Abstract

Introduction
It has been estimated that the cost of the Affordable Care Act (ACA) that expanded health insurance to about seven million people in 2014 will be triple the original 10-year estimate of 850 billion dollars and still leave 20-30 million people uninsured. The primary sources of insurance for subsidized enrollees are the Federal Exchanges. However, the legality of their funding will be reviewed by the Supreme Court. If the ruling is negative, new laws will be necessary to reduce the cost of healthcare. These laws should be based on principles that have a proven record and not on recent constructs of uncertain viability.

The Hypothesis
The hypothesis of this paper is that a reduction in the cost of healthcare is most likely to be achieved if the reforms that are made are chosen on the basis of mathematical principles such as probabilities, averages, and marginal risks. The hypothesis is validated by applying the methodology to the recently passed ACA, demonstrating why some programs were mathematically unlikely to achieve the expected results, and comparing the results of the analysis with the expectations. The methodology is then applied to alternative reforms in order to predict which of them are likely to reduce the cost of healthcare.

Evaluation of Hypothesis
The results contradict the ACA assertions that the addition of multiple preventive services will reduce the cost of care and that the expansion of Medicaid will reduce cost and improve outcomes. Analysis shows which reforms can be expected to lower cost: promoting catastrophic policies instead of comprehensive Exchange policies and Medicaid, requiring all insurers to offer the identical catastrophic policy, charging premiums that represent actual age-adjusted risk instead of overcharging the young, limiting free preventive services to maternal care, neonatal care, and immunizations, using co-pays and deductibles to reduce unproductive specialty care and technology, promoting price transparency, the mandatory inclusion of a Health Savings Account that was flexible in size and provides a debit card for the payment of deductibles and co-pays, and only providing subsidies to those who were below the poverty level.

Discussion
The financial results of the first year of the ACA indicated that the original cost projections were at the levels postulated by critics of the act and not close to government estimates. The counting errors were ubiquitous—social security savings were double counted, the number of enrollees was miscounted, their age distribution was not favorable, etc. The emphasis of the ACA was put on expanding the number of people covered and relying on cost-shifting from Medicare Advantage, a Medical Devices Tax, capital gains surtax, and unproven concepts such as Accountable Care Organizations and expanded free preventive care to pay the cost. The experience to date indicates that an alternative approach is necessary.

Conclusion
The estimates made in the ACA have proven to be unreliable. This suggests that new reforms will need to be enacted. These reforms should be based on principles that have proven to be effective in the past.

Introduction
Because the United States has the world’s highest healthcare cost and lower longevity than comparable industrialized nations, the government enacted the 2010 Affordable Care Act (ACA). Two of its major assumptions were that the cost of care could be substantially reduced by using subsidies and taxes to increase the number of self-insured and the number on Medicaid, and by providing multiple preventive care services at no cost. The ACA expected to insure seven of the 40 million who were uninsured.

These goals will not be met. The preliminary estimate by the Congressional Budget Office (800 billion over 10 years) has been increased to over two trillion and the net number of newly insured in 2014 is likely to be less than 7 million after subtracting those who lost their insurance. The accuracy and efficacy of many other ACA assumptions and proposals have been called into question.

For reforms to be effective, they must take history into account. Prior to the 1970’s, the annual increase in the cost of healthcare was modest. At that time, the obligation to pay for low-level healthcare costs out-of-pocket provided an incentive for individuals to avoid care that was overpriced or of questionable value. Since the 1970’s this incentive diminished as insurance became more comprehensive and insurers assumed responsibility for all charges.

To counteract this trend, employers partially restored the role of cost in moderating demand by switching from comprehensive coverage to modalities that made individuals more cost-aware such as catastrophic policies with a deductible, and co-pays for comprehensive policies. Meanwhile, the high cost of insurance caused some individuals to delay purchasing insurance until an
expensive illness developed. This in turn caused insurers to place some individuals into high-risk groups and to charge very high premiums for individual policies. The high premiums created a demand for reform.

The ACA justified several of its reforms on the assumptions that the uninsured increase the overall cost of care because they fail to obtain the preventive care that would detect disease at an early, less expensive stage and because they defer the primary care office visits that would have been inexpensive and rely instead on expensive emergency room visits. ACA financing was based on the assumption that ACA reforms would increase the low participation rate among the young and healthy and thereby decrease the average cost of premiums.

To reduce the number of uninsured, the ACA encouraged states to increase the number of low-income individuals receiving Medicaid at little or no cost, set up insurance clearing houses (Exchanges) to sell comprehensive policies to Medicaid-ineligible individuals, provided this group with subsidies that went up to 400% above the poverty level, and allowed the inclusion of those aged 19-26 on their parent’s policy. It also provided multiple preventive care services at no charge. In order to channel applicants into the Exchanges and thereby strengthen their solvency, the ACA included provisions that discouraged the Health Savings Accounts (HSA) that had been set up previously to provide tax-deductibility for individually purchased healthcare services.

The Hypothesis
Our hypothesis is that any new laws passed to reduce the cost of healthcare in the United States should be based on methods that have proven effective in the past such as the use of deductibles and co-pays to reduce utilization and an increase in competition. The ACA has instead increased utilization through subsidized premiums and the elimination of certain deductibles and co-pays, and declined to increase competition by allowing insurance across state lines.

Evaluation of Hypothesis
Evaluation of the hypothesis is made difficult by multiple distortions in the implementation of the ACA. Many of the ACA costliest provisions have been postponed. Insurance rates have been distorted by government guarantees. Despite these impediments to analysis, the fact that the cost estimates for the ACA have tripled suggests that the assumptions made in the Act are flawed and the alternatives are worthy of consideration.

Discussion
Preventive Services
The premise that screening programs will lead to cost savings by detecting disease at an early stage has been challenged. For example, although a Swedish study on mammograms in women aged 40-49 found a 29% reduction in deaths, a subsequent analysis concluded that the estimated cost of attaining one additional 10-year survivor was about one million dollars when the low frequency and high lethality of the disease in this age group was factored in with the cost of false positives, outreach programs, compliance programs, etc.

There was prior evidence that this procedure would not be cost-effective. When the U.S. Preventive Services Task Force reviewed the literature, it concluded that the cost outweighed the benefit in this age group and recommended that routine mammography should not be performed. A recent Canadian study did not find any reduction in the death rate among those in this age group who received routine mammography. These findings confirm that routine mammograms in women aged 40-49 will significantly increase the cost of care rather than decrease it.

The cost-effectiveness of other preventive services that used to be routine has also been questioned. The USPHS, Mayo Clinic, and Academy of Family Practice all recommended against annual physicals in most people and against routine testing for items such as a CBC, EKG, BUN, or liver profile. Despite this history, the ACA mandated that insurers must provide many newer preventive services of similarly questionable cost-effectiveness at no charge.

The benefit of these preventive tests is even less when marginal rates of cure are used instead of average rates in calculating the benefit gained by using prepayment to increase participation rates. For example, if a program of prepayment and outreach succeeds in increasing the participation rate for mammography from 75% to 80% but the increase is in women at low risk, the result will be new costs, higher premiums, and very few lives saved. Pap smears at recommended intervals and mammograms in women 50-74 are two preventive services that are accepted by all major medical entities. But these tests are not used by everyone and are affordable for most. The vast majority of the insured will not achieve any benefit from transferring the cost of the service from the doctor’s office to the insurer’s premium.

While these tests may be inexpensive individually, they are cumulatively expensive. By forcing the purchase of services that the majority of the insured will never use, the ACA created an incentive for many, especially young people in their lower earning years, to remain uninsured or to over-utilize services “in order to get their money’s worth”. This is counter to one of the major goals of the ACA.

If an individual is unable to afford an important medical activity that is inexpensive, a solution to their financial problem should be adopted that is not limited to preventive tests, does not cause others to pay for services they will not use, and does not lead to the over-utilization that often results when there are no price signals to moderate demand and there is no incentive to scrutinize a bill or to avoid doing a test at an inappropriately short interval.

On the other hand, it is mathematically sound to prepay for preventive services that are used universally, have a clear benefit, are expensive, and are unlikely to be over-utilized.
Under these circumstances the cost/benefit ratio shifts and prepayment becomes both cost-effective and convenient. Prenatal care, newborn care, and immunizations are three public health measures that meet these criteria. Although all men and many women will not use maternity coverage, prenatal care is used universally in that every individual benefits from the prenatal care that their mother received. Almost every parent will want to use insurance to spread these costs over a working lifetime instead of a 1-2 year period. U.S. longevity statistics will benefit when all pregnancies are covered by insurance and all women have equal access to care.

**Subsidies**

Had the ACA targeted its premium subsidies to its goals of reducing cost and improving outcomes, it would have distributed them differently. Subsidies transfer the cost of care; they cannot accomplish the stated ACA goal of lowering the cost of care. Their purpose should be to improve the quality of care by directing resources to those with the least favourable outcomes. A 1% subsidy will have a greater percent effect on health if applied to the 15% who are below the poverty level and have substandard health outcomes than if diluted over the cohort of almost 40% that is eligible for Exchange subsidies but already has outcomes that are near-average.

Instead, the ACA subsidized people whose income was as much as 400% above the poverty level. At the same time, it limited the access to healthcare of those who are below the poverty level and have inferior outcomes by consigning them to Medicaid, a program that is underpaid because it compensates providers with only 60 cents on the dollar and is also subject to significant fraud and waste.

**Medicaid**

The ACA hypothesis that increasing Medicaid enrollment would reduce emergency room visits was not supported by the early data from Massachusetts where emergency visits increased by 7% between 2005 and 2007 after that state had expanded Medicaid coverage. A recent study from Oregon was even less supportive of the ACA assumption. There a group that had Medicaid used the emergency room 40% more than a control group that did not have Medicaid.

In Oregon most other important outcomes were no better for those on Medicaid than for the Medicaid-eligible who had no insurance. Moreover, the program has been over budget significantly since its inception in 1965. Based on the budgetary figures and prior results, policymakers should have predicted that providing insurance through Medicaid was unlikely to result in a reduction in emergency room utilization.

Instead of placing more people under a failing system, the ACA should have pooled those eligible for Medicaid or an Exchange with those receiving employer based insurance and given all of them access to a new policy that was based on changes that had already proven to be cost-effective.

**Catastrophic Policies**

In the past, catastrophic policies have provided an effective method of reducing the cost of insurance. However, the ACA included many provisions which discouraged this option. The law restricted these policies to people under 30, required participants to have one of 14 possible conditions, did not provide tax-deductibility, and imposed a differential between the cost to the old and the cost to the young of a 3:1 ratio instead of the usual ratio of 5:1. The intent was to force the young into the more expensive comprehensive policies that were favoured by insurers because of their greater profitability and to use the added income to reduce the premium for older ages.

The primary purpose of health insurance should be to take costs that are unaffordable over the short term and average them over a long period of time and over a large population so that they become affordable. Some age based adjustments will be necessary to avoid having a significant gap between the cost of the policy and the actual cost experienced by the young.

The importance of averaging risk over a large group instead of concentrating it into subgroups can be demonstrated using government data. Only 5% of the population is responsible for 50% of healthcare expenditures. Less than 1% of this group will be those who are at the end of their lives and therefore will not create ongoing costs for insurers. Under 2% will have a one-time catastrophic illness. Only about 2% will have high level charges that are ongoing. If the catastrophic costs of the 5% are considered together and diluted over 100% of the population, they will be much more affordable.

To illustrate, if 200 million adults aged 19-64 spent 800 billion dollars on healthcare each year and 50% (400 billion) of that was on catastrophic care, the average cost of a catastrophic policy would be $2,000 for each adult. It would be lowest at age 19 then increase modestly each year. However, if the 4 million (2%) who are chronically high utilizers were placed into high risk pools, their average catastrophic cost would rise to $40,000 each while the cost for the other 98% would improve only slightly.

For competition to lower prices, it must be possible to compare premiums easily. Therefore, along with their existing policies, each insurer would have to offer a catastrophic policy that was identical for every insurer. Each insurer would be required to charge the same premium to all of their customers who are in the same age group. However, premiums would vary from one insurer to the next.

To minimize the cost of these new catastrophic policies and thereby encourage participation, the cost of minor preventive services would not be added to premiums. Such services have inaccurately been described as being free. In fact, the cost has merely been shifted from the individuals to the premiums where they will cause the majority of policyholders to pay for services that they will never use. Only the preventive care that is universal, expensive, and of proven cost-effectiveness—i.e., maternal care, neonatal...
care, and vaccinations—should have its cost included in the premium of a catastrophic insurance policy. These policies would be available to Medicaid enrollees. In 2010 Medicaid paid $5,563 per enrollee, more than enough to allow those now on Medicaid to purchase a catastrophic policy. Having such a policy would allow them to choose between multiple providers instead of being limited to the one or two who accept Medicare but might be inconveniently located, overworked, or inept. The improved access should reduce the frequency of their emergency room visits and improve other outcomes.

**Health Savings Accounts**

To pay for deductibles and co-pays, some of the savings achieved by switching to catastrophic policies must be placed into a Health Savings Account (HSA). Deductibles and co-pays reduce utilization by making individuals more cost-aware, but without the addition of a HSA to provide for payment, they could discourage some individuals from getting care that was necessary. Because the 50% of healthcare costs that are non-catastrophic are divided very unevenly, there is a need for a mechanism like HSAs to preposition the funds that will be needed. 25% of the population, mostly those who are young, will not use the healthcare system at all in a given year. As a result, they object to paying for preventive services that they do not participate in, object to paying for an inordinate share of the cost of catastrophic care, and consequently do not take out insurance. In order to encourage them to participate and distribute risk over the largest possible population, their concerns must be addressed.

The addition of a debit card to the HSA will facilitate the payment of these non-catastrophic costs. Unlike the ACA law that caps administrative charges but does nothing to reduce these charges, a debit card is a structural change that should reduce the cost of a policy by at least 5% and encourage more people to become insured. The debit card will reduce transactional costs. The expense of pre-authorization and utilization review will disappear when individuals rather than insurers make decisions on utilization. Payment at the time of service will create an incentive for individuals to scrutinize bills and avoid fraudulent charges.

Individuals would decide annually on a payroll deduction level for their HSA. This would allow them to tailor it to their circumstances. While the ACA reduced the maximum contribution level for the HSA, the new reforms would expand them. There would be a minimum contribution of perhaps $260 per year, equivalent to a payroll withholding of $10 each two weeks. Much larger contributions would be allowed to provide flexibility for those who anticipate higher costs.

Reform would also include regulations that would encourage individuals to contribute to the HSA and to do so at an adequate level. Healthcare costs would not be tax deductible if they were paid outside of the HSA. At year end, unused HSA funds that exceeded $260 could be carried over to the next year or withdrawn without a penalty but with full income tax liability. In order to discourage the practice of delaying enrollment until an illness had developed, there would only be one enrollment period in a year and there would be significant multi-year penalties if enrollment was delayed.

**Conclusion**

Our hypothesis was that the appropriate mathematical analyses of available data would have accurately predicted that some of the major ACA reforms--expanding Medicaid, favouring comprehensive policies over catastrophic ones, and mandating that a multitude of preventive services be provided at no charge-- would increase the cost of healthcare significantly and would not improve health outcomes measurably. The corollary of the hypothesis is that future reforms should be based on a mathematically based analysis.

Although a stated goal of the ACA was to lower the cost of healthcare, the policymakers actively discouraged the purchase of the cheapest form of insurance, the catastrophic policy. The basis of this decision seems to have been the belief that outcomes would improve and expenditures would decrease if more people were provided with a comprehensive policy that shielded them from having to make out-of-pocket payments for screening tests and physicals.

If mathematical factors such as frequency are taken into consideration, it becomes clear that many screening programs, mammography in women aged 40-49 being a common example, will not reduce the cost of care. There is a wide discrepancy in reported survival rates after mammography in women aged 40-49, but even if a reduction of 29% is accurate, the low frequency of the illness in this age group invalidates the contention that screening will reduce the cost associated with the disease.

The ACA also assumed that increasing the percent of women aged 50-74 who had a mammogram would result in a proportional increase in survival rates. In fact, the extra exams achieved by outreach efforts will disproportionately find benign lesions rather than cancers. This will raise cost instead of decreasing it. In any event, such services are inexpensive and would easily be affordable if Medicaid and Exchange policies were replaced by the combination of a catastrophic policy and a HSA that included a debit card.

ACA subsidies should have been directed to the smaller Medicaid population with its below average outcomes rather than to the much larger lower middle class market where outcomes were already average. It is mathematically easier to change the average for a smaller group than it is to change it for a much larger group. Averaging the risk in a large population will significantly reduce the insurance premium for those at high risk and will not materially increase the premium for those at low risk. Nevertheless, a case can be made to subdivide the population into different age groups in order to...
acknowledge the lower risk faced by the young and lower the cost of their premiums. The main costs for the young are pregnancy and newborn care. By including these costs in a catastrophic policy and using age as a risk factor, both the young and the middle aged can experience premiums that are affordable.

In summary, healthcare costs in the United States will only decline if the options available are carefully examined. This analysis predicts that administrative costs will decline by 5% and utilization will decline to an unspecified extent if the healthcare system switches from comprehensive policies to a standard catastrophic policy that is applicable to those on Medicaid as well as those with employer-based insurance, and includes prenatal care, newborn care, and immunizations but no other preventive services. Other changes include the use of a HSA with an associated debit card, price transparency, and subsidies that are directed at outcomes rather than incomes.

References