



## Medical savings accounts in a universal system: wishful thinking meets evidence

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### Abstract

Medical savings accounts (MSAs) and similar approaches based on flowing reimbursements through individuals/consumers rather than providers are unsuited for systems with universal coverage. Data from Manitoba, Canada reveal that, because expenditures for physician and hospital services are highly skewed in all age groups, MSAs would substantially increase both public expenditures and out-of-pocket costs for the most ill. The empirical distribution of health expenditures limits the potential impact of many current ‘demand-based’ approaches to cost control. Because most of the population is relatively healthy and uses few hospital and physician services, inducing the general population to spend less will not yield substantial savings.

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### 1. Introduction

Although most existing experiments with medical savings accounts (MSAs) occur within pluralistic funding systems, they are increasingly being pro-

posed as an “innovative” mechanism to finance care within systems of universal coverage. MSA supporters variously claim that they can reduce government expenditure on health care services, constrain the growth rate of health expenditures, lower taxes, expand the range of insured services, help the poor and the chronically ill, increase expenditure on preventive services and thereby save money in the long run while making people healthier, change the nature of the physician–patient relationship, eliminate waiting lists, and revitalize the health care system. We suggest that advocates of MSAs and similar approaches base their claims on a misreading of evidence (particularly of

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findings from the RAND health insurance study) and a failure to incorporate the implications of the actual distribution of health care utilization in a population.

Although all health care systems have their unique characteristics, findings from Canada, where there is universal first-dollar coverage for all “medically necessary” physician and hospital care, are likely to be applicable to other systems which provide universal coverage. This paper presents data from the Canadian province of Manitoba. Our results suggest that substituting MSAs for the current methods of financing hospitals and physician services would substantially increase public expenditures, unless insurance coverage is cut dramatically. No feasible method of tailoring MSAs to individual needs on the basis of age, sex, income and health status can eliminate this cost increase if all members of the population are to be covered. Indeed, the empirical distribution of health expenditures limits the potential impact of many current ‘demand-based’ approaches to cost control.

Subsequent sections of this paper examine, in turn:

1. some inconsistencies and mutations in MSA plans being proposed for Canada,
2. reasons why the RAND insurance experiment cannot be directly applied to the policy debate about MSAs in universal systems, and
3. the cost implications to a single payer should MSAs be introduced.

Computations are based on data from Manitoba, Canada on the distribution of spending for hospital and physician services, and focus on two groups, one with low mean expenditures (men age 25–35) and one with high spending (women age 75+). MSA advocates have assumed, often on the basis of the RAND results, that very large reductions in the use of the healthcare system would result if individual consumers were given control of the funds used to provide health care and appropriate incentives to use less of it. A sub-analysis accordingly computes the results should utilization respond maximally to the incentives claimed for MSAs. The paper concludes by briefly considering the implications of the distribution of health expenditures for demand-based approaches to cost controls.

Our analysis does not address the issue of which services should be publicly financed. Indeed, Canada, with about 70% of expenditures coming from public

sources, is among the least publicly funded systems in the industrialized world [1,2]. As recent reviews of Canada’s health care system have noted, it is difficult to defend the current omission from publicly-funded insurance in many Canadian provinces of elements of home care, pharmaceutical coverage, rehabilitation, mental health, and other clearly “medically necessary” services merely because of where or by whom this care is delivered [3,4]. Nonetheless, the question of what should be paid for is analytically separable from the question of how best to finance whatever goods and services the costs of which society has agreed to pool. This paper addresses the implications of moving from systems under which this pooled money is used to reimburse providers directly, towards systems which instead flow those resources to individuals, in the expectation that they will become wiser purchasers of health care services.

## 2. Variations on the theme

Although details vary, MSAs are a financing mechanism whereby individuals combine a high-deductible catastrophic insurance policy with a savings account intended to pay “small” medical bills as they arise. Unspent funds can roll over for use in future years.

Much of the debate on MSAs has relied on theoretical arguments, plus some limited empirical analysis of the models in Singapore, South Africa, China, and the United States [5–26]. This literature includes efforts to anticipate what might happen should MSA models be applied in the US and attempts to explain why they had not been received as enthusiastically as proponents wished [27–38]. In such developed countries as the United States, these plans are often marketed as a tax advantage, because individuals (or their employers) can contribute a tax-exempt portion of their income to these accounts. In the United States, MSA proposals have long been a mainstay of Republican health reform initiatives [37,39] and are a major component of their newly passed Medicare reform bill [40]. In a publicly-funded system, in contrast, individual savings accounts are often assumed to be funded by government transfers to individuals of funds that, under the current system, are directly allocated to physician services or hospital funding.

As Dixon has noted in her review article, advocates have suggested that MSAs will “reduce moral hazard, increase choice, improve the efficiency of insurance, and result in lower costs and expenditures on health care” [5]. The dream of a patient-driven system in which everyone comes out ahead—being able to cover a wider array of services while spending less money and retaining individual choice—has proven a powerful one. In Canada, MSAs were proposed by several private think tanks [41–46], picked up by Alberta’s Premier’s Advisory Council on Health [47], received favorable mention in preliminary reports by the Standing Senate Committee examining the health care system [48,49], and were advocated to the Romanow Royal Commission on the basis of their purported success in Singapore, China, and the US. The Canadian province of Alberta actually announced its intention to implement MSAs, and other provincial governments were giving the concept careful attention.

Although MSAs vary considerably in their details, all consist of an individual allowance (which may vary by age, sex, health status, and/or income) and a threshold (beyond which costs are considered ‘catastrophic’ and become fully paid by a third-party insurer). There is no insurance coverage for costs in the “corridor” between the allowance and the threshold, thus introducing incentives for economical use of health services. The net costs of MSA models—as well as who bears them—accordingly depend on a number of variables, including:

1. The levels at which the allowance and the threshold are set, and which, if any, factors are used to adjust these amounts.
2. The source of the money for the allowances (government, employers, and/or individuals), the extent to which privately-paid allowances are tax deductible, and whether participation is voluntarily or mandatory.
3. Permitted uses of the allowance. In addition to specifying what services can be purchased with the allowance, other policy decisions concern how any surplus in MSA accounts will be treated. For example, the government may claw back portions, or allowance holders may be able to keep the surplus as personal income, use it to purchase approved but uninsured services, retain it for future years, or transfer it to a retirement savings account. Dif-

ferent rules will clearly lead to different incentives for various players.

### 3. Different proposals

Clearly, the more attractive a model is to potential consumers, the less attractive it is to potential funders. Among the most widely discussed Canadian models was suggested by a privately-funded think tank, the Consumer Policy Institute (CPI), in 1997 [41].

Within our proposed system, each Canadian would have a Medical Savings Account, similar to an RRSP, into which the government would deposit, an amount equal to its current health care contribution or on average, about \$ 2500 per year (the very young and the very old, who have greater medical expenses, would receive more, others less). Of this \$ 2500, about \$ 1600 would pay the premium on a catastrophic health insurance policy, to cover hospitalization and other major expenses; the balance—about \$ 900 per year—would remain in each person’s account, to be spent as necessary for routine purposes such as doctor’s visits. If someone exhausts this balance, the catastrophic policy would kick in, ensuring that no one is ever left without medical care. But when Canadians don’t spend it all—and most of us won’t—the money becomes available to be spent in future years for uninsured medical purposes, such as dentistry and drugs, as well as on preventative medicine. Government health care costs, meanwhile, become restrained. Under this system, there are no losers.

Similar proposals under which government provided relatively large allowances (often equivalent to current per capita expenditure under publicly-financed health care) and permitted individuals to keep, and even invest, the difference between their allowance and their spending were inherent in most of the Canadian proposals [42–44]. The Montreal Economic Institute proposed that “individuals would be allowed to opt out of the hospital, medical, laboratory, or drug coverage and take the average annual per capita cost of these respective services in equivalent dollars with them” [45], while the Frontier Centre assumed that *all* the money now being spent by government for health care would be used for these accounts [46]. How-

ever, actual data on experience in a system employing universal coverage has been largely lacking.

Forget et al. accordingly examined actual expenditures for individually-attributable physician and hospital services—the services which must be publicly insured under the terms of the *Canada Health Act*—in the Canadian province of Manitoba between 1997 and 1999 [50]. Whereas most analyses of MSAs focus only upon average spending, Forget et al. examined how this expenditure was distributed. Health expenditures were found to be heavily skewed. The healthiest 50% of Manitobans used about 4% of resources, while the sickest 1% used 26%. In every age group, at least 80% of all people incurred costs less than the average for that age, while a small proportion incurred very high expenditures. Their results paralleled those found in an analysis of the US National Medical Expenditure Studies [51].

This distribution in turn implied that most formulations of MSAs would involve sending money to many relatively healthy people, without generating offsetting savings from the sickest, most of whose costs would still be paid by catastrophic insurance provisions. “Incentives” to economize on the use of care cannot generate meaningful saving from people who are currently spending very little for insured health-care services. Within a universal system, this preliminary analysis suggested that MSAs would significantly increase government expenditure on health care, with most of this increased spending going to the healthiest members of the population.

#### 4. Altered assumptions

In response, Canadian MSA advocates have dramatically, if quietly, altered their model in several ways. First, they substantially reduced the size of the allowance which would be paid by government, and converted it from direct payments (which would appear on provincial balance sheets as expenditures) into tax-based credits (which would represent only foregone revenue). For example, CPI revised their model to allow government to claw back a proportion (usually half) of the surplus remaining in the accounts, while Carey noted that the allowance need not be a cash payment, but instead a notional credit, which can be drawn down but not otherwise used

[52]. A committee advising the Alberta government proposed that the health insurance premiums paid to the province—which cover about 13% of the cost of health care provided in that province—be diverted into MSAs [47]. Ramsay suggested that “the size of the government’s contribution could vary from the whole to a fraction of the catastrophic insurance policy’s deductible, depending on a person’s health, age, and income level” [43]. The Atlantic Institute for Market Studies proposed that government payments go only to low income individuals; everyone else would pay for all expenditures below the threshold “directly out-of-pocket or from tax-deferred deposits made by consumers in the MSA itself” [53]. Migué’s proposal would be financed through a tax credit or deduction rather than by government payments [54].

From a distributional viewpoint, once these allowances become “self-financing,” MSAs become a high deductible catastrophic insurance policy with or without a tax break, rather than a novel approach to the use of public money in financing health care. Clearly, eliminating any government role in financing health care will save the government money, although costs to society (and business) would probably be higher. Proponents of these ‘self-financing’ variants—which do not include all MSA advocates—thus make explicit the underlying ideological debate. As Evans has noted, these variants have as their purpose the erosion of universality, replacing social solidarity by individual responsibility, and shifting the distribution of costs from the rich and healthy to the poor and unhealthy [55].

However, few MSA advocates overtly base their arguments on these grounds. Shifting costs from third-party payers to individuals has little public appeal, and will not reduce the overall burden of health expenditures within society. Their justifications for MSAs instead frequently draw upon assumptions about other changes which are believed to occur in how health care is financed and delivered as a result of moving the locus of control from government to individuals.

Some MSA advocates believe that the prices paid for particular services would decline as a result of bargaining between the user and the provider, plus various other supply-side reforms logically unconnected with MSAs. For example, an e-letter to *CMAJ* [52] argued that MSAs cannot achieve their goals unless

delivery is fully privatized, and health professionals lose their professional monopoly, writing “another necessary component of a MSA system would be that all professional and labor services would operate in a free market. In other words, there would be no artificial limitation imposed on the training or licensing of any discipline, nor on the negotiation by an individual with his, or her, employer”. One does not need to debate the merits of such a free labor market, or its ability to achieve the proposed cost savings, to recognize that an MSA proposal dependent upon eliminating professional licensure, fee schedules, and all health care unions is unlikely to occur in the foreseeable future in any industrialized nation.

The second set of suggested changes are independent of the prices of particular services; they assume that utilization would decrease enough to compensate for the increased costs associated with transferring large sums to the healthy. Because the RAND Health Insurance Experiment results are frequently cited to justify these reductions, it is worth scrutinizing the RAND study to see the relationship between the design decisions made in this study, and the ability to apply their results to analyze the likely impact of MSA models in a universal system.

### 5. Elasticity of demand and the RAND health insurance experiment

“Price sensitivity” or “elasticity of demand,” a basic concept in economics, predicts that, other things being equal, when the price of any commodity increases, the quantity demanded will decrease. The key issue is the size of this effect. Certain decisions are highly price sensitive; others are far less so. In the case of those expenditures highly sensitive to changes in price, an increase in price might cause such a large reduction in quantity demanded that total expenditure declines. For other less price-sensitive commodities, an increase in price will lead to an increase in total expenditure.

Clearly, health care is heterogeneous; a person brought into an emergency room after a traffic accident is likely to be less price conscious than an individual contemplating a visit for the sniffles. The best available information about price sensitivity comes from a randomized controlled trial of co-payments for health insurance conducted by the RAND Orga-

nization between 1974 and 1982 [56]. The approximately 2000 families participating in the experiment were assigned to one of 15 insurance plans; 14 were fee-for-service plans, which systematically varied the *coinsurance* rate (the fraction of billed charges which the individual had to pay out-of-pocket) and the maximum dollars which would have to be expended in a 12-month period, and the 15th was a prepaid group practice (i.e., an earlier form of managed care). Coinsurance could be 0 (free care), 25, 50, or 95%; maximum charges (MDE) could be 5, 10, or 15% of family income, to a maximum of \$ 1000. In that connection, MDE corresponds to what we have termed the catastrophic threshold. However, because this classic experiment was not designed to test MSAs, a number of the design decisions, fully appropriate for that study, may limit our ability to generalize its results to an entire population.

A number of issues affecting the generalizability of the RAND results are beyond the scope of this paper. Accordingly, we will not discuss such legitimate questions as the extent to which physicians might react to widespread cost sharing by altering their practice patterns (the debate about “supplier induced demand”) [57,58]. Neither will the paper deal with whether changes which have subsequently occurred in the structure and nature of medical practice (e.g., dramatic declines in hospitalization) might have changed their findings. These effects are unlikely to be trivial; there is a widespread belief among health economists that problems of medical practice variation and inappropriate care delivery are unlikely to be solved by demand-side interventions [59]. However, this paper will focus primarily on the implications of the selection criteria used by RAND for conducting a population-wide analysis.

The RAND experiment is a careful study, clear about its own limitations, and a model of how to conduct experiments in this extremely difficult area. As the RAND scholars themselves make explicit [56], the population studied by RAND was basically healthy. Those over the age of 62 were ineligible for the experiment, as were those who had end-stage renal disease, or had been out of the labor force for more than 2 years and had a medically certified disability. In addition, the fact that refusal rates were only 8% for the plan without co-payments, but as high as 25% for the plan requiring a 95% co-payment (which also had

a higher attrition rate) suggests that the highest need population was least likely to agree to enroll in a high co-payment plan. The study noted that “attrition from death, institutionalization for health reasons, and becoming eligible for Medicare by virtue of becoming disabled are at very low levels (1–2%) on all plans” [56] (p. 19). Only 11 deaths occurred among those on the free care plan [56] (p. 25).

This experiment is widely cited for its finding that those receiving free care (no deductible) were more likely to use services, implying a considerable income elasticity in demand for health care services. However, the main difference found was in the likelihood of receiving any care at all, rather than in the “intensity” of services received once a decision was made to seek care. The sickly proved to be as (or more) responsive to price than the healthy [56] (pp. 48–49). Price responsiveness was strongest among the poorest participants and for outpatient care as opposed to inpatient care, because most patients requiring hospitalization had already exceeded their upper limit (removing economic incentives as a factor affecting utilization).

Overall, per-person expenditure on the plan with the highest copayments (the 95% plan) was about 69% of that on the free-care plan; adjusting for the fact that some of those had incurred costs but failed to file the paperwork raised it to about 75% [56] (p. 79). Although MSA advocates usually suggest that the RAND results mean that utilization would be reduced by 30% [37], the study actually found that the reduction varied considerably by type of care. Thus, the ratio of visits for those on cost sharing plans to those with free care ranged from 0.36 (for asthma) to 1.35 (for acute alcohol/drug related); the ratio for chest pain/acute heart disease was 1.04 (p. 155), suggesting minimal elasticity. The study divided diagnostic categories into those seen as “more urgent” or “less urgent” (based on the seriousness of the diagnosis and the need for immediate care). The RAND authors noted an overall 23% drop for the more urgent diagnoses, versus a 47% drop for the less urgent ones. However, use for the more urgent diagnoses was 85% of the free plan rate if there was a 25% copayment, but only 65% if the copayment rose to 95% [56] (p. 157). This drop was not related to the effectiveness of treatment; cost sharing “is just as likely to lower use when care is thought to be highly effective as when it is thought to be only rarely effective” [56] (p. 162). Even more disquietingly, non-poor chil-

dren showed no response to cost sharing, whereas “for poor children, by contrast, there are significant differences for 14 diagnoses” [56] (p. 161). They concluded that “cost sharing has a non-specific effect on the use of medical services . . . in particular, it reduces appropriate and inappropriate services-or highly efficacious and relatively inefficacious services-by the same proportions” and noted that these findings tended to disprove “the theory . . . that cost sharing reduces the least-valued services” [56] (p. 162).

Because the RAND study population tended to be healthy, the finding that eliminating medical visits did not have a significant impact on short-term health status is unsurprising, particularly since the study did not examine longer-term impacts. Advocates of user fees have since used that finding to argue that incorporating user charges would diminish utilization, without adverse effects on the health of the people being asked to pay them. However, although numbers were small, the RAND study did find that, for the small number in sub-populations with conditions likely to respond to medical treatment, health outcomes were significantly worse for those on cost sharing programs as compared to those receiving free care. This applied, for example, to individuals with hypertension (which was never diagnosed or treated among a group of individuals deterred by the fees from visiting a physician) and to those who were discouraged from seeking mental health, vision, or dental services.

Although the RAND study makes a strong case that over-treatment can be as harmful as under-treatment, they explicitly argue that “the burden [from cost sharing] on the poor and on persons (particularly the poor) with chronic conditions is a separate issue and should be dealt with as such” [56] (p. 357); this caveat is missing from much of the work purporting to cite this study. Indeed, the RAND authors argue that “a sufficiently high MDE [equivalent to the threshold] effectively loses any resemblance to insurance, and the health consequences of no insurance relative to some insurance may be larger than any of the variations in health outcomes that we saw” [56] (p. 361). Individuals under treatment for chronic problems are singled out; they cite work by Nicole Lurie and colleagues showing that “for a subgroup of the population lack of insurance could have catastrophic consequences”. The authors conclude that too high thresholds is “bad policy for two reasons: (1) they impose more risk than

much of the population wishes to bear; and (2) at a level at which they effectively become no insurance, they can have serious health consequences”.

The RAND elasticities have been applied to estimate the potential impact of MSAs on healthcare costs for the non-elderly in the USA [27]. However, as we demonstrate, this almost certainly over-estimates the extent to which the RAND results can be extrapolated to predict the implication of such allowances on the utilization of services in a less-selected population.

## 6. Economic incentives at work

When the price of any commodity increases, two factors come into play. The first is the substitution effect, which implies that those goods that increase in price will be substituted for by similar but less expensive goods. An increase in the price of medical services ought to cause people to consume fewer of the medical services previously paid for fully by insurance and more of substitutes, such as over-the-counter drugs and alternative practitioner care. The substitution effect always works to reduce the quantity demanded of a product when its price rises, although the size of that reduction is an empirical question. In addition, when the price of a significant commodity increases, the real incomes of consumers decline, in the sense that now they have less money to spend on *all* commodities, including health care. As the price of health care increases, people would experience such reductions in their real incomes; this income effect means that they would therefore be expected to consume less of all normal commodities, including health care. Increased incomes, in contrast, would allow for higher expenditure for health services.

For both practical and ethical reasons, one feature of the RAND study was a guarantee that “no one would become financially worse off as a result of participation in the experiment” [56] (p. 12). Participants were accordingly given side payments (“participation incentive”) and the maximum out of pocket expenditures each year were capped. As Newhouse noted, this was in turn likely to affect the income effect (although they made considerable efforts to analyze its extent).

If, however, third-parties (including government) provided MSA allowances to individuals, those currently spending less than their allowance would have

their incomes increased rather than decreased. If health care were a normal commodity these consumers should then consume *more*, rather than less, health care. This tendency would be enhanced if models restricted how the money could be used and/or clawed back a proportion of it. Because income and substitution effects work in opposite directions for the proposed MSAs, any overall reduction in utilization of health care services by this group of healthy people will be minimal. In fact, consumption of health services may well increase. Similarly, those very sick individuals whose expenditure falls within the catastrophic zone are likely to have a smaller response than the reductions found by the RAND study because their care would be fully paid for by third parties. The likely impact of MSAs thus depends in large part on the actual distribution of health expenditures in a population.

## 7. Evaluating the models

Analysis of the impact of MSAs also requires clarifying what model is being tested. Our analysis accordingly begins with the most widely promoted MSA model in Canada, that proposed by the CPI. However, this model has many similarities to the Health Savings Accounts being proposed in the United States as a replacement for their current Medicare coverage for seniors [37,40]. An actuarial study commissioned by CPI, written in 1998 by Litow and Muller from the firm of Milliman and Robertson [60] has been widely cited by MSA advocates as having demonstrated that Canada could achieve cost savings on the order of \$ 6 billion annually. The results are similar to those from Litow’s evaluation of MSA proposals in the United States, which are quoted as concluding that there could be savings of \$ 273 billion over 7 years, without any loss of health coverage [37]. However, closer scrutiny of the report for CPI reveals that this conclusion is tautological. On page 9 they state explicitly that the proposed health care allowance scenarios which they cost begin with the *assumption* that the plan will be cost neutral, adding that “utilization reductions are assumed to match the expected aggregate Health Care Allowance Account balances accrued to consumers at the end of the year” [60]. That is, either prices of health care services, or the quantity of health care services

consumed, or both together are assumed to decline by an amount large enough to offset the large costs imposed upon the government funder by the creation of health care accounts.<sup>3</sup>

Although many advocates of MSAs now argue that the allowance should be based on some combination of age, sex, health status and/or income, the Litow and Muller computations are based solely on average costs by age and gender, and our analysis will follow suit.<sup>4</sup> Their design for MSAs has the following features: the public sector would provide catastrophic insurance and an annual allowance to each eligible individual; the annual allowance, the corridor and the threshold would be based on age and gender to reflect differences in the average costs for these sub-populations; any money left in the allowance at the end of the calendar year would belong jointly to the government

<sup>3</sup> These assumed reductions are based on the authors' "judgement" [60] (p. 8). As the authors recognize, "if utilization reductions are less than anticipated, aggregate government costs will be greater and could exceed costs under the status quo". Furthermore, although these models provide few economic incentives for individuals to constrain catastrophic expenditures (which are defined as being fully insured), the study assumes the same reductions will apply to all spending, not just to spending below the threshold. Without these very large reductions in demand, the report itself states that costs to the government increase by between \$ 4.31 billion if only primary care is funded through MSAs, and \$ 6.83 billion if all health care is funded through MSAs. The analysis this firm performed for the Republican plan has fewer details, but closely resembles the CPI plan: it sets the catastrophic threshold at \$ 3000 for each person over age 65, and the allowance at either \$ 1500 or \$ 2100, depending upon whether or not Managed Care is employed, while allowing beneficiaries to keep any money remaining in their accounts [37].

<sup>4</sup> As far as we can determine, the Milliman–Robertson study took Canadian data on spending for age–sex categories, but did not use actual data on the distribution of health costs, which would not have been available from the national sources it cites. Instead, it appears to have adapted an unspecified "adjusted claim probability distribution" drawn from a proprietary US database used to construct premiums for group insurance policies (rather than to predict individual spending) to estimate Canadian average spending for each age–sex category. Note that claims data bases would have no reason to estimate the expenditures for those individuals who would not exceed the deductible; if the insurance company would pay only for expenditures above \$ 500, for example, it is unclear how one would distinguish individuals spending \$ 450 from those spending nothing, since neither of them would have made a claim. Hence, although details are not provided, the database they used would be unlikely to be able to capture the distribution of expenditures in the population.

and to the individual (in this specific version, half of the unspent balance would revert to the government funder, and the other half would be retained by the individual for uninsured services, for future health care expenditure or, ultimately, for retirement savings) [60].

MSA models assume significant reductions in utilization once individuals have fiscal incentives to spend less on health care. Clearly, any expenditure that falls into the corridor will be maximally subject to these incentives. Individuals pay these costs directly, and have no allowance to cover them. On the other hand, there is little economic incentive to reduce utilization for those costs exceeding the catastrophic threshold. At the margin, the government pays all these costs, and therefore any savings will revert to the government rather than to the individuals receiving care. The analysis in this paper looks only at the short-term incentives applying to an individual in a given year. It does not seek to incorporate the longer-term implications of these short-term decisions. For example, individual decisions to forego care could either reduce future expenditures (e.g., if that care would have led to a cascade of other expensive interventions), or increase them (e.g., if failure to receive preventive services would make subsequent catastrophic costs more likely). The data used in this study do not allow us to ascertain the magnitude or relative impact of these hypothetical trajectories of care.

This analysis also recognizes that the incentives for those expenditures that are less than the annual allowance depend, in part, on what happens to the surplus. If the surplus is entirely clawed back by the government, then the incentive is to spend the allowance before it disappears. If the individual may keep part or all of the allowance, then the individual has an incentive to economize, but the government (and ultimately the taxpayer) will not necessarily save money, even if individuals spend less on health care. If individuals are allowed to keep the entire surplus, then any reduction in health care expenditures of people currently spending less than the allowance would be more than offset by the additional payments made by the government to those individuals. Although the net cost implications depend upon plan details, these will thus depend crucially upon the distribution of costs within the population.

## 8. Manitoba data

The Manitoba Population Health Research Data Repository captures standardized data, based on almost every physician and hospital contact in Manitoba. This information (including anonymized patient identification number, physician claims, diagnoses, costs, hospitalization and institutionalization data) is maintained and controlled by Manitoba Health. All records deposited in the repository have been processed by Manitoba Health to remove patient identifiers such as name and address, while preserving the capacity to link records together to form individual histories of health care use. All uses of this database are subject to approval by Manitoba Health, and compliance with its ethical guidelines. The database includes direct information on physician billings. The method omits capital costs, the costs of blood and blood products, salaries for residents and trainees, some patient visits outside the province, and care for non-residents of Manitoba treated in Manitoba [61]. The costs of inpatient hospital care and day surgery procedures are estimated by applying the Manitoba average cost per weighted case to each discharge [62,63], using resource intensity weights from the Canadian Institute for Health Information to impute appropriate per diem costs for the various kinds of admissions and procedures [64]. Total cost of care for an inpatient or day surgery patient includes all physician services received during the hospital stay.

The validity, reliability and usefulness of the data have been established through several previous studies [61,65] and are recognized as a unique resource for policy makers [66,67]. The data for Manitoba are broadly representative of Canada. Although the province represents about 4% of the Canadian population, it typically ranks in the middle with respect to major socioeconomic and demographic variables.

## 9. Two sample cases

Since most MSA models assume each age–gender category to be cost neutral in the sense that no age or gender subsidizes anyone else, we analyze two sample cases, one of which is, on average, a low user of

health care, and the other a high user.<sup>5</sup> In both cases, we set the catastrophic threshold at the average expenditures for covered services for that age–sex group and the allowance at 80% (leaving a 20% corridor for which maximum incentives to economize would apply). Our analysis includes only attributable expenditures for physician visits and hospital stays, the core services fully insured in all provinces under the terms of the national *Canada Health Act*. (Future analyses will also look at the implications of expanding the basket of insured services to add coverage for pharmaceuticals and home care.)

We first assigned costs to individuals and then divided the population into deciles based on their annual expenditure. If utilization were evenly distributed across the population, then the lowest spending 50% would be incurring approximately 50% of the cost.

We then divided the Manitoba data for spending on hospital and physician services in 1999 into age–sex groupings. In each group, individuals were arrayed according to the average amount of health care expenditures incurred over that 3-year period. Fig. 1 shows this distribution for the sub-population of men age 25–35, while Fig. 2 presents the distribution for the sub-population of women over the age of 75. Two lines are superimposed on these figures and subdivide these expenditures into those falling between 0 and 80% of the mean for that age–sex group (corresponding to the proposed allowance), those falling between 80% of the mean and the mean (corresponding to the out-of-pocket corridor), and those exceeding the mean (corresponding to the catastrophic zone).

Most of the population in both age groups falls below the first line. Their spending would not exceed the allowance, and they would expect a surplus in their account. A small proportion of the population,

<sup>5</sup> The CPI model sets the threshold for a 30-year-old male at \$ 520, and his Health Care Allowance Account at \$ 416; it would allocate to a 75-year-old female an allowance of \$ 3330 for her routine needs and establish the threshold at \$ 3700. In both cases, once expenditures exceed the threshold, government-provided catastrophic insurance would continue to cover “hospital care and other extraordinary needs that medicare now provides” [68]. The CPI numbers are based on average expenditure, rather than on actual claims attributable to individuals, and in fact are higher than the amounts attributable to physician and hospital services we found in the Manitoba database. We accordingly use the actual averages in attributable costs for each age–sex group in our analysis.

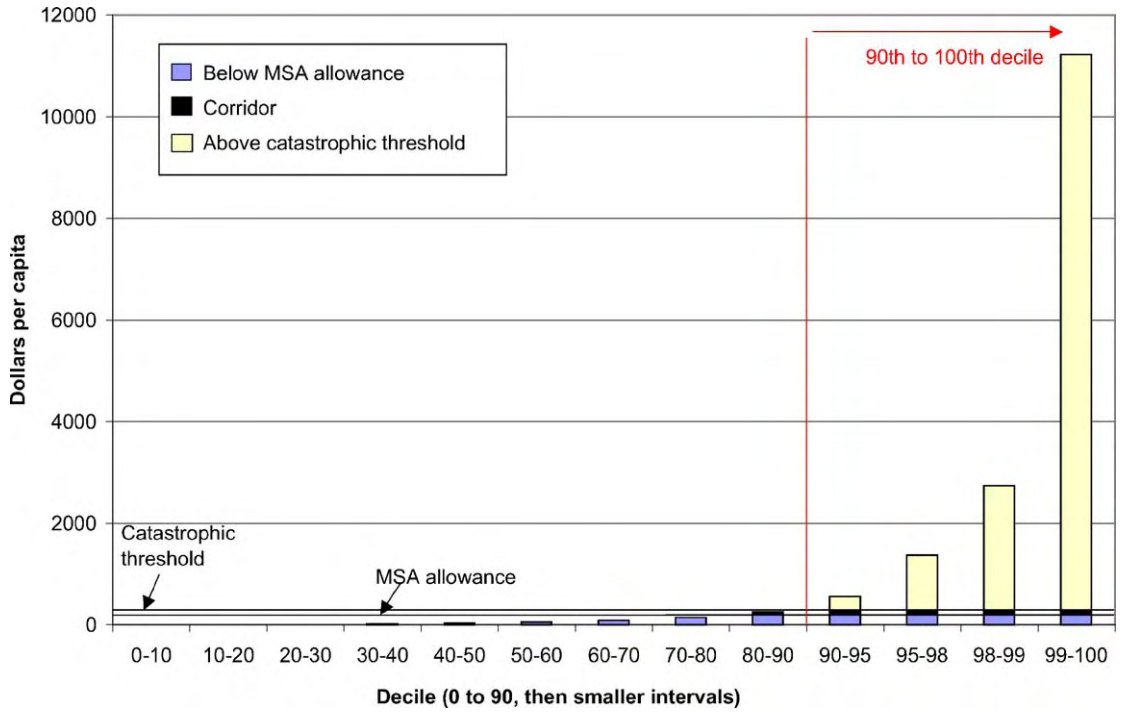


Fig. 1. Distribution of physician/hospital expenditures by “expenditure zone”, Manitoba 1999, men age 25–35.

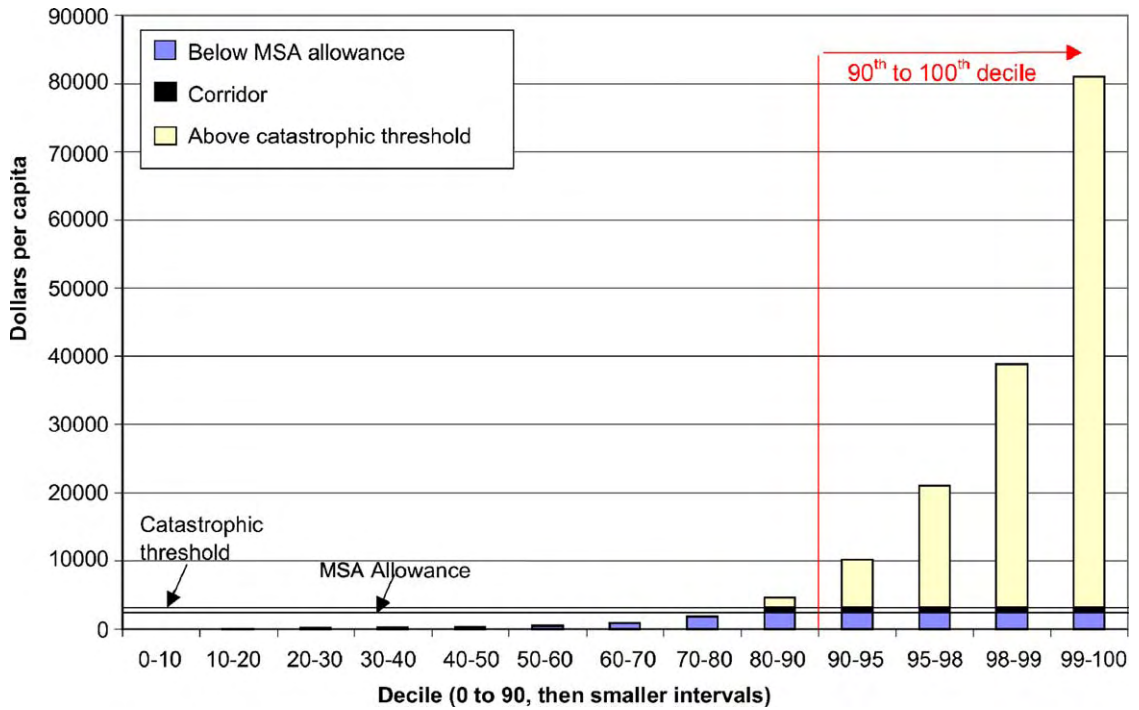


Fig. 2. Distribution of physician/hospital expenditures by “expenditure zone”, Manitoba 1999, women age 75+.

but a high proportion of expenditures, fall into the catastrophic zone. Very little expenditure falls into the corridor between the two lines. Indeed, all age–sex groups showed this pattern, with 70–80% of individuals falling below the mean expenditures for their group.

The mean expenditure for the young males (Fig. 1) was \$ 268.80; to avoid meaningless precision, expenditures are rounded to the nearest dollar. However, more than 90% used less than the mean; we will refer to this group as the “low spenders”. Indeed, 20% of these individuals made no demands whatever on the health care system in that period, while over 70% spent less than \$ 100. This healthiest 90%, with an average spending of \$ 67, accounted for 22.5% of the costs incurred by this age group, with the sickest 10% accounting for the remaining 77.5%. For 75-year-old women (Fig. 2), mean expenditure was \$ 3203. However, 80% spent less than the mean, with an average expenditure for that sub-group of \$ 507. Because most 75-year-old women receive at least some medical care, the distribution was slightly less skewed, with the sickest 20% accounting for 87.4% of the costs, and the healthiest 80% for 12.5%.

Considering distributions rather than only central tendencies is critical in analyzing the potential impact of MSAs. Suppose one sets the catastrophic threshold at the level of mean spending for that age–sex group, and the allowance at 80% of the mean, or \$ 215 for the 30-year-old male, and \$ 2562 for the 75-year-old female. Individuals would thus be responsible for paying, out of their pockets, the amount in the “corridor” between the allowance and the catastrophic threshold. Individuals retain half of the balance in the MSA at year-end, returning the other half to government. Because average spending across age–sex groups differs, with no cross-subsidization, the 30-year-old men would be responsible for a maximum out of pocket cost of \$ 54 in their corridor, as opposed to the maximum of \$ 641 which the sickest women over age 75 would be expected to pay for formerly insured services. Individuals who belong to sicker cohorts would thus be responsible for much higher maximum payments than those in healthier cohorts.

What are the net costs to government of this model? First, consider the cost implications if there is no change in utilization. Using the 1999 Manitoba data, average costs per capita for the young men increase

by \$ 59, while average costs for the older women increase by \$ 695. All other things being equal, government will either have to pay these higher costs or alter other aspects of the plan. If we do not change the allowance or the proportion of the surplus that individuals can retain, government must recoup this money from the only remaining population using care—the sickest 10–20% now falling above the catastrophic threshold. In the unlikely event that these plans remained cost-neutral, without cross-subsidy, government would not break even until it raised that threshold to \$ 1171 for the younger men, and \$ 8768 for the elderly women. Subtracting the allowance, the maximum out-of-pocket payment which the sickest individuals would have to pay for formerly insured services increases to \$ 956 for 30-year-old men, and \$ 6206 for 75-year-old women, over and above other costs for currently uninsured services.

The distribution of health expenditures found in the Manitoba data also imposes severe limitations on the potential savings from changes in utilization. One well-done simulation of MSAs in the US context allows for a reduction of utilization in the order of 4–6%, and even so suggests that this estimate might be too high [69]. Another simulation using the RAND model estimated that savings could be as large as 6–13% if everyone switched to high deductible MSAs, but would be negligible with other plan designs [27].<sup>6</sup> As a thought experiment, suppose that we nonetheless accept the assumption that health care utilization will fall because of the incentives created by MSAs. Indeed, suppose the effect to be so large that *everyone* below the threshold—in the cases we are examining, the healthiest 90% of 30-year-old males and the healthiest 80% of 75-year-old females—reduces their use of the health care system to zero. For each of these individuals, then, the government will pay out the allowance and claw back half of it (since by definition

<sup>6</sup> In contrast, the CPI actuarial study works with averages (rather than distributions), and computes an average reduction of between 19.6 and 31.4% of total costs [60], levels which appear unrealistically optimistic. These assumed reductions appear to have been used as the basis for claiming that MSAs would *save* over \$ 6 billion per year, rather than *cost* that amount [54,68,70,71]. Similar claims, which also appear to be based upon consideration of average costs and assumptions about large reductions in utilization, are currently being made in the United States for proposals to move from Medicare to MSAs.

none would have been required to purchase medical care). For the 90% of 30-year-old males below the threshold, government pays out \$ 215 and claws back \$ 107.50, for a net cost of the \$ 107.50 each individual receives as a reward for their frugality. However, before the imposition of health care accounts, the government was only spending an average of \$ 67 for each member of this group. Even with this extremely unrealistic scenario, government costs increase for each of the healthiest 90% of 30-year-old males by \$ 40 (or 60%) each. For the 80% of low spenders among the elderly women, per capita costs increase from \$ 507 to half of their \$ 2563 allowance, for a net increase of \$ 774.50 (or 153%) each. These sums are somewhat offset by decreased public expenditures for the sickest (who are now responsible for paying the amount in the corridor), leading to a net increase of \$ 31 for each 25–35-year-old male, and \$ 492 for each elderly female. Recovering this while retaining cost-neutrality across groups would require an increase in the catastrophic threshold to \$ 605 for the men, and \$ 6741 for the women, or a maximum out of pocket payment of \$ 390 and \$ 4179, respectively, on top of whatever other

uninsured services need to be paid for. Additional subsidies to these individuals to reduce out-of-pocket expenditures, of course, would further increase the net costs of MSAs.

Figs. 3 and 4 summarize the change in expenditures for each category of these two age groups resulting if such allowances were implemented, with half of the balance in each account ‘clawed back’ by government. Even this analysis understates the extent of skewing, since we assign the mean expenditure within each category to all of those falling into that grouping. The first bar shows the change in expenditures if there were no changes in utilization; the second shows the changes which would result if utilization were somehow reduced to zero for all those in the low spending group. The results are summarized in Table 1.

Why are these figures so high? The skewed distribution means that the population from which the additional resources can be recouped by modifying the catastrophic cutoff becomes smaller and smaller. For example, assume that government wishes to recoup the \$ 492 increase in per capita spending for each woman over age 75 (in the scenario where the low

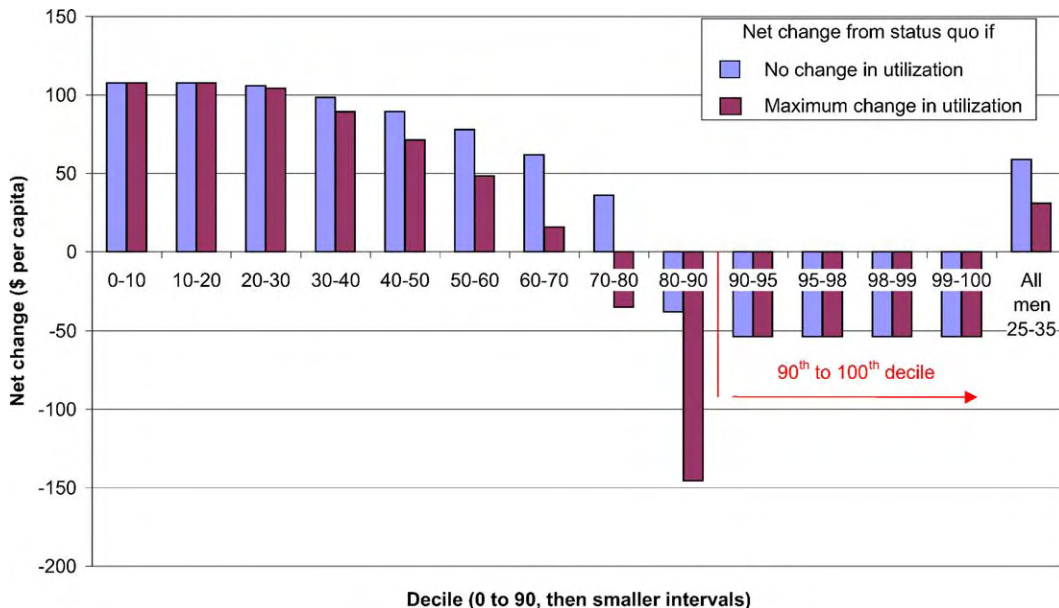


Fig. 3. Distribution of change in public expenditures per capita by decile with an MSA, by assumed change in utilization. Manitoba 1999, men age 25–34.

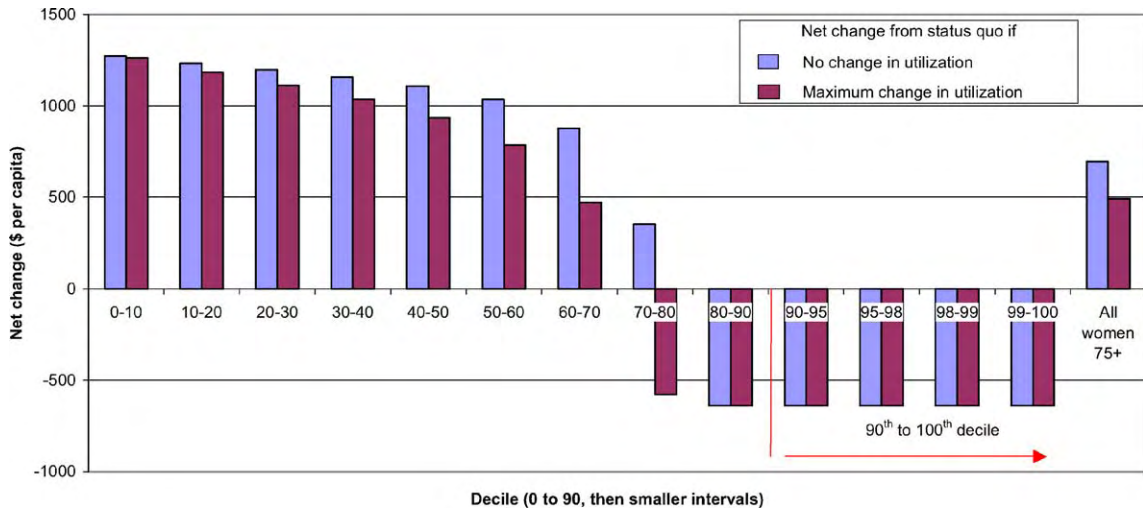


Fig. 4. Distribution of change in public expenditures per capita by decile with an MSA, by assumed change in utilization. Manitoba 1999, women age 75+.

spenders reduce their spending to zero). Because only 20% of that sub-population is still using medical care, the target must be multiplied by 5; government must recover \$ 2460 from each of these women. But since half of these women, those in the 80–90 percentile, had average costs of \$ 1381 above the cutoff, that limits the additional resources obtainable from them. The remaining \$ 216 per capita can be recouped only from the 10% still above the threshold, meaning that it must be multiplied by 10 to reach a target savings. The net result of performing these computations, even in this optimistic assumption of no health expenditures for 80% of that sub-population, is a threshold of \$ 6741. Although various combinations of the allowance, threshold, and clawback are also possible, all represent considerable changes to the simple MSA model. Either costs to government will increase substantially, or the sick will be taxed to provide windfalls to the healthy, or both. The elimination of all health services for the low spending population, in turn, does cast some doubt on how long these individuals will remain healthy, but that is a point for another analysis.

Even more insidiously, many of these models assume that all government expenditures for health care can be moved into MSAs. The Manitoba data can assign only 58% of hospital expenses to individual patients. Yet, some proposals would allocate not only the funds now used for specialty programs (e.g., pe-

diatric hospitals), but even the resources for public health, health services research, addictions services, and other government expenditures towards MSAs. Would highly specialized pediatric hospitals, or experts in cystic fibrosis, be able to survive if their only source of revenues were the accrued MSAs of the families of the sick children being treated there [72]? Could rural hospitals survive? Allowing these highly valued services to disappear would be neither wise nor politic. Presumably, government would have to pay again to ensure that the needed infrastructure remained in place, further increasing the cost of health care.

Attention to distributions rather than averages clarifies that, because no savings can be expected from the population already spending almost zero, in practice published elasticities would either yield lower savings or require higher reductions from the population actually using care. However, much of this reduction would have to occur in the zone above the catastrophic threshold, where there is little economic incentive to reduce utilization. Similar findings were obtained by the Congressional Budget Office (CBO)'s analysis of the initial Republican plan, which concluded "rather than saving, CBO found that new plan would cost the government an additional two billion three hundred million dollars over seven years, by handing money to healthy seniors who run up minimal costs under the current system" [39].

Table 1  
Implications of distribution of physician/hospital expenditures in Manitoba (1999) for status quo, and potential MSA models, for specific age groups

	Group	
	Men age 25–35	Women age 75+
Model: status quo (Manitoba data, 1999)		
Mean spending per capita	269	3203
Percentage of group spending < mean (% 'low spenders')	90	80
Percentage of total expenditures by low spenders	22.5	12.5
Mean per capita expenditures for low spenders	67	507
Maximum out of pocket payment for insured services	0	0
Model: medical savings accounts, with following characteristics		
Catastrophic threshold (set to mean expenditures for that group)	269	3203
Medical savings allowance (set to 80% of mean)	215	2562
Corridor (out of pocket)	54	641
Ratio: threshold/allowance	1.25	1.25
Impact of MSA model for each age group, applied to Manitoba data—if no change occurs in utilization		
Mean spending per capita	328	3898
Per capita change in government expenditures (from status quo)	59	695
Break-even value for catastrophic threshold (if no cross-subsidization)	1171	8768
Ratio: threshold/allowance	5.45	3.42
Maximum out of pocket payment by sickest individuals (for formerly insured services) if no cross-subsidization	956	6206
Impact of MSA model for each age group, applied to Manitoba data—if utilization for all low spenders drops to zero		
Mean spending per capita	300	3695
Per capita change in government expenditures (from status quo)	31	492
Required value for catastrophic threshold if no cross-subsidization	605	6741
Ratio: threshold/allowance	2.81	2.63
Maximum out of pocket payment by sickest individuals (for formerly insured services) if no cross-subsidization	390	4179

MSA proposals accordingly would require insurers to be able to identify, in advance, sub-populations which would be relatively homogeneous in their anticipated health expenditures. If that could be done, low users would receive very low allowances, and high users would receive the resources they needed. Age and sex alone explain less than 1% of the variance in health expenditures [73]. Efforts to risk adjust payments have proven expensive and complex [74–81]. As the Forget analysis confirms, within each age category, at least 80% are spending less than the mean [50]. US data over the past 30 years have shown similar trends [51,82]. Disease-based categorizations present similar distributional issues. Certain chronic conditions without clear diagnostic cut-offs, such as diabetes or hypertension, provide incentives to 'over' or 'under' diagnose. For example, even among in-

dividuals with hypertension, many individuals make minimal to moderate demands on the health care system, while a very small number of sick individuals place a very heavy demand on health care resources. Policy makers would also have to decide which conditions would qualify for higher payments, leading to disputes from those populations not yet designated. Furthermore, allowances determined on the basis of past health care utilization penalize people who economize on health care while rewarding profligate users. Implementation would be further complicated because public policy in many jurisdictions—as reflected in privacy legislation—would almost certainly forbid collecting and using data about individual health status to determine health care allowances, introducing yet another set of policy/legislative changes which would be required should such approaches be recommended.

A key assumption of many MSA models is that government will no longer have a significant role in actually providing services or health insurance; instead, individuals will use their allowances to purchase catastrophic insurance from competing firms, some or all of which would be for-profit corporations. This in turn assumes that private insurers are willing to sell full catastrophic coverage to all potential clients. For example, one Canadian proposal called for dedicating \$ 1600 for catastrophic coverage and \$ 900 for a MSAs; in effect, this amounts to giving 64% of resources to the catastrophic insurers. Whether this is profitable would thus depend upon the proportion of costs falling into the catastrophic zone. In practice, few insurers would be willing to assume a risk that would outweigh their premium earnings. Catastrophic insurance policies often exclude pre-existing conditions, cap coverage, and otherwise practice risk selection in order to remain a viable business. In Manitoba, if the catastrophic threshold were set at the level of mean expenditures, the 64% of revenues to these insurers (whether public or private) would have to cover 80.95% of attributable expenditures, making universal and comprehensive coverage of such risks an economically unattractive proposition.

Analysis of “success stories” in systems where coverage is not universal often reflects the attractive market for catastrophic insurance for *sub-sets* of the population [31,38]. For example, in Manitoba, the lowest spending 50% of the population accounted for about 4% of expenditures, and hence would be an attractive market. Furthermore, since the sickest 1% accounted for 26% of spending, an insurer would not have to avoid many potential high users to make a profit. The consequence, however, is that the very sick will either find themselves uninsurable or will be faced with such large premiums that they are effectively uninsurable.<sup>7</sup>

<sup>7</sup> In addition, the high out of pocket payments for sick people would be likely to reintroduce the access problems that Canadian Medicare was proud of having diminished (and which still persist in the US). In an attempt to mitigate this, some advocates suggest scaling allowances by income. In Singapore, allowances are indeed based on income, since they are financed by mandatory contribution based on wages (beginning at 6%, rising to 7% between ages 35 and 45, and 8% from ages 45 until retirement; the maximum monthly and total contributions are also capped). However, this model reverses what advocates of income-based allowances usually suggest—the poor have less (rather than more) to spend for their health needs.

For that reason, great caution must be exercised in translating analyses for sub-groups within countries which do not have universal coverage (such as the US) into systems or sub-systems (e.g., US Medicare) which do. The fact that a healthy sub-population can indeed see their expected costs fall—which follows logically from the skewed distributions observed—tells us little about the overall cost implications to payers with responsibility for the entire population.

## 10. Conclusion

Close scrutiny of existing MSA plans around the world reveals the benefits to be concentrated among the healthier members of those populations; indeed, most of the sickest are not members of such plans. Hsiao has concluded that the Singapore Medisave scheme—the one attempt to use MSAs universally—has neither curbed health expenditures nor provided a major source of health financing. As of 1995, only 8.5% of Singapore’s total national health expenditures came from MSAs, with 57.7% coming from patients’ direct out-of-pocket payments. He concluded that Medisave has “caused financial hardship for Singapore’s citizens” and “adversely affected the cost-effectiveness of its health care system” [22].

A plan that strips specialty services, escalates costs, adds bureaucracy, undermines privacy, and erodes health care has little to recommend it. Because health expenditures are heavily skewed, MSA models can be attractive to the healthy, presuming that they will remain in good health. Since most of the population is healthy, such proposals can also be attractive politically, if the implications for those who become ill are ignored or minimized. Extrapolating to a universal population, however, makes the limitations of such models very clear indeed.

Because most of the population is relatively healthy and spends very little on hospital and physician medical services, few savings can be found from inducing the general population to spend less. Rather than concentrating upon user fees and other demand-based approaches, policy makers might instead focus on other options more likely to generate both long-range savings and better health outcomes. One set of options are the well-known efforts to control utilization through an array of non-price factors, including provider mix and

reimbursement, and clinical guidelines to ensure that care given is appropriate and effective. Another set of options would be to focus on the high spenders, to see whether better disease management might make more effective use of resources among those now spending very high amounts. Finally, our results would support use of effective disease prevention and health promotion activities, which could allow those individuals now spending very little to remain healthy. The skewed distribution of health expenditures, however, emphasizes the limitations of trying to control health costs by reducing demand among potential users of care.

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