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Lok Sang Ho*

Abstract

This paper reviews some of the recent literature and experiences in healthcare reform in the light of the peculiarities of human nature. The review suggests that successful healthcare financing reform boils down to working out a cost/risk-sharing formula between government and citizens that can effectively preserve the incentives for efficient utilization of healthcare resources and for preventive care, while limiting the financial risk of citizens. The paper will also address issues arising from aging and redistributive concerns, as well as political and administrative feasibility.

1. Introduction

A recent paper by Sidorenko and Butler (2007) reviewed the various efforts to provide health insurance among Asian Pacific countries. They cited the WHO Commission on Macroeconomics and Health (2001:21): "good population health is a critical input into poverty reduction, economic growth, and long-term development at the scale of whole societies." But health[1] is also a crucial input in "household production," which is the economist's jargon for the process of turning consumption goods and services purchased in the market place into "consumption attributes," such as nutrition and sensory pleasure, that directly affect people's well being.[2] According to many studies (Veenhoven, 1991, Peiro, 2006), health appears to be an important determinant of happiness.[3] Gruber and Mullainathan (2005) even found cigarette taxes conducive to happiness, and this apparently is because cigarette taxes reinforce the commitment to quit

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[1] Here health should refer to "functional health." This is the flow of functionally healthy time that an individual enjoys within a specific time period. Duffy and MacDonnald(1990) investigated into the determinants of functional health for the elderly.

[2] One of the pioneers of the household production concept is Becker. See Becker(1965).

[3] Causality is however notoriously difficult to establish. For example, one authoritative result shows that happiness is inversely related to hypertension (Blanchflower and Oswald, 2007). One may ask if it is hypertension that make people less happy, or whether unhappy people develop hypertension.

smoking, and ultimately contribute to a healthier and happier life for smokers over the longer run.

Today the healthcare systems in many countries are facing a crisis. The crisis facing Americans is well known and attracted even more debate after Michael Moore's controversial movie Sicko. Even the often-touted Singapore system had to cope with emerging problems with various reforms, which over time have added to the complexity of the system considerably (Taylor *et.al.* 2003). Thus, on top of the better known Medisave, which was launched in 1984, a catastrophic insurance scheme called Medishield was introduced in 1990 to serve as a risk management tool, protecting the insured from excessive burden in the event a major illness struck. To ensure the sustainability of Medishield, Singapore requires of patients payment in the form of deductibles and co-payments, and sets limits over claims per treatment, per policy year, and over one's life time. Singapore introduced the Medifund to assist the poor in 1993, and stipulated that only the interest proceeds from the endowment fund were to be used to help the eligible poor. Singapore further introduced the Eldershield in 2002 to provide protection against the risk of severe disabilities when one gets old. In Hong Kong, alarm had been raised time and again that the government-funded healthcare system is unsustainable (Hsiao *et.al*. 1999). On the Chinese Mainland, where government funding for healthcare is minimal and hospitals are asked to procure its own finances through fees and charges, considerable anxiety pervades the population over unpredictable and often large medical expenditures (Liu and Mills, 2002; French, 2006), putting great pressure to reform the system. Across the Taiwan Strait, the introduction of a National Health Insurance plan in Taiwan was welcomed by the population, but had raised concern about sustainability and moral hazard problems,[4] while the co-payment requirements also had raised concern about fairness (Cheng, 2003).[5]

The fact is, there is a dilemma that faces most universal health insurance schemes or national health systems. It is human nature that people are worried about great financial risks. But if patients are protected from the bulk of the cost when health services are required, it is also human nature that they will lose some motive for preventive care and will tend to

[4] Moral hazard is a term used in the insurance literature to describe how people respond to insurance by taking less preventive care(demand side moral hazard) or by providing more services than is appropriate(supply side moral hazard).

[5] Critics argue that the sick are already disadvantaged and often poor and should not be burdened with copayments.

over-utilize the system ("demand side moral hazard"). Furthermore, when caregivers are asked to bill the insurance fund for the care they give to patients they may give more "care" than necessary ("supply side moral hazard") and they may even bill it for care not given.[6] Although there is little dispute that governments should provide a safety net to the needy, in an aging society, it is important that people should be motivated to take care of themselves and to save for their healthcare needs[7] at an early age by arousing their cost consciousness. The kind of universal health insurance as we know to date[8] however blunts that cost consciousness, raising the possibility of a cost explosion in the future when people grow old. The tendency for diabetes and obesity cases to develop among the younger population as observed in many countries is particularly worrying.[9]

Section 2 will explore the reasons why healthcare reform has been so difficult and why many efforts at reforming healthcare have failed. Section 3 will discuss the key elements of a successful healthcare policy. Section 4 provides an argument for the public healthcare sector to cover only "basic care," to implement marginal cost pricing for such services, and for the government to *negotiate* standard pricing for basic drugs with pharmaceutical companies, while leaving premium services and premium drugs entirely to the market. Section 5 discusses a modified version of Ho's Excessive Burden Insurance (Ho, 1997) designed specifically to address the aging issue. Section 6 will discuss the concept of Lifetime Healthcare Supplement, which can go hand in hand with Excessive Burden Insurance to increase the choices available to citizens without exposing the government itself to excessive financial risk. Section 7 looks into the subject of political and administrative feasibility, which inevitably will include distributive justice concerns. Section 8 concludes the paper by observing that the key to successful healthcare reform lies in defining the roles of private and public caregivers in a way that reflects their comparative advantages and in combining the best features of a market-oriented system and those of a public healthcare system.

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[6] "Care" in quotation marks to highlight the fact that it may not be in the patient's interest at all. While living in Canada in the 70s the author read of multiple news reports about such fraudulent claims.

[7] We will argue that they should save for *part* of their healthcare needs when they get old. This is the "affordable share" of their healthcare cost. See below.

[8] Typically these are in the form of "Fee Reducing" insurance. See Appendix for a comparison with Excessive Burden Insurance.

[9] See Daviglus *et.al.*(2004) & http://www.diabetes.org/diabetes-research/summaries/daviglus-bmi.jsp

2. Health Policy as a Socio-Economic and a Political Problem

Many efforts at healthcare reform have failed because they fail to recognize the peculiarities of human nature, particularly people's natural incentives and extreme risk aversion (psychological/ economic) and the peculiarities of the healthcare and insurance markets (economic), Pressured by different interest groups (political) and worried over implications on the public purse (economic), policy makers have often failed to build in features in the policy that directly address the incentive problem and the human need for peace of mind. (Ho, 1998, 2001b, 2006).

A sustainable and high quality healthcare system requires providing the right incentives among all key stakeholders and getting the cooperation of all parties concerned. Unfortunately, typically this is rendered very difficult because of political reasons. Politicians may be wary of introducing cost-based user charges that may turn their voters away. They figure that voters will take the short view rather than the long view. Their own time horizon, too, seldom extends beyond one or two terms of office. Then there are insurers, pharmaceutical companies, private doctors, lawyers, and others who are eager to defend or further their interests, all rendering a fair, longer term solution to the health policy problem "academic."[10]

Although public policy affects different stakeholders differently, it is possible to have a workable definition of "the public interest." Following Rawls (1971) and Ho (2001) we propose that the public interest is the *ex ante* interest of the "representative individual" as he confronts different possibilities: the representative individual being a hypothetical individual who faces equal probability of being anyone within the society. We may perform a thought experiment as suggested by Rawls (1971). Imagine that we could be a doctor; a healthy person or a patient; the shareholder of a pharmaceutical company; the shareholder of an insurance company; or someone not holding any stake in these companies; a rich person or a person of poor means; a fortunate one, or an unfortunate one: *with probabilities equal to the percentage of these different people in the community*. We would ask, as we ponder over each policy proposal: if we were "behind a veil of ignorance" about our identity (Rawls, 1971), which

[10] "The pharmaceutical and health products industry has spent more than $800 million in (US) federal lobbying and campaign donations at the federal and state levels in the past seven years." See "Drug Lobby Second to None How the pharmaceutical industry gets its way in Washington", The Centre for Public Integrity, posted July 7, 2005. http://www.publicintegrity.org/rx/report.aspx?aid=723 accessed August 10, 2007.

policy option would we prefer? Thus public interest is the interest of society when vested interests are forgotten: there is no specific person or party to fend for or to please, but there is a need to fend for and to care for anyone in society in a probabilistic sense.

Various surveys on the two sides of the Atlantic and elsewhere have shown that people are all deeply concerned about healthcare (Blendon, *et.al.*, 1990; Mossialos, 1997, Blendon and Benson, 2001, Peiro, 2006) and unpredictable healthcare costs. Various polls in China have indicated that healthcare and healthcare cost are one of the key concerns of the population. Providing reliable needed care at an affordable cost is clearly conducive to happiness and deserves high priority in the social agenda in most countries.

Understandably, many governments are worried about the rising burden of healthcare on the public purse. However, while sustainability is a legitimate concern, a rise in the share of healthcare spending in GDP does not necessarily signal any problem, and may simply reflect the changing needs of society. To control costs, many governments look upon the Singapore healthcare system as a model, as it demonstrably has succeeded in containing public expenditures on healthcare. But with so many rules and restrictions all of which limit choice and potentially welfare, the Singapore model may not be the best option.

The task facing a government concerned with maximizing the public interest is the daunting one of seeking the best deal for the representative individual while facing the fight to promote self interest by different interest groups: from patient and consumer groups to doctors and HMOs to insurance companies and lawyers to pharmaceutical companies and their shareholders. This paper argues that the government needs to define its role narrowly as providing just "basic care" at affordable cost, while leaving the market to take care of "premium care" as long as proper standards and accountability are maintained. Defining what is covered under "basic care" will limit the cost exposure of the government and will give private players maximum room to play out their different roles without fear of unfair competition from the public sector. Politically, by allowing pharmaceutical companies to charge market prices for "premium care" drugs, there is a better chance for the government to be able to negotiate affordable drug prices on the "basic care" list.

The essence of healthcare financing reform, from this perspective, boils down to defining the role of the government appropriately and to working out a cost/risk-sharing formula between the government and the citizen that can effectively preserve the incentives for efficient utilization of healthcare resources and for preventive care, and thus to ensure sustainability.

3. Key Elements of Reform

Economists know well that correct pricing holds the key to economic efficiency.[11] Common folks know well that the dilemma of having to pay beyond one's means or facing the serious consequences of substandard or inadequate care is the source of much agonizing both for the patient and for his immediate family members. Recent analysis by Ho (2001, 2006) further suggests that the prospect of having to face such a dilemma has an immediate negative effect on happiness.[12] Thus any viable healthcare financing package should include:

(1) a pricing policy that ensures fees and charges reflect marginal or direct costs of services;
(2) an insurance mechanism that ensures that patients never have to face the dilemma of either going broke or going without proper healthcare at a time when such care is crucial to preserving health or even survival.

Apart from these basic considerations, providing more choice is assumed to be superior to providing less choice, unless the choices become confusing and lead to disorientation (Schwartz, 2004),. Thus there is:

(3) an imperative to increase choices as long as the benefit of increasing choices exceeds the cost. Finally,
(4) resources should be allocated into healthcare as long as the additional benefit exceeds the cost. This is true for the government as well as for the individual. An appropriate amount of public revenue should be allocated for the prevention of illnesses and accidents, for the treatment of patients, for the training of healthcare professionals, and for research and development. Cost benefit analysis needs to be performed to assess how much of each is optimal. At the individual level, as long as prices are appropriate, we can leave the individual to make his own choice, unless a particular kind of behavior has

[11] Economic efficiency means simply making the most out of what is available. It requires producing at the least cost, allocating resources according to people's choices, and consumption efficiency.
[12] This is called "prospective happiness."

significant external effects on others, in which case government regulation will be necessary.

While most countries continue to see an increase in the share of resources being devoted to healthcare there is evidence of wastefulness and inadequate resources being allocated to healthcare at the same time for many countries. In China, doctors supplement their meager incomes by overcharging patients through drug sales or unnecessary services and procedures so as to obtain bonuses. The practice is encouraged by hospitals which are under-funded by the government and need extra income to make ends meet (Blumenthal, 2005). Because lucrative fees can be charged on high-end services, Chinese hospitals over-invest in costly medical equipment, such as Computerized Tomography machines—the 30.6% ownership rate is even higher than that in major European cities and the US (IBM, 2006).

4. Marginal Cost Pricing for Basic Care for Efficiency

It is important to distinguish between basic care and premium care.[13] For basic care, which is defined as the most cost-effective care to maintain normal health given the constraint of sustainability and universal accessibility, fees and charges need to be regulated and fixed at the marginal cost (the direct cost arising from a service) of the care. This is necessary to minimize both demand side and supply side moral hazard. In general, charging below marginal cost may lead to waste and demand beyond what is optimal. This is well documented by the famous Rand Health Insurance Experiment study (Newhouse, 1993). Charging above marginal cost on the other hand makes providing a service profitable and may lead to supply-side moral hazard. Given the importance of health and the need for timely care patients and information asymmetry, patients and their families tend to comply with suggestions made by their caregivers, especially when they have few alternatives to choose.[14]

It is suggested that governments should pay for all fixed/overhead costs of basic care services, so that there will be no need for user charges to exceed marginal costs. With charges covering direct costs, caregivers also will

[13] This is crucially related to the question of public versus private provision, as pointed out by Lim (2005). As well it is crucially related to the question of affordability: "the thought of denying a fellow human being access to the same level of health care because of his or her inability to pay, stirs deep emotions."(p.461)

[14] Ho(1995) has documented how lucrative fees and charges had caused inappropriate care and waste in China. A more recent study(IBM, 2006) also drew the same conclusion.

not undersupply services for financial reasons. Successful control of supply-side moral hazard is an important reason why both the National Health Service of the UK and the Hong Kong Hospital Authority system are widely considered good value for money. In both healthcare systems doctors as well as other healthcare professionals are paid a salary that allows a reasonable return for their human capital investment. Salaried doctors would not like patients to revisit unless there is a professionally perceived need for it.

While the charges for basic care should be regulated and set equal to marginal cost, the prices of premium services should be left entirely to the market. By definition, patients opt for premium services and they do so only when they perceive good value. The government should not only leave premium care pricing alone, but should also avoid competing with private caregivers in providing such services. It is unfair for the government, which has the authority to tax, to compete with private caregivers for profitable business. When suppliers of healthcare services, including pharmaceutical companies, are thus allowed to earn more for premium services rendered, they will be in a better position to agree to concessionary pricing for "basic care" products and services. Moreover, they will be in a better position to engage in research and development, and further improve their premium services.

While public hospitals and clinics should not compete directly with them for profitable business, private healthcare providers should be allowed and even encouraged to offer basic care services. But if their services are truly "basic" they should follow the government's pricing scheme. For such caregivers, since they are helping the government and are alleviating the public burden to fund healthcare infrastructure it may be argued that the government should provide some lump sum grants to defray part of their overhead costs.

5. Excessive Burden Insurance for Protection

If the public is worried about healthcare being excessively burdensome, then the universal Excessive Burden Insurance (Ho, 1997, 2001a) appears to be a logical policy response. The idea of public healthcare based on an annual deductible has been implemented in Sweden, where a patient who has paid a total of SEK 900 in patient fees from the date of the first consultation is entitled to free medical care for the rest of a twelve-month period (Fact Sheets on Sweden, 2003, Swedish Institute). But there the

fees as well as the annual deductible appear too low to serve the purpose of healthcare financing or that of moral hazard control. Excessive Burden Insurance is an insurance scheme in the sense that each citizen is protected or "insured" against having to spend *beyond his means* in some sense. Under Excessive Burden Insurance the insured person pays the direct cost for services consumed up to a pre-set annual limit which is considered a fair and bearable contribution by the patient. Beyond this "annual deductible" the government will offer complete protection for basic care. Of course, the coverage of basic care needs to be carefully defined. Under an EBI insurance, premiums may either be collected from the public individually or entirely paid for by the government. Excessive Burden Insurance distinguishes itself from most national health insurance schemes in that, before the pre-set annual limit has been reached, citizens are expected to pay the direct cost of healthcare services. A problem with many national health insurance plans is that they mitigate the incentive of citizens to take preventive care and that the effective under-pricing of health services often leads to waste and abuse. Under Excessive Burden Insurance waste and abuse are minimized while any revenue collected through user charges is recycled back into basic healthcare. Although beyond the pre-set limit all cost is absorbed by the government it is argued that those citizens who utilize health services so intensively are likely to have a good reason.

Table 1 and Table 2 in the Appendix provide a numerical illustration to show that in order for a "fee-reducing" insurance program, which is typical of most national health insurance schemes, to significantly reduce the risk exposure to patients, as Excessive Burden Insurance does, the discount off the actual cost of medical care is likely to be as high as 90%. This kind of discount, however, would significantly distort the perception of costs and will cause serious moral hazard.

Finally, it is a well known fact that older people generally use healthcare services much more than younger people, although there can be a great variation from country to country (Hagist and Kotlikoff, 2005).[15] To be fair to everybody and to encourage saving and a healthy life style at a young age, the annual pre-set limit (the annual "deductible") should be raised for those beyond the age of 50 by some specific amount each year up to some socially agreeable amount. Such arrangement would enable the government to collect more revenue that can be recycled back to the public healthcare system to provide timely quality healthcare for the aged.

[15] Their Table 2 is reproduced as Table 3 in the Appendix.

Considering the fact that the healthcare expenditure-age profile has actually *steepened* following the introduction of a new health insurance law in 1996, and that a similar steepening has been observed in many other countries (Steinmann *et.al.* 2007), making people aware of the high cost of healthcare if their health should decline significantly when they get old may be the crucial step necessary to prevent the expansion of morbidity as discussed in Olshansky *et. al.* (1991)

6. Lifetime Healthcare Supplement (LHS) for Greater Choice

While conceptually "basic care" is "the most cost-effective care to maintain normal health" defining the boundary between basic care and premium care is not entirely a scientific exercise. It depends on the expectations of the community, as well as the readiness of the community to fund healthcare. Presumably, if the annual deductibles are higher, the government will collect more revenue from patients. The coverage of basic care can be broader.

In general, because care using the latest technology is usually very costly, the community may not be able to afford including certain expensive treatments/drugs as basic care, even if they are proven effective in restoring normal health/functioning. Addressing this concern, the Lifetime Healthcare Supplement (LHS) is proposed as a cost-sharing arrangement to offer patients the opportunity to take advantage of these latest advances in medical knowledge with assistance, while limiting the cost exposure to the government. Under this arrangement, the government will set aside some contingent funds for each member of the community in a LHS account in his name. Patients can draw funds from this account to pay for any form of care as he sees fit, but they must match the withdrawals with their own funds according to a stipulated ratio. Moreover, since the funds put up by the government is fixed for the lifetime of each individual, if a patient draws funds now, he will have less available in the future. Thus the lifetime fixed amount caps the contingent cost to the government and in addition helps preserve the incentive to use the resources wisely. The matching requirement is like a co-payment in insurance to reduce moral hazard problems. Because of the matching requirement and the availability of Excessive Burden Protection for basic care, only a fraction of the community will ever draw funds. In addition it is also likely that cumulative lifetime withdrawals in the end will not exhaust the funds in the account. What proportion of the population will draw funds from their LHS accounts and what proportion

of the funded amounts will be withdrawn are empirical questions that will be answered with experience.

7. Political and Administrative Feasibility

The suggestion that basic health care fees should be based on direct costing and that the annual deductible should rise from age 50 raises worry that it may not be politically feasible. This is on top of the worry that it might undermine access to care or might cause costly delays in getting care. These are valid concerns and need to be addressed.

To mitigate the affordability problem under excessive burden insurance,[16] discounts on fees and reduced annual deductibles may be given those found to be poor. Moreover, for those who are receiving welfare payments, an increase in their monthly stipends may go hand in hand with charging them a reduced fee. The increase in the welfare stipend can in principle reduce the net increase in burden to as small as is desired.

With the affordability issue taken care of, and with the promise of better, more timely and more reliable services in the offing, and on top of that with the offer of the Lifetime Healthcare Supplement— there is a good chance that political feasibility will not be a problem.

Administratively the proposal is easy to implement especially in light of today's information technology. Indeed Sweden has been implementing some kind of excessive burden protection for over a decade. The proposed system will require setting up a separate central file for each eligible citizen. Under this file will be recorded his medical history, blood type, what he is allergic to, as well as his "basic care" medical spending within the year. The system will be automatically alerted when he has paid up his annual deductible. From that time on till the end of the year the government will be responsible for all his basic care medical expenditures.

The public healthcare system will provide basic healthcare only and will announce official basic care charges from time to time. Private caregivers

[16] Bundorf and Pauly(2006) found evidence that in the US one quarter to 3/4 of the uninsured can actually "afford" but did not choose to get coverage. Perceived value for money, which may be affected by the insured person's own perceived health, will affect enrollment. Without mandating health insurance, it is quite likely that some people will stay uninsured even when it is subsidized.

who opt to provide basic care will have to charge the same rates, but they have the option to provide better than basic care and to charge more, as well as to provide premium care. In the case where caregivers provide better than basic care, only the official basic care charges will be recorded as insurable expenditures. With authorization by the patient private caregivers will have access to the central file and will record his "basic care" expenses and treatment history as well. The patient's central file will therefore provide the basis of "seamless care" and will serve multiple purposes, including epidemiological studies that can prove crucial to public health.

8. Conclusions

Healthcare reform is on the agenda of almost every government. Social scientists are in a unique position to inform policy makers in the reform process. It is important that policy makers take full account of human nature when they go about designing the reform package: the human propensity to follow the natural course of incentives, the aversion to extreme risks, and the preference for autonomy. If healthcare reform can reduce the worries of citizens it will immediately contribute to the happiness of the society. If rules and restrictions are minimized and people are given a greater sense of autonomy when they conduct their lives happiness will be enhanced. Reference to human nature will usually reveal why some healthcare reform fails. Moral hazard is a case in point. The challenge is to combine market-oriented options, which will make people more cost-conscious, with public provision, which can reduce risk and information cost and can better ensure quality, innovatively so that healthcare reform works with rather than against human nature.

While many policy makers are right to be worried about containing costs, a rising percentage of the GDP being spent on healthcare does not necessarily signal a problem. It may simply reflect society's new priorities, changing demographics, and the latest advances in technology. Sustainability, however, is a valid concern. One key reason why national health insurance systems may not be sustainable is the demand-side moral hazard problem caused by the under-pricing of key services and the supply-side moral hazard problem caused by the profitability of rendering services by caregivers. Containing the moral hazard problem is fundamental to achieving sustainability. Pricing "basic care" at or near true marginal cost (direct cost) must be an important component of a sustainable healthcare system. For premium care, to the extent that it is

consumed voluntarily and that it is provided by the free market without subsidy, pricing should not be regulated.

Given the citizens' concern for excessive burden, some form of excessive burden protection is logical. To an extent this is already in place in many countries. The Medishield in Singapore for catastrophic insurance is a case in point. Excessive burden insurance as discussed in this paper, however, is more flexible in that it covers not only specified illnesses but all basic care expenses up to the yearly pre-set limit.

The idea of a high deductible health insurance plan is also already quite well known, particularly in the United States, where High Deductible Health insurance Plans (HDHPs) are often paired with a Health Savings Account.[17] The purported advantages of such plans by way of reducing the cost of insurance premiums and of reducing waste are also well known. However, HDHPs have been criticized as undermining access to care and as failing to cause a dent in the trend for rising health insurance premiums (Davis, Doty, and Ho, 2005). Regarding access, a problem with the American situation is that there is no regulation of basic care charges and there is typically a co-payment of 20 per cent even after the deductible amount. Because HDHPs account for only about 8% of all private insurance plans it is not surprising that they do not have any noticeable effect on overall costs. The observation that HDHP has effectively reduced access suggests that it is effectively reducing utilization of health services and should therefore reduce overall costs, provided that it is widely used. Instead of the fear that HDHP may fail to reduce overall costs, then, the fear is that it may be reducing warranted care.

To alleviate excessive burden for the poor and in order not to undermine access, we have suggested that eligible persons passing a means test may enjoy lower fees and lower annual deductibles. The appropriate discount has to be determined through consultation and consensus, and may be supplemented by a greater stipend for those who currently receive welfare payments. Efficiency considerations dictate that no one should be totally exempt from healthcare charges. Thus redistribution and resource allocation are two different and equally worthy objectives and will require two different policy instruments to achieve them.

[17] Unlike the mandatory health savings accounts in Singapore, US Health Savings Accounts are voluntary with contributions encouraged by tax advantages.

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Appendix

Population of 100,000 is assumed. Social cost of healthcare for the unfortunate in a year assumed to be $100,000 that for the fortunate $10,000 (10 being the "Misfortune Multiple"). Individuals pay full direct costs of care up to the cap under Excessive Burden Insurance. "Risk ratio" is defined as Maximum Cost to Individual divided by Minimum Cost to Individual. Expected cost = Sum of Minimum Cost and Maximum Cost weighted by probabilities. "Premiums" are the amounts needed to fund the insurance program, ignoring administrative costs. Table 1 shows that the risk ratio is less than 2 for annual deductibles of $20,000 under Excessive Burden Insurance. Table 2 shows that if the risk ratio is to be reduced to less than 2 under Fee-Reducing Insurance, the fee reduction will have be equal to a 90% discount. Moreover, at 100% discount (i.e., no charges at all), stakes under FRI would be identical with stakes under EBI with an annual cap at $10,000. Given human nature as it is, this is likely to reduce preventive care and cause serious moral hazard problems.

Appendix Table 1: Excessive Burden Insurance when misfortune multiple = 10 and probability of misfortune = 1%

Amount of Annual Deductible D (The "Cap")	Charges paid by fortunate	Charges paid by unfortunate	Premium Required	Minimum Individual Pays	Maximum Individual Pays	Individual's Expected Cost	Risk Ratio
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)=(f)/(e)
10000	*10000*	*10000*	*900*	*10900*	*10900*	*10900*	*1.00*
20000	10000	20000	800	10800	20800	10900	1.93
30000	10000	30000	700	10700	30700	10900	2.87
40000	10000	40000	600	10600	40600	10900	3.83
50000	10000	50000	500	10500	50500	10900	4.81
70000	10000	70000	400	10400	60400	10900	5.81
60000	10000	60000	300	10300	70300	10900	6.83
80000	10000	80000	200	10200	80200	10900	7.86
90000	10000	90000	100	10100	90100	10900	8.92
100000	10000	100000	0	10000	100000	10900	10.00

Note: "Premium Required" is calculated as total healthcare costs minus fees collected divided by the population. Premiums are assumed to be collected in these examples but in practice may be funded from the general revenue.

Appendix Table 2: Fee Reducing Insurance when Misfortune Multiple = 10 and Probability of Misfortune = 1%, assuming behavior is neutral, i.e., not affected by the high premiums.

Discount Factor d	Charges Paid by Fortunate	Charges Paid by Unfortunate	Premium Required	Minimum Individual Pays	Maximum Individual Pays	Individual's Expected cost	Risk Ratio
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)=(f)/(e)
10%	9000	90000	1090	10090	91090	10900	9.03
20%	8000	80000	2180	10180	82180	10900	8.07
30%	7000	70000	3270	10270	73270	10900	7.13
40%	6000	60000	4360	10360	64360	10900	6.21
50%	5000	50000	5450	10450	55450	10900	5.31
60%	4000	40000	6540	10540	46540	10900	4.42
70%	3000	30000	7630	10630	37630	10900	3.54
80%	2000	20000	8720	10720	28720	10900	2.68
90%	1000	10000	9810	10810	19810	10900	1.83
100%	*0*	*0*	*10900*	*10900*	*10900*	*10900*	*1.00*

Note: "Premium Required" is calculated as total healthcare costs minus fees collected divided by the population.

Appendix Table 3: Healthcare Benefit-Age Profiles for 10 OECD Countries

	0 – 14	15-19	20 – 49	50 – 64	65 – 69	70 – 74	75 – 79	80 +
Australia	0.60	0.57	0.64	1.00	1.81	2.16	3.90	4.23
Austria	0.28	0.28	0.46	1.00	1.42	1.75	1.98	2.17
Canada	0.43	0.61	0.65	1.00	2.45	2.44	4.97	7.54
Germany	0.48	0.43	0.58	1.00	1.52	1.80	2.11	2.48
Japan	0.44	0.22	0.43	1.00	1.70	2.20	2.76	3.53
Norway	0.57	0.34	0.52	1.00	1.70	2.21	2.69	3.41
Spain	0.57	0.39	0.48	1.00	1.46	1.73	1.97	2.11
Sweden	0.43	0.43	0.63	1.00	1.50	1.50	1.96	1.99
United Kingdom	1.08	0.65	0.76	1.00	2.07	2.07	3.67	4.65
United States	0.88	0.82	0.77	1.00	5.01	5.02	8.52	11.53

Source: Hagist and Kotlikoff (2005), Table 2.