doubt that the scope of medicine has enlarged greatly, with many formerly fatal conditions now susceptible to treatment. Furthermore, some of the criticisms made by Illich concerning unnecessary and inappropriate investigations and treatment should have been addressed by the rise of evidence based medicine. But have these changes altered the main conclusions reached by McKeown and Illich? And, if so, what are the implications for those who seek to improve the health of populations?

How Effective Is Health Care in Reducing Mortality?

One of the earliest critiques of McKeown was by Beeson (14) who undertook an assessment of the extent to which treatments recommended in the 1927 and 1975 editions of a major textbook of medicine could, on the basis of current knowledge, be classified as effective. He showed a major shift from treatments, which, although recommended in 1927, were either useless or harmful to ones that had been proven to be effective.

A more fruitful line of enquiry has developed from a body of work based on the argument that examination of changing patterns of overall mortality was likely to obscure the contribution being made by health care. Instead, it is important to separate causes of death from conditions that are, or are not, amenable to medical care. This concept was first developed by Rutstein et al (15) but has subsequently been refined by other researchers and applied to many countries (16-19), including an atlas of avoidable mortality in the European Union, which has been regularly updated and expanded (20), with a recent sister volume covering the countries of central and eastern Europe (21). In summary, these consistently show that, in the period since the mid 1950s, declines in amenable causes have been more rapid than those from non-amenable causes.

This approach has, however, been criticised, most notably by Carr-Hill (22) who has drawn attention to the relatively low percentage of total deaths included under the heading of "amenable" and the absence of a clear link, at a geographical level within a country, with other measures of health care provision. This has, in part, been countered by Mackenbach et al (23,24) who extended the number of conditions classed as amenable and included a wider range of ages (most earlier studies had only included deaths under 65 or, for some conditions, under 50). They examined changes during this period with regard to the times that particular interventions were introduced and argued that the impact of specific treatments were observable in terms of accelerating falls in mortality. They calculated that, in The Netherlands between 1950 and 1984, had the observed changes in amenable causes not taken place, male life expectancy at birth would have actually fallen by almost a year due to increases in other causes of death. In fact, male life expectancy at birth increased by 1.9 years, so changes in deaths from amenable causes added a total of 2.9 years to what would otherwise have

occurred. Among women, who experienced an increase of 5.86 years, 3.95 years could be accounted for by fewer deaths from amenable causes.

A further refinement has been proposed by Albert et al (25), who divided the classifications used by Charlton and Holland into those that were amenable to medical care and those that related to national health policies and applied them to the region of Valencia, Spain, for the period 1975 to 1990. The former included conditions such as tuberculosis, appendicitis, and asthma and accounted for 11% of all deaths. The latter included conditions such as cirrhosis of the liver and motor vehicle accidents and accounted for 19% of total mortality. They found that deaths from causes amenable to medical care fell whereas those amenable to national health policies increased. However, they also noted that while the net trend was downward, some causes amenable to medical care, such as cancer of the cervix, increased.

This last finding implies that one factor preventing medical care exerting its potential impact on health is the existence of barriers to access. Some evidence supporting this argument is from a study of "avoidable" deaths in counties in Sweden, focusing on the proportion that took place outside hospital (26). In general, while the proportion of deaths outside hospital could not explain the variation in overall death rates, there were some counties where a problem was apparent, such as a high death rate from diabetes for young people in one of the most remote counties where access to hospital was difficult.

A related issue is the contribution of differences in amenable mortality to health inequalities. Marshall et al (27) have shown that social class gradients in New Zealand are substantially greater for amenable than non-amenable causes of mortality.

Most recently, the concept of amenable mortality has attracted attention in the context of understanding the stagnation of life expectancy in central and eastern Europe. Following studies that showed that death rates from amenable causes were somewhat higher in the east than in the west (28,29), Velkova et al (30) have attempted to quantify the contribution that these deaths make to the east-west gap. Excluding early neonatal deaths, for which only incomplete data are available, they estimate that amenable causes account for 24% of the east-west gap in male life expectancy between birth and age 75, varying between countries from 11 to 50%, and 39% of the gap in female life expectancy, varying from 24 to 59%.

An alternative approach has been used by Bunker (31). Instead of starting from causes of death, Bunker began by looking at a series of specified clinical interventions, such as screening for certain cancers or for hypertension, immunisation, and aspirin used as secondary prevention of ischaemic heart disease and sought to estimate their effect on the American population. For each intervention, the average gain in life expectancy that had been achieved for those receiving the service was estimated. In addition, on the basis of an estimate of the proportion of all those with potential to benefit who actually received it, the potential for further gain if it was universally accessible was calculated.

The estimated total contribution of curative services was between 3.5 and 4.0 years, with the potential of further 1.5 years if existing treatments were more widely available. The improvement attributable to clinical prevention services was estimated at 1.5 years, with a further potential gain of 7-8 months. Bunker (31) also estimated the impact of health care on quality of life, estimating that, on average, an individual has been relieved of about 5 years of poor quality life.

On closer examination, however, Bunker's study (31) contains certain flaws. It depends largely on a study that sought to identify the contribution of medical care to the decline in heart disease in the United States (32). This paper adopts an unreservedly optimistic approach, disregarding direct evidence, such as the failure to identify a benefit in terms of survival for coronary care units and instead using indirect evidence to infer that they do save a substantial number of lives. It notes, but then disregards the evidence that survival benefits following cardiac surgery are restricted to patients with specific types of lesions. Finally, it assumes that the advantages in terms of secondary prevention achieved with beta-blockers could be achieved by all patients, regardless of contraindications. Consequently, rather less emphasis should be placed on these findings than on those of Mackenbach and his team.

Apart from the specific weaknesses of the paper by Bunker, these studies are all subject to certain methodological limitations. Apart from those noted by Carr-Hill (22), referred to earlier, there is the question of attribution. To what extent can the observed changes actually be attributed to specific interventions? Mackenbach et al (23) partly addressed this issue by relating the timing of introduction of certain interventions to the observed reduction in mortality but formidable problems remain. It is far from clear that the attribution of these reductions in amenable mortality meet the standard criteria of causality (33) but there are also more fundamental questions.

First, are the estimates of effectiveness of interventions realistic? As noted above, many of the

assumptions made by Bunker seem over-optimistic, especially when results from randomized controlled trials are extrapolated to the general population, given that there is now considerable evidence that trials are often on highly selected populations and achieve outcomes that cannot be generalised (34). Second, when applying evidence of effectiveness to patterns of disease, do the words used always have the same meaning? There is considerable evidence that diagnostic labels change over time and between countries. Furthermore, different patterns of risk factors may affect the extent to which a particular cause of death is amenable. For example, when comparing death rates in the east and west of Europe, it has only recently been recognised that many deaths from ischaemic heart disease are due to the effects of binge drinking, leading to a much higher proportion of cardiac deaths taking place suddenly, outside hospital than is the case in the west. As a result, the potential contribution of medical interventions, such as thrombolytics, is reduced (35).

Conversely, the approach taken by Mackenbach and others (23,24) has overcome, at least in part, some of these problems and, while it may be difficult to quantify the precise effect of health care on reductions in mortality, it is unlikely to have been insignificant.

Impact of Health Care on Individual Diseases

The concerns about the use of aggregate measures of amenable mortality have led other researchers to move away from this to focus on how medical care has contributed to observed effects on mortality from specific conditions.

The impact of clinical interventions on trends in death and disability from certain diseases is somewhat better documented than is research on aggregate rates of amenable causes. In particular, researchers have examined the impact of new treatments for certain cancers and ischaemic heart disease. Studies have examined both differences between countries and over time.

An example of the former is an international comparison of survival by patients with colo-rectal cancer which found wide variations that were attributed largely to differences in stage at diagnosis but also, albeit to a lesser extent, to differences in treatment (36).

The diffusion of a range of interventions such as coronary care units and thrombolysis has stimulated attempts to identify an effect on cardiovascular mortality. Bonneaux et al (37) examined deaths from cardiovascular disease in The Netherlands between 1969 and 1993. They found that the long-term decline in mortality from coronary heart disease accelerated significantly after 1987, coinciding with the wider availability of new interventions.

The second approach is illustrated by Levi et al (38) who reported that death rates from certain childhood cancers, for which effective treatments are now available, have shown recent decreases in most European countries although the declines were generally larger and earlier in northern Europe than in southern or central Europe, suggesting a measurable difference in the diffusion of new treatments. More recent work has examined the effect of greater access to effective interventions following the transition to democracy in central and eastern Europe. Examples include the decline in deaths from testicular cancer in former East Germany (39) and in childhood leukaemia in Russia (40). Similar findings have been reported from an analysis of trends in deaths from benign prostatic hypertrophy, which found substantial reductions in deaths between 1950 and 1990 in many countries but to a much greater extent in those in northern Europe and North America than in those in central and eastern Europe and South America (41). The authors attribute this to differences in the diffusion of developments in surgery and anaesthesia.

The impact of these interventions is likely to reflect not just their availability but also the organisational context within which they are delivered, with many studies showing advantages from treatment in specialised centres (42). One study has, however, examined the specific impact of organisational differences on population level health indicators. A detailed examination of deaths among children was undertaken in Trent, England, and Victoria, Australia (43). The former has a pattern of decentralised intensive care units whereas the latter centralises facilities. The risk of death, after adjustment for severity of illness on admission, was more than twice as high in Trent than in Victoria. The 32 excess deaths in Trent accounted for 11% of all deaths among children between the ages of one month and 16 years.

Negative Effects of Health Care – Illich Revisited

The preceding sections have explored the positive contribution that health care might make to population health. However, as Illich argued, health care also has the potential to damage health. This, he argued, could act at three levels. Clinical iatrogenesis includes not only those adverse effects arising from attempts to treat patients but also those arising from efforts to reduce the risk of subsequent litigation. Social iatrogenesis describes some of the consequences of medicalization, such as how medically certified sickness can remove people from the workforce and thus from the political struggle to change the system that led to their impaired health. Cultural iatrogenesis refers to the way in which the medical paradigm prevents people from responding appropriately to their

individual patterns of weakness and vulnerability. For the purposes of this chapter, the key issue is the first of these.

The greatly increased emphasis in some countries on evidence based practice testifies to the enhanced awareness of the limited basis in research for much clinical practice. In view of the enormous volume of literature on this issue, it will not be reviewed in detail here. To some extent, it supports Illich's argument, in that some interventions are provided that are ineffective as well as some that are harmful. The latter include many well publicised examples such as Thalidomide, contamination of human growth hormone with the agent responsible for Creutzfeldt-Jakob disease, and contamination of Factor VIII, administered to haemophiliacs, with hepatitis C and Human Immunodeficiency Virus. A recent example was the discovery that the widespread policy of administration of albumen to seriously injured or burned patients increases mortality (44). There are many other less well publicised examples. However, it has also shown that, contrary to what might be inferred by Illich's view of a technological imperative to adopt new methods, there are also examples of interventions supported by evidence of effectiveness that are not adopted (45). This is as applicable in the field of public health as in curative medicine, an example being the slow diffusion of policies on sleeping position as a means of reducing risk of sudden infant death syndrome (46).

Implications

The evidence reviewed indicates that, despite methodological limitations, health care now, even if not in the past, is likely to have a significant effect on the health of a population. This poses a challenge to those who would promote the health of a population. Within available resources, they should promote provision of effective care while seeking to reduce ineffective care. The evidence of greater inequality for amenable conditions emphasises the importance of promoting equity of access to curative, as well as to preventive services.

The emergence of the concept of "planned markets" (47) in health care can provide opportunities to address this agenda. van den Ven et al (48) have argued that such systems must contain three elements: insurance (matching income and expenditure); agency (providing information to support choice and acting as a "prudent" buyer); and a guarantee of access.

The second and third components are emerging in several countries but they are arguably most highly developed in the United Kingdom, where public health plays a major role in purchasing care. In this model, health authorities, which contain a major public health component, are responsible for assessing the health needs of their populations, deciding priorities for meeting these needs, placing contracts to meet these needs, evaluating the performance of these contracts, and taking other actions to promote health and prevent disease. They must undertake population-based epidemiological studies to identify need and to evaluate evidence on effectiveness of corresponding interventions. This process is based on a much greater use of evidence based practice, drawing on a national research and development programme (49), and has involved the acquisition of new skills and the creation of structures by which change can be implemented and monitored. It provides an opportunity to ensure that those clinical interventions that yield most 'health gain' are adopted and those that offer little are discarded. However it also involves challenging what are often strongly held views about clinical autonomy, which may be especially difficult in cultures where clinical policy is based on the views of the senior physician or surgeon.

All European health care systems have some structure that can adopt these roles. They involve identifying the needs of the population for whom they are responsible, determining what services are required to meet these needs, identifying the most appropriate means to bring about change in providers, and evaluating the outcomes. However, to do so, they must develop skills to monitor and evaluate research and, what is rather more difficult, there must be new attitudes among both public health professionals and clinicians about what is and is not possible. This will present a major challenge to both groups but especially public health professionals, who must make major changes to how they work. It is a challenge which, in many countries, they are as yet poorly equipped to respond.

Acknowledgement

This paper is based on the presentation at the Second Dubrovnik Summer School, September 1998, Dubrovnik, Croatia.

References

- 1 Alvarez-Dardet C, Ruiz MT. Thomas McKeown and Archibald Cochrane: a journey through the diffusion of their ideas. *BMJ* 1993;306:1252-4.
- 2 Scheiber GJ, Poulter JP, Greenwald LM. Health spending, delivery, and outcomes in OECD countries. *Health Aff Millwood* 1993;12:120-9.
- 3 Cochrane AL, St Leger AS, Moore F. Health service "input" and mortality "output" in developed

- countries. *J Epidemiol Com Health* 1978;32:200-5.
- 4 Porter R. The greatest benefit to mankind. A medical history of humanity from antiquity to the present. London: HarperCollins; 1997.
- 5 McKeown T. The role of medicine: dream, mirage or nemesis? Oxford: Blackwell; 1979.
- 6 Illich I. Limits to medicine. London: Marion Boyars; 1976.
- 7 Ingelfinger FJ. Health: a matter of statistics or feeling? *N Engl J Med* 1977;296:448-9.
- 8 Lavis JN, Stoddart GL. Can we have too much health care? *Daedalus* 1994;123:43-60.
- 9 Evans RG. Health care as a threat to health: defence, opulence, and the social environment. *Daedalus* 1994;123:21-42.
- 10 Smith R. Medicine's core values. *BMJ* 1994;309:1247-8.
- 11 Lalonde M. A new perspective on the health of Canadians: A working document. Ottawa: Information Canada; 1974.
- 12 Whitty P, Jones I. Public health heresy: a challenge to the purchasing orthodoxy. *BMJ* 1992;304:1039-41.
- 13 Dekker E. Health care reforms and public health. *Eur J Publ Health* 1994;4:281-6.
- 14 Beeson PB. Changes in medical therapy. *Medicine* 1980;59:79-84.
- 15 Rutstein DD, Berenberg W, Chalmers TC, Child CG, Fishman AP, Perrin AB. Measuring the quality of medical care. A clinical method. *N Engl J Med* 1976;294:582-8.
- 16 Charlton JRH, Velez R. Some international comparisons of mortality amenable to medical intervention. *BMJ* 1986;292:295-301.
- 17 Poikolainen K, Eskola J. The effect of health services on mortality: decline in death rates from amenable and non-amenable causes in Finland, 1969-81. *Lancet* 1986;i:199-202.
- 18 McKee CM, Bewley BR. Preventable mortality in Northern Ireland. *Irish Med J* 1987;80:229-31.
- 19 Malcolm MS, Salmond CE. Trends in amenable mortality in New Zealand 1968-1987. *Int J Epidemiol* 1993;22:469-74.
- 20 Holland WW, editor. European Community atlas of 'avoidable' death. 2nd ed. Oxford: Oxford University Press; 1991.
- 21 Józán PE, Prokhorovskas R, editors. Atlas of leading and 'avoidable' causes of death in countries of central and eastern Europe. Budapest: Hungarian CSO; 1997.
- 22 Carr-Hill RA, Hardman GF, Russell IT. Variations in avoidable mortality and variations in health care resources. *Lancet* 1987;i:789-92.
- 23 Mackenbach JP, Looman CWN, Kunst AE, Habbema DF, van der Maas PJ. Post-1950 mortality trends and medical care: gains in life expectancy due to declines in mortality from conditions amenable to medical intervention in The Netherlands. *Soc Sci Med* 1988;27:889-94.
- 24 Mackenbach JP. The contribution of medical care to mortality decline: McKeown revisited. *J Clin Epidemiol* 1996;49:1207-13.
- 25 Albert X, Bayo A, Alfonso JL, Cortina P, Corella D. The effectiveness of health systems in influencing avoidable mortality: a study in Valencia, Spain, 1975-90. *J Epidemiol Comm Health* 1996;50:320-5.
- 26 Westerling R. Can regional variation in "avoidable" mortality be explained by deaths outside hospital? A study from Sweden, 1987-90. *J Epidemiol Comm Health* 1996;50:326-33.
- 27 Marshall SW, Kawachi I, Pearce N, Borman B. Social class differences in mortality from diseases amenable to medical intervention in New Zealand. *Int J Epidemiol* 1993;22:255-61.
- 28 Bojan F, Hajdu P, Belicza E. Avoidable mortality. Is it an indicator of quality of medical care in Eastern European countries. *Qual Assur Health Care* 1991;3: 191-203.
- 29 Boys RJ, Forster DP, Jozan P. Mortality from causes amenable and non-amenable to medical care: the experience of eastern Europe. *BMJ* 1991;303:879-83.
- 30 Velkova A, Wolleswinkel-van den Bosch JH, Mackenbach JP. The east-west life expectancy gap: differences in mortality from conditions amenable to medical intervention. *Int J Epidemiol* 1997;26:75-84.
- 31 Bunker JP. Medicine matters after all. *J Roy Coll Physicians Lond* 1995;29:105-12.
- 32 Goldman L, Cook EF. The decline in ischemic heart disease mortality rates: an analysis of the comparative effects of medical interventions and changes in lifestyle. *Ann Intern Med* 1984;101:825-36.
- 33 Hill AB. The environment and disease: association or causation? *Proceedings of the Royal Society of Medicine* 1965;58:295-300.
- 34 Britton A, McKee M, Black N, McPherson K, Sanderson C, Bain C. Choosing between randomised and non-randomised studies: a systematic review. Report to the NHS HTA Programme, 1997.
- 35 McKee M, Britton A. The positive relationship between alcohol and heart disease in eastern Europe: potential physiological mechanisms. *J Roy Soc Med* 1998;91:402-7.

- 36 Gatta G, Sant M, Coebergh JW, Hakulinen T. Substantial variation in therapy for colorectal cancer across Europe: EURO CARE analysis of cancer registry data for 1987. *Eur J Cancer* 1996;32A:831-5.
- 37 Bonneaux L, Looman CW, Barendregt JJ, van der Maas PJ. Regression analysis of recent changes in cardiovascular morbidity and mortality in The Netherlands. *BMJ* 1997;314:789-92.
- 38 Levi F, La Vecchia C, Lucchini F, Negri E, Boyle P. Patterns of childhood cancer incidence and mortality in Europe. *Eur J Cancer* 1992;28A:2028-49.
- 39 Becker N, Boyle P. Decline in mortality from testicular cancer in West Germany after reunification. *Lancet* 1997;350:744.
- 40 Shkolnikov VM, McKee M, Vallin J, Aksel E, Leon D, Chenet L, et al. Cancer mortality in Russia and Ukraine: validity, competing risks, and cohort effects. *Int J Epidemiol*. In press 1999.
- 41 Boyle P, Maisonneuve P, Steg A. Decrease in mortality from benign prostatic hyperplasia: a major unheralded health triumph. *J Urol* 1996;155:176-80.
- 42 Selby P, Gillis C, Haward R. Benefits from specialised cancer care. *Lancet* 1996;348:313-8.
- 43 Pearson G, Shann F, Barry P, Vyas J, Thomas D, Powell C, et al. Should paediatric intensive care be centralised? Trent versus Victoria. *Lancet* 1997;349:1213-7.
- 44 Cochrane Injuries Group Albumin Reviewers. Human albumin administration in critically ill patients: systematic review of randomised controlled trials. *BMJ* 1998;317:235-40.
- 45 Mulrow CD. Rationale for systematic reviews. In: Chalmers I, Altman DG, editors. *Systematic reviews*. London: BMJ Publications; 1995. p. 1-8.
- 46 McKee M, Fulop N, Bouvier P, Hort A, Brand H, Rasmussen F, et al. Preventing sudden infant deaths – the slow diffusion of an idea. *Health Policy* 1996;37:117-35.
- 47 Saltman R, von Otter C. *Planned markets and public competition*. Buckingham: Open University Press; 1992.
- 48 van den Ven WP, Schut FT, Rutten FFH. Forming and reforming the market for third party purchasing for health care. *Soc Sci Med* 1994;39:1405-12.
- 49 Peckham M. Research and development for the national health service. *Lancet* 1991;338:367-71.

Received: September 23, 1998

Accepted: December 14, 1998

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