A SIMULATION MODEL OF THE POTENTIAL CONTRIBUTION
OF A COMPETITIVE APPROACH TO
CONTROLLING HEALTH CARE EXPENDITURES IN ONTARIO

By

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ABSTRACT

Assessment of the current performance of the Canadian health care system has led to concern about the capability of current 'treasury-type' management to control health care expenditures and improve the efficiency with which health care is delivered. This thesis builds and employs a simulation model to illustrate one particular variant of a competitive market reform proposal and investigate its potential for controlling health care expenditures.

The baseline model illustrates a simple formulation of competition between two alternative practice styles within a hypothetical community, under the existing public health insurance plan. Consumers choose to obtain their health care from either capitation reimbursed providers or traditional fee-for-service providers on the basis of an enrollment charge. The enrollment charge reflects differences in the average per capita costs of providing both ambulatory and hospital care to each sector's respective population. The results of the simulation

provide the first quantitative estimates of the potential significance of such a policy direction in Canada.

The results indicate that the existence of the capitation modality and the addition of a consumer choice decision can generate significant cost savings. The present value of estimated savings over a ten year period for a community of 80,000 people range from 3 million to 34 million dollars (in 1985 dollars) in the baseline model. The 'best guess' set of parameter values yields an estimate of approximately 31 million dollars.

Extended versions of the baseline model, which include an alternative reimbursement arrangement for the capitation modality and increased competition between the modalities, increase discounted savings in the 'best guess' case to approximately 52 million dollars for the single community. Extrapolation of the results to the province of Ontario yields estimated savings of approximately 1680 million dollars (in 1985 dollars).

Extensive sensitivity analyses on initial parameter values show large variations in potential cost savings. In particular, variations in initial market shares and the initial hospital utilization rate differential between sectors (and to a much lesser extent the enrollment elasticity) can cause large variations in the results.

These and other issues identified in the design of the model provide an agenda for future theoretical and empirical work on the subject of publicly financed competition.

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CHAPTER 1

INTRODUCTION

The policy path that Canada should take to control future health care expenditures is a subject of frequent discussion and debate. Although current policies have been reasonably successful in controlling health care expenditures, there is serious concern about the capability of the health care system, as it is presently structured and managed, to achieve long-run cost control. Proposals to improve the performance of the system range from calls for increased regulation to support for increased use of market forces.

The purpose of this thesis is to investigate the likely significance of one specific proposal for market reform under the umbrella of public health insurance. A simulation model is developed to illustrate a situation which promotes cost containment (or expenditure control) through improved efficiency in the use of scarce resources.[1] In particular, market forces are incorporated into the structure of the current system by the introduction of an alternative delivery modality in competition with the traditional fee-for-service sector.

Evidence to date in both the United States (U.S.) and Canada points to the fact that alternative delivery plans (such as capitation-reimbursed group plans) provide a substantially different product mix. Reductions in hospital utilization rates and therefore health care costs for enrollees of such plans have been clearly demonstrated by researchers such as Luft (1980a) in the U.S.. Similar evidence regarding hospital utilization rates and cost savings for capitation group practice plans in Canada has been documented by Hastings et al. (1970, 1973), Barer (1981), and Wolfson (1981). In addition to the cost savings arising directly from the existence of a capitation scheme, alternative delivery plans may also force a competitive response from traditional fee-for-service providers that further lowers health care costs.

Because of the considerable uncertainty regarding the impact of a competitive strategy within a publicly financed system and because there does not presently exist in Canada a market area with an institutional structure completely compatible with the market structure necessary for competitive market reform, the adoption of any such proposals should be approached cautiously. This thesis provides a framework for evaluating the potential impact of a market reform policy on health care expenditures and long-run cost control. In addition, the analysis highlights many of the logistic and practical problems of competitive market reform in the Canadian context.

The remainder of this chapter is organized as follows. A description and an assessment of past and current performance of the Canadian health care system are provided. An analysis of past expenditure control and the prospect for future control is detailed. Inefficiencies within the current system are highlighted and strategies for improved performance are given. The last section of this chapter details the organization of the rest of the thesis.

1.0 The Canadian Public Health Insurance System

The public health insurance system in Canada consists of ten independent provincial plans which provide coverage for both hospital and physician services. Each province has the responsibility for implementing and administering its own plan, although the financing of each provincial plan relies on both federal and provincial contributions. Federal contributions are drawn from general tax revenues, while the provinces use a variety of revenue sources such as general tax revenues, special taxes and premiums.[2] To qualify for federal cost-sharing a provincial plan must satisfy certain criteria: (1) it must provide comprehensive coverage of both people and services, (2) it must provide coverage on uniform terms and conditions, (3) it must have coverage that is portable, and (4) it must be publicly administered.[3]

Provider costs are reimbursed primarily through prospective global budget allocations in the hospital sector and by fee-for-service payments in the medical sector. Separation of the financing of the system and the reimbursement of providers within the system has resulted in the public health insurance program in Canada being a payment mechanism with its primary function one of a "bill-payer".[4]

Public health insurance was introduced in Canada in response to the belief that the private health care system was suffering from severe market failure. Market failure is defined as the inability of a system of private competitive markets to achieve an efficient allocation of resources in terms of both the production and the allocation of goods.

Specific characteristics of the commodity health care distinguish it from other commodities that are traded in the marketplace. These characteristics, the uncertainty of illness, asymmetry of information, and externalities in consumption combine to cause certain forms of market failure.[5] Various forms of intervention have occurred in response to the market failure. The unpredictability of illness has led to insurance, asymmetry of information has led to licensing and self-regulation of providers, and externalities in consumption have led to "in-kind" subsidies.

The insurance response to market failure is expected to lead to resource use and distribution of care among the members of society in a way that society deems more acceptable. However, a private insurance system may still result in distribution of care among the population which many would consider unjust or inequitable.[6] For this reason health insurance in Canada is a public universal program based upon "in-kind" subsidies. The subsidies are based on the premise that all individuals should have equal financial access to care. Public, universal, first-dollar coverage implies that the nominal price of care is zero to all consumers, hence the equalizing of financial barriers for all individuals.

1.1 Assessment of Performance

As the system is designed it has been successful in providing access to care for a significant portion of the population. In particular, public health insurance has been successful in improving access for those groups who normally would have received inadequate coverage or no coverage at all, such as the very ill, the elderly and the poor. In addition, the system has been able to exercise some control over both the unit cost of care and the overall mix and level of utilization. It has accomplished this through blunt financial instruments such as fee schedule negotiations and global budgets.

This type of financial management has relied on providers to make efficient use of resources and has avoided any direct attempt to modify the behaviour of providers by identifying or encouraging cost-effective behaviour or by discouraging inefficient behaviour. However, because this form of financial management has little effect on the delivery of care, the system is one that is virtually devoid of incentives for efficiency. As a consequence there is concern about the long-run outcome of the system under a type of management that tolerates many inefficiencies.

Improving the performance of the system in terms of efficiency would have a positive effect on cost (expenditure) control in the long run. It should be emphasized, however, that cost control does not necessarily imply efficiency.

1.2 Sources of Inefficiency

In a typical market, the following three questions are answered through the price mechanism: (1) what goods and services to produce and in what quantities, (2) how to produce these goods and services, and (3) how to distribute the supply of goods and services among consumers. A competitive market solves for prices through the actions of producers competing for profits and consumers seeking to get value for money. These prices determine which goods and services are produced and how they are distributed among consumers. In addition, the production of goods and services is achieved at least resource cost.

Conditions in the market for health services in Canada represent a departure from these ideal conditions. One of the unfortunate consequences of public health insurance is that it removes the normal market mechanisms through which efficiency is attained. Potential sources of inefficiencies can be identified on both the demand and supply sides of the market.

On the demand side, because public health insurance has removed the financial barriers to care, it has also removed the direct link between providers and consumers. The absence of financial responsibility on the part of consumers precludes them from influencing resource allocations, at least by their response to prices. There is no incentive for consumers to choose least-cost providers because they are unable to realize the savings that could result from such a choice.

On the supply side, physicians are reimbursed on a fee-for-service basis and their remuneration is independent of the resource implications of their decisions. Inasmuch as physician incomes are related to the number of services that are performed, there is a strong incentive to over-supply with the result that the actual quantity and mix of services that are produced are sub-optimal. In addition cost reimbursement of hospitals through negotiated budgets contains little incentive for efficiency.

The absence of the direct link between consumption and production decisions has led to unnecessarily high cost "styles of practice". There is a large amount of evidence that the system could produce more health care with the current resource commitment or could produce the same level of health care with a smaller amount of resources.

In theory a provider can be viewed as having a production function which combines various factor inputs in a given state of technology to produce an output called "health". However, the definition and measurement of health are such formidable tasks that it is necessary to specify health services as an intermediate good. It is the relationship between health and the amount of resources devoted to health care that underlies all health policy discussions.[7]

Given that health services are an intermediate product in the production of health, the actual quantity and mix of services produced can be defined as optimal in the following manner. The production of health services is viewed as optimal if the services are produced in both a technically and allocatively efficient manner (see Cochrane (1972)). Health services are produced in a technically efficient manner if providers produce these services using the least-cost production technology measured either in real (technical efficiency) or dollar (economic efficiency) terms. The production of health services is allocatively efficient if the level and mix of services produced are those valued most highly by society, which implies that only necessary and effective services are produced.

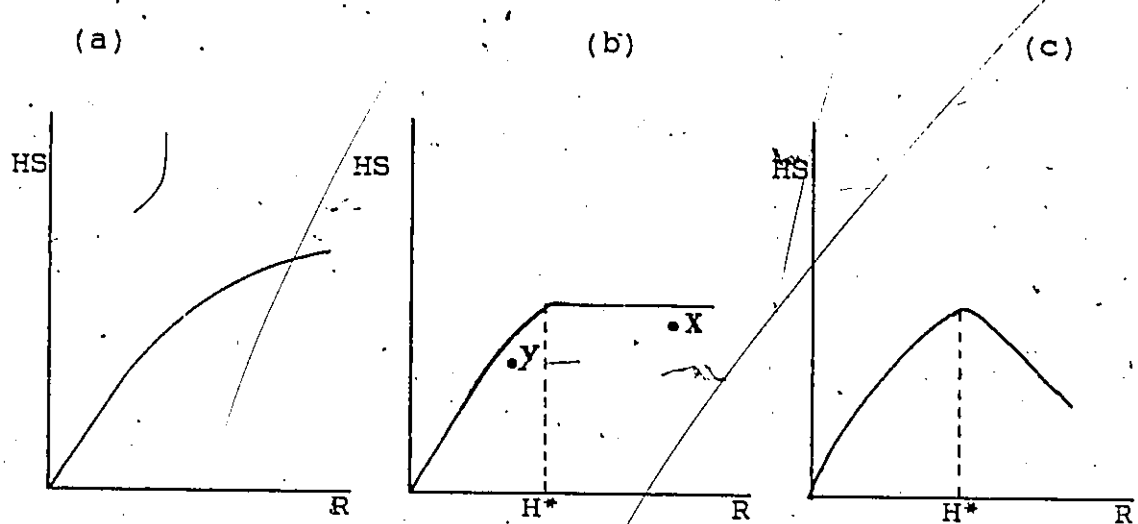
This thesis, and the policy path investigated in the thesis, are concerned with technical and allocative efficiency in the production of <u>health services</u>, which in turn generates technical efficiency in the production of <u>health</u>. Allocative efficiency in the production of health is beyond the scope of this thesis and deals with questions about the relative spending on health versus other publicly financed commodities such as defense or recreational parks.

This framework for defining efficiency in the production of health and health services can be used to evaluate the performance of the current system and to identify sources of both technical and allocative inefficiencies. Any policy route (including the policy explored in this thesis) suggesting improvements to achieve cost control must deal with these inefficiencies (or, at least, not make them worse).

With this framework in mind, the diagrams in Figure 1-1 can be used to identify sources of inefficiency in the current system.[8] The diagrams represent causal relationships between health status and the use of resources in the production of health services. Each curve represents the maximum possible health status for a given resource commitment under a given state of knowledge and technology. The curve in diagram (a) represents the case in which the additional application of resources to health care gives additional improvements in health status (but with diminishing marginal productivity). The diagram in (b) represents the case that is often referred to as "flat-of-the curve medicine", (Enthoven (1980a)). As additional

FIGURE 1-1

Relationship Between Health and Health Services



where HS - represents health status, and
R - represents the resources devoted to health care production.

Source: Evans (1984), p. 18.

resources are devoted to health services, the effect on health is at first positive, but it eventually becomes zero. The last diagram (c) represents a relationship described by Illich (1975) in which additional resources devoted to health care are eventually detrimental to health status.

Different points on the above diagrams illustrate differing situations in terms of technical and allocative efficiency. In each diagram, points on the non-negatively sloped parts of the curve represent technically efficient use of resources, and points below the curve represent technically inefficient use of resources, in the production of health services and hence health. In diagrams (b) and (c) points to the right of H^* (whether on or off the curve) represent an allocatively inefficient use of resources. In diagram (b) points on the curve to the right of H^* are technically efficient, but are allocatively inefficient in the sense that there is over-utilization of health services.

Many examples of this type of inefficiency can be found in the literature. For example, a clinical study by Gilbert et al. (1984) indicates that the optimal protocol for well-baby visits in the first two years of life should be six instead of the ten that are currently funded through the Ontario Health Insurance Program (OHIP). Other examples are evidence on the over-use of hospital facilities in the treatment of acute myocardial infarction victims (Hutter et al. (1973) and McNeer et al. (1978)) and the ineffectiveness of some annual periodic health examinations (Canada (1980)).

Other types of inefficiencies are encouraged by the reimbursement methods for physician services. For example, because reimbursement is restricted to physicians and not their aides, physicians tend to practice a more costly treatment style in attaining a given level of health for the population. An often cited example of this type of inefficiency is the case of nurse practitioners. The evidence (Spitzer (1978, 1984), Spitzer et al. (1974) and Denton et al. (1983)) indicates that nurse practitioners can do many of the same tasks as physicians, at a smaller resource cost. Point "Y" in diagram (b) would illustrate this. However, their use is not widespread. Encouraging the use of such cost-saving techniques would undoubtedly improve the efficiency with which health services are delivered.

In diagram (c) points to the right of H^* are also allocatively inefficient, but there is an additional problem in that harm is done to people. The indiscriminate use of x-rays and drugs would be examples of this.

It is apparent that points at different places in the diagrams have different interpretations in terms of technical and allocative efficiency, and hence present different challenges for public policy even if the main objective is identified as efficiency improvement. The question arises of where the Canadian health care system might be situated in terms of its performance. After reviewing the evidence, one could conclude that the Canadian health care system is within its efficiency frontier in the production of health services in terms of both technical and allocative efficiency, considerably more so in the latter, than in the former, case (as illustrated by a the point "X" in diagram (b)).

However, questions still remain concerning the magnitude of the inefficiencies and whether the problems lie primarily in the hospital or physician sector. There is no doubt that the large body of health services research and clinical epidemiology literature (from which examples were drawn above) indicates that the system could provide more of both health and health care with its current resource commitment. Some services are inefficacious or provided in excess of their efficacious levels.[9] In addition, many efficacious services could be provided more efficiently by using alternative procedures, alternative practice styles or alternative providers.

1.3 Past Performance in Terms of Expenditure Control

Despite the large degree of inefficiency embedded within its structure, the Canadian health care system appears to have performed well thus far in terms of controlling expenditures. Table 1-1 presents expenditure data for Canada and the United States and is used as one measure in evaluating the performance of the system.[10] From the introduction of public health insurance (fully completed by 1971), total health expenditures (THE) in Canada remained a relatively constant share of Gross National Product (GNP) throughout the 'seventies. This performance is in noticeable contrast to that of the United States and many other developed countries which experienced escalating expenditures during the same decade.[11] However, estimates for the 'eighties show total health expenditures at approximately 8.5% of GNP in Canada, a significant difference in comparison to its value during the 'seventies. An interesting observation in this current period is that while the share of total health expenditures as a percentage of GNP is growing in Canada, it appears to be levelling off in the U.S.. There is some suggestion that the increasingly competitive environment created by business initiatives in the U.S. has been responsible for this.[12]

TABLE 1-1

Health Care Expenditures in Canada and the United States 1960-1985

YEAR	THE (thousand $)	CANADA (% of GNP)	UNITED STATES (% of GNP)
1960	2136.5	5.57	5.32
1961	2375.5	5.99	5.52
1962	2561.4	5.97	5.45
1963	2801.5	6.09	5.57
1964	3059.9	6.09	5.62
1965	3415.0	6.17	6.06
1966	3837.5	6.21	6.12
1967	4324.4	6.51	6.44
1968	4909.7	6.76	6.70
1969	5505.3	6.90	7.01
1970	6255.9	7.30	7.60
1971	7122.3	7.54	7.83
1972	7790.2	7.40	7.98
1973	8720.3	7.06	7.89
1974	10247.5	6.95	8.24
1975	12381.4	7.49	8.68
1976	14158.7	7.38	8.79
1977	15532.6	7.39	8.91
1978	17094.1	7.36	8.90
1979	19067.2	7.21	8.89
1980	22178.6	7.48	9.46
1981	25769.3	7.60	9.70
1982	30087.7	8.50	10.40
1983(a)		8.60	10.70
1984(a)		8.60	10.60
1985(a)		8.60	10.40

Note: (a) provisional estimates from Health and Welfare Canada.

Source: Canada (n.d. 1984b)

There are, however, conflicting views on the performance of the system in terms of expenditure control. On one side, there is concern by government that expenditures are becoming too high, hence the need for tighter control. On the other side of the debate, providers claim that the system is seriously under-funded (that is, the level of expenditure is too low) and additional funds should be injected. These conflicting views on expenditures and the resulting confrontations between government and providers have contributed to the concerns about the ability of the system to achieve long-run cost control.

The apparent resurgence of expenditure growth in the early 'eighties for Canada is primarily price and income driven and is evidence of instability in the current institutional arrangements for the long run. This can be illustrated by the following identity:[13]

$$\sum_{i=1}^{m} P_i * Q_i \equiv THE \equiv \sum_{j=1}^{n} Y_j * N_j$$

where P_i is average cost per unit of service
Q_i is number of units of service
THE is total health care expenditures (or total health care costs)
Y_j is average income of providers
N_j is number of providers.

This relationship illustrates many of the instruments that have been effective in controlling expenditures. During the seventies, one of the primary means of controlling total health expenditures was restraint on fee (benefit) schedule increases. In the first ten years after the introduction of medicare, benefit increases received by physicians were smaller than the movements in the Consumer Price Index (CPI).[14] This restraint on fee schedule increases placed extreme pressure on physician income levels, so much so that a growing dissatisfaction among the profession became evident. This discontent was not just symbolic in nature, as was evident from the 1982 fee schedule negotiations between the Ontario government and the Ontario Medical Association. Negotiations were quite acrimonious with physicians operating on work-to-rule and at times withdrawing their services. This type of behaviour clearly was fuelled by provider income aspirations. The agreement that was finally reached in 1982 was to last for five years and amounted to an increase in the fee schedule of approximately 43%.[15]

As a consequence, after 1981 the trend in expenditures reverses such that the CPI rate of increase is lower than the rate of increase in the physicians' benefit schedule.[16] Settlements of this magnitude no doubt have contributed to the growth in health care expenditures during the 'eighties.

In addition, reimbursement methods in the hospital sector have contributed to the growth in health care expenditures. Although hospitals are reimbursed on global budgets which afford some control of expenditures, the Ontario government, for example, has twice since 1981 financed hospital deficits. In 1982, the Hon. Larry Grossman, the then Ontario Minister of Health, financed the aggregate hospital deficit of 110 million dollars.[17] In April 1987, the Liberal government in Ontario made an additional allocation of 95.4 million dollars to be distributed to Ontario hospitals.[18] Actions such as these no doubt have led to increases in total health expenditures.

Discontent on the part of providers appears in many forms, examples of fee schedule negotiations described above being one such form. Another example of discontent is the confrontation between physicians and government on the issue of extra-billing.[19]

Such situations of ongoing confrontation are further evidence of the instability of current institutional and financial arrangements for the long-run.

What is needed is a system that will encourage efficient behaviour on the part of providers without leading to the types of confrontation that the system is currently experiencing. However, any restructuring in the hope of gaining efficiency improvements must also ensure that equity in terms of access to care prevails simultaneously with the potential efficiency gains.

1.4 Proposals for Improving Performance

With the growing evidence that present management of the system has entrenched perverse incentives, it appears that to improve performance it is necessary to improve the structure and incentives within the system.

1.4.1 Regulation

The status quo, in terms of treasury-type management, leaves many doubts regarding its ability to control or contain expenditures in the long-run. An obvious response, however, might be that performance could be improved if the current forms of treasury-type management were strengthened. This would imply such actions as tougher positions on fee schedule negotiations and the refusal to finance hospital deficits after the fact. This type of regulatory action, however, is unlikely to be successful. The incentives towards inefficiency will become further entrenched and the confrontations between government and the medical profession can only be increased.

Other regulatory approaches call for the government to take more initiative in encouraging efficiency through policies that affect the supply side of the market. For example, the government could introduce policies to shift practice styles towards less expensive forms of delivery or policies to encourage manpower substitution of nurse practitioners for physicians, or effective utilization review.

1.4.2 Market Reform

Although it is recognized that regulatory policies may be successful in controlling health care expenditures, regulatory approaches per se are not the subject of this thesis.[20]

Instead, this thesis considers an approach involving the use of market forces to encourage improved performance of the system. Various proposals incorporating the use of market forces to varying degrees have been suggested by many authors, both in Canada and the U.S..[21] At the outset one point should be emphasized. It is unrealistic to expect that the proposals suggested for strengthening competitive forces within the market will cause the market for health services to conform to the norm of perfect competition. What is sought is a workable solution of competition rather than the theoretic optimum; a solution that would, through the use of competitive market forces, improve efficiency while maintaining equity within the health care system.

As a result, competition itself is often not well-defined. The nature of competition depends upon forces external to an organization such as overall demand, as well as the internal structure and goals of the organization. Competition may occur over prices, services or amenities, and is seriously affected by legislation and regulation in the market.

1.4.3 Publicly Financed Competition

One approach to market reform within the Canadian context has been forwarded by Stoddart and Seldon (1984). They suggest that, under certain assumptions and conditions, a competitive market strategy could be successful in providing incentives for both patients and providers to behave efficiently. Their proposal calls for the creation or development of alternative primary care delivery modes that would engage in price (and perhaps benefit) competition with the traditional fee-for-service sector. The presumption is that alternative delivery modes have the potential to lower the per capita cost of health care for their enrollees, and in combination with consumer choice may have a substantial effect on the behaviour of fee-for-service providers.

The research reported in this thesis examines a variant of the market strategy proposed by Stoddart and Seldon. The competitive strategy is modelled within the context of public health insurance and provides a framework within which to define and evaluate the policy options facing a provincial government which is considering the introduction of publicly financed competition. The simulation analysis investigates the magnitude of potential cost savings resulting from publicly financed competition, how long it takes to achieve these savings, and the sources of the savings.

Analysis of the competitive strategy with a simulation model identifies the variables which have the most effect on the results. For example, the potential cost savings may be primarily a result of the existence of alternative delivery modes with their alternative organization and reimbursement methods, or it may be the response that alternative delivery plans draw from the traditional fee-for-service sector that is more important. The simulation analysis helps identify any avenues of unrealized potential or pitfalls before an actual pilot project or full scale restructuring of the system is undertaken.

1.5 Organization of the Thesis

The organization of the rest of the thesis is as follows: Chapter 2 provides further details and explanations of various proposals for the introduction of competitive market forces. These proposals include those involving alternative health care plans and the more general proposals of consumer cost-sharing. This literature review includes both the U.S. and the Canadian literature. The strengths and weaknesses of the various proposals are given. Of particular interest is the Stoddart and Seldon proposal for Canada.

The third chapter outlines formally the variant of the Stoddart and Seldon proposal used in this thesis. In particular, this chapter details the baseline specification of a simulation model of competitive market forces under public health insurance for a hypothetical community in Ontario. The model is a two sector model illustrating two alternative health care plans, a capitation modality and a fee-for-service modality, existing side-by-side in a community.[22] The structure and underlying assumptions are described, identifying the incentives facing both modalities and how these factors affect costs (expenditures) in each modality and the community as a whole. The baseline model illustrates the existence of an alternative delivery plan with each modality competing for patients on the basis of price, but does not allow either modality to recapture lost market shares. The key data requirements also are identified in this chapter.

Chapter 4 of the thesis is a thorough review of the empirical literature pertaining to the Canadian situation, generating data for the model. The chapter discusses data availability, bias within the existing data and, most importantly, missing information. Data from the U.S., particularly regarding consumer enrollment decisions, are used to supplement Canadian data where appropriate.

The fifth chapter reports the results of the baseline simulation model. The results identify important parameters affecting the costs in each sector, enrollment decisions, and overall costs. The results provide a quantitative estimate of potential cost savings under a publicly financed competitive proposal.

The results of the baseline model are guidelines to modelling rather than conclusions. Chapter 6 details extensions and refinements to the baseline structure. The extended structure allows for various scenarios, including fee-for-service response to lost market share, and independent capitation rate setting. The structure, assumptions, and data for these and other possible scenarios are detailed. The results are presented in Chapter 7. The results reported in Chapters 5 and 7 also include a sensitivity analysis on important parameter values.

Chapter 8 discusses the legislative and practical problems of implementing the variant of publicly financed competition analyzed throughout the thesis. A discussion of the problems concerning the existing legislation, the feasibility of implementation, the design of the institutional arrangements and the lack of knowledge about critical variables is given. The significance and implications of model results for a publicly financed competitive policy direction are discussed, including an extrapolation of the results to a provincial level.

Chapter 9 summarizes the thesis and its main conclusions. The Appendices of the thesis include model specifications and the detailed results of the sensitivity analyses.

Endnotes

1. A simulation model is a representation of a real-life situation (or possible situation) that is used to evaluate different structural designs or policies over time. A simulation model is not a perfect representation; however, a well structured model can isolate factors which govern the performance of a proposal and can contribute to its eventual success or failure. In general a simulation model specifies a set of individual relationships fitted to available data. Simulation is then the process of solving these equations simultaneously over some time interval. In this thesis, because the market situation suggested does not currently exist, it is necessary to build a model for which there are few data available. In this case a set of hypothetical relationships which are not statistically fitted or tested are employed. Although individual relationships are not tested, the model as a whole is simulated. The analysis is extremely useful in forecasting and analyzing the impact of alternative scenarios over a limited time period.

2. Most provinces draw their contributions from general revenues; however, the province of Quebec employs a payroll tax and the provinces of Alberta, British Columbia and Ontario finance part of their expenditures through premiums which are unrelated to use. For a more extensive review of the historical development of national health insurance in Canada see LeClair (1975) and Taylor (1978).

3. In 1984 the Canada Health Act was passed which detailed additional criteria that the provincial plans must satisfy to continue to qualify for federal-provincial cost sharing. An important new development in this Act is the attempt by the federal government to eliminate extra-billing. Under the Act, if provincial plans continue to allow extra-billing by physicians and/or user charges by other health care providers the province will lose an equivalent amount in federal revenues. For additional details on the legislation governing provincial health care plans, see Canada (1984a). The importance of these legislative requirements to the thesis is discussed in Chapter 8.

4. In private markets, revenue raising and payment to providers usually occur simultaneously. The significance of the separation of these functions for the efficiency of a publicly financed health care system has been discussed by Stoddart and Seldon (1984) and Lomas (1985).

5. For more details on the nature of market failure in the health care market see Arrow (1963), McClure (1981) and Evans (1984).

6. For further details on the observation that private insurance markets lead to an unsatisfactory outcome in terms of the distribution of care see Evans and Williamson (1978) and Evans (1984).

7. One should be aware, however, that other factors beside the use of health services contribute to an individual's overall level of health. Factors such as lifestyle, biology and environment have important contributing effects on health (Lalonde (1974)).

8. A more detailed explanation of the relationships between health status and resource use can be found in Illich (1975), Enthoven (1980a), and Evans (1984).

9. In the health care evaluation literature an efficacious procedure is defined as one that does more good than harm when administered in a controlled or ideal environment, whereas effectiveness refers to whether or not an actual field trial is successful in providing more benefits than harm.

10. The data presented in Table 1-1 are only records of expenditures and do not disaggregate the changes over time into prices and quantities of services or incomes, manpower and capacity, as would be appropriate in a comprehensive evaluation of system performance.

11. In contrasting the U.S. and Canadian experience during the 'seventies, approximately 67% of the difference in total expenditures is due to differences in hospital expenditure, and 30% is due to differences in expenditures on physician services. For more details see Evans (1984) and Barer and Evans (1984).

12. In the U.S., private business employers see themselves as agents for employees in the purchase of health care. Employers seek to manage costs by bearing more of the financial risk internally and by demanding more information on the charges of providers and their practice style behaviour. Businesses are becoming more aware of the cost consequences of variations in practice styles. With this information they can begin to identify high and low cost providers and can then use reimbursement processes to encourage a more efficient system. For additional information see Schlenker and Shanks (1983), Tell et al. (1984), Herzlinger (1985), Herzlinger and Schwartz (1985), and Evans (1986).

13. This identity is referred to as the "iron law of health care costs" and illustrates the economic relationship of "the circular flow of income." It is evident that any change in the left hand side of the equation (in terms of prices or quantities) necessitates some change on the right hand side of the equation (in terms of providers' incomes or number of providers) and vice versa. (Evans (1982, 1984)).

14. For the years 1947 - 1971, the data indicate that physician incomes relative to the income of the average worker rose about 3% per year for a total of over 50%. During the same period there was no indication of increased physician workloads. As a consequence, the main impact on costs was due to an increase in the unit price received by the physician. During the 'seventies, however, fee increases were tightly restricted by provincial governments. Fee schedule increases during this time averaged 4.9% per year while increases in the Consumer Price Index (CPI) were an average 8.3% per year. See Evans (1984) and Canada (1986).

15. See Canada (1986) for the particulars of this settlement.

16. For the years 1980-1985 fee schedule increases averaged 10.6% per year while increases in the CPI averaged 8.0% per year. See Canada (1986) and Bank of Canada (1986).

17. See <u>Globe and Mail</u> (1982).

18. See <u>Medical Post</u> (1987).

19. In Ontario, the government-sponsored health insurance plan (OHIP) covers a large range of benefits for both medical and hospital services. Prior to June 1986, physicians who had "opted in" submitted their fee billings directly to OHIP and accepted the plan's allowance as full payment. Those physicians who had "opted-out" billed their patients directly, though they often submitted a claim to OHIP on behalf of the patient. OHIP then reimbursed the patient on the basis of the OHIP schedule of benefits. The patient was left to pay any difference between the physician's charge and the benefit schedule. The decision to "opt-out" may have been for financial reasons or it may have reflected a desire to register a protest against universal public health insurance. However, large numbers of "opted-out" physicians threaten the essence of universal public health insurance by seriously affecting universal access to care on "uniform terms and conditions". In addition, extra-billing on the part of a large number of physicians has the potential to increase total health care costs. Extra-billing represents an instance of out-of-pocket expenses borne directly by patients, hence an influx of private funds into the system. The practice of extra-billing is a highly sensitive issue. Wolfson and Tuohy (1980) and Manga (1983) provide a detailed examination and history of extra-billing and the resulting confrontation between government and the medical profession before the introduction of the new Canada Health Act. In 1984, the new legislation was an attempt to deal with the issue directly. Many provinces have passed legislation preventing extra-billing. The province of Ontario did so in June 1986. The legislation however, was not passed without a great deal of confrontation between the medical profession and the Ontario government, culminating in a doctor's strikes. Although the legislation prohibiting extra-billing has been passed, the discontent on the part of physicians has not gone away.

20. Many authors, including Detsky et al. (1982), Weller and Manga (1983), and Horne (1984) emphasize the virtues of regulatory approaches to improving the performance of the system while others, like McClure (1981) condemn such strategies. This author feels that although regulatory approaches have many positive benefits, the type of regulatory approach most applicable to Canada involves more direct government

involvement in the provision of health services. The evidence cited already regarding confrontations between providers and government, and which can be traced prior to the introduction of medicare (that is, the doctors' strike in Saskatchewan in 1962, (Badgley and Wolfe (1967)) leads to the conclusion that physicians are reluctant if not hostile to more direct government involvement in provision. In addition, this author feels that many of the positive attributes of regulatory strategies can be achieved through market reform. For example, the encouragement of manpower substitution and differing methods of reimbursement can be promoted with the introduction of market forces. This is not to say that regulation will be dismissed altogether; the ultimate solution will require both regulation and increased use of competitive forces.

21. A more detailed description of the various models, including their strengths and weaknesses, are given in Chapter 2 of the thesis.

22. The term modality refers to the combination of financing and organization within a health care delivery setting (See Contandriopoulos et al. (1986)).

CHAPTER 2

MARKET REFORM PROPOSALS AND EXPERIENCE

2.0 Introduction

The purpose of this chapter is to elaborate on the criteria essential for successful market reform by reviewing proposals and experience in both the U.S. and Canadian literature. This review serves to highlight the features of the institutional environment, and other specific characteristics, relevant to the model structure of publicly financed competition. The American experience (particularly the roots of current competitive initiatives) is discussed because evidence from the U.S. on consumer cost-sharing and the success or failure of alternative delivery organizations is pertinent to an evaluation of the likely success of competitive market forces in Canada.

2.1 Key Features of Competitive Proposals

In general, proposals for competitive market reform contain two key features: (1) there is provision for consumer cost-sharing so that informed consumers have some interest in choosing efficient providers, and (2) there is provision for consumer choice among alternative organizational arrangements in the financing and delivery of health services. The consumer choice decision is structured such that it induces providers to seek their incomes in competition with each other. Providers in alternative organizational arrangements must engage in price and benefit competition with providers in the traditional fee-for-service sector. Alternative delivery modalities offering favourable price and benefit combinations to consumers are thus able to draw consumers away from traditional providers. The resulting lost market share is then expected to stimulate a countervailing competitive action on the part of traditional providers.

The first feature, that of consumer cost-sharing, is a strategy to make consumers better informed about the market. If consumers participate in cost-sharing they will have a greater financial stake in the decisions that are made on their behalf. This will cause consumers to search for efficient providers in order to obtain "better value" for their money.

Obviously, consumer cost-sharing requires a certain amount of information. For example, the product must be sufficiently defined so that consumers can make informed, price-guided decisions. Once the definition of the product has been sufficiently standardized, consumer cost-sharing has two effects: (1) a reduction in the number of services demanded is expected because price and quantity are inversely related, and (2) price-conscious consumers are expected to shift away from high cost providers to lower cost providers.

There are inherent weaknesses with the above expectations. First, there is a large degree of consumer ignorance in the health care market. In the event of illness, consumers generally do not have the experience or expertise to make rational judgements on the purchase of specific health services and their resulting effects. This situation results in a special relationship between the physician and the patient, often referred to as the agency relationship.[1]

The agency relationship refers to the authority given to the provider by the consumer, whereby in making his decisions, the provider puts the consumer's interests ahead of his own. However, the agency relationship between the consumer and provider is not a perfect one. Although the agency relationship requires the provider to substitute his judgement in place of that of the consumer, and to do so in the consumer's best interest, there are other incentives affecting the provider's behaviour. For example, if providers are reimbursed on a fee-for-service basis, then the type and amount of treatment the patient receives may well be based upon the provider's financial motives.

Remuneration on a fee-for-service basis does not encourage providers to minimize the number of services or costs. As a result, the consumer may not obtain the services he needs or wants at the lowest possible cost. Evidence indicates that fee-for-service physicians' practice styles are oriented toward more rapid and routine procedures rather than toward a more thorough investigation and diagnosis of the patient's conditions (Hall (1980), Luft (1981) and Eisenberg (1985)). Consequently, the necessity of relying on someone else's judgement, particularly if the relationship is an imperfect one, represents a serious violation of consumer sovereignty. This may impose a significant barrier to achieving the optimal allocation of health care resources.

In many situations of consumer ignorance, the consumer is afforded some protection through the competitive behaviour of producers in the market. If producers engage in price competition, many will make the effort to inform consumers about the relative merits of their products. However, the typical structure of health care markets does not guarantee such competition.

Consequently, competitive strategies must generate information for the health care consumer which is of value in making informed choices.[2]

With informed consumer choice, cost-conscious consumers have an interest in choosing an efficient producer. It is important then that consumers' decisions affect physicians' behaviour to ensure that market forces work to generate efficiency improvements and hence cost (expenditure) control. For consumer choice to affect physician behaviour, physicians must actively compete for consumers and hence market share. One way to encourage this competition is to establish different organizational arrangements combining the provision and financing of health services, i.e., organizational arrangements that are alternatives to the traditional fee-for-service sector.

Both the provision for consumer choice between competing delivery modalities and consumer cost-sharing must be present for market forces to have maximum impact. A competitive environment is extremely important because none of the modality arrangements available or proposed are completely free from adverse incentives on quality or efficiency.

Currently, little is known about the competitive impact of alternative practice styles on entire health care systems over prolonged periods. However, advocates of the pro-competitive stance assume that competitive pressures exerted by alternative delivery organizations will improve efficiency substantially and contribute to the achievement of long-run cost control for both medical and hospital services.[3]

2.2 Alternative Delivery Organizations

The alternative form of organization and payment that is most frequently considered is a multi-specialty group practice reimbursed on a capitation basis. There are, however, a wide variety of different organizational forms and payment mechanisms that have been suggested and sometimes deployed in market reform strategies. Because the publicly financed competition approach investigated in this thesis relies on a multi-specialty, capitation-reimbursed, group practice approach, the review below concentrates on that organizational form. For other possibilities see Barer (1981), Luft (1978, 1981, 1985), Fox et al. (1984), Hornbrook and Berki (1985) and Contandriopoulos et al (1986).

The multi-specialty, capitation-reimbursed group practice consists of a group of physicians (both primary and specialist) who practice together in shared facilities. The group provides comprehensive health services to a specified, voluntarily enrolled population on a prepaid basis. The plan guarantees access to medical care and pools medical risks by requiring that all enrollees prepay a fixed amount for services during a specified enrollment period (usually one year). Group revenue in a given period is independent of the number of services actually provided and depends only on the number of people for whom the practice is formally responsible. Net income to the plan is then the difference between the value of the capitation payments and the cost incurred in providing services. Therefore, unlike revenue, net income depends upon the number and type of services provided (and the costs of providing them).

In comparison with the fee-for-service sector, the appeal of a capitation modality is that it creates the economic incentive to provide care more efficiently. It is generally argued that capitation plans have greater potential for improving both the technical and allocative efficiency of health care delivery. This is asserted to be the result of several factors including group size, internal organization and reimbursement method.

In the group versus solo practice comparison, one issue is economies of scale and their relationship to technical efficiency. In favour of group practice, the argument is that such organizations are better able to employ auxiliary personnel and medical equipment. For example, the substitution of less qualified personnel for the more highly trained, and the better utilization of medical equipment such as lab and x-ray facilities could result in cost savings.

Both Canadian and American literature on the existence of pure economies of scale in medical services is inconclusive. In comparing group and solo practice, however, Migue and Belanger (1974), Barer (1981), Luft (1980a, 1980b, 1981), and Hornbrook and Berki (1985) all carefully review the literature on the effects of organizational structure and reimbursement mechanism. In general, the conclusion is that although technically there are potential savings related to economies of scale from group practice, these savings are not always realized. The financial incentives facing each form of practice must also be investigated.

The literature indicates that cost savings are a function of both the organizational size and structure (group versus solo) and the payment mechanism (capitation versus fee-for-service). The separate impact of each effect cannot be determined.

This inseparability is not a major concern for investigations of competition proposals in general or for this thesis in particular. The fact that there exist potential savings through gains in technical efficiency associated with prepaid group practice supports the view that alternative delivery organizations could play an important role in market reform strategies.

Advocates of competitive strategies also emphasize the role of alternative delivery plans in achieving a more allocatively efficient use of resources. The argument is that capitation group plans (for example) not only deliver at a lower cost the same set of services offered by the fee-for-service sector, but also can provide a setting in which a different mix of services (such as greater emphasis on health promotion and disease prevention) can be offered while at the same time lowering overall utilization of services.

There is, however, an ongoing debate on the performance of capitation and fee-for-service modalities in achieving allocative efficiency. While the fee-for-service physician has a strong incentive to over-service, the capitation physician has an incentive to under-service. Although critics of prepaid group practice claim that under-servicing is a major problem, evidence on quality

(Cunningham and Williamson (1980), Donabedian (1983), and Ellwood and Paul (1986)), and satisfaction of enrollees (Berki and Ashcraft (1980), Korcok (1984), and Davies et al. (1986)), seems to contradict this.

For example, Cunningham and Williamson review 27 studies in which the main focus was a direct comparison of the quality of care in capitation-reimbursed plans with traditional fee-for-service providers. They found that in nineteen of the studies the general level of quality was superior in the capitation plan. In eight of the studies there was no difference in quality and no study supported the case that care in the capitation plans was inferior. Cunningham and Williamson conclude that care in a capitation plan setting is at least comparable and perhaps superior to that found in fee-for-service practice.

Other difficulties arise in comparisons of the efficiency and costs of the two modalities. For example, a modality might attempt to minimize the average cost per person by selecting only healthy patients. This is a problem of adverse selection. If it occurs, then the cost savings within a particular modality should be attributed to this selection process and not to the organizational form or reimbursement mechanism. Evidence on this issue is inconclusive but the possibility that adverse selection may confound comparisons of utilization in fee-for-service and capitation modalities requires that existing data must be interpreted carefully.[4]

In summary, the establishment of alternative delivery organizations and the re-establishment of the financial link between providers and consumers are both necessary for efficiency improvements. The remainder of this chapter reviews both Canadian and American literature to assess whether certain competitive proposals that have been suggested satisfy the above criteria for successful market reform and whether any existing competitive situations provide evidence of the success or failure of market reform.

2.3 American Proposals for Market Reform

2.3.1 Major Risk Medical Insurance

Many proposals for market reform have been suggested in the U.S. literature. Because of the large number of proposals and the fact that thorough reviews have been done elsewhere (Luft (1980a, 1981), Langwell and Moore (1982), and McClure (1982)) only a few of the major proposals will be outlined here. These form the basis for most of the others found in the literature.

The first proposal to be examined was suggested by Feldstein (1977). The proposal is referred to as Major

Risk Medical Insurance (MRM). The claim by Feldstein is that efficiency in the health care market can be achieved only if patients have a direct financial interest in the efficiency with which health care is delivered. This financial responsibility involves consumer cost-sharing up to some maximum amount. For example, MRM might cover expenditures greater than $1000, a form of deductible, or greater than 10% of the total, a form of co-insurance. The consumer is then left to pay out-of-pocket until the limit of the deductible or the co-insurance amount is reached. MRM insurance puts a limit on the amount of cost-sharing, so that consumers are still assured of some financial protection.

The claim is that this form of cost-sharing alters the incentives facing both the consumer and producer at point of service. Cost-sharing on the part of the consumer will induce the consumer to restrain his use of medical services by decreasing the amount of unnecessary or marginally beneficial services demanded. In addition, cost-sharing may induce consumers to seek out the more efficient providers. If enough consumers make the appropriate choices, then over time a change in providers' practice styles could result. The less efficient providers will lose patients, i.e. market share, to the more efficient providers. If the less efficient providers do nothing they will eventually drop out of the market because of their inability or unwillingness to compete. Their likely choice of action, however, would be to adopt a more efficient practice style in order to regain lost market share.

There are some advantages of such a proposal. With first-dollar insurance coverage, there is no incentive for the consumer to choose wisely. MRM insurance, however, rewards the consumer for shopping wisely. Because the consumer must pay out-of-pocket below the limit of the deductible or co-insurance, for some set of services market forces are at work.

However, the MRM proposal has difficulty (Barer et al. 1979) satisfying the criteria necessary to ensure adequate market forces that induce competition. Although the proposal satisfies the provision for consumer cost-sharing, it does not necessarily satisfy the condition which links the consumer to the provider.

First, the MRM insurance scheme places a large amount of faith in the ability of consumers to force competition on the basis of prices and quality among providers. Although consumers are made cost-conscious as a result of the cost-sharing provision, they are made so at the time of illness rather than before the fact. During illness, it is difficult for the consumer to be an informed buyer of complex medical services. In addition, MRM only induces price sensitivity on a certain set of services. It is thought to discourage the use of unnecessary services, but there is no evidence that this is so (Barer et al. (1979), McClure (1982), Hulka and Wheat (1985), and Stoddart and Labelle (1985)). Finally, although there may be a deterrence effect for services purchased while under the limit of the deductible, once the maximum limit is reached the effect presumably ceases.

Under MRM, it is possible that the provider organization or individual physician still receives a large portion of revenues on a fee-for-service basis, which rewards providers for the increased use of medical services, especially after the limit of the deductible has been reached. If MRM were offered in a "dual-choice" situation with first-dollar coverage, too few consumers might choose it to create significant provider competition.[5]

In addition, although MRM insurance includes consumer cost-sharing, equity in access to care is also weakened when coverage is based upon deductibles and co-insurance. These charges may leave a large proportion of the population at financial risk. If the deductible or co-insurance rates were large enough many low income consumers would have to be subsidized to ensure adequate financial protection.

Although MRM insurance provides for consumer cost-sharing it is unlikely to induce competition between alternative practice styles. The link between consumers and providers is only an indirect and partial link and is not related to the entire cost of providing services.

2.3.2 Consumer Choice Health Plan and Health Maintenance Organizations

One of the most widely recognized proposals for encouraging competition in the U.S. market has been advanced by Enthoven (1978b, 1978c, 1980a). Enthoven's plan is called the Consumer Choice Health Plan (CCHP), which describes a system of universal health insurance based on fair economic competition in the private sector. The goals of the plan are to reward consumers for making wise economic choices, to reward providers for providing health care efficiently and to do so under universal health insurance coverage. The competitive strategy has the following principles (Enthoven (1981)):

(1) multiple choice for the consumer between alternative delivery plans with an annual open enrollment in all qualified plans;

(2) a fixed dollar subsidy which each individual receives regardless of the plan chosen. This dollar subsidy would ensure adequate access to care while at the same time inducing cost-consciousness. Consumers who chose a more expensive plan would have to pay the additional costs;

(3) the same rules hold for all competitors. There must be rules governing the setting of premium rates, rules ensuring a minimum benefit package and provisions protecting against catastrophic expenses. Qualified plans must set premiums according to community ratings by actuarial categories, they must limit out-of-pocket expenses and must provide coverage for a standard package of basic health care services. These requirements prevent: (a) preferred risk selection by plans; (b) excessively high costs for high risk individuals; and (c) inadequate coverage[6]; and

(4) physicians organize themselves into competing provider groups whereby the premium that each plan charges reflects the ability of its physicians to provide care efficiently and thereby control costs.

The CCHP does seem to satisfy the conditions necessary for successful market forces. Consumers make a choice based upon a price (or a range of services) which reflects the costs generated by the providers in a particular modality. Consumer cost-sharing under the CCHP has consumers paying the full cost differential between alternative plans. The key in the CCHP is the large role for alternative delivery systems. Providers organize into groups (often prepaid) as an alternative to the traditional fee-for-service solo physician. This provides a direct incentive for providers to be economical in their use of health care resources.

The alternative organizational arrangement that Enthoven promotes is called a Health Maintenance Organization (HMO) which, in general, has the following characteristics (Luft (1981)):

(1) HMOs assume a contractual responsibility to provide or assure the delivery of a stated set of health services which includes at least physician and hospital services;

(2) HMOs serve a defined enrolled population;

(3) HMOs have a voluntary enrollment of subscribers;

(4) HMOs receive a fixed periodic payment that is independent of the use of services; and

(5) HMOs assume at least part of the financial risk or gain from the provision of services.

The first, second and third criteria ensure that the HMO knows whom it is obligated to serve and for what services, and that consumers have a choice of whether or not to participate in this type of organization. The fourth criterion guarantees the HMO a fixed amount of revenue, independent of the use of medical services. The last criterion imposes a financial risk on the HMO, such that the HMO will suffer or benefit financially from its decisions about production and utilization of services. The presence of this risk provides the incentive for cost-containment within the HMO.

The above definition of an HMO does not specify any restrictions on the method of payment of individual physicians within the plan, or on the organization of the services that the plan delivers. Many types of systems might succeed in satisfying this definition. The types of organizations described most often in the literature are (a) prepaid group practice (PPG), (b) individual practice associations (IPA), and (c) preferred provider organizations (PPO).

In a PPG a group of physicians practice jointly (common building, etc.) and accept responsibility for providing comprehensive care to a defined enrolled population for a fixed prospective per capita payment. Physicians in this group are usually reimbursed on a salary or salary/bonus system.

Within an IPA, however, physicians as a group accept responsibility for providing comprehensive services for a fixed per capita payment but individual physicians operate on a fee-for-service basis out of their own offices.

PPOs are very similar to PPGs. There is a contractual arrangement between existing groups of physicians, hospitals and other providers to provide health care benefits to groups of employees. The organizational arrangements are more flexible than that of the PPG and the organization is reimbursed on a fee-for-service basis. Although employees are not locked into these providers, co-payments and deductibles are lower or non-existent and benefit packages are richer if the consumer obtains his care from the PPO.

HMOs are attractive primarily for their potential to contain costs. Early claims that HMOs performed better than the traditional fee-for-service physician were based on data from a few large PPGs such as Kaiser Permanente (KP), and the Federal Employees Health Benefit Program (FEHBP). Comparative data on the fee-for-service sector were usually based on utilization studies of the general population or from surveys of employee groups facing "dual-choice" arrangements.

Luft (1981) surveys many studies on HMO and fee-for-service comparisons. The evidence indicates that medical care expenditures were lower for HMO enrollees than for individuals with conventional insurance coverage.[7] In addition, HMO enrollees had fewer hospital days and lower admission rates than persons covered by traditional plans. From this evidence, it appears that the potential gains in cost control result from both the lower hospitalization rates and the lower out-of-pocket expenses that HMO members experience. It is important to remember, however, that if adverse selection existed then this evidence is biased in favour of HMOs.

Additional and more recent evidence on the efficiency of HMOs versus traditional fee-for-service providers comes from a study by the Rand Corporation. The study was a randomized controlled trial comparing the cost and use among people randomly assigned to fee-for-service providers (with varying degrees of co-insurance and deductibles) or to a prepaid group practice (Manning et al. (1984)). In summary, the results were as follows:

(1) When enrollees in the prepaid group were compared to those assigned to fee-for-service physicians and paying a positive co-insurance rate, there was approximately a 28 percent reduction in annual expenditures per enrollee. In addition prepaid group enrollees had approximately 40 percent fewer hospital admissions and patient days per enrollee when compared to those individuals who received first-dollar coverage from fee-for-service physicians.

(2) Prepaid group plan physicians practice a less costly style of medicine than fee-for-service physicians.

The Rand experiment provides solid evidence that prepaid group practice can cut costs significantly.[8]

Although the evidence favours HMOs, HMOs standing alone are not a guarantee that cost savings can be generated for an entire community. There is a question whether the cost savings realized by HMO enrollees are transferable to non-HMO enrollees through competitive actions. The CCHP of Enthoven establishes the competitive environment and links provider behaviour to the consumer through cost-sharing, over and above some fixed subsidy provided by government. Hence, consumers are responsible for the open-ended portion of the premium. This should encourage consumers to search for an efficient provider or organization.

The response by fee-for-service providers in this proposal cannot be predicted, however. Fee-for-service providers reacting competitively is only one possible response; perverse responses are also possible and nothing within the CCHP proposal prohibits them.

Hence, the realization of savings attributable to competitive actions is still an empirical question. A brief summary of the available evidence on this from U.S. areas with competition among health care providers is provided in section 2.4 below.

2.3.3 Other Proposals

Another competitive proposal, similar in nature to Enthoven's, has been outlined by McClure (1978a, 1978b, 1981, 1982).[9] In this proposal providers are separated into identifiable provider groups and the resulting premiums reflect the efficiency of each respective provider group. Provider groups compete with each other for consumers and with traditional providers on the basis of benefits and premiums. McClure stresses that employers and unions can foster an approach to choice and competition by offering their employees a choice between qualified health care plans and traditional plans. To reward the employee for the choice of an efficient plan, he suggests that the employer contribution for each employee should be the same for all plans, with the employee paying any difference in charges.

McClure's claim is that his proposal (although not as concrete or detailed as Enthoven's) satisfies the conditions for workable competition. His proposal establishes a sufficient number of sets of providers, each with the freedom to enter or exit from the market, and all operating without collusive behaviour. His conditions call for adequate information to be provided to consumers about their choices and for a premium/benefit mechanism which simultaneously affects the behaviour of both providers and consumers.

F.O. Evans (1980) has suggested the concept of physician-based group insurance. The proposal delegates the responsibility for managing a patient's care to the primary care physician who chooses the insurance plan for his patient. The patient selects a physician and pays a premium to the insurance plan chosen by the physician. The patient is required to receive all primary care as well as referrals for secondary care from his chosen physician. Patients are free at any time to change providers and providers are free to change insurance companies.

The premise is that such a plan will control costs because physicians choosing insurance plans with higher premiums may lose patients to those physicians who choose insurance plans with lower premiums.

Although patient cost-sharing is involved and there is a partial link between providers and consumers, there are no competing alternative delivery modalities. There is no strong reason why any one primary care physician should be encouraged to change his practice style. If most physicians still practice on a fee-for-service basis, there is no reason to expect any radical changes in their behaviour. It is doubtful that a particular physician's market share would be significantly affected by his being more efficient.

Ginsburg (1981) has proposed an alternative approach to inducing competitive pressures. He suggests altering the tax treatment of health insurance premiums as a method of containing costs. Health insurance premiums currently represent a tax subsidy in the U.S. which Ginsburg claims is a major source of inefficiency and inflation in the health sector. When health insurance is obtained through employment, an employee's contribution is excluded from taxable income. This form of tax subsidy is a substitute for other forms of compensation such as taxable wages.

This subsidy will induce individuals to purchase more health insurance than otherwise and as a consequence consumers will be less interested in the economies offered by alternative delivery modalities such as HMOs. This weakens the ability of HMOs to attract enrollees because the full cost differential between alternative modalities is not strictly borne by the consumer.

Ginsburg proposes changing the tax treatment of health insurance, and expects it to have the following effects: (1) if the proposal reduces tax subsidies, it will induce more cost-sharing, and will result in patients choosing more carefully between alternatives, and (2) a proposal that reduces tax subsidies could enhance the ability of HMOs to gain enrollment.

Many U.S. authors recognize that the tax structure has a significant impact on the promotion of competition. For example, both Enthoven (1980a) and McClure (1982) recognize that the tax laws in the U.S. must be changed to promote competition.[10]

In this respect, the importance of the Ginsburg proposal as well as those by Enthoven and McClure is to highlight the significance of the institutional structure in which market forces operate. It is important that all health care delivery modalities are treated equally so that their growth and acceptance is promoted fairly. In addition, tax laws and other institutional characteristics are extremely important in focusing and circumscribing the role of consumer cost-sharing.

The proposals outlined in this section are an indication of the types of proposals that exist in the U.S.. Many have flaws (such as the Evans proposal) or are similar but less detailed than Enthoven's. Consequently, no further purpose is served by an extended review here.

2.4 Possible Fee-For-Service Sector Reactions

The proposals described thus far do not give a clear indication of the fee-for-service sector's expected reaction to competitive pressures. Most of the authors of proposals for competitive market reforms are optimistic in believing that the fee-for-service sector's reaction will be "positive" in nature, i.e. that it will shift to a more efficient style of practice and promote cost containment.

Enthoven (1977) outlines three models of potential competitive response by the fee-for-service sector while Luft (1981) describes one other possible scenario.

2.4.1 Model I: Desirable Competitive Response by the Fee-For-Service Sector

In this model, third-party insurers, physicians and hospitals respond to the competitive pressures by constraining the utilization of their members in order to reduce per capita costs. As a result, competition between HMOs and the fee-for-service sector in a specific region can be expected to produce lower costs than would have existed without such competition.

2.4.2 Model II: Perverse Response by the Fee-For-Service Sector

This model describes a perverse response by the fee-for-service sector in which fee-for-service providers respond by increasing fees and performing more discretionary procedures when faced with the prospect of excess beds and physician time. This implies that per capita costs could actually increase with the introduction of HMOs and consumer cost-sharing. With the perverse response by the fee-for-service sector, HMOs as alternative delivery organizations do not have as strong an incentive to continue promoting the efficient use of resources. HMOs may allow their costs to follow the rise in fee-for-service sector costs. This may be a necessary reaction by the alternative delivery organization if it is widely perceived that the fee-for-service sector sets the standard for care. To maintain the perceived standard and retain consumers, HMO plans may have to follow suit.

2.4.3 Model III: Competition Among Organized Systems

In his third model, Enthoven describes a situation in which there exist two or more HMOs within the same market, competing with each other as well as with the traditional fee-for-service sector. This situation creates the strongest incentive for efficiency. An individual HMO may expand its market share even if the fee-for-service sector displays a perverse response.

2.4.4 Model IV: Self-Selection

Luft (1981) describes one other possible reaction by the fee-for-service sector. He describes a situation in which, as enrollment continues to grow, HMOs may encourage self-selection of low-risk patients in an attempt to lower per capita costs. By enrolling low-cost users HMOs would leave traditional providers with an increasingly more expensive segment of the population, making it difficult for them to compete. The resulting situation is a form of experience rating whereby the sick pay more, which has major implications in terms of both costs and equity.

2.5 Evidence From Competitive U.S. Environments

Available evidence on health care competition in the U.S. provides a conflicting picture: in part it supports all of the above scenarios. Goldberg and Greenberg (1977, 1980), tested two hypotheses regarding the response of the traditional sector to competition. Their results support Model I above, in which HMO competition is responsible for lowering the utilization rates of the traditional sector. Their hypotheses were that the introduction of an HMO into the market would induce traditional insurers (namely Blue Cross) to (1) reduce the hospital utilization of its members and (2) offer more benefits.

The first hypothesis was tested by examining the relationship of HMO market share to three variables: non-maternity hospital utilization rates of federal government employees covered by high-option Blue Cross plans; maternity length of stay of the high-option government plan; and hospital utilization rates of non-government Blue Cross enrollees. Multiple regression analysis on 1974 cross-section data for various regions of the U.S., accounting for other relevant influences such as the ratio of physicians to population, supported their first hypothesis.

The second hypothesis was tested by comparing market share to the value of the benefit package offered by Blue Cross plans. The results only weakly supported the hypothesis that Blue Cross plans increase their benefit package in response to HMO competition.

Both Luft (1981) and Enthoven (1980a) point out that the results of Goldberg and Greenberg's analysis are dominated by the observations for the three west coast states and Hawaii. If these four states are removed from the sample, the relationship between HMO market share and Blue Cross hospital utilization rates is no longer statistically significant. Goldberg and Greenberg (1980) argue, however, that the results still provide qualitative evidence which supports their first hypothesis. In areas with a significant HMO market share, Blue Cross plans have responded with more vigorous attempts to reduce hospital utilization.

Further evidence comes from the Washington D.C. area, where Federal Employees' Health Benefit Program (FEHBP) gives federal employees the choice between enrollment in a traditional Blue Cross - Blue Shield Plan (BC-BS) or a Group Health Association (GHA).[11] GHA is a consumer-owned, prepaid group plan which provides comprehensive care to its members. The increased competitiveness of the GHA plan has led the BC-BS plan to support the establishment of new HMOs in the Washington area. This is qualitative evidence that traditional plans will compete.

Evidence from a study by Valiante (1976) shows that HMO premiums for federal employees over a ten year period ranged within $10 above to $5 below that of BC-BS rates. This study was conducted in eight U.S. market areas over the period 1964 - 1973.[12] The evidence would tend to support Model II above, in which HMOs do not aggressively attempt to constrain growth in costs over time.

Evidence for Model III is somewhat sketchy, with the clearest example being Hawaii (Enthoven, 1980a). The Hawaii Medical Service Association (HMSA) is a not-for-profit community service organization that uses fee-for-service as a reimbursement method. The HMSA is in competition with Kaiser Permanente (KP), a prepaid group practice. The two plans compete for over 50,000 government employees who are offered a choice of plan and receive a fixed employer contribution toward that choice.

The presence of the KP plan has exerted pressure on HMSA to improve its benefit coverage and cost performance. In addition, KP departed from its traditionally large health centre concept to a number of small out-patient clinics in order to satisfy consumer preferences. Both KP and HMSA have reported hospital utilization rates less than 400 patient days per 1000 population which is about 75% of the national average. As a result, health care costs per capita were approximately 2/3 of the national average. HMSA and KP premiums for comprehensive care are among the lowest found in the FEHBP. HMSA has even established its own HMO on the premise that certain activities are best carried out in a capitation-reimbursed, multi-specialty group practice.

Christianson (1978b) and Christianson and McClure (1979) provide evidence on HMO competition in the Minneapolis/St. Paul area of Minnesota. This market area satisfies the necessary requirements for the successful development of market forces. Consumers can choose among several HMOs and employers contribute only a fixed dollar amount to the plan of the consumer's choice, so there is consumer cost-sharing. The reported data indicate lower than average hospitalization rates and lower HMO costs per enrollee in the Twin cities area (when compared to enrollees in traditional insurance plans such as BC-BS).

Because of these lower costs, HMO development has had an impact on traditional providers in the area. Both BC-BS and the county medical society have responded to HMO development by establishing their own HMOs. Hospitals also have been involved in establishing HMOs and competing for patients by offering discounts.

The studies by Christianson and McClure, however, focus on HMO behaviour rather than the long-term response by conventional providers. The studies provide little evidence of the impact of HMOs on aggregate per capita costs.

More recent studies by Johnson and Aquilina (1986), Feldman et al. (1986) and Luft et al. (1986) have reported little evidence of community wide reductions in utilization rates and costs attributable to the competitive effect of HMO growth and development. The first two studies examined competition between HMOs and the hospital industry in Minneapolis/St. Paul. Both studies showed that HMOs use fewer medical services per hospitalized patient but that this has not resulted in lower hospital costs for the community as a whole. Although these results are significant and perhaps discouraging for HMO advocates, they may be interpreted to mean that if competition is to succeed it must include more than HMOs.

The third study, by Luft et al., reviewed three market areas (Hawaii, Rochester (New York) and Minneapolis/St. Paul) in which competition has taken place with some beneficial effects according to observers. Luft cautions, however, that although there are a number of inconsistencies and contradictions in the available data, reductions in hospital use are not attributable to HMO competition. He claims that they are attributable to other factors, including biases in the data, indirect effects of other policy changes, and other forms of competition.

Some evidence also exists in the Minneapolis/St. Paul market area to support Model IV, which involves adverse selection. The market share of HMOs increased from 2% in 1972 to 10% in 1978, while hospital utilization remained relatively constant during that period. Luft (1981) argues that, although many factors may explain this, the evidence is consistent with both the notion of no major competitive response and selective enrollment of low users in HMOs.

2.6 Previous Simulation Work

The studies cited above suggest that the long-run impact of competitive market forces is still unclear. Moreover, caution is required when interpreting results concerning the competitive effect of alternative delivery modalities on the entire market. As a consequence, a much more structured analysis of market reform proposals is needed. One early attempt at this was a study by Ramsay and Wright (1978). They analyzed the market responses of the traditional fee-for-service sector to HMO growth through the use of a simulation model. This study is the only attempt to examine market reform with a simulation model that could be found in the published literature.

Ramsay and Wright claimed that cost-containment resulted from the HMO sector experiencing lower inflation rates as well as lower per capita hospital use than the traditional fee-for-service plans. Their model included endogenous formulations for changes in HMO and traditional sector memberships, costs and premiums as well as hospital use. The major exogenous variables were the base rates of inflation for the HMO and fee-for-service sectors.

In their model, respective sector costs determine premiums, premiums influence membership and membership affects costs. The fee-for-service sector reactions are as follows: (1) reforms of excess inflation; (2) reforms of hospital utilization; (3) reforms of hospital capacity; and (4) resistance to further HMO growth. The goals for these reaction functions are the HMO values, which remain constant over a fifteen-year period.

Costs in each sector are measured from the input side in terms of resources employed. Data on costs, utilization and productivity of HMOs in comparison with the fee-for-service sector are employed in the simulation to show the effects of competition on community health care costs, market share and number of hospital beds. A more detailed explanation of the structure of the Ramsay and Wright model is found in Appendix A.

Their results indicate that HMO growth does reduce total community health care costs, but that a substantial proportion of the saving to HMO enrollees is offset by increases in the cost to fee-for-service sector subscribers. In addition, HMO cost savings depend significantly on HMO control of both inflation rates and hospital utilization.

There are, however, a number of criticisms of the Ramsay and Wright model. First, they do not examine the content or number of visits in each sector to obtain an overall measure of the volume of services provided by each modality. As a result, the model does not illustrate clearly the role for improvements in both technical and allocative efficiency. For example, if both sectors face the same increases in the costs of the inputs, but the HMO sector is more efficiently managed, it may be able to alter its input mix to reduce the growth in costs. The role of lower cost health-care personnel is an area which also has not been developed in the Ramsay and Wright model.

Second, Ramsay and Wright are not explicit about the organization of the HMO sector. For example, it is not clear whether they are talking about just one HMO or several, or whether the HMO is a multi-specialty group. How the HMO sector is defined has important implications for the reactions by the fee-for-service sector.

Third, the Ramsay and Wright model assumes that the HMO sector has 10% of the market initially. The speed of adjustment by the fee-for-service sector and consequent policy implications may be quite different depending on the initial market share of the HMO sector. For example, the effects of introducing the first HMO into a market may be quite different than expanding the market share of an already existing HMO.

Fourth, the values used for hospital capacity, inflation, etc. in the HMO are considered to be the optimal values, and any fee-for-service sector reform tends toward these values. These optimal values are also assumed to be constant for the 15 year simulation period. Both assumptions are quite unrealistic. There is no clear evidence that the HMO values are "optimal". HMOs are not necessarily on the efficiency frontier, even if they are closer to it than traditional fee-for-service providers.

Furthermore, productivity in a given organization may change over time.

Fifth, the choice between plans is made on the basis of out-of-pocket premiums. Ramsay and Wright make the assumption that a certain percentage (1/3) of fee-for-service consumers would switch whenever the HMO premium was some fraction (1/2) less than the fee-for-service premium. It is here that the largest improvement to their model structure can be made by building in a more sensitive consumer choice decision.

Sixth, the net subscription rate to the HMO sector is constrained by the potential number of new subscribers and the sector's ability to expand. The HMO sector is constrained by a growth rate of 10% per year and the ability to recruit 100 physicians per year. In addition, there is an upper limit of 50% on the market share that the HMO is able to capture. These constraints seem somewhat arbitrary. If in fact the HMO is able to capture all of the market then the model should allow it. It is true that supply side constraints such as ability to recruit physicians and other health personnel are important, as is the availability of funds for expansion, but more flexibility seems warranted in the time path of adjustments until further research is available.

Finally, the Ramsay and Wright results (shown in Tables A-1 and A-2 in Appendix A) are predetermined by the structure of their model. The different inflation rates in the two sectors seem to be the driving force in the model. It is not clear that the two sectors should have differing rates of inflation. Inflation aside, the model should allow the HMO sector to gain market share through the more efficient production of services and a different level or mix of services. Results relevant to this point are presented in Appendix A of the thesis, in Tables A-3 and A-4. They illustrate that the specification of the Ramsay and Wright model does not allow competition based on the efficient use of resources even though this is <u>the</u> motivation for market reform through competing alternative delivery modalities.

Because the Ramsay and Wright model is not structurally sound, its results on the significance of the competitive effects of alternative delivery modalities must be treated cautiously. The model does, however, serve to highlight the utility of simulation analysis for investigations of competition in health care markets. It is this form of analysis, with refinements, that is applied to the Canadian context in later chapters of the thesis.

Before the detailed structure of the Canadian simulation model is presented, it is necessary to review the proposals for and the evidence of market reform in the Canadian situation.

2.7 Canadian Experience With Market Reform

As outlined in Chapter 1, many features that enhance competitive pressures are not present in the health care market in Canada. There have been only a few attempts at consumer cost-sharing and the establishment of alternative delivery arrangements and they have not been integrated. Consumer cost-sharing in Canada has taken the form of extra-billing by physicians or user charges at the point-of-service, such as per day charges for hospital services or a nominal charge for a physician office visit.

There are various rationales for levying user charges (or extra billing). One is to deter frivolous or unnecessary use. Standard demand theory predicts that the expected effect of a point-of-service charge is a reduction in the utilization of that service in response to an increase in its price. Studies in Canada by Beck (1974, 1976), and Beck and Horne (1978) support the view that a user charge in the form of a deterrent fee reduces utilization for at least some groups in the population. Their studies of the Saskatchewan experience with deterrent fees from 1968 - 1971 indicate that utilization of ambulatory services by low income groups and the aged was significantly reduced. However, utilization by middle income and high income groups was either unaffected or actually increased.

As a result, the evidence does not provide a clear indication of the effect of deterrent fees on overall utilization and costs. The fact that utilization of middle and high income groups was unaffected could have been a result of physicians doing more for this group once the first patient contact had been made.[13] This would indicate that user charges did not have the desired effect on provider incentives.

Other authors who have reviewed studies of user charges (Barer et al. (1979), and Badgley and Smith (1979)) find few significant effects of co-payment on utilization of services, especially hospital services. Consequently, it is reasonable to suggest that the types of user charges most frequently observed do not satisfy the characteristics of consumer cost-sharing necessary to induce successful market forces for expenditure control. In particular, the attempt to alter the efficiency of health care delivery through incentives to consumers alone is not effective; the link must extend to the providers of care as well.

Another rationale for user charges is that they are a means of raising revenue to finance the health care system. Thus they have been advocated by those who have not fully accepted the philosophical position of distributing costs on the basis of ability to pay rather than on the basis of benefits received. The evidence (Beck and Horne (1978), for example) indicates that user charges are a regressive form of financing for health care because they introduce significant financial risk to the sick and low income groups. This is perhaps the major objection to the use of user charges; the charges reintroduce inequity into the system.

Barer et al. (1979), Manga (1983), Stoddart and Woodward (1980), and Stoddart and Labelle (1985) all cite criticisms and evidence regarding the use and success of user charges. Briefly, user charges as they have been introduced into the Canadian system in the past have not performed well on either efficiency or equity grounds. However, proposals for publicly financed competition incorporate a new form of consumer cost-sharing. This form of consumer cost-sharing must be differentiated from previous attempts if the proposals are to have any chance of success in the Canadian market.

Blomqvist (1979) and Stoddart and Seldon (1984) have suggested ways in which to strengthen competition in the Canadian health care market. Blomqvist forwards a market reform proposal under the assumption that equity is already achieved in the market, such that there exists a minimum benefit package to which everyone has access. He suggests a switch from compulsory subsidized health insurance to a system of compulsory but unsubsidized health insurance.

He suggests that public sector insurance premiums be set to reflect the expected cost of health services, and that private insurance plans be allowed to compete with the public plan on the basis of premiums. This allows room for private sector insurance plans to compete both in offering the basic benefit package and in offering supplementary coverage.

Blomqvist's proposal allows for the possibility of competition from prepayment plans similar in nature to the HMOs found in the U.S.. He recognizes that prepayment plans are able to produce comprehensive coverage at lower costs than traditional private insurance plans. Blomqvist, however, fails to provide a detailed explanation of how the choice of this type of plan is linked to consumer cost-sharing. He recognizes that to establish competition and still preserve equity many legislative changes are needed, such as ensuring a minimum benefit package or preventing catastrophic financial losses. However, his proposal for competition between private insurance and public insurance leaves doubts about the ability of private insurers to maintain equity.

In particular, there is no clear discussion of the link between the competition among insurance plans and the actual delivery of care (except for the conclusion that HMO-type plans could result). Competition among insurance plans, especially in the provision of supplementary services, does not provide strong incentives for providers to improve the efficiency with which care is delivered. Perceived product differentiation is the strong selling point here, rather than the same set of services at a lower cost. A more detailed link to providers of care is still needed.

The most detailed proposal thus far for introducing competition into the Canadian health care market comes from Stoddart and Seldon (1984). Their proposal recognizes that successful market forces must allow for informed consumer choice on the basis of some financial interest and that this choice must affect provider incentives. The authors claim that their competitive strategy could improve efficiency while simultaneously maintaining the equity that has already been achieved in the health care system. Their proposal is designed within the context of public health insurance for the province of Ontario, and consists of the following four basic steps:

(1) the province would create or encourage three different and distinct modalities for the provision of health services, based primarily on method of physician reimbursement;

(2) the system would continue to be financed through general revenues, with consumers continuing to contribute through taxes and premiums and with premium assistance remaining intact;

(3) consumers would enroll for a specific period of time (one year, for example) with a particular modality, and all costs of ambulatory and hospital care received by an individual would be recorded against the modality in which the individual was enrolled. Unreferred care, or care sought and received outside the modality of enrollment, would require out-of-pocket payments by patients;

(4) at the end of each enrollment period, a standardized cost comparison of the modalities would be performed. The least-cost modality would be covered by the existing Ontario Health Insurance Plan (OHIP) arrangements. Those consumers who chose a more expensive modality from which to obtain their health care would then be charged a higher premium or surcharge to reflect that choice.

A set of institutional and structural relationships from the Stoddart and Seldon proposal can be highlighted. First, the three modalities for service delivery that the authors suggest are fee-for-service, capitation and salary reimbursed practices or organizations.

Second, the competitive strategy is proposed within a system of universal public health insurance. This institutional feature provides a direct role for government, particularly in ensuring equity of access.

Third, the strategy establishes a link between providers and patients in the form of a user charge to patients, based on the source of care. This type of user charge, unlike past or present ones, gives both patients and providers a vested interest in cost-effective practice styles. This, in conjunction with the provision that consumers may change modality at specified intervals, is the essential feature of this competitive proposal.

Fourth, the Stoddart and Seldon proposal assumes that the reimbursement rate set in the capitation sector will be linked to the average per capita cost of ambulatory insured services across all three modalities.

Fifth, the proposal assumes that the quality of care will be equivalent in all sectors so that cost differences will reflect only practice style differences.

Last, the original proposal was set within the province of Ontario, which retains health insurance premiums and has a small network of capitation-reimbursed health plans.

Because proposals such as those outlined above depend on the establishment of alternative organizational and financing arrangements such as capitation-reimbursed group practices, it is of interest to review the status of such plans in Canada, and particularly in Ontario.

Few organizations similar to (and none exactly like) the HMO in the U.S. exist in Canada and none have been established for the purposes of enhancing competition or have arisen as a result of competition. Most have been established to fulfill some perceived need such as an inadequate supply of physicians. They do not compete on price and, if competition exists in any form, it is on product differentiation through promotion of a practice style different from that of the traditional fee-for-service modality.

Alternative delivery organizations similar to HMOs in the U.S. are called Health Service Organizations (HSO) in Ontario.[14] As of 1986, there were 25 HSOs established in Ontario and funded on a capitation basis (Lee (1986)). There were also 12 Community Health Centres (CHC) which are globally funded by the provincial government. The largest of the HSOs is the Group Health Association (GHA) in Sault Ste. Marie which has approximately 45,000 members.[15]

HSOs establish a roster of patients who agree to receive primary care from the HSO. OHIP then pays a monthly fee for each roster member, whether or not they actually use the services. Capitation rates vary with age, sex and physician specialty according to a scale established by negotiations between the Ministry of Health and the individual HSO.[16] It is expected that the cost of the HSO to the Ministry of Health is no more than it would cost to service a similar population on a fee-for-service basis.

Roster patients are not required to use only the HSO, even for primary care, in that they are not held financially responsible for out-of-plan use. The HSO, however, is penalized for out-of-plan use, in that it loses the monthly capitation payment for that patient. HSOs are eligible for Ambulatory Care Incentive Payments (ACIP) which are calculated by comparing the HSO hospital utilization rate with the hospitalization rate of the comparable OHIP district. Hence, if an HSO can keep patients out of hospital it can share some of the estimated cost savings.

There is some indication that HSOs are efficient in their use of resources. Hastings et al. (1973) conducted a study which compared consumers receiving their care through an HSO (the Sault Ste. Marie group) to a similar population who received their care from fee-for-service physicians.[17] The study found that patients in the HSO spent 24% less time in hospital, and had fewer surgical operations, lower rates of readmission, and more laboratory tests on an outpatient basis. In addition, they were more likely to see a doctor at least once a year, to receive immunizations and check-ups, and to be attended by an "appropriate" specialist. The latter practices lead to more emphasis on prevention. These findings tend to support the role of alternative delivery organizations in achieving efficiency.

Although there have been no specific studies of competitive responses in the Canadian context, Lomas (1985) points out two interesting pieces of evidence in the Sault Ste. Marie situation. First, although hospital utilization rates for Sault Ste. Marie patients of traditional fee-for-service providers (who are in direct competition with GHA) were higher than the rates for GHA patients, they were still significantly lower than the rates reported for the area around Sault Ste. Marie. This may indicate a response by fee-for-service providers in decreasing their hospital use. Second, the rates for discretionary surgical procedures for patients of fee-for-service physicians in the Sault were also significantly lower than in the surrounding areas.

Consumers enrolling in an HSO do not currently receive a reduction in health insurance premiums, although they do share the savings indirectly. Consumers can expect a greater variety of services, such as access to medical specialties like ophthalmology, sports medicine, or laboratory and radiology facilities. It appears that current cost savings are directed to expanding and improving services.

Seidelman (1982) provides a detailed explanation of the similarities and differences between HSOs in Ontario and HMOs in the U.S.. The HSO has a contractual responsibility to provide a given set of health services to a defined, voluntarily enrolled population in return for a fixed periodic payment. The HSO also assumes at least part of the financial risk or gain in provision of the services.

On the surface, then, it appears that an HSO has the same characteristics as the HMO. There is, however, a significant difference with regard to accountability. HSO physicians have no financial interest (other than ACIP) in the costs of their patients' hospital treatments, and as a result may not actively avoid or monitor hospitalization as they might if they were accountable for these costs. In addition, patients do not benefit financially from cost savings achieved by the HSO nor do they incur any financial risk from their enrollment in the HSO. The contract is between the HSO and the Ministry of Health rather than the HSO and the patient. Improving the accountability between the HSO and the consumer is a necessary condition for inducing efficiency improvements in the system.

It appears that there is scope in the Canadian context for introducing a proposal for competition. Alternative delivery organizations do exist, public health insurance exists and appropriate consumer cost-sharing could be designed. With some modifications, the market for health services could be adjusted to proxy a workable competitive situation within a publicly financed system.

Many authors, including Stoddart and Seldon themselves, and subsequent commentators (Horne (1984)), have noted several potential weaknesses of the publicly financed competition approach. These include questions about the feasibility of implementation, data requirements, self-selection of patients, and actual or perceived quality differences among modalities. In addition, the Stoddart and Seldon proposal assumes a positive reaction on the part of all modalities to competition. Evidence from the U.S. literature casts some doubt on this assumption.

Some of the issues that have been raised might be resolved by more thorough consideration and specification of required legislative changes, operating procedures, and information requirements. Other issues could only be resolved through an experiment. First, however, the structure of a competitive system needs to be modelled more formally so that its quantitative significance can be investigated and structural variants and alternative behavioural scenarios explored. That is the intent of this thesis.

The primary question of interest is the effect on community health care costs of introducing a variant of the Stoddart and Seldon proposal for publicly financed competition. The model is such that it examines the effects on one community, with data generated from the existing HSO plan in Sault Ste. Marie. The effects on costs are examined under alternative reaction scenarios for the fee-for-service sector to such competition. Conditions necessary for successful implementation of the proposal are also investigated. The next chapter presents the basic simulation model used to investigate more formally the potential significance of publicly financed competition.

Endnotes

1. For more information, see Evans (1982), Tuohy and Wolfson (1975), and Eisenberg (1985).

2. Because the proposals are intended to encourage situations of workable competition and not a "perfectly competitive" market, it is not necessary that all consumers possess perfect information. A situation of workable competition requires only that a sufficient number of consumers possess the information necessary to enable them to shop and to assess the relative prices of alternative sources of care. For example, instead of a consumer making decisions at the time of illness about a particular set of services a more plausible solution involves consumers choosing a source of care on the basis of practice style and its effects on the costs of services.

3. The role of hospitals is extremely important in competitive proposals. If efficiency improvements can be encouraged here as well as in the primary care sector, gains in cost savings can be significant. Many proposals for market reform involve the ownership of hospitals by alternative delivery modalities. In Canada, however, hospitals are "publicly" owned and operated. As a consequence, feasible market reform proposals in Canada must work within this institutional constraint.

4. For more information on the adverse selection problem, see Luft (1981), Enthoven (1984), and Wilensky and Rossiter (1986). Note that regulations to create and enforce open enrollment periods on a first-come, first-serve basis would address this problem. There is also the possibility that providers self-select. In particular, there is the possibility that physicians predisposed to practice efficiently are the ones most likely to be receptive to alternative delivery modalities (Luft (1981)). Although this phenomenon confounds comparisons of modalities, it increases the importance of adding a competitive environment so those who are disposed to practice inefficiently cannot continue unaffected.

5. "Dual-Choice" refers to a situation, common in the U.S., in which employees have a choice between joining an alternative delivery modality or participating in a traditional health insurance plan, as part of their fringe benefit package.

6. These requirements mitigate the potential for adverse selection which may be quite significant and must be addressed. Suppose the following situation exists; a consumer is given a choice between two plans where one plan provides first-dollar coverage with an associated premium while the other has a very large deductible in addition to a premium. Low-risk individuals would choose the cheaper plan (the one with the large deductible) and save money. When they needed surgery or became chronic patients they would switch to the comprehensive plan at the next annual enrollment. As a result, comprehensive plans would attract all the poor risks which might eventually drive these plans out of business. The requirement for community rating of premiums and provision of a minimum set of benefits would reduce the potential adverse selection problem. Under community rating, based on average costs of the average person within the community, insurance premiums would reflect the expected usage of everyone in a geographical area. Community ratings according to actuarial categories would provide plans with more revenue for servicing higher risk patients. This, in addition to the requirement of a minimum benefit package, would reduce the marginal economic advantages of switching from one plan to another according to expected future use.

7. The evidence is much stronger for HMOs organized as a PPG than for those organized as IPAs. Medical care expenditures include not only expenditures on hospital and ambulatory services but out-of-pocket expenses as well.

8. For additional information on the Rand Experiment, see Manning et al. (1984), Enthoven (1984), Korcok (1983), and Hulka and Wheat (1985).

9. For additional references, see Christianson and McClure (1978, 1979) and Ellwood and McClure (1976).

10. Many other authors provide detailed discussions on these issues (Wilensky et. al. (1984), Taylor and Wilensky (1983), Sullivan and Gibson (1983), and Phelps (1983)).

11. Blue Cross is hospital insurance and Blue Shield is insurance for physician services.

12. The market areas were New York, Seattle, Honolulu, Los Angeles, Washington, D.C., Denver, Boston, and St. Paul.

13. Other reasons are possible as well; for example, utilization increase may have been the result of easier access to care due to a reduction in waiting times.

14. Other provinces such as Saskatchewan, Alberta, Quebec, and British Columbia have similar organizations. For more details see Hastings and Vayda (1986).

15. The Sault Ste. Marie Plan will be discussed in detail in Chapter 4 where data from this plan provide the initial values for variables in the simulation model.

16. See Seidelman et al. (1982) for more details on the calculation of capitation rates.

17. Other studies are reviewed in Chapter 4, which assesses the availability of data for the simulation model.

CHAPTER 3

BASELINE MODEL

3.0 Introduction

This chapter provides a general description of the baseline model employed in the thesis. The structure of the model illustrates the use of market forces within a publicly financed, publicly monitored system of health insurance. The underlying premise of the model is that the provision of consumer choice between alternative health care modalities promotes the efficient utilization of both medical and hospital services within a given community. The purpose of the simulation exercise is to examine the effect on community health care costs of market forces involving consumer choice among health care providers. Such an analysis highlights potential avenues for promoting cost containment which may be usefully incorporated into future public policy endeavours.

The chapter contains a brief discussion of the structure of the model, the assumptions upon which the structure is based, and the forms of the particular equations. It also identifies the data requirements necessary to make the model operational.

As outlined previously, a model illustrating competitive market forces must have two features. It requires, first, an avenue for consumer cost-sharing, and second, consumer choice between alternative health care modalities. Consumer cost-sharing and choice between alternative modalities are inter-related in their effect on the economic efficiency of practice styles. Providers become more aware of the economic efficiency of their activities because efficient provision of services is least-cost provision and consumers will, ceteris paribus, tend to choose least-cost providers for the services they buy.

The model incorporates consumer cost-sharing in the form of an "enrollment charge" (to be defined shortly). The consumer's choice is between a capitation group plan and the traditional fee-for-service modality. Each practice style is financed by a public health insurance programme. To ensure that market forces are allowed to operate, the public health insurance system must allow for the existence of competing alternative modalities as well as flexibility in charges and perhaps benefits. In addition, the public health insurance system must simultaneously ensure adequate access to care for all individuals.

3.1 Overview of the Model Structure

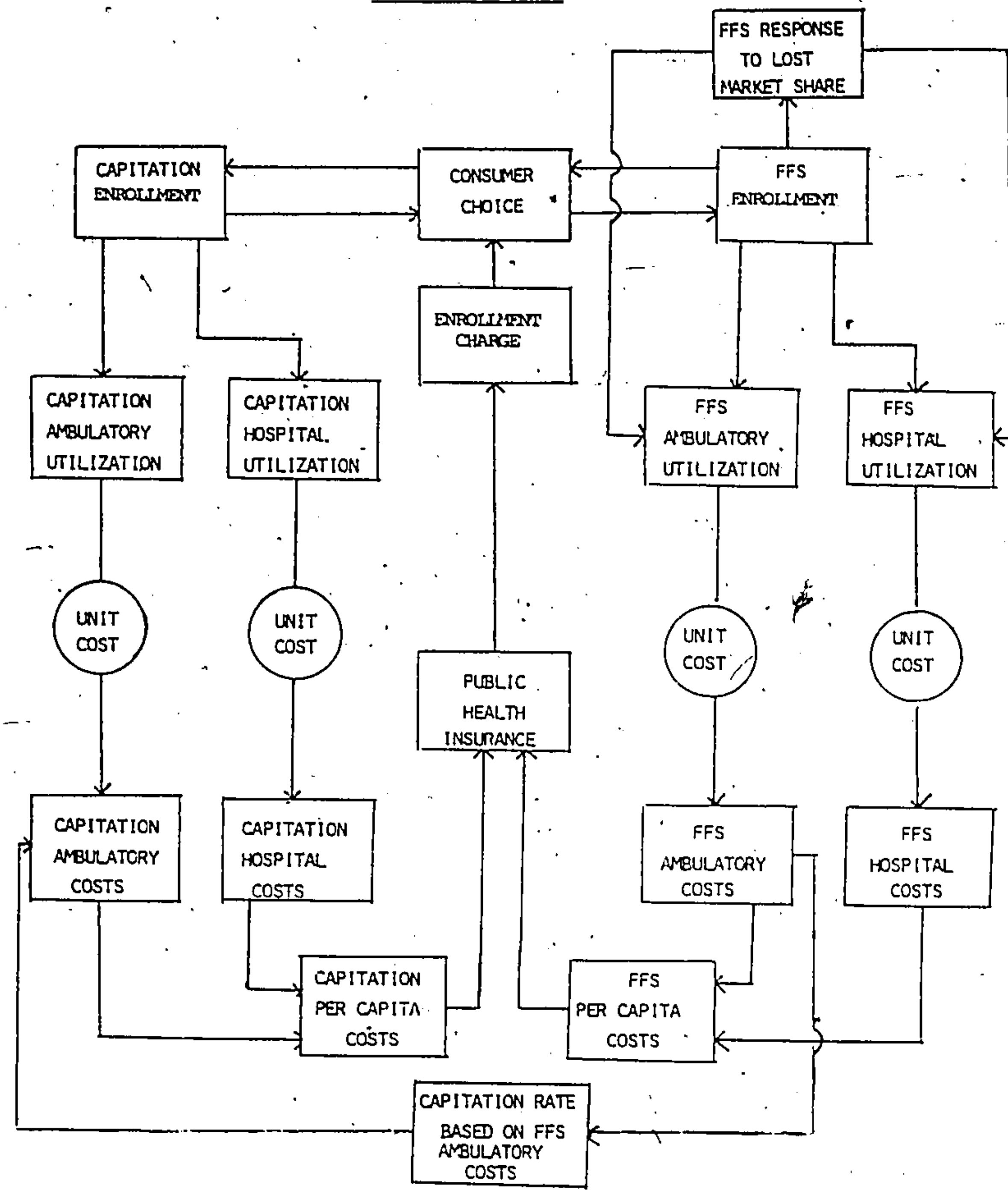
The model structure represents a micro-simulation of the effects of competition on health care expenditures in a single (Ontario) community. To aid the reader in understanding the model a flow diagram (Figure 3-1) is provided which illustrates the structure of the baseline model. The arrows in the diagram indicate the direction of the causal relationships.[1]

In each time period consumers choose to obtain their primary care from one of the two modalities. The consumer decision is a utility maximizing one based upon a price differential (enrollment charge) that is related to the average per capita cost differential between the two modalities. The model structure defines ambulatory and hospital services as the outputs in each modality.

The structure separates hospital and ambulatory utilization for each sector and proceeds to calculate modality costs as the product of utilization rates and unit costs (or reimbursement) for both types of services. Hospital utilization is measured by the number of patient days and the unit cost of hospitalization is measured by cost per patient day. Ambulatory costs are structured in their most aggregate form and are represented by total

FIGURE 3-1

MODEL STRUCTURE



dollar expenditures for ambulatory services in each modality.

For each modality both ambulatory and hospital costs are summed to obtain the total cost of providing care. Average per capita costs are then calculated in each sector with the government then assuming responsibility for the lower cost on behalf of all individuals. The difference in average per capita costs between each modality translates into an "enrollment charge".[2]

The existence of the enrollment charge generates switching by consumers between the two modalities. Because movement occurs in a particular time period, a new market share for each modality can be calculated and incorporated into the next period of the model. New enrollment numbers combined with utilization and cost data for each sector generate new relative cost differentials which are expressed through a change in the enrollment charge. Consumers react again to this charge and the process is repeated.

Changes in enrollment or market share of each modality in response to cost differences impose competitive pressures on both modalities. In theory, successful competitive pressures in the long run should minimize the cost differential between the two modalities by pushing each sector to the attainment of its full efficiency potential. As a result, the total cost of providing health care to a given community should be minimized.

Given the general overview of the baseline structure of the model, it is necessary to examine explicitly the assumptions underlying this structure. The more detailed explanation is divided into three parts; (1) the institutional environment, (2) the cost structure, and (3) the consumer choice decision.

3.2 Institutional Environment

The model is structured within a fixed geographical region and assumes that competition takes place within a single community of fixed size. Choosing a community of a fixed size places certain restrictions on the model. These restrictions are the demographic and socio-economic characteristics of the specific population.

Health services in the community can be obtained from two alternative modalities: (1) the capitation modality, and (2) the fee-for-service modality. The capitation sector consists of one multi-specialty group practice.[3] Because capitation plans are reimbursed on a per capita basis, total revenues for the sector are fixed for a specified period of time. However, total costs depend upon the number and type of services provided. A capitation plan seeking increased market share has the incentive to increase enrollment rather than to increase the number of services per enrollee. However, there is also an incentive for the capitation plan to under-service its patient population.

The fee-for-service modality consists of a large number of solo practitioners, partnerships or groups, all of which are reimbursed on a fee-for-service basis. Because of the positive relationship between the number of services and income, providers in this sector have an incentive to increase the number of services provided per enrollee, as well as to increase the number of enrollees.

Both modalities are assumed to offer similar benefit packages. For example, the benefit package may reflect the package of services that are currently insured under OHIP. The offering of similar benefit packages is not to say, however, that the same services would actually be provided to the same extent in each sector.[4] Some services may be considered unnecessary or just marginally beneficial, so that a particular modality may decide to restrict or not to provide such services. As a result, styles of practice are expected to differ between modalities. This results in both different intensities of servicing and different service mixes across modalities.[5]

It is assumed that each modality accepts consumers on a first-come, first-served basis (up to the limit of its capacity). Consumers choose between modalities on a yearly basis during an open enrollment period. The open enrollment periods are intended to restrict the ability of modalities to discriminate against poor risks. It is assumed that at any time all consumers are enrolled in one of the modalities. The subscriber population within a modality generates a certain volume and mix of illness according to its size and particular age-sex composition.

The model structure assumes that the subscriber populations within each respective modality are similar in nature. Each patient population has a similar age-sex distribution, similar health status, and incidence of illness so that each patient population group generates basically the same need for health services. This assumption guarantees that differing health status is not a contributing factor to differing utilization rates between the two plans.[6] The model structure then guarantees that both sectors are able to maintain the same health status for a patient population, but one sector may do so in a more efficient manner.

The quality of care provided by the two modalities is assumed to be equivalent. Consumers make their enrollment decisions when they are well, rather than ill, thereby allowing them more time in which to gather information on cost and practice style differences. The assumption that both sectors provide equal quality care is consistent with the existing evidence in the literature. Cunningham and Williamson (1980), cite a number of examples of evaluations demonstrating that the quality of care in capitation and fee-for-service plans is essentially the same; in many instances it is actually better in the capitation sector.[7] The assumption of equal quality of care across modalities is essential to ensure that cost differences between the two modalities, and any resulting charges to patients, are due to differences in practice styles only.

It is assumed that the capitation modality begins with an initial non-zero market share.. The question of how new capitation plans emerge is not addressed. The emphasis instead is on the effects of an already existing capitation modality engaging in price competition with the fee-for-service sector. Whether new capitation plans emerge in communities where they do not currently exist, when competition is introduced, is an important question, but beyond the scope of this thesis.[8]

Within this structure, the role of government is to encourage the efficient provision of care while simultaneously ensuring adequate coverage and access to care for all individuals. As a result, public health insurance provides access, without additional charges, to the lower cost modality based on historical expenditure levels. Consumers joining the higher cost modality are charged an enrollment fee equal to the difference in average per capita expenditures (including both ambulatory and hospital expenditures) between the two modalities.

To see explicitly what is meant, consider the following <u>hypothetical</u> example. Suppose that the capitation modality can provide care to its enrolled population at a cost of $300 per person per year, while the fee-for-service modality services its population at a cost of $350 per person per year. Under private insurance, persons enrolling in the capitation sector would pay $300 per year under an actuarially fair system, while fee-for-service patients would pay $350 per year. However, under public health insurance the respective costs of each modality are covered by the government regardless of which sector the consumer chooses.

In order to encourage efficient resource allocation the government would cover, on behalf of all individuals, the average per capita cost of the lower cost modality, namely $300 in this example. The differential between the low and high cost modality is translated into an enrollment charge.[9] In this example, the enrollment charge is $50 per year to those individuals choosing to obtain care from the more expensive fee-for-service modality.

The enrollment charge is intended to affect resource allocation and is not intended to raise revenue. Revenue raising is a separate government function, an additional exercise that is not the issue in this thesis. Although the revenues collected from the enrollment charge could be used to pay a portion of the costs of care, the enrollment charge is not intended to raise any specific proportion of total health care expenditures and is simply another source of general revenue for government.

In this model, the enrollment charge is set equal to the full differential in the modality costs. In practice, the enrollment charge could be any positive monotonic function of the cost differential. In fact, the enrollment charge need not necessarily be a charge to consumers in the more expensive modality but could be modelled as a rebate to individuals choosing the lower cost modality.

The institutional environment assumed in this model neither prohibits nor requires the existence of provincial health insurance premiums. The concept of the enrollment charge can be extended to incorporate the current situation of premiums in the Ontario system.[10] It is possible simply to add the current premium structure to the enrollment charge associated with source of care. Individuals would then base their choice on the aggregate of the two charges. It is obvious, however, that it is only the differential portion of the total charge facing the consumer that is the important price variable. Consequently, premiums as they currently exist in Ontario need not be modelled.

Supplemental private health insurance to cover the enrollment charge is not permitted in this competitive strategy. This assumption, which is consistent with existing Canadian legislation, is necessary to ensure that individuals cannot insulate themselves against the enrollment charge, and thereby dampen the price competition between modalities.

Government is also responsible for specifying a minimum benefit package to ensure that each modality provides comprehensive care to its respective patient population. A minimum benefit package prevents a supplier from achieving expenditure reductions at the expense of necessary services. In general, the provision of other benefits would be optional and as a consequence would be paid for entirely out-of-pocket by the consumer. For the purpose of the baseline model, additional or optional benefits which might induce benefit competition between the two sectors are ignored.

3.3 Cost Structure

To understand why consumers might face an enrollment charge when choosing between the two sectors it is necessary to examine the cost performance of both modalities.

Each modality can be viewed as having a production function that combines various factor inputs with a given state of technology to produce an output called "health". From this relationship, true production costs could be derived. The production functions would then reflect differences in practice style between the two modalities. With knowledge of the true production relationships, differences in the scale of operation between the two modalities and differences in input substitutability across the modalities, for example, could be investigated.

In practice, however, a number of difficulties arise. First, the definition and measurement of the output "health" is not an easy task. Ideally, hospital and medical services should be evaluated in terms of their ability to affect the patient's health and hence contribute to the consumer's level of utility. However, in reality this is not possible. As a result, it is necessary to assume that consumers purchase health services with some expectation that the services will improve their health. Output then is not measured in terms of health but rather is specified in terms of intermediate goods called "ambulatory" and "hospital" services. Output of each respective modality is defined as the ambulatory and hospital services that it provides. The care provided by each modality is assumed to have equal impact on the respective patient population's health. The assumption of equal impact on patient's health permits per capita cost comparisons between the two modalities.[11]

A second problem in measuring true production costs is that under public health insurance, what are referred to as "costs" are really "expenditures".[12] In fact, costs are typically measured by provincial government outlays for medical and hospital services. These outlays are affected by both the production functions of the service modalities and the utilization incentives provided by provincial reimbursement methods and policies.

A third problem is that expenditures or costs in the baseline model do not include possible scale effects. It is assumed that no change in costs occur due to changes in the scale of operation. As a consequence, the accuracy of the conclusions regarding costs may be compromised if there are any economies, or diseconomies, of scale.

The flow diagram (Figure 3-1) illustrates the output of each modality as ambulatory and hospital services. Costs are calculated for each utilization component separately and then summed together to get the total cost of each respective modality. In calculating the costs of ambulatory and hospital care it is necessary to examine both the unit cost of producing the service and the level and mix of services provided. A modality with low unit costs is not necessarily an optimal producer of health care; both the level and mix of services can also lead to excessive expenditures. Therefore, costs are broken down into unit costs of a particular service and the quantity and mix of services. Total costs for each sector are expressed as follows:

$$TC_j = \sum_j (c_{ij} * Q_{ij})$$

where c_{ij} is the per unit cost of service i in modality j,

Q_{ij} is the quantity of service i in modality j, and

TC_j is total cost in modality j.

Total costs within a sector can be reduced in three possible ways:

(1) the total number of services rendered can be reduced (a reduction in the level of Q_{ij}),

(2) the per unit cost of specific services can be reduced (a reduction in c_{ij}), and

(3) a change in the mix of services provided can occur by substituting less expensive services in place of more expensive services.

The structure of the cost equations in the baseline model is formulated on the basis of constant average costs. Consumers switching from one modality to another have no effect on the average cost per enrollee. This implies that a consumer switching to the lower cost sector generates a per capita cost identical to those individuals already in that particular modality. This cost structure is very simplistic. It would seem reasonable to assume that as enrollment in a modality increases or decreases, the particular modality may experience economies or diseconomies of scale. To model this, however, it would be necessary to allow costs to be a function of enrollment. Because of the nature of the data available for the simulation and because costs are not production costs but rather dollar expenditures (costs to government), this refinement of the model is not undertaken in the thesis. It is recognized, however, that the incorporation of scale effects into the cost structure is an important area for future research.

3.3.1 Ambulatory Costs

Ideally, the model for ambulatory utilization would disaggregate services by type, where services are office visits, minor surgery, pre-natal checkups, etc., all of which are considered to be primary care.[13] Ambulatory costs would then be calculated as the product of utilization rates for each of the services and the corresponding unit reimbursement. However, difficulties arise at the stage of initializing the simulation model, even with this relatively simple approach. Comparative data on a service-by-service basis, including referred services, typically are not available for both modalities, in part because capitation practices are not reimbursed for specific services but rather for a package of services. Consequently, the baseline version of the model structures ambulatory cost equations in the most aggregate form, total dollar expenditures for ambulatory services in each modality.

3.3.2 Hospital Costs

The model structure accepts the existing structure of the hospital services sector, including reimbursement by global budgets. Modalities neither own nor operate their own hospitals, and any reductions in the stock of beds that become possible through competition must be accomplished by a government planning/consultation process. The inclusion of modality-owned hospitals into the model is another possible variant of the competitive strategy, in which the potential savings may be even greater. However, the amount of institutional change that is required is also much greater. This variant is not considered in the thesis, but is recognized as a potential extension to the model.

Total hospital cost in each modality equals the product of the number of people enrolled in each modality, the number of patient days per member, and the hospital cost per patient day. More formally, hospital costs in each modality are expressed as follows:

Total Hospital Costs (Capitation modality) = Capitation population * number of patient days per member * cost per patient day.

Total Hospital Costs (FFS modality) = FFS population * number of patient days per member * cost per patient day.

Hospital utilization in each sector is measured as the number of patient days per thousand population. Unit reimbursement is measured by the cost per patient day. Given the current institutional structure of the hospital sector, it is reasonable to assume that both modalities share the same hospitals and, as a result, face the same per diem charge for hospitalization.

The use of a per diem may be misleading for it assumes that every patient day, or admission, is identical. It is quite probable, however, that treatment costs differ substantially by type of illness. If detailed hospital data were available for enrollees in both modalities, a considerable refinement to the cost structure of the model could be made by employing disease-specific expenditures.

The use of a non-specific per diem also requires cautious interpretation of potential cost savings resulting from differences in hospital utilization rates between the fee-for-service and capitation modalities. Dollar savings may be approximately proportional to utilization reductions in the long run, when all capacity adjustments have been made, but they will be less than proportional in the short run (Barer (1981)).

An implicit assumption regarding the cost structure is that as utilization rates in a community fall, all excess capacity is removed from the system. In reference to the hospital sector this implies that as hospital utilization rates fall in the community, the excess beds must be removed from the system so that potential savings can actually be realized.[14] The capitation utilization rate minus the fee-for-service utilization rate in a given year provides an estimate of the number of days saved through enrollment in a capitation modality. The number of days saved divided by the average number of patient days per bed provides an estimate of the excess capacity generated by growth in the capitation sector. This excess capacity, when eliminated from the system, generates savings in hospital costs which translate into savings in community health care costs.

The baseline model sums both ambulatory and hospital costs to obtain the total costs of providing care in each modality. The difference in average per capita costs between the two modalities becomes the enrollment charge. Thus the enrollment charge reflects the resource allocation decisions of the producers in the fee-for-service and capitation modalities.

3.4 Consumer Choice Decision

At the end of each time period (say one year) consumers react to the enrollment charge and the services provided by the suppliers of health care by changing or remaining with their supplier of primary health services.

The model of the consumer's decision assumes that individuals maximize expected utility. In general, the consumer maximizes

$$U = U[X, HCC, HS(HC)]$$

subject to a budget constraint, the constraint that health care must be provided by one of two modes of health care delivery, and a personal history related to health status. In the utility function, X is a composite good, representing all consumer expenditures other than those on health care. HCC is a vector of characteristics of health care delivery which are important to the consumer. HS is the consumer's health status, and HC is the set of health services consumed. Generally, $\partial U/\partial X>0$, $\partial U/\partial HS>0$, $\partial HS/\partial HC>0$ and $\partial U/\partial HCC>0$.

The direct utility function may be rewritten as an indirect utility function which contains the prices of X, the charges associated with the two health-care modalities, the income of the individual, and the exogenous variables which affect health status. Given the indirect utility function and a set of final good prices, health-care modality charges, and other exogenous variables, the utility associated with each modality of health care delivery can be derived. The underlying behavioural rule is that individuals will choose the health care delivery system which gives them the greatest level of expected utility.[15] Depending upon the relative values an individual places on the delivery modality, final good consumption, and health status the ultimate choice may or may not lead to the highest potential health status or the highest potential consumption.

Recognizing the utility maximization decision as the underlying process, the baseline structure incorporates this decision in a simple manner. Consumers are assumed to have preferences about the modality from which they obtain care but respond only to price differences reflected in the enrollment charge. Preferences are represented by enrollment elasticities specified on price alone. Consumer preferences are static in the sense that all responses to a given enrollment charge occur immediately. Movement between the two modalities can occur in either direction.

It is recognized that this is an incomplete view of the decision problem to the extent that consumers may have preferences for modalities, practice styles, or practitioners themselves. If such preferences did not exist, and given that the enrollment charge is an important variable in the consumer's decision, everyone might be expected to switch to the cheapest sector immediately. The American literature leads us to believe, however, that this result does not occur. It appears that factors other than price have a significant influence on consumers' decisions.[16] Therefore, although the baseline model structure channels switching of patients between modalities through the enrollment elasticity specified on price alone, the values employed for the elasticity variable are based on studies in which consumers also exhibit non-price determined behaviour. The elasticity values used in the simulation may therefore be interpreted as "net" elasticities, having already taken into account preferences for modalities, styles, or practitioners themselves which might interact with the price effects.

A possible extension of the baseline structure would be to incorporate a dynamic response by consumers to the enrollment charge. For example, if consumers were unable to recognize immediately the cumulative effect of paying an enrollment charge, then at some later time, further reactions to the enrollment charge could be expected. To include this behaviour, the model would need to incorporate a delayed reaction on the part of some consumers, who would re-evaluate their initial decisions upon recognizing the cumulative effect of the enrollment charge. Modelling this response is another possible area of future research.

3.5 Baseline Model Equations and Variable Definitions

Based on the above discussion the following equations define the baseline simulation model.[17]

The intent of the baseline model is to provide partial and relatively crude estimates of the effect of the existence of a capitation sector and consumer choice on community health care costs while establishing a foundation upon which to build the refined and extended model in Chapter 6.

COMMUNITY SIZE AND MODALITY MARKET SHARE

```
TPOP = 80000             Total Community Population

FFSPOP.K = FFSPOP.J + (DT)* (PTELAS * FFSPOP.J * DPSTAR.JK)
                         FFS Modality Population at Time K

FFSPOP = FFSIOP
FFSIOP = 40000               Initial FFS Population

CAPPOP.K = TPOP - FFSPOP.K
                         Capitation Modality Population at
                             Time K
CAPFRC.K = CAPPOP.K / TPOP
                         Capitation Market Share
```

CONSUMER ENROLLMENT DECISION

```
PSTAR.K = SWITCH(GOVT1.K,GOVT2.K,PREM)
PREM=0.0                 Relative Price

PTELAS = -0.25                FFS Enrollment Elasticity
                             (Own Price Elasticity)

RPRIC1.K = [(FFSPRM.K - CAPPRM.K) / (CAPPRM.K)] + 1
                         Relative Price (FFS / CAP)

RPRIC2.K = [(CAPPRM.K - FFSPRM.K) / (FFSPRM.K)] + 1
                         Relative Price (CAP / FFS)

DPSTAR.KL = (PSTAR.K - LSTAR.K) / LSTAR.K
                            % Change in Relative Price

LSTAR.K = SMOOTH(PSTAR.K,DEL)
                         Relative Price Lagged One Period

GOVT1.K = CLIP(RPRIC1.K,1,TIME.K,1)

DEL = 1.0

GOVT2.K = CLIP(RPRIC2.K,1,TIME.K,1)
                         Government Reimbursement Covers Cost
                             of Least-Cost Modality
```

HOSPITAL COSTS

```
CAPHCT.K = CAPPOP.K * CAPHUT * COSTPD.K
                         Capitation Hospital Costs

CAPHUT = 0.85
                         Capitation Hospital Utilization Rate

COSTPD.K = COSTPD.J + (DT) * (COSTI.JK)
                         Cost Per Patient Day

COSTI.KL = CLIP(COST * COSTPD.K,0,TIME.K,1)
                         Increase in Cost Per Patient Day

COST = 0.0
COSTPD = 167.86               Initial Cost Per Patient Day
```

```
FFSHCT.K = FFSPOP.K * FFSHUT * COSTPD.K
                      FFS Hospital Costs

FFSHUT = 1.21         FFS Hospital Utilization Rate
```

AMBULATORY COSTS

```
CAPAMC.K = CLIP(NNCAMC.K,INCAMC.K,TIME.K,2)
                      Capitation Ambulatory Costs

INCAMC.K = CAPPOP.K * 87.23
                      Initial Capitation Ambulatory Costs

NNCAMC.K = CAPPOP.K * (FFSAMC.K / FFSPOP.K)
                      Current Capitation Ambulatory Costs

FFSAMC.K = FFSPOP.K * 102.68
                      FFS Ambulatory Costs
```

TOTAL AND AVERAGE PER CAPITA COSTS

```
CAPTOT.K = CAPHCT.K + CAPAMC.K
                      Total Capitation Costs

CAPPRM.K = CAPTOT.K / CAPPOP.K
                      Average Per Capita Costs
                          (Capitation Modality)

FFSTOT.K = FFSHCT.K + FFSAMC.K
                      Total FFS Costs

FFSPRM.K = FFSTOT.K / FFSPOP.K
                      Average Per Capita Costs
                          (FFS Modality)
```

SUMMARY VARIABLES

```
SAVING.KL = CLIP[(FFSPRM.K - CAPPRM.K) *
                              CAPPOP.K,0,TIME.K,1]
Savings Per Year

TOTSAV.K = TOTSAV.J + (DT) * (SAVING.JK)
                      Cumulative Savings

TOTSAV=0.0
```

COMCOS.KL = CLIP(CAPTOT.K + FFSTOT.K,0,TIME.K,1)
Community Costs Per Year

TOTCST.K = TOTCST.J + (DT) * (COMCOS.JK)
Cumulative Community Costs

TOTCST = COMCOS

CAMCPM.K = CAPAMC.K / CAPPOP.K
Capitation Ambulatory Costs Per Member

FAMCPM.K = FFSAMC.K / FFSPOP.K
FFS Ambulatory Costs Per Member

TOTHCT.K = CAPHCT.K + FFSHCT.K
Total Hospital Costs (Both Modalities)

TOTAMC.K = CAPAMC.K + FFSAMC.K
Total Ambulatory Costs (Both Modalities)

(NOTE: .K is time period K; .J is time period K - 1, .JK is the interval between time periods K and K-1)

To operationalize the model, initial values for the parameters in the above equations are needed. Below is a list of the variables used in the simulation model. The variables that are marked with an asterisk are the variables for which initializing data must be found. These initial values appear in the above equations; their sources are decribed in the next chapter. The values for the remaining variables are generated during the simulation analysis.

VARIABLE LIST

*	CAMCPM	Capitation Ambulatory Costs Per Member
	CAPAMC	Capitation Modality Ambulatory Costs
	CAPFRC	Capitation Modality Market Share
	CAPHCT	Capitation Modality Hospital Costs
*	CAPHUT	Capitation Modality Hospital Utilization Rate
	CAPPOP	Capitation Modality Population
	CAPPRM	Capitation Modality Average Per Capita Costs
	CAPTOT	Capitation Modality Total Costs
	COMCOS	Community Health Care Costs Per Year
	COSTI	Percentage Increase in Cost Per Patient Day
*	COSTPD	Cost Per Patient Day (Both Sectors)
	DEL	Lag of One Period
	DPSTAR	Percentage Change in Relative Price Differential
	GOVT1	Government Reimbursement of Least-Cost Modality (Fee-For-Service / Capitation)
	GOVT2	Government Reimbursement of Least-Cost Modality (Capitation / Fee-For-Service)
*	FAMCPM	Fee-For-Service Ambulatory Costs Per Member
	FFSAMC	Fee-For-Service Modality Ambulatory Costs
	FFSHCT	Fee-For-Service Modality Hospital Costs
*	FFSHUT	Fee-For-Service Modality Hospital Utilization Rate

*	FFSIOP	Initial Fee-For-Service Modality Population
	FFSPOP	Fee-For-Service Modality Population
	FFSPRM	Fee-For-Service Modality Average Per Capita Costs
	FFSTOT	Fee-For-Service Modality Total Costs
	INCAMC	Capitation Modality Initial Capitation Costs
	LSTAR	Relative Price Differential Lagged One Period
	NNCAMC	Capitation Modality Current Ambulatory Costs
	PSTAR	Relative Price Differential Between the Two Modalities as a Function of the Government Subsidy
*	PTELAS	Fee-For-Service Enrollment Elasticity
	RPRIC1	Relative Price (Fee-For-Service / Capitation)
	RPRIC2	Relative Price (Capitation / Fee-For-Service)
	SAVING	Savings Per Year
	TOTAMC	Total Ambulatory Costs (Both Modalities)
	TOTCST	Cumulative Community Health Care Costs
	TOTHCT	Total Hospital Costs (Both Modalities)
	TOTSAV	Cumulative Savings to Capitation Modality
*	TPOP	Total Community Population

Endnotes

1. The model is closed in the sense that the baseline model does not include reactions of traditional providers to pressures from competitors.

2. To be more specific, the enrollment charge is calculated in the following way:
   enrollment charge = average per capita cost in the more expensive sector at time K − average per capita cost in the lower cost sector at time K

3. It should be emphasized that it is the organization as an administrative entity that is reimbursed on the basis of capitation. Physicians themselves within the organization may be reimbursed by this method or in some other way, for example, by salary, or through profit-sharing. Obviously, the method by which physicians are reimbursed within the organization may affect the efficiency with which services are delivered. Efficient behaviour may be encouraged through profit-sharing or fringe benefits, for example. The implications of the internal organizational structure have been discussed in chapter 2. The assumption that the capitation modality consists of just <u>one</u> capitation plan is not necessarily limiting. Extending the sector to consist of more than one plan does not cause problems if it is assumed that all plans behave identically. If capitation plans compete with each other, then further extensions to the modelling in this thesis are required and the estimated potential cost savings will be even larger.

4. The term "services" is used, depending upon the context, both to distinguish different categories of services such as optometry, medical and hospital services and to distinguish specific services within a category, such as complete exams, partial exams, minor surgery, well baby visits, pre-natal checkups, etc.

5. For example, the mix of hospital versus ambulatory services or the mix of preventive versus curative services may differ between modalities.

6. If this assumption is not made it becomes difficult, although not impossible, to compare total costs and utilization over time for different patient populations. In principle, the issue of differing health status between two population groups can be dealt with if average cost calculations are health-status adjusted, although it is difficult in practice. McClure (1983), Thomas and Lichtenstein (1986) and Anderson et al. (1986) offer further research along these lines.

7. Luft (1981), Donabedian (1983) and Hornbrook and Berki (1985) provide further review and discussion on the issue of quality.

8. The emergence of new capitation modalities is a different but not entirely separate issue when dealing with reactions to competition. Although this issue is not analyzed in the thesis, some of the concerns involved are discussed in Chapter 8.

9. Additional direct charges to patients have historically been viewed as a violation of the spirit, if not the letter of Canadian health insurance legislation. The relationship of the enrollment charge in this model to the existing legislative environment is discussed in Chapter 8. It is sufficient to say for now that the charge does not have the usually historical characteristics of Canadian user charges, in that it is meant neither as a deterrent fee nor as a revenue raising mechanism. As a result it is not expected to impose barriers to access to care.

10. Currently, revenue raised in Ontario through the collection of premiums covers approximately 30% of the total costs of health care in the province (see Ontario (1972/73 - 1984-85 (annual)). The remaining 70% are covered by revenue raised through typical public finance methods such as the personal and corporate income tax. An individual (or the individual's employer) pays a lump sum premium amount per year which is unrelated to individual use and hence not a differential charge.

11. Measuring only the per capita costs of ambulatory and hospital care ignores many of the social costs that are involved in obtaining care from a particular modality. These costs include such non-monetary costs as waiting time, travel time, etc. It is reasonable to assume that differences in these costs would occur between modalities, however, they are not included in this model.

12. The terms "costs" and "expenditures" are used interchangeably throughout the remainder of the thesis, as they commonly are in discussions of health care cost control.

13. Primary care is referred to as care which is required for a wide range of frequently encountered basic health problems, usually the services of the initially contacted provider. General practitioners typically provide primary care, as do specialists, hospital emergencies and outpatient departments when serving as the initial patient/medical care system contact. Primary care providers are responsible for first contacts as well as the promotion and maintenance of health and continuous care for the individual.

14. Excess hospital capacity contributes to elevated hospital costs in two ways. First, the fixed capital costs of hospital beds are incurred regardless of whether the beds are filled, and second, hospital use is directly related to the availability of hospital capacity (see Roemer (1961). If excess hospital capacity can be reduced, then unnecessary utilization can be eliminated, resulting in a reduction in costs without any adverse effects on the health of the population.

15. With appropriate data, an estimate of the probability that an individual would switch according to plan and individual characteristics could be derived by means of a qualitative response model. The model can be defined as follows:

$U^f_{it} = \beta X^f_{it} - \sigma^f_{it}$ - is the i^{th} person's indirect utility associated with joining the FFS sector at time t

$U^c_{it} = \beta X^c_{it} - \sigma^c_{it}$ - is the i^{th} person's indirect utility associated with joining the capitation plan at time t

where σ^f_{it} and σ^c_{it} are stochastic error terms in the empirical estimation of the indirect utility function.

The basic assumption is that the i^{th} person joins the capitation plan if $U^c_{it} > U^f_{it}$. There is indecision if $U^c_{it} = U^f_{it}$, but this occurs with zero probability if σ^f_{it} and σ^c_{it} are continuous random variables.

Defining $Y_{it} = 1$ if the i^{th} person joins the capitation plan at time t, then

$$
\begin{aligned}
P(Y_{it} = 1) &= P(U^c_{it} > U^f_{it}) \\
&= P(\beta X^c_{it} - \beta X^f_{it} > \sigma^f_{it} - \sigma^c_{it}) \\
&= F(\beta X_{it}) \quad \text{where } F \text{ is the distribution of } (\sigma^f_{it} - \sigma^c_{it}).
\end{aligned}
$$

The type of qualitative response model that one gets is determined by the distribution that one assumes for $\sigma^f_{it} - \sigma^c_{it}$. If it is assumed that σ_{it} is independent and normal over time, then a simple probit model can be used. The probability of individual i joining the capitation plan at time t can then be expressed as

$P^c_{it} = \Phi(\beta X_{it})$ where Φ is the cumulative normal distribution.

To calculate the total number of individuals joining the capitation plan $P^c_{it} = \Phi(\beta X)$ can be calculated for a base scenario and the total number in the capitation plan can be calculated by an enumeration method which sums all the probabilities for the target population. A separate simulation can be run which would incorporate a change of one of the X's, for example the relative price differential between the two plans. From this type of exercise the elasticity of enrollment due to a change in the relative prices between the two modes of care can be calculated. This relationship could then form one basis for the consumer choice decision in the overall simulation model. To do this exercise, however, would be a thesis in itself. Because of this and the fact that the data needed to estimate such a model do not exist, a simpler approach is taken here. It is recognized, however, that the consumer choice decision could be modelled theoretically, and estimated, and obviously is an area for future research.

16. A significant factor that is often cited in the American literature is that individuals with strong physician-patient relationships are highly unlikely to switch plans just for the (currently observed) savings in premiums (see Luft (1981)).

17. The DYNAMO simulation package is used to run the model and the notation below corresponds to the DYNAMO language. For further explanation on notation see Pugh-Roberts Associates, Inc. (1984).

CHAPTER 4

DATA REVIEW

4.0 Introduction

This chapter reviews the Canadian data available for use in the simulation exercise. Estimates of the cost and utilization of services are needed for each sector, disaggregated into ambulatory and hospital services. As well, a price-based enrollment elasticity must be calculated from existing data.

Data pertaining to the community of Sault Ste. Marie were chosen to initialize the model because a well-established capitation group, the Sault Ste. Marie and District Group Health Association (GHA), functions alongside traditional fee-for-service providers. The Sault Ste. Marie experience provides the closest institutional approximation to the environment outlined in the simulation model.[1]

In extracting the data necessary to initialize the model, this chapter will proceed as follows. First, a discussion of the socio-demographic characteristics and health care utilization rates of the Sault Ste. Marie community are presented. This is important in order to understand the context from which data are drawn and to acquire insights into extending the results of the thesis to a provincial level. Second, Canadian studies pertaining to the capitation plan in Sault Ste. Marie are reviewed. Initial parameter values are selected from this literature, along with a sensitivity range for the parameters. Third, the American literature on consumer choice is reviewed for the selection of initial enrollment elasticities. The U.S. experience is used because the Canadian experience, including the Sault, does not offer consumer choice based on an enrollment charge.

4.1 The Sault Ste. Marie Community

Sault Ste. Marie is an industrial city in northwestern Ontario with a population of approximately 83,000 people in 1986. It is the major city in the Algoma region of Ontario. Table 4-1 shows population and demographic characteristics for both Sault Ste. Marie and Ontario for the census years 1966 to 1981. Since 1971, Sault Ste. Marie has had very little population growth. However, there has been a change in the age profile of the community, with a growing elderly population and a declining younger population. Forty-seven percent of the population is married. English is the predominant language. In comparison, population growth in Ontario has

TABLE 4-1

Population and Demographic Measures for Sault Ste. Marie and Ontario (For Census Years)

Sault Ste. Marie	1966	1971	1976	1981
Population	74,595	80,332	81,048	82,700
Population Growth	-	7.7 %	0.9 %	2.0 %
Median Age	-	-	26.4	28.5
% Population > 65	5.3	5.9	6.7	8.0
% Population < 15	35.7	31.5	27.6	23.2
Married Status				
Single	38,735	39,865	38,085	36,600
Married	32,799	36,650	38,390	38,870
Other	3,036	3,117	4,573	7,230
Mother Tongue				
English	-	61,565	64,104	-
French	-	4,430	3,715	-
Other	-	14,337	13,223	-
Sex				
Male	37,747	40,722	40,480	41,090
Female	36,847	39,610	40,568	41,605

Ontario	1966	1971	1976	1981
Population	6,960,870	7,703,110	8,264,465	8,625,110
Population Growth	-	10.7 %	7.3 %	4.4 %
Median Age	-	-	28.6	28.6
% Population > 65	8.2	8.4	8.9	8.6
% Population < 15	31.7	28.7	25.0	21.9
Marital Status				
Single	3,392,923	3,628,925	3,706,100	3,683,870
Married	3,216,166	1,420,435	1,967,260	2,074,440
Other	351,781	2,653,750	2,591,105	2,866,800
Mother Tongue				
English	-	-	6,457,645	6,678,765
French	-	-	462,065	475,605
Other	-	-	1,344,755	1,470,740
Sex				
Male	3,479,149	3,840,910	4,096,865	4,246,790
Female	3,481,721	3,862,200	4,167,600	4,378,320

Sources: Canada (1966), Canada (1971), Canada (1976) and Canada (1981).

been much greater on average. However, the changing age profile toward a more elderly population is also prevalent. The city of Sault Ste. Marie, however, has a younger population than the Ontario average.

The Algoma region had a population-to-physician ratio of 872 to 1 in 1981, much higher than the overall Ontario ratio of 539 to 1 (Ontario (1975 - 84 annual)). This is due in part to the isolated nature of the community. The community of Sault Ste. Marie has two hospitals, the Sault Ste. Marie General and the Plummer Memorial. In addition, the Algoma region has four smaller hospitals in Elliot Lake, Blind River, Horne Payne and Wawa, as well as two Red Cross Hospitals in Thessalon and Richard's Landing.

The hospital utilization rates for the Algoma region, both in terms of patient days/1000 population and separations/1000 population are much higher than the Ontario average (see Table 4-2). In 1982-83 for example, the Algoma region had 1,418 patient days/1000 population and 190 separations/1000 population while the Ontario average was 1234 patient days/1000 population and 142 separations/1000 population. These crude rates give a general indication of the extent of health services in the Algoma region compared with the Ontario average, but they

TABLE 4-2

Hospital Utilization for the Algoma Region (1973-1983) and Ontario (1973-1983)

	Population	Separations	Patient Days	Rates/1000 Population Separations	Rates/1000 Population Patient Days
Algoma Region					
1982/83	136130	25930	193016	190	1418
1981/82	133555	24834	186797	186	1399
1980/81	130158	24639	183636	189	1411
1979	128234	23891	179270	186	1396
1978	127256	24253	178722	191	1404
1977	124416	22962	179781	185	1445
1976	124129	25338	191837	204	1545
1975	128869	26112	211372	203	1640
1974	127023	26220	220628	206	1737
1973	124854	26053	216769	209	1736
Ontario					
1982/83	8715800	1238423	10752901	142	1234
1981/82	8625115	1219789	10567500	141	1225
1980/81	8570400	1215959	10521903	142	1228
1979/80	8503300	1238485	10622456	146	1249
1978	8448300	1263891	10863745	150	1287
1977	8373500	1260418	10769524	151	1286
1976	8330186	1331368	10847617	160	1302
1975	8226000	1371167	11475550	167	1395
1974	8094000	1345254	11554883	166	1428
1973	7939000	1325592	11524120	167	1452

Note: From 1979 to 1983, figures are based on fiscal year 1 April - 31 March.
From 1973 to 1978, figures are based on calendar year 1 January - 31 December.

Source: Ontario (1972-1982/83 (annual)), Hospital Statistics.

do not provide disaggregated information about the use of health services by enrollees of the capitation and the fee-for-service modalities. It is necessary to examine studies that separate utilization of services in the capitation modality from utilization rates in the fee-for-service modality (see section 4.3 below).

4.2 History of the Sault Ste. Marie Capitation Plan

Only a brief history and description of the Sault plan will be given here. For more detailed information on the plan's history see Lomas (1985). The Sault Ste. Marie and District ~~Group~~ Health Association (GHA) plan was established in 1963 before the advent of medicare. It was organized by a consumer group representing the Algoma Steel Company Union. The primary motivation for founding the plan was to provide greater access to and availability of medical care to this isolated northern community. It was established as a multi-specialty group practice with a separate administrative body and physician partnership.

The plan is administered on a non-profit basis. The administrative body hires all non-physician staff, supplies all the support facilities and contracts with the physician partnership for the provision of physician services. The physician partnership determines the division of income among the physicians. Physicians are paid a salary based on their qualifications, with some sharing of the excess of revenues over expenses. The GHA plan has only ambulatory facilities and has no control over hospitals. In its formative stages the Sault plan very closely emulated the Kaiser-HMO setting in the U.S. containing features such as non-profit administration, salaried physicians and prepayment of physicians.

4.2.1 Revenue Sources

The sources of revenue to the GHA plan have changed considerably since its establishment. The time period over which the GHA has existed can be separated into three distinct periods. The first period is pre-1969, that is, pre-medicare. The second period is post-medicare but prior to the introduction of Ambulatory Care Incentive Payments (ACIP). The last period begins with the introduction of ACIP payments in 1979 and extends to the present.

a) Pre-Medicare

During this time period, the GHA plan was basically a capitation plan. Members of the production and maintenance workers union of Algoma Steel were presented with a "dual-choice". They could choose to obtain care for themselves and their dependents from the GHA plan or from a fee-for-service physician under a traditional indemnification type of insurance provided by the

Prudential Insurance Company of Canada. Members or the members' employers paid a monthly premium to the GHA plan (employees paid 2/3 of the premium) for ambulatory care. Hospital costs in both sectors were borne by the Ontario Hospital Service Commission.

Initially, it was expected that if members chose to seek care outside their initial choice they would be expected to pay the costs of such action out-of-pocket. Similarly, fee-for-service patients could pay directly for care received at the GHA plan. In 1966, the GHA plan introduced a concept of "inter-selection" which permitted members of GHA to go outside of the plan for medical care (without referral). The plan itself was responsible for the costs of such action.

b) <u>Post-Medicare - Pre-ACIP</u>

In 1969, with the introduction of medicare the prepayment of all hospital and physician services were combined into a simple financial mechanism administered and funded through the provincial government. The introduction of medicare gave patients the freedom to obtain care from any provider or provider group.

Beginning in 1969, the GHA contracted with the provincial government to provide care on a capitation basis. This was purely an administrative arrangement with no consumer involvement, as noted in the previous chapters. Over this time, although the GHA plan's orientation remained extensively capitation, its fee-for-service element rose considerably. A study by Sisk-Willems (1975) provides data on sources of revenue for the GHA plan from 1965 to 1971. The GHA plan received three categories of revenue from the provincial government: (1) capitation payments (monthly) for enrolled members; (2) hospital incentive payments for enrolled members; and (3) fee-for-service payments (according to a benefit schedule) for non-members.

Data on GHA population and revenue sources are presented in Tables 4-3 and 4-4, respectively. The data indicate that since the introduction of medicare the fee-for-service population of the GHA plan has increased significantly. This has resulted in as much as 26% (by 1971) of the plan's revenue coming from fee-for-service transactions. This mix in the payment method may encourage the provision of more services than one would expect to find in a pure capitation plan but probably not as many as in a pure fee-for-service organization.

The possibility of mixed population groups must be considered when using any data related to the Sault plan. Attention must be paid to whether the capitation plan

TABLE 4-3

GHA Enrolled Population and FFS Population Using GHA
(1963-1973)

	GHA Population	FFS[1] Population Using GHA	Number of Physicians	Population/ Physician Ratio (only GHA members)	Population/[2] Physician Ratio (both GHA & FFS patients)
1973	17798	23322	-	-	-
1972	15318	29435	-	-	-
1971	16065	17471	22.0	730.3	1524.4
1970	17106	10434	21.1	810.7	1305.2
1969	17428	9000	19.6	889.2	1348.4
1968	18230	7000	18.3	996.2	1378.7
1967	19565	6400	19.0	1029.8	1366.8
1966	19246	4500	16.0	1202.9	1484.1
1965	19311	255	16.5	1170.4	1230.1
1964	17417	-	15.7	1109.4	1109.4
1963	16923	-	-	-	-

Note: 1. FFS population is estimated
2. Figures include both capitation enrollees and fee-for-service population of the plan. The accuracy depends upon what proportion of the FFS population continued to use GHA as an initial contact (this proportion was estimated).

Source: Sisk-Willems (1975) (unpublished GHA data)

TABLE 4-4

Source of GHA Revenue (1965-1971) (Current Canadian Dollars)

Source	1965	1966	1967	1968	1969	1970	1971
Premiums	645464	670647	648471	840015	723530	-	-
Capitation Payments	-	-	-	-	279740	1164321	1220951
Hospital Incentives	-	-	-	-	20302	69952	47491
FFS Payments	23112	72973	121267	191544	234827	374465	476234
Miscellaneous	31815	36162	69174	61588	39194	40878	58305
Total	700391	779782	838912	1093147	1297793	1649616	1802982
Percent from Capitation	92	86	77	77	79	75	70
Percent from FFS	3	9	14	18	18	23	26

Source: Sisk-Willems (1975) (unpublished GHA data) population has one of the following three potential patient mixes: (1) pure capitation plan members (that is, individuals who use just the GHA plan), or (2) members who use both the capitation and fee-for-service physicians but are registered as GHA members, or (3) fee-for-service members who use the GHA plan as their initial contact but do not register as GHA plan members. In comparisons of the costs of fee-for-service and capitation modalities in providing care, enrollment groups should be as pure as possible to ensure that the assumptions of the simulation model are satisfied. Any mixture of the patient populations could seriously bias the results.

Between 1969 and 1979 when patients were allowed to choose a physician freely, the GHA plan lost revenue due to a charge back scheme. Because the GHA plan was intended to share some of the financial risk in providing health care to its defined population, steps were instituted to ensure that the GHA plan was liable for the outside use of its members. Therefore the GHA plan was charged in full for any fee-for-service expenses of its members. This caused financial pressure on the plan and penalized it for something it could do little about.[2] This method of penalizing outside use has since been replaced by the concept of negation which is explained below.

c) Post-ACIP

Current financing arrangements of capitation-type plans, which include GHA, are discussed in a recent Ministry of Health document (Ontario (1982)). Capitation budgets for plans like the Sault's GHA are generally not allowed to exceed the amounts of money their respective populations would have extracted from the system if they had been serviced by fee-for-service providers. Capitation plans are allowed to offer additional services than one would normally obtain from primary care physicians but these services have to be financed through tradeoffs in the mix of services.

The budget given to a capitation plan, such as the Sault plan, is obtained by multiplying the per capita reimbursement rate by the number of eligible OHIP insured persons who are enrolled in the plan. The per capita reimbursement rate is based on the OHIP payments made to fee-for-service physicians and specialists divided by the census-population estimate for Ontario. The rate is adjusted for the age and sex distribution of the enrolled population (often referred to as a roster).[3] Monthly payments are made to the capitation plans.

In addition to the capitation rate, a capitation-negation amount is also calculated for each plan. This amount is based on the number of roster members who use an out-of-plan physician for contracted services. If at any time in a given month a capitation enrollee uses an out-of-plan physician, the monthly capitation rate for that member is deducted from the plan's capitation revenue.

In November 1979, the Ambulatory Care Incentive Program (ACIP) was introduced in the Sault.[4] Recognizing the fact that capitation plans achieve substantial cost savings in hospital care, the ACIP program rewarded capitation plans for excellent performance in terms of hospital utilization statistics.

The ACIP payments to the capitation plans are based on a comparison of active treatment inpatient hospital days per thousand population. For example, if the number of patient days/1000 population used by GHA members are less than the number of patient days/1000 population used by non-GHA, OHIP-insured persons in the comparable district then the GHA plan receives a payment based upon the number of days saved and the per diem hospital cost. One-third of the total calculated savings are returned to the GHA plan. These savings are intended to cover the additional ambulatory costs that the plan would incur as a result of reduced hospital utilization.

The financing arrangements of capitation plans in Ontario (and the Sault) do not coincide with the assumptions of the baseline model. The lack of integration of primary and secondary care within capitation plans and the fee-for-service sector tends to limit the performance of each sector. In addition, because consumers are not locked in to one modality or the other, plans such as those found in the Sault do not represent a true capitation system. Data drawn from such a situation must be used carefully.

4.3 Studies of the Performance of the Sault Ste. Marie Capitation Plan

The relevant Canadian literature comparing fee-for-service and capitation modalities is reviewed in this section. Special emphasis is placed on extracting per capita data pertaining to costs and utilization rates for ambulatory and hospital care for the two provider groups. A discussion of how well the extracted data fit the assumptions of the simulation model is included.

Before examining the data available for the Sault plan, it would be valuable to discuss the concept of *per capita*. This is necessary because most of the data employed in the model are per capita measures.

4.3.1 Per Capita Measurement

Shaughnessy (1982) describes two ways of measuring per capita data, community-based or provider-based. With community-based per capita figures, a specific target group, usually confined to a specific geographic area, is defined. The utilization of services by members of that target population is summed across all providers to determine the total utilization of health services by that target population.

Provider-based per capita figures on the other hand are defined for a specific group of providers. The sizes of the population groups served are determined by allocating to each provider group portions of the population that it services. Once the size of the population serviced is determined it forms the denominator for the per capita measures.

The simulation model requires data that combine both measures. First, data on one particular community is collected and second, utilization and cost figures for that particular community are separated into specific provider groups. This allows provider performance to be reflected in the same per capita units as the consumption of health services by residents of a particular community. The per capita measures are then sensitive to the tendencies of consumers to alter their utilization of services offered by a particular provider group, both in terms of total utilization of services and the substitution of services offered by other providers. In addition, the per capita measures allow an assessment of whether a particular provider or group of providers are efficient relative to other providers, or perhaps to established norms.

It is difficult to define populations according to provider groups in a market where the prevailing practice style is fee-for-service. Comparisons of different modalities must use equivalent control groups for the populations served and types of service provided. Under the current OHIP program, patients are identified according to the policy holder. OHIP gives an identification number to a policy holder (for example, head of household) and other individuals also can be identified under this number (for example, family members). This makes it difficult to obtain information on each individual's use of the system and it is particularly hard to link medical and hospital utilization for a particular individual. As a result, there is difficulty in getting individual utilization data necessary to calculate costs or utilization rates per capita.

Consumers generally do not register with a specific provider. Their freedom of choice is unlimited. Capitation plans (such as the Sault's) are required to develop a roster of individuals who choose the capitation plan as their central source of care. Consequently, it is possible to trace directly the utilization and cost of care for those individuals. In the fee-for-service sector, however, consumers do not enroll with a particular group of providers for a specified period of time. Tracing utilization and costs for those consumers is difficult and biases may be introduced when comparing utilization rates and costs between the two modalities. However, as the system currently functions, it would be unrealistic to expect the fee-for-service providers to develop a roster. Such a roster could, however, be developed indirectly (as some studies have done) and can be based on utilization data generated through the provincial insurance plan. Artificially-developed rosters may have some inherent biases and they should be carefully interpreted.

4.3.2 The Wolfson Study

A study by Wolfson (1981) is the primary data source for the cost and utilization data used in the model. Other data sources which provide the range of sensitivity values are discussed below.

The Wolfson study compared the hospital and ambulatory utilization of two large (over 30,000 members) and distinct groups of patients (capitation versus fee-for-service) during the period 1 July 1978 to 30 June 1979. The study investigated how the total Ministry of Health costs of providing medical services to roster (capitation) patients compared to that for fee-for-service patients. The study looked at two comparable groups. One group was serviced by GHA, and excluded any patients for which GHA received fee-for-service payments instead of capitation payments. The comparison group consisted of patients serviced only by the fee-for-service sector. The two "pure" groups were matched on age, sex and prior hospitalization experience, the last criterion being an attempt to standardize for health status. The two groups had identical coverage for both physician and hospital services.

The Wolfson study fits the assumptions of the simulation model extremely well. The study was conducted during a period in which public health insurance was in existence. The two population groups were "pure" because they were constructed artificially. The only major problem with the Wolfson data is that the composition of the groups was not determined by an enrollment decision made in the face of price competition. Consequently, it is necessary to proceed on the assumption that the data on utilization rates and costs found in Wolfson's study would not be significantly different if consumers did in fact face an enrollment decision.[5]

The initial values of the parameters for the simulation model are listed in Table 4-5. The parameter values marked with an asterisk are taken from the Wolfson study. The sources of the other parameter values are discussed below.

Initial values for the utilization and cost variables begin with the variable CAPHUT, the hospital utilization rate for the capitation modality population, expressed as the annual number of patient days per person. Wolfson's estimate of this variable is .85 patient days per capitation enrollee.

The initial fee-for-service hospital utilization rate (FFSHUT) is set at 1.21 patient days per person. Capitation patients thus appear to use approximately 30% fewer patient days than do their fee-for-service counterparts. There is some question, however, about the accuracy of the fee-for-service hospital utilization rate. Wolfson claims that this rate may be biased upward by as much as 15% in his study, as a result of the method of

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TABLE 4.5

Initial Values for Parameters in the Baseline Model

	Variable	Initial Value
*	CAPHUT	.85 (patient days/person)
*	FFSHUT	1.21 (patient days/person)
*	CAMCPM	$87.23 initial period (1978-79 dollars)
		$102.68 subsequent periods
*	FAMCPM	$102.68 (1978-79 dollars)
	TPOP	80000
*	FFSIOP	40000 (50/50 market split)
	COSTPD	$167.86 (1978-79 dollars)
	PTELAS	-0.25

Sources: Wolfson (1981),
Ontario (1972-1982/83 (annual)),
Hospital Statistics (1978-79).

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construction of the fee-for-service patient pool used in the comparison.

This fee-for-service patient population consisted of those individuals who had at least one visit to a fee-for-service physician during the study period, whereas the capitation group consisted of both utilizers and non-utilizers. To allow for this discrepancy in group membership, a 15% reduction would imply a figure for FFSHUT of 1.03. At this new value of FFSHUT, capitation sector enrollees use approximately 17% fewer patient days than their fee-for-service counterparts. This figure provides a lower bound on the fee-for-service sector's utilization rate. Hence the analysis employs a hospital utilization differential between the two sectors ranging from 17% to 30%. This range captures the variation cited in the literature on the Sault Ste. Marie experience. It also is consistent with data available from U.S. markets (Luft (1981)). The baseline model, however, uses FFSHUT of 1.21.

The initial values for ambulatory utilization rates and costs were also taken from the Wolfson study. The average per capita cost for ambulatory care (CAMCPM) in the capitation modality was equal to total capitation payments to the capitation modality ($3,150,573) for the fiscal year 1978-79 divided by the number of roster members (36,118). Reimbursement for ambulatory services per capita, therefore, amounted to $87.23. Ambulatory care reimbursements in the fee-for-service sector (FAMCPM) were $102.68 per person for the fiscal year 1978-79.

It is important to note that expenditure data taken from a non-competitive environment such as this may bear a different relationship to the true resource (production) costs than would expenditure data in a price-competitive environment. For example, because the rate in the capitation modality is based on the previous year's fee-for-service costs, it is unlikely that all possible efficiency gains and savings in the capitation modality are actually obtained (that is, captured in the rate-setting process). Both fee-for-service and capitation providers may be less militant in annual fee negotiations with government if they are aware of the potential effect of their "prices" on the enrollment charge facing some consumers.

An estimate of the total community population (TPOP) is needed to initialize the model. For the period from which the cost and utilization data were drawn the population of the Sault Ste. Marie community was approximately 80,000 people (see Table 4-1). Therefore, TPOP was set at this value, and the implicit assumption was made that the model population has characteristics similar to those found in Sault Ste. Marie.

In the baseline model, there are no growth projections for the community nor is there any estimate of a changing age profile. It is recognized, however, that use of medical and hospital services and the resulting health care costs are partly a function of the size, composition and growth of the population. A changing population could have an appreciable effect on health care costs across the entire community or in a particular modality. No attempt is made in the baseline model to capture this influence, although it should be kept in mind when interpreting results for policy.

The total population within the community must be divided between the two modalities. The initial market split (FFSIOP) is assumed to be 50/50. This parallels the recent Sault Ste. Marie experience, but is an extremely high share for the capitation modality when compared to the U.S. experience.[6] As a result, alternative assumptions about the initial market shares are made in a sensitivity analysis. The range of variability for the initial fee-for-service market share (FFSIOP) is 50% to 95%.

There are two hospitals in Sault Ste. Marie which service the population of the city and its surrounding area, and from which a value was obtained for the cost per patient day (COSTPD). To match the utilization figures from the Wolfson study, per diem rates for the fiscal year 1978-79 were chosen. The Sault Ste. Marie General had a per diem rate of $150.92 while the Plummer Memorial had a per diem rate of $184.80. The average rate of $167.86 is used in the simulation exercise. This figure was not very different from the 1978-79 Ontario average per diem of $165.06. Although averaging the two hospitals' rates might bias results if one modality used one of the hospitals exclusively, this was apparently not the case.

Other studies of the GHA plan are next reviewed to provide either (a) support for the Wolfson data, (b) a sensitivity range for the parameters, or (c) an indication of possible weaknesses or strengths of the data. The final variable in Table 4-5, the enrollment elasticity (PTELAS), requires more extensive treatment and is discussed in section 4.5.

4.3.3 Hastings' Studies

One of the first studies to evaluate the performance of the Sault Ste. Marie Group Health Association plan was undertaken by Hastings et al. (1970) under the sponsorship of the World Health Organization. This preliminary report was followed by two other studies, Hastings et al. (1973) and Mott et al. (1973). The three studies covered the same time period, 1 July 1967 to 30 June 1968. The first study provided preliminary results while the latter two studies gave much more detail. The studies of the Sault plan were carried out in two ways: (1) a record analysis, and (2) an interview study. The results were quite similar.

The comparison groups were (1) the Sault Ste. Marie and District Group Health Association (GHA) plan and (2) solo fee-for-service physicians reimbursed by a traditional indemnification insurance plan (IIP) sponsored by the

Prudential Insurance Company. Production and maintenance workers of Algoma Steel Corporation chose annually between membership in GHA or IIP.

From the outset, the GHA plan captured approximately 50% of the population who were offered the "dual-choice". The resulting patient populations were comparable in terms of age, sex, family composition, educational level, annual family income, country of birth and length of residence in the area. The fact that the separate patient populations were comparable on the previous characteristics allowed the authors to use crude utilization rates rather than age-sex adjusted rates. In addition, the health status of the two population groups was found to be comparable. The authors reported no statistically significant difference between the two groups with regard to either the incidence or prevalence of illness.

The benefit coverage between the two plans was identical. Hospital costs for both plans were borne by the Ontario Hospital Services Commission and included all care except long-term psychiatric, tuberculosis, workmens' compensation, maternity and some dental services. Ambulatory coverage was basically the same between the two plans due to increased comprehensive coverage of the IIP plan.

In analyzing utilization rates for the two plans, the authors found the following results:

(1) the GHA plan used approximately 24% fewer patient days/1000 than did the IIP plan;[7]

(2) the number of admissions/1000 population for GHA members was approximately 21% lower than for IIP members;

(3) the type of admissions were significantly different for GHA members;[8]

(4) there were no significant differences in utilization of ambulatory services between the two groups;[9] and

(5) GHA members were more likely to have received immunization and check-ups, which indicates an orientation toward prevention.

The studies by Hastings et al. and Mott et al. indicate a significant differential in hospital utilization rates between the two groups (see Table 4-6). It should be noted that the 25% reduction in hospital utilization for the GHA plan occurred without the incentive that the GHA plan could benefit from any savings generated by such a reduction. In fact the 25% reduction occurred at the expense of the plan because all resulting ambulatory procedures were a direct cost to the plan. Because health status is a major determinant of aggregate hospital utilization, it may be tempting to think that the resulting

TABLE 4-6

Summary of Hospital Utilization Statistics

		1967/68[1]	1972[2]	1973[3]	1973[4]	1978-79[5]
Patient Days/1000 (Record Analysis)						
	GHA	979	1100	929.6		850
	FFS	1284	1107	491 (986)		1210
% Difference		23.8	0.6	-89 (-3.8)		29.8
Interview Analysis						
	GHA	1117			1753 (1505)	
	FFS	1323			2024	
% Difference		15.6			13.4 (25.6)	
Admissions (Discharges)/1000 (Record Analysis)						
	GHA	109.2	130.4	121.2		
	FFS	137.3	142.4	72.8 (102.6)		
% Difference		20.5	8.4	-66.5 (-18.3)		
Interview Analysis						
	GHA	104.6			149.8 (135.6)	
	FFS	129.8			166.8	
% Difference		19.4			10.2 (18.7)	

Sources:
1. Hastings et al. (1970, 1973), Mott et al. (1973), and Korcok (1972). FFS comparison group is IIP as defined in text.
2. University of Toronto (1973), Korcok (1974). FFS comparison group is a composite group of FFS practices as defined in text.
3. Ontario (n.d. 1976). FFS comparison group is a multi-specialty FFS group practice, numbers in brackets represent a solo FFS pool in Northern Ontario.
4. DeFriese (1974, 1975). FFS comparison group is a group of FFS solo practitioners in Sault Ste. Marie. Numbers in brackets represent pure GHA utilization while other numbers for GHA represent a combination of GHA/FFS.
5. Wolfson (1981). FFS comparison group is a group of FFS solo physicians in Sault Ste. Marie.

differential in hospital utilization rates was a direct result of differences in the health status of patients in the two plans, but the Hastings studies report no significant differences in health status between the two groups.

Another possible explanation of the differential is the range and degree of benefit coverage and the financial risk borne by the enrollee. The range of insured hospital services may affect the amount of hospital utilization because of moral hazard. The extent of ambulatory coverage also may influence the use of hospital services. Because in-hospital coverage was identical for the two population groups, it is unlikely that the effect of moral hazard on hospital utilization would lead to the differences that were found in the rates of hospital admissions or utilization.

It is generally thought that prepaid capitation groups offer a wider range of ambulatory services which result in lower hospital utilization rates than their fee-for-service counterparts. If ambulatory coverage is less comprehensive in the fee-for-service sector, then there is the financial incentive for physicians to hospitalize whenever possible. Evidence from the Hastings studies suggests that the utilization differences in hospitalization existed even with uniform ambulatory coverage between the two groups. Hence, it appears that extending ambulatory coverage under fee-for-service practice is not incentive enough to encourage physicians to lower the rates of hospital utilization.

It appears, then, that the utilization differences are a result of the reimbursement method and the organization of physicians. Socio-economic values, health status and benefit coverage do not seem to account for these utilization differences. The hospital and ambulatory utilization rates found in the Hastings and Mott studies support the use of the parameter values in Table 4-5.

4.3.4 DeFriese Studies

DeFriese (1974, 1975) compares the findings from a 1973 community household interview survey conducted in the Sault with the findings of Hastings et al.. DeFriese studied how the introduction of universal health insurance, in 1969, affected the patterns of utilization of hospital and physician services.

DeFriese interviewed 1503 randomly selected households in April and May of 1973.[10] Respondents were identified according to the extent to which they used the GHA plan or the traditional fee-for-service physician as their primary source of medical care. The sample was divided into three groups; GHA users (N=407), GHA/FFS users (N=317) and FFS users (N=777). The groups were similar in terms of socio-economic characteristics and health status. DeFriese's results are very similar to Hastings' et al. (for a summary see Table 4-6).

In combining GHA/FFS with GHA users and comparing this to FFS users, he finds the GHA members use approximately 13% fewer patient days than those patients who received their care from fee-for-service physicians. Comparing the pure GHA patient population with the FFS patient population, the differential increased to 26%. In terms of number of admissions, the combined GHA/FFS group had approximately 10% fewer admissions than the FFS group, while the pure GHA group had 19% fewer admissions. The DeFriese study indicates hospital utilization differences between the two sectors even after medicare.

The DeFriese study did not provide useful data on ambulatory services. The study did, however, attempt to examine quality of care between the two sectors. The results indicated that there were no major differences between the plans in terms of access to preventive health care.

The data on hospital utilization provide additional support for the range of values in the simulation exercises; in addition, these data were generated when full (that is, medical and hospital) national health insurance was in effect. It should be noted, however, that the consumer choice decision had virtually disappeared during this time period.

4.3.5 University of Toronto Study

Other studies for the post-medicare period have been sponsored by the Ontario Ministry of Health. The first of these studies was conducted by the University of Toronto (1973). This study compared the utilization of primary health care services by a population who received care from two different sources. The study involved two community-sponsored, capitation-reimbursed, multi-specialty group practices, one in Sault Ste. Marie and the other in St. Catharines. The study also identified six population groups serviced by fee-for-service physicians. The population groups were groups of employees who had group coverage under voluntary comprehensive insurance before medicare, and who, after medicare, had been registered as groups with the Ontario insurance plan. Two of the six groups were from communities in Northern Ontario, while the remaining four were semi-urban communities in southern Ontario. The six groups were combined for the purpose of comparison with the capitation plan.

Utilization of hospital and ambulatory services by the study groups were examined for the period 1 January, 1971 to 31 December, 1971. The groups appeared comparable in terms of age and sex characteristics; consequently, no adjustment was made for demographic variations between groups. Although there appeared to be no distinct differences in socio-economic characteristics, the variety and number of health professionals, beds and other services available to group members varied considerably across the groups.

The study compared hospital and ambulatory utilization rates and costs between the groups. Only the data for the Sault plan (GHA) and the composite fee-for-service group are reviewed. Details on the other comparisons can be found in University of Toronto (1973).

Data for all hospital in-patient episodes, all physician services and all other insured health services, such as dental and chiropractic services, were recorded on a family basis for each group, with the number of family members taken into account when calculating rates/1000 population. Two problems existed in the collection of these data. First, the identification number for hospital insurance was different from that for medical insurance, with all numbers being family identification numbers rather than individual identification numbers. Second, physician services rendered in hospital by Sault plan physicians were excluded from the data. This necessitated an estimate for this figure in order to make cost comparisons between the two sectors.

Tables 4-6 and 4-7 provide a summary of the utilization figures for hospital care reported in this study. In Table 4-7 the number of patient days/1000 population is only 0.6% lower for the GHA plan than they are for the control group, but are 14% lower than the Ontario average. The number of admissions/1000 population are approximately 8.5% lower for the GHA plan than the control group, and 15% lower than the Ontario average.

The data on admissions/1000 population from this study seem to support the earlier studies, but data on patient days/1000 population do not. It appears that the average length of stay for patients in the GHA plan was considerably longer than that of patients in the control group, a factor that was not evident in the earlier studies. The higher number of patient days per 1000 population and the longer average length of stay may be attributable to the impure mix of patients in the GHA plan.

Some members of the defined GHA plan population were actually serviced by out-of-plan physicians. In fact,

TABLE 4-7

Summary of Hospital Utilization Statistics from University of Toronto Study (1973)

		GHA Plan			Control (FFS)		
		Medical	Surgical	Obstetrics	Medical	Surgical	Obstetrics
Patient Days/ 1000 Population	Male	548	433	-	493	537	-
	Female	512	514	210	419	511	259
	Average	532	471	97	457	525	125
Admissions/ 1000 Population	Male	58.8	49.7	-	53.7	66.1	-
	Female	50.6	66.7	38.4	46.5	76.3	43.1
	Average	55.0	57.6	17.8	50.2	71.0	20.8

	Total Patient Days/1000 Population	Admissions/1000 Population
GHA	1100	130.4
Control	1107	142.4
Ontario	1280	153.0

Source: University of Toronto (1973) Tables 3 and 4

1/5 of all hospital admissions of GHA plan members were by outside physicians. The average length of stay for the GHA plan members serviced by GHA plan physicians was 8.1 days, while it was 9.6 days for those enrollees serviced by out-of-plan physicians. As a consequence, the higher utilization rates found in this study are not entirely attributable to the GHA plan's own physicians.

As is evident from Table 4-7, surgical admissions for the GHA plan were 18.9% lower than for the control group while medical admissions were 9.5% higher. This evidence tends to support the Hastings study on surgical procedures.

For ambulatory services, which include physician, paramedical and laboratory services provided per 1000 population, the study found the utilization rates of GHA members to be less than the rates for the control group. It should be recalled, however, that the figures for the GHA plan do not include physician services delivered in hospital. These results also support the findings of the Hastings et al. studies.

The authors of this study allocated fees based on the 1971 Ontario Medical Association fee schedule to all services rendered to the respective populations in order to calculate the costs of providing ambulatory services. They found that the total costs of providing both ambulatory and physician services in hospital to the control population was $126.47 per person, while the government paid $133.31 per person (capitation payments plus physician services in hospital) for GHA members. If the ambulatory use by GHA members had been reimbursed on a fee-for-service basis, the study claimed it would have cost the government $123.06 per person.

The authors concluded that it is more expensive to the government to reimburse through capitation than through typical fee-for-service reimbursement. The capitation sector, however, did provide additional services such as family counselling which were not available to the control group and these extra services increased cost. To say that it would have cost the government less to reimburse on a fee-for-service basis ignores the basic fact that, in this study, services provided under one method of payment cannot be used to measure the activity that would have occurred under an alternative method of payment.

The data from this study were found to be inappropriate for use in the simulation analysis for several reasons. First, the population groups were impure; many GHA patients had been serviced by out-of-plan physicians. This may have caused a significant upward bias in the hospital utilization rate. Second, ambulatory coverage was different across the two comparison groups, with greater coverage provided by the GHA plan. This may account for the capitation plan being more expensive than the fee-for-service plan. The study is useful, however, in providing an indication of the type of bias involved if patient groups are mixed. Evidence such as this strengthens support for an assumption of lock-in in the baseline model.

4.3.6 Sisk-Willems Study

A study by Sisk-Willems (1975) provides additional data on the Sault plan for the period 1965 to 1971. The Sisk-Willems thesis studied two hypotheses concerning the effect on costs of variations in method of payment and level of vertical integration within group practice. The first hypothesis was that capitation groups delivered medical care at a lower per capita cost than did comparable fee-for-service groups. The second hypothesis was that hospital-based groups have lower per capita costs of delivering total medical care than do groups who have separate ambulatory group and hospital functions.

The thesis compared two ambulatory group practices, one fee-for-service, the other capitation, to see which of the two delivered care at the lowest per capita cost. The study also compared two capitation groups, one which provided just ambulatory services and one hospital based group, to see which level of vertical integration provided medical care at a lower per capita cost. The study, however, did not provide any information on a comparable group composed of solo fee-for-service practitioners. Sisk-Willems did not find sufficient evidence to test the first hypothesis. However, available data did support the second hypothesis. A more vertically-integrated system was better able to control costs.

Although the Sisk-Willems study does not provide data for the comparison groups with which the current thesis is concerned, it does provide additional detailed information on the GHA. Comparison of the utilization rates for GHA members and fee-for-service patients that used GHA as their primary source of care showed that GHA physicians treated their fee-for-service patients no differently than they treated regular GHA plan members.

This result is significant in that it points out that patient groups can be mixed within the capitation plan itself. Capitation-plan physicians do not behave in a significantly different manner if the patients they treat are capitation enrollees or fee-for-service patients. What is important, however, is how capitation enrollees are treated by fee-for-service physicians. Evidence indicates that this type of mixed patient population tends to be associated with upward bias in the utilization rates and hence costs attributed to the capitation modality.

4.3.7 McKillop Study

A study by McKillop (Ontario (n.d. 1976)) compared in-patient and ambulatory care services rendered to sample populations drawn from two distinct group practices. One was reimbursed on a capitation basis (GHA plan of the Sault) while the other was reimbursed on a fee-for-service basis (Glazier Clinic of Oshawa). The objective was to study the effect of alternative payment arrangements. An additional comparison with a group of solo fee-for-service practices allowed for the effects of differing organizational arrangements.

The study populations of the Sault and Oshawa clinics were a good match with regard to age, sex, education level, ethnic background, family size and average income. The providers within each group also were similar with regard to specialty, age, place of training, hospital appointments, and length of time in practice. A group's patient population was defined as consisting of those patients who had received 60% or more of their total ambulatory care from that particular clinic. However, this definition proved to be a poor basis for defining the respective group populations. A bias attributed to the way in which the study patients sought and received care from the two clinics was introduced.[11] For this reason, it is inappropriate to compare hospital and medical utilization rates and costs between the two groups. Consequently, the data from this study are not employed in the simulation model.

4.4 Data on Enrollment Elasticity

Canadian studies evaluating the performance of the capitation modality provide little insight into the consumer enrollment decision generally, and no insight into this decision in a world of price competition between modalities. For the baseline model, an enrollment elasticity variable (PTELAS), based upon changes in the relative price of enrollment in the fee-for-service modality, was created to account for switching behaviour of consumers.

In the simulation model, enrollment is a function of per capita costs in each sector. Fee-for-service per capita costs expressed relative to capitation per capita costs creates a relative price variable which affects consumers' enrollment decisions. In the initial time period, the relative price facing consumers is set equal to one. This is because consumers face the same cost regardless of the modality from which care is obtained. After the initial period, the government introduces an enrollment charge that reflects the relative cost difference between the two modalities. The government acts to keep relative prices equal to one, in the sense that it will not cover any increases in relative prices. The government achieves this by paying on behalf of all individuals the cost of the lowest cost modality. Increases or decreases in price which are not covered by government are then imposed on the consumer in the form of an enrollment charge.

The number of people who switch between the two modalities can be calculated using the definition of price elasticity. It is important to note that prices are relative prices and not absolute dollar amounts. Consumers base their enrollment decisions upon changes in relative prices. Movement between the capitation and fee-for-service modalities can occur in either direction, depending upon which sector has the lower costs. The elasticity formulation allows for changes in the relative costs between the two modalities.

The own price enrollment elasticity formula in the fee-for-service modality can be expressed as follows.

PTELAS = (%ΔQ)/(%ΔP),

where %ΔQ represents the percentage change in the enrollment in the fee-for-service modality, and

%ΔP represents the percentage change in the relative price of the fee-for-service modality.[12]

For an estimate of the enrollment elasticity it was necessary to search the U.S. literature. Tables C1-C8 found in Appendix C provide a range of empirical estimates for this variable for various market areas in the U.S. These tables were calculated on the basis of raw data reported by Valiante (1976) who analyzed the effects of HMO pricing strategies on federal employees' enrollment in HMOs within a community. The study provided data on relative premium costs which represented net out-of-pocket costs to the subscriber of selecting one plan over another. Although benefits were not identical across all plans, the plans were generally comprehensive, so comparison of utilization rates and enrollment would not be significantly distorted by slight differences in benefits.

The market share for a particular plan was defined as the number of subscribers in the plan divided by the total number of federal employees in the particular SMSA.

The tables represent two different market situations. Tables CI-C3 represent market areas in which there was only one capitation-type plan in competition with traditional fee-for-service physicians. Tables C4-C8 represent market areas in which there were two or more capitation plans in competition. As a result, a capitation plan competed for a share of the market not only with the fee-for-service sector but with other capitation plans as well.

The enrollment figures calculated for the various plans are based on the assumption that the community in which the plans operate experienced no growth in population during the particular time horizon. Hence, data used from the Valiante study were respecified to represent a constant community population. This is consistent with the assumption of zero population growth in the simulation model.

In Tables C1-C3 columns (2), (3) and (4) give community size, enrollment in the capitation plan and enrollment in the fee-for-service plan (BC-BS), respectively. From these figures, changes in enrollment in each sector are calculated over time. To match the specification of the simulation model, the percentage change in the FFS sector population is calculated. This calculation is found in column (7).

Calculation of the relative price is given in column (8). Column (9) represents the own price enrollment elasticity for the fee-for-service sector. In Tables C1-C3 this calculation gives a negative own price enrollment elasticity value. In general the enrollment elasticity is very inelastic, ranging from -0.004 to -0.64. This estimate is consistent with price elasticity estimates found in demand studies for medical services (Newhouse and Phelps (1976) for example). Contrary to expectations, the elasticity value is not, however, always negative. Occasionally the results do not indicate an inverse relationship between price and enrollment. This results from the inability to hold all other factors constant (population is the only factor that is explicitly held constant). Income or plan characteristics may be changing, and these may lead to an apparent positive relationship between price and quantity in some instances.

Tables C4-C8 provide a range of elasticity estimates for market areas which consist of more than one capitation plan. Changes in enrollment in the fee-for-service sector relative to one particular capitation plan are calculated holding the population in other capitation plans constant for that particular year. However, this does not allow one to capture the true nature of competition between all plans. Despite this pitfall, the elasticity estimates are comparable to those estimates found for the market situation of a single capitation plan.

The results found in Tables C1 to C8 provide a wide range of estimates to employ in a sensitivity analysis of the simulation model. The choice from among these estimates, however, depends upon their applicability to the Sault Ste. Marie market region as well as upon the assumptions of the simulation model. For example, did the estimates result from an open enrollment decision? Are the estimates representative of a situation in which the government's or employer's contribution is consistent throughout a study period? Are the initial market shares and the price levels consistent with those in the Sault market area? Considerations such as these are important for the selection of parameters for the simulation exercise.

McGuire (1981) demonstrated that consumers are sensitive to prices when choosing between modalities. His study examined the choice of employees, of Yale University in June 1974, among three options. Each consumer in the sample chose one of (1) a capitation plan (Yale Health

Plan), (2) a fee-for-service plan (Blue Cross), or (3) no coverage at all. Benefits under both plans were similar, with the capitation plan offering slightly more coverage for physicians' services. The probability of joining a particular plan was estimated as a function of the relative price of the capitation and fee-for-service plans, the distance of residence to the capitation plan facility, the perceived quality of services received from the capitation plan, and the likelihood of demand for more medical services.

The most significant finding was that employees were sensitive to the prices at which the options were available. The results indicated that for each dollar increase in the price of membership in the fee-for-service plan, the probability of an employee joining the capitation plan increased by approximately 4%. Using the estimates of the probability model together with the sample size and plan enrollments, an enrollment elasticity of approximately -0.55 was calculated for the fee-for-service plan. This estimate falls within the range of estimates calculated using raw data from the Valiante study. This supports the choice of an inelastic enrollment parameter value for the simulation model. The effect of different values of the parameters can be investigated thoroughly by a sensitivity analysis.

In the baseline model, -0.25 is used for the PTELAS variable. The sensitivity analysis investigates a range for this variable from -0.004 to -0.64.

4.5 Summary

Table 4-5 earlier in this chapter provided the list of parameter values used in the initial baseline model. Results derived from these initial values are considered to be the standard set of results to which sensitivity analyses are applied. The following chapter presents these results.

Endnotes

1. This location might even be viewed as a logical candidate for a competition experiment. It does not, however, fit the assumptions of the simulation model exactly. Because no enrollment charges of the type envisioned in this thesis are currently in use in Ontario, and because consumers are not locked-in to either modality, the Sault Ste. Marie data can only be used as initial approximations for the utilization and cost levels under publicly financed competition.

2. For more information on the nature of this arrangement see Vayda (1977). Although the GHA plan did not suffer extensively from this arrangement other group plans, such as the one established in St. Catharines in 1969, were severely affected. For example, the use of outside service in the St. Catharines plan was such that capitation funding was not a viable reimbursement method. As a result capitation reimbursement was replaced with a global budget (Korcok (1974)).

3. In general, the formula is sufficient for reimbursement purposes but it does not take into account the burden of illness in the population serviced. If the capitation population differed significantly on dimensions such as incidence and prevalence of illness then the current calculated rate would be severely biased. In addition, the calculation of the per capita rate itself is subject to question. The number which represents average fee-for-service billings for all OHIP insured services does not include the costs of capitation plans, and the denominator is measured by census population instead of insured population. Both tend to bias the per capita reimbursement rate downward.

4. This program replaced the earlier Hospital Days Reduction Incentive Program first instituted in 1969 (Sisk-Willems (1975)).

5. In the presence of an enrollment charge, the capitation modality may find itself enrolling a greater share of the poor, less-educated consumers who tend to have higher than average use of care. If this were the case then cost variations in the data that exist under a non-enrollment charge system may be quite different than those that would exist under the proposed enrollment charge system.

6. This 40% - 50% market share is different from U.S. experience, which shows market shares for capitation-type plans ranging between 5% and 10% at a plan's inception. Evidence to date indicates that these plans do not often grow to 50% of the market.

7. These figures are from the record analysis study. Results from the interview study are quite similar and are reported in Table 4-6.

8. Patients not hospitalized for respiratory conditions appeared to be the largest single contributor to "days saved" for GHA members. In addition, 11 out of the 13 diagnostic categories investigated showed positive contributions to 'days saved' for GHA members. For 16 out of 26 surgical classes, admissions occurred less frequently for GHA members by a statistically significant margin. This was particularly true for categories of elective surgery, such as tonsillectomies and adenoidectomies. Although in 10 of 26 surgical classes admissions occurred more often for GHA members, the differences were not statistically significant.

9. The percentage of GHA members reported to have received services was approximately 69% while the percentage of IIP members reported to have received physician services was approximately 65%. These resulted in an average number of 7.1 services per person for GHA members and 5.5. services per person for IIP members.

10. The sample population was selected from the entire Sault Ste. Marie community. After the advent of medicare, membership in the GHA plan was open to the entire community and not just members of the Algoma Steel union.

11. For more information see Ontario (n.d. 1976).

12. The elasticity formulation measures the responsiveness of enrollment in the fee-for-service modality to changes in its own price (as reflected through changes in the relative price).

CHAPTER 5

BASELINE RESULTS

5.0 Introduction

The general strategy followed throughout the simulation analysis is to generate a set of results for a given set of parameter values, and to compare the community health care costs under publicly financed competition with the costs that would have been incurred if the entire community population had been serviced by the fee-for-service modality. This chapter presents estimates from the baseline model described in Chapter 3, using the parameter values identified in Chapter 4. The results include both estimates of the magnitude of potential cost savings and an indication of the sensitivity of the savings estimates to changes in the initial parameter values.

In the baseline model, the community population is divided between the two modalities under the assumption of a 50/50 market split. In the first year, an enrollment charge is computed on the basis of historic expenditure data which are proxies for production costs in each modality. Consumers react to the enrollment charge in the second year with the result that some consumers switch modalities on the basis of their price sensitivity. Once some consumers have switched to the less expensive sector there is a savings to government because these consumers now experience lower hospital and ambulatory costs.

In year two of the model, the institutional link between the capitation modality and the fee-for-service modality begins to have an effect. Because capitation payments are linked to fee-for-service ambulatory billings in the previous period, ambulatory costs in the capitation sector increase. The new enrollment charge reflects this and, because it is now relatively less expensive to belong to the fee-for-service sector than it was previously, some consumers return to that sector. Once this switching is complete, no further changes occur due to the nature of the cost structure and the assumption of constant enrollment elasticity.

Savings that are generated by the existence of the capitation sector and the linkage of capitation payments to fee-for-service ambulatory costs are constant annually after year two. These savings are the expected gains from publicly financed competition under the simplified baseline model structure. They should not be interpreted as dollars withdrawn from the system by subsequent budget cuts.

Instead, they should be interpreted as a proxy measure for the control in the growth of costs.

Table 5-1 presents the results of the initial baseline scenario in which the initial parameter values are employed. In addition to yearly estimates of savings, the present value of a ten year period of accumulated savings is calculated in order to illustrate the magnitude of potential savings attributable to this limited form of competition.

5.1 Baseline Results

In the absence of a publicly financed competitive scheme, it would have cost the government 24.47 million dollars per year (measured in 1978-79 dollars) to service a community of 80,000 entirely on a fee-for-service basis. This is obtained by using the fee-for-service ambulatory and hospital utilization rates and costs listed in Table 4-5.[1] Over 10 years, for example, the present value of this cost, discounted at 10%, is approximately 165.40 million dollars.[2] With the introduction of publicly financed competition, the cost of servicing the same community for the same time period is 147.42 million dollars. This is based on the parameter values in Table 4-5. It would cost the government 17.98 million

TABLE 5-1

Baseline Results Employing Initial Parameter Values

Year	Capitation Modality Population	Fee-for-Service Modality Population	Capitation Modality Market Share (%)	Community Health Care Costs (million$)	Cost Savings to Government (million$)
0	0	80000	0.0	24.47	--
1	40000	40000	50.0	21.43	3.04
2	43300	36700	54.1	21.85	2.62
3	42723	37277	53.4	21.88	2.59
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
10	42723	37277	53.4	21.88	2.59
Present Value					
5%				176.93	21.42
10%				147.42	17.98
15%				125.81	15.42

Note: Results for years 4 to 10 are identical to year 3. Present Values are calculated for years 1 to 10.

dollars less to service the community for the 10 years under publicly financed competition. This savings of approximately 11% is primarily the result of the difference in hospital utilization rates between the fee-for-service modality and the capitation institution introduced in the simulation model.

In addition, because consumers have reacted to an enrollment charge, the capitation modality has managed to capture an additional 3.4% of the market (approximately 2700 people) by the end of the ten-year time horizon.

The savings found under this scenario can be further disaggregated to examine the various individual aspects of the competitive scheme. These results are summarized in Table 5-2.

In the first year of the simulation, the only effect is to allow a market split between the capitation and fee-for-service modality. In this instance, 50% of the market is serviced by the capitation sector and 50% by the fee-for-service sector. Consumers serviced by the capitation sector experience lower hospital utilization rates and lower ambulatory costs. This results in lower costs to the government in the first year. Savings are calculated to be 3.04 million dollars. This can be interpreted as the marginal cost savings attributable to the existence of a capitation sector with a 50% market share.

Because the capitation modality can service its population at a lower average per capita cost, an enrollment charge is imposed on consumers serviced by the fee-for-service sector in the second year. As a result a number of consumers switch from the fee-for-service modality to the capitation modality. This results in an

TABLE 5-2

Baseline Model - Marginal Savings Attributable to the Individual Components of the Publicly Financed Competition Scheme
(million $)

Year	Existence of Capitation Modality (50% Market Share)	Consumer[1] Enrollment Decision	Linkage of Ambulatory Costs	Consumer[2] Enrollment Decision	Total
1	3.04	--	--	--	3.04
2	3.04	0.25	-0.67	--	2.62
3	3.04	0.25	-0.67	-0.03	2.59
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
10	3.04	0.25	-0.67	-0.03	2.59
Present Value					
5%	24.65	1.78	-4.76	-0.18	21.42
10%	20.55	1.44	-3.86	-0.15	17.98
15%	17.55	1.19	-3.20	-0.12	15.42

Note: (1) Consumer decision in year 2.
(2) Consumer decision in year 3.

additional 0.25 million dollar savings in costs to the government based on year 1 payment schedules. However, during year 2, capitation payments are linked to fee-for-service ambulatory costs in the previous period. This causes an increase in payments to the capitation sector, hence increasing government expenditures by 0.67 million dollars. The net savings in year 2 are therefore 2.62 million dollars.

The increase in the cost of the capitation modality to the government in year 2 generates a new enrollment charge for year 3. In comparison to year 2, the capitation modality in year 3 (though still less costly than fee-for-service) is now relatively more expensive, i.e. the charge for enrollees in the fee-for-service sector has been reduced. Some individuals will switch back to the fee-for-service modality. This action further reduces the annual savings to government by 0.03 million dollars.

The cost savings of 17.98 million dollars can be disaggregated into separate effects, due to (1) the existence of the capitation sector, (2) the initial reaction of consumers to the enrollment charge, and (3) the institutional linkage of capitation payments to fee-for-service billings on the ambulatory side. Over the ten year period, the existence of the capitation sector (which initially services 50% of the market) generates cost savings to the government of approximately 20.55 million dollars. The consumer enrollment decision generates additional savings of 1.44 million dollars. Finally, the linkage of capitation payments to fee-for-service billings, combined with subsequent consumer reaction, increases government expenditures by 4.01 million dollars.

In each of the ten simulated years, consumers are faced with an enrollment charge if they choose to obtain care from the more expensive sector. In the first two years the enrollment charge is $75.88 to each consumer who is serviced by the fee-for-service sector. In the third and all subsequent years the charge is reduced to $60.43. If a consumer remains with the fee-for-service modality for the entire period, the present value of the charges would be $423.90, using a 10% discount rate. Since this amount is collected from each individual who remains in the more expensive sector, the present value of collections from users of fee-for-service physicians over the ten years is approximately 16.50 million dollars.

Although the enrollment charge is not intended as a revenue raising device it nonetheless is an additional source of revenue. In evaluating the overall attractiveness of the publicly financed scheme, this result should be taken into consideration.

5.2 Sensitivity Tests

The significance of the introduction of differential enrollment fees in an environment in which all health care costs are covered by public health insurance can best be discussed after the sensitivity of cost savings to initial model parameters is explored. Market share, enrollment elasticity, and the hospital utilization rate differential are all important parameters. The results of varying the values of these parameters are presented in the following sections. The full results from the sensitivity analysis are presented in Appendix D.

5.2.1 Sensitivity to Initial Market Share

Results from setting the initial market share of the capitation sector at 5, 20, 40, and 50 percent are summarized in Table 5-3. (All other parameter values remain as listed in Table 4-5.) At a 10% discount rate, savings range from 3.55 million dollars, when the initial capitation market share is 5%, to 17.98 million dollars when the initial market share is 50%. The potential cost savings range from approximately 2% of community health care costs in the absence of competition (hereafter referred to as the status quo costs) to 11% of these costs.

TABLE 5-3

Baseline Results - Sensitivity Analysis on Initial Market Share

Capitation Modality Initial Market Share (%)	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Savings in Costs to Government (million $)
50	53.4	5%	176.93	21.42
		10%	147.42	17.98
		15%	125.81	15.42
40	44.1	5%	180.73	17.61
		10%	150.61	14.74
		15%	134.06	12.63
20	25.4	5%	188.33	10.01
		10%	157.00	8.35
		15%	134.06	7.13
5	11.5	5%	194.04	4.30
		10%	161.79	3.55
		15%	138.19	3.00

5.2.2 Sensitivity to the Enrollment Elasticity

Results of variation in the enrollment elasticity for a given market share of 50% are presented in Table 5-4. The present value of cost savings over ten years, at a 10% discount rate, is 16.97 million dollars when the enrollment elasticity is -0.0004 and increases to 19.52 million dollars when it is -0.64. The potential cost savings range from approximately 10% of the status quo costs of community health care, to about 12% of these costs.

TABLE 5-4
Baseline Results - Sensitivity Analysis on Enrollment Elasticity

Enrollment Elasticity	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Savings in Costs to Government (million $)
-0.004	50.1	5%	178.11	20.24
		10%	148.37	16.97
		15%	126.61	14.58
-0.02	50.3	5%	178.03	20.31
		10%	148.31	17.03
		15%	126.56	14.03
-0.10	51.4	5%	177.65	20.69
		10%	148.00	17.34
		15%	126.30	14.89
-0.25	53.4	5%	176.93	21.42
		10%	147.42	17.98
		15%	125.81	15.42
-0.64	59.0	5%	174.97	23.37
		10%	145.82	19.52
		15%	124.48	16.71

5.3 Sensitivity to the Hospital Utilization Rate Differential

Computations similar to the above were performed for variations in the initial hospitalization rate differential. The results presented in Tables 5-1 to 5-4 are based on the assumption that the difference in hospital utilization rates between the two modalities was approximately 30%. However, as noted in the preceding chapter it is conceivable that the differential may be much smaller. The difference in the hospital utilization rate between sectors is 17% for this sensitivity analysis. This represents a 15% reduction in the fee-for-service sector's hospital utilization rate, from 1.21 patient days per person to 1.03 patient days per person. The rate of the capitation sector is 0.85 patient days per person.

Table 5-5 displays the effect on the baseline results of this reduction in the hospital utilization rate differential. (All other parameter values remain as stated in Table 4-5.) The capitation modality achieves an equilibrium level of 51.7% of the market (1388 more consumers). In this case, the competitive strategy generates 9.04 million dollars of potential cost savings for the government, discounted at the 10% rate. Expressed as a percentage of the status quo costs, these savings are approximately 6% when the hospital utilization rate differential is 17% instead of 11% when the differential is 30%.[3]

TABLE 5-5
Baseline Results - Reduction in the Initial Hospital Utilization Rate Differential

Year	Capitation Modality Population	Fee-for-Service Modality Population	Capitation Modality Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million$)
0	0	80000	0.0	22.05	--
1	40000	40000	50.0	20.22	1.83
2	41896	38014	52.5	20.78	1.27
3	41388	38612	51.7	20.80	1.25
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
10	41388	38612	51.7	20.80	1.25
Present Value					
5%				168.02	10.73
10%				139.97	9.04
15%				119.43	7.81

5.3.1 Sensitivity Results With a Reduction in the Initial Hospital Utilization Rate Differential

A 15% reduction in the fee-for-service sector's initial hospital utilization rate led to a 45% drop in the present value of cost savings over ten years. Because of this substantial impact it is worthwhile to re-examine the sensitivity of the baseline results to assumptions about initial market share and the enrollment elasticity in conjunction with a reduced hospital utilization rate differential.

Tables 5-6 and 5-7 present the sensitivity results of variations in the initial market share and enrollment elasticity, respectively, (under the assumption that the hospital utilization rate differential between sectors is 17% instead of the initial 30%). A 10% discount rate is used throughout the remainder of the chapter.

Changes in the initial capitation market share from 5% to 50% generate a range of cost savings of 1.37 million dollars to 9.04 million dollars. This range represents approximately 1% to 6% of the status quo costs. Variation in the enrollment elasticity estimate from -0.004 to -0.64 generates a range of potential cost savings from 8.79 to 9.47 million dollars. As a percentage of the status quo health care costs, these savings range from slightly below 6% to slightly above 6%.

TABLE 5-6

Baseline Results - Sensitivity Analysis on Initial Market Share With Reduced Initial Hospital Utilization Rate Differential

Capitation Modality Initial Market Share (%)	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Savings in Costs to Government (million $)
50	51.7	5%	168.02	10.73
		10%	139.97	9.04
		15%	119.43	7.81
40	42.1	5%	170.03	8.71
		10%	141.67	7.34
		15%	120.91	6.33
20.	22.8	5%	174.08	4.67
		10%	145.08	3.92
		15%	123.86	3.38
5	8.3	5%	177.11	1.64
		10%	167.64	1.37
		15%	126.07	1.17

TABLE 5-7

Baseline Results - Sensitivity Analysis on Enrollment Elasticity With Reduced Initial Hospital Utilization Rate Differential

Enrollment Elasticity	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Savings in Costs to Government (million $)
-0.004	50.03	5%	168.32	10.42
		10%	140.21	8.79
		15%	119.64	7.60
-0.02	50.10	5%	168.30	10.44
		10%	140.20	8.81
		15%	119.63	7.61
-0.10	50.70	5%	168.20	10.54
		10%	140.12	8.89
		15%	119.56	7.68
-0.25	51.70	5%	168.02	10.72
		10%	139.97	9.04
		15%	119.43	7.81
-0.64	54.60	5%	167.50	11.25
		10%	139.54	9.47
		15%	119.08	8.16

The results of Tables 5-6 and 5-7 can be compared to those presented in Tables 5-3 and 5-4 respectively. Table 5-8 presents a summary of this comparison. When

TABLE 5-8

Baseline Results - Summary Results of Sensitivity Analyses

Variable	Sensitivity Range Lower Bound	Sensitivity Range Upper Bound	Potential Cost Savings (million $) Lower Bound	Potential Cost Savings (million $) Upper Bound
(A) Capitation Market Share	5%	50%	3.55 [2.1]	17.98 [10.8]
(B) Enrollment Elasticity	-0.004	-0.64	16.97 [10.3]	19.52 [11.8]
(C) Capitation Market Share (15% reduction in FFS hospital utilization rate)	5%	50%	1.37 [0.09]	9.04 [6.1]
(D) Enrollment Elasticity (15% reduction in FFS hospital utilization rate)	-0.004	-0.64	8.79 [5.9]	9.47 [6.4]
(E) Most Responsive Case[1] (includes both (A) and (B)) (50%/-0.64)				19.52 [11.8]
Least Responsive Case (includes both (A) and (B)) (5%/-0.004)				1.72 [1.0]
(F) Most Responsive Case (includes both (C) and (D)) (50%/-0.64)				9.47 [6.4]
Least Responsive Case (includes both (C) and (D)) (5%/-0.004)				0.89 [0.06]
(G) % Difference[2]				
(C) vs (A)			61.5	49.7
(D) vs (B)			48.2	51.5
(F) vs (E)[3]			48.3	51.5

Note: Numbers in square brackets represent percentage of status quo costs.
(1) The detailed results for the most and least responsive cases can be found in Appendix D.
(2) Results reflect the percentage decrease in potential cost savings with a 15% reduction in the fee-for-service hospital utilization rate.
(3) Numbers reflect the least and most responsive cases, respectively.

changes in the values for the initial market share and the enrollment elasticity are combined to form 'most' responsive and 'least' responsive cases, potential cost savings range from approximately 12% of status quo health costs to 1% of these costs. In addition, row (G) of the table shows that if the baseline model simulates with a 15% lower initial hospital utilization rate in the fee-for-services sector, then potential cost savings would be approximately 50% in all cases.

The results of Table 5-8 indicate that potential cost savings are particularly sensitive to the initial capitation market share and the initial hospital utilization rate differential, and are relatively insensitive to the enrollment elasticity.

5.4 Discussion

Recall that the potential cost savings are reported in 1978/79 dollars. To obtain an estimate of what the potential cost savings would be if this specific version of the publicly financed competition scheme were introduced tomorrow it is necessary to express the results in current dollars. In order to provide an updated figure the results of Table 5-2 were converted to 1985 dollars using the Consumer Price Index and are presented in Table 5-9.[4]

TABLE 5-9

Baseline Results - Marginal Savings Attributable to the Components of the Publicly Financed Competition Scheme (1985 dollars)
(million $)

Year	Existence of Capitation Modality (50% market share)	Consumer[1] Enrollment Decision	Linkage of Ambulatory Costs	Consumer[2] Enrollment Decision	Total
1	5.25	--	--	--	5.25
2	5.25	0.43	-1.16	--	4.52
3	5.25	0.43	-1.16	-0.05	4.47
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
10	5.25	0.43	-1.16	-0.05	4.47
Present Value					
5%	42.57	3.06	-8.25	-0.31	37.07
10%	35.48	2.48	-6.68	-0.24	31.04
15%	30.30	2.05	-5.54	-0.20	26.62

Note:
(1) Consumer decision in period 2
(2) Consumer decision in period 3

The present value of potential cost savings over the ten year period is approximately 31 million dollars, using a 10% discount rate. The potential savings amount to approximately 11% of the cost to the government of servicing the community entirely on a fee-for-service basis. This amount is not insignificant.

The results of the simulations show what would happen in a community approximately the size of Sault Ste. Marie with two sectors characterized by practices that are typical of the capitation and fee-for-service practices when a variant of publicly financed competition is imposed and consumers behave in a way similar to consumers in "dual-choice" situations in the U.S..

The results of the baseline model must be interpreted cautiously, however, for a number of reasons. First, it is not clear that the costs to government for the reimbursement of ambulatory services, on either a fee-for-service or a capitation basis, are representative of the true resource cost of producing ambulatory care. Both fee-for-service fees and capitation rates may be an over-estimate of the true resource costs. For example, because the capitation rate is based upon the previous year's average fee-for-service billings for ambulatory care, it is difficult to ascertain whether all efficiency gains possible through the capitation sector are attained. In fact, it seems unlikely to be the case. By setting arbitrary rates (unrelated to efficiency) the government does not take full advantage of competitive forces.

As a consequence, it would be interesting to know more about the technical efficiency of the modality, about factor input mixes and costs of production. This information would provide an estimate of residual "profit" or surplus if any and, by implication, the scope for lowering capitation rates.

Second, the baseline model does not employ growth projections for the community nor does it provide an avenue for estimating the effects of a changing demographic profile. It is recognized, however, that medical and hospital services and the resulting health care costs are a function of the size, composition and growth of the relevant patient population. Although this thesis does not incorporate population growth or a changing demographic profile into the refined model, both could have an appreciable effect on health care costs within each modality and across the entire community and should be kept in mind when examining the impact of competition in public policy discussions.

Third, the baseline model is only the starting point for a model of a competitive environment. Cost savings are attributable to a one-time shift of market share from the more costly to the less costly sector in response to the introduction of an enrollment charge based on modality costs. The baseline model does not allow for subsequent competition for market share between the two modalities.

Consequently, the results of the baseline model are not conclusions but rather guidelines to modelling that will potentially yield significant conclusions. The following chapter refines and extends the baseline model to allow for (1) competition for market share, and (2) the setting of the capitation rate independent of fee-for-service ambulatory costs.

These two extensions are deemed to be the most important of several that could be considered; however, they by no means exhaust all possibilities. Additional refinements and opportunities for future research are noted throughout the remaining chapters.

Endnotes

1. Fee-for-service ambulatory costs are $102.68 per capita and fee-for-service hospital utilization is 1.21 patient days per person. The cost per patient day is $167.86.

2. The justification for choosing a discount rate of 10% is to impart a conservative bias in the reporting and discussion of the potential savings estimates. The rates of 5% and 15% provide a range for the sensitivity analyses.

3. It should be emphasized that status quo costs are lower in this case. Under the assumption of a 15% reduction in the initial fee-for-service hospital utilization rate, it would cost the government 22.05 million dollars per year to service the community entirely on a fee-for-service basis (instead of the previous 24.47 million dollars). Hence the impact of the smaller hospital utilization differential comes not only in a lower estimate of cost savings but also in a smaller denominator in the ratio of potential cost savings to status quo costs.

4. Given the illustrative nature of this exercise the consumer price index was used for simplicity.

CHAPTER 6

EXTENSIONS TO THE BASELINE MODEL STRUCTURE

6.0 Introduction

As outlined earlier, there are a number of ways in which publicly financed competition might control the growth in health care expenditures. The most obvious way is by replacing some existing fee-for-service practices with an alternative modality which embodies a less costly practice style. The baseline model developed thus far illustrates this aspect of the publicly financed competitive approach to controlling health care expenditures within a hypothetical community.

The baseline model structure, however, is not a complete representation of the forces envisioned in the proposal for competition. The structure of the baseline model does not allow competition for market share between the two modalities nor does it guarantee that either sector is producing on its efficiency frontier. This chapter is an attempt to remedy these shortcomings of the model.

The first extension of the baseline model is a restructuring to incorporate a fee-for-service modality reaction function. This refined structure allows competition on the basis of market share between the capitation and fee-for-service modalities. The fee-for-service reaction takes on one of two specifications, either a "positive" response or a "perverse" response in terms of utilization rates for hospital or ambulatory services.[1]

In the positive response, fee-for-service practitioners are assumed to change their service mix by reducing hospital utilization rates. A positive response by the fee-for-service modality is expected to increase the potential cost savings from competition.

A perverse response to lost market share is modelled as an increase in ambulatory utilization in the fee-for-service modality. This increase is assumed to result from an attempt by fee-for-service physicians to maintain their incomes in the face of a smaller patient population by doing more for their remaining patients. A perverse response may or may not generate increased potential cost savings from competition, depending on the assumed institutional arrangements for capitation reimbursement.

The second extension of the baseline model investigates the implications of an alternative institutional arrangement for capitation reimbursement. In order to investigate the significance of lower ambulatory costs in the capitation modality, the linkage of the capitation rate to average fee-for-service ambulatory cost is removed. It is expected that such a restructuring will lead to increased potential cost savings.

A further extension of the baseline model would allow for competition between the fee-for-service modality and many capitation plans or additional modalities such as community health centres. This refinement is beyond the scope of the simulation model, but a qualitative analysis of such a situation is possible. Because this refinement has significant policy implications, the analysis of this extension is left to the discussion in Chapter 8.

Interested readers no doubt will think of many other extensions to the baseline model which might have useful policy implications. It should be emphasized that several further extensions could be incorporated into the model once the basic analytical framework has been established. The extensions chosen here are deemed to be the most significant for a first, and realistic, assessment of public policy implications.

The organization of this chapter is as follows: the chapter is divided into two main sections, each section relating to one of the extensions outlined above. Each section contains (1) a description of the extended model structure, (2) the model equations, and (3) a description and list of the initialized parameter values that are in effect at the beginning of the extended simulation exercise. The results and the sensitivity analysis of the results appear in the next chapter.

6.1 Fee-For-Service Reaction Functions

6.1.1 Positive Fee-For-Service Modality Hospital Utilization Response

The first modification of the baseline structure is an illustration of a positive (i.e. expenditure reducing) fee-for-service response to lost market share. As in the baseline model, consumers choose to obtain their health care from one of two sectors. Their decision is a utility-maximizing one based on the enrollment charge (the difference in average per capita costs between the two modalities). Consumers choosing the more expensive fee-for-service sector pay the enrollment charge; consumers not wishing to remain with the fee-for-service sector switch to the capitation modality. Consumers who switch to the less expensive modality have, on average, lower per capita costs than their counterparts in the more expensive modality. The resulting lower per capita cost (which includes both hospital and ambulatory care) incurred by these individuals then translates into potential savings in public health care expenditure.

In subsequent years the institutional link between fee-for-service ambulatory expenditures and capitation payments plays a dominant role. This link, as outlined in the baseline model, causes average per capita costs in the capitation sector to increase.[2] This in turn generates a difference in relative average per capita costs of the two modalities.

The first and second years of the extended model are identical to the same periods in the baseline model. As the baseline results illustrate (Table 5-1), the change in the enrollment charge due to the linkage of the two sectors' ambulatory costs is not large enough in magnitude to cause all of the consumers who switched in the first instance to switch back. Consequently, the fee-for-service modality has still lost a portion of its initial market share. As a result, in the third year the model structure changes.

In this extension of the model it is assumed that the fee-for-service modality would like to regain as much of its lost market share as possible. Because capitation payments for ambulatory care are linked to fee-for-service ambulatory costs as the model simulates through time, the fee-for-service modality will soon recognize that the difference between its average per capita costs and those of the capitation modality is the direct result of the difference in hospital utilization rates between the two modalities. Lost market share is a direct consequence of this difference. It is assumed that the fee-for-service modality recognizes the possibility of gaining back lost market share if it becomes more efficient. Improved efficiency in this instance occurs via the avenue of a changed service mix, primarily a reduction in hospital utilization rates.

Fee-for-service practitioners, as a group, will be astute enough to recognize that the capitation modality is servicing a similar population with a lower hospital utilization rate and is able to do so without adversely affecting the health status of that population. It is not implausible to envision the fee-for-service modality, through a collective plan or by individual action, acting such that by the end of some finite time horizon it will have reduced its hospital utilization rate to that found in the capitation modality.

Various time horizons and adjustment paths could be investigated under this scenario; the extended model assumes for simplicity that the adjustment occurs over a time horizon of either three or five years and that the rate of adjustment in each year will be of equal magnitude such that the gap is closed at the end of the time horizon. The structure assumed in this extended model does not preclude other possible time horizons or adjustment paths, rather it serves to highlight the effect on potential cost savings of one simple, but plausible and important, response by the fee-for-service modality.

It is important to note that a positive fee-for-service response on hospital utilization does not impose a corresponding adjustment in fee-for-service ambulatory utilization (or ambulatory expenditures). Consequently, the model does not specifically account for various tradeoffs that may exist between hospital and ambulatory care. Nor does existing literature offer much help in modelling these relationships. As a result, both the quantitative and qualitative analysis of this tradeoff is currently beyond the scope of this thesis.

The structure of the model is such that it allows the fee-for-service modality to steadily lower its hospital utilization rate until it equals that of the capitation sector. The extension does not allow for any counter response by the capitation modality. If the capitation modality is already on the efficiency frontier with regard to its utilization of hospital services then no counter response would be expected. However, if the capitation modality is not on the efficiency frontier, that is, if hospital utilization rates could be reduced further without reducing effectiveness or denying needed care, it might counter respond by further lowering its hospital utilization rate (and perhaps its ambulatory utilization).[3]

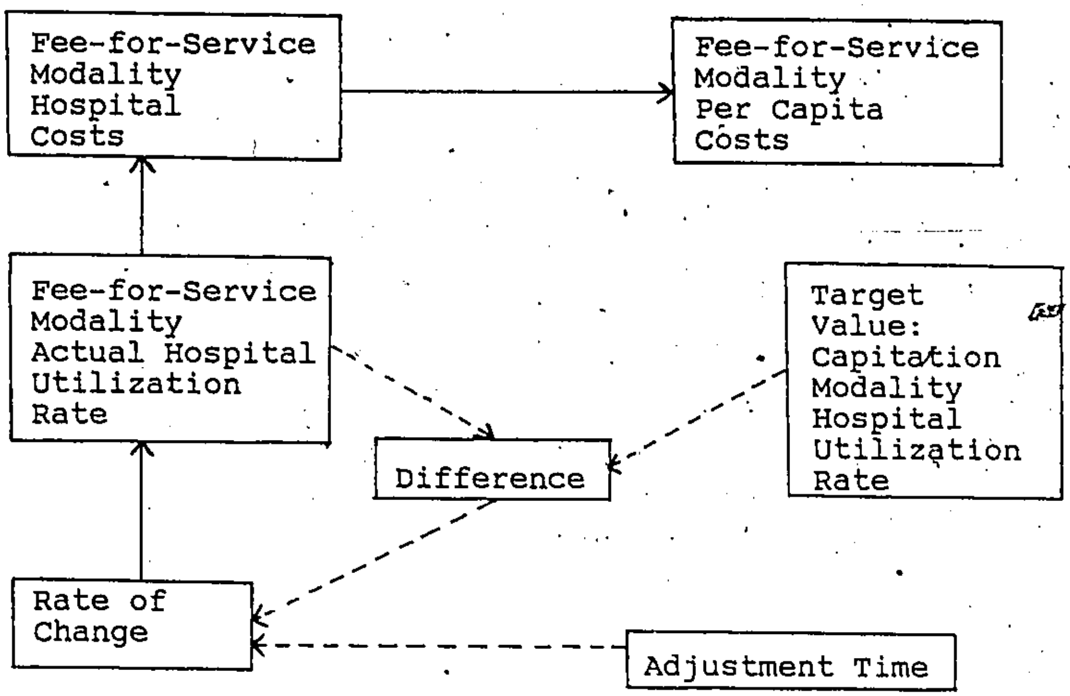
Available data do not allow a test of whether the capitation sector is on the efficiency frontier. As the model stands, it is assumed that the capitation modality cannot lower hospital utilization rates without compromising effectiveness. As a consequence, the estimates of cost savings from this scenario are perhaps conservative. For ambulatory care, the assumption that the capitation modality is on its efficiency frontier is much less plausible. This assumption is examined in a later extension of the baseline model.

6.1.2 Model Structure for the Positive Fee-For-Service Modality Hospital Utilization Response

The flow diagram below (Figure 6-1) illustrates the structure of the extension made to the baseline model. The new DYNAMO equations follow. A listing of the equations for the entire model and variable definitions are found in Appendix E.

FIGURE 6-1

Positive Fee-For-Service Modality Hospital Utilization Response



The flow diagram indicates that a goal or target value exists. In this case the desired target is the capitation modality's hospital utilization rate of 0.85 patient days per person. The difference between the target value and the actual situation, a hospital utilization rate of 1.21 patient days per person initially, is the driving force underlying the corrective action in the extended model. The corrective action, that is, the adjustment of the fee-for-service hospital utilization rate to the value found in the capitation modality, does not occur all at once; instead, it occurs over some adjustment time horizon.

The new DYNAMO equations to structure the fee-for-service modality's hospital utilization reaction are as follows:

(1) FFSHCT.K = FFSPOP.K*AFSHUT.K*COSTPD.K

i.e. fee-for-service hospital cost at time K is the product of the fee-for-service patient population at time K, the fee-for-service hospital utilization rate at time K and the cost per patient day.

(2) FFSHUT = 1.21

i.e. the initial fee-for-service hospital utilization rate is equal to 1.21 patient days per person.

(3) AFSHUT.K = AFSHUT.J + SWHUT*((DT/5))*(AAGAP.J)

i.e. the fee-for-service hospital utilization rate at time K is the fee-for-service hospital utilization rate at time K-1 plus an adjustment (or portion) of the gap between the hospital utilization rates of the two modalities.

(4) SWHUT = 1.0

i.e. an adjustment switch where {1.0 means the response is in effect; 0.0 means no response in effect}

(5) GAP.K = CAPHUT-FFSHUT

i.e. the gap is the difference between the capitation modality's hospital utilization rate and the initial fee-for-service hospital utilization rate.

(6) AGAP.K = CLIP(0,GAP.K,TIME.K,7)

(7) AAGAP.K = STEP(AGAP.K,2)

i.e. the time horizon for the adjustment period starts at time K=2 and continues to monotonically decrease for 5 periods such that the fee-for-service modality's hospital utilization rate equals the capitation rate at the end of the time horizon.

(8) FFSTOT.K = FFSHCT.K + FFSAMC.K

i.e. fee-for-service total health care cost at time K is the summation of fee-for-service hospital and ambulatory costs at time K.

(9) FFSPRM.K = FFSTOT.K/FFSPOP.K

i.e. fee-for-service average per capita cost at time K is equal to the fee-for-service total cost at time K divided by the fee-for-service modality's population at time K.

The remainder of the causal linkages specified in the baseline model are preserved. In the restructured model, lower hospital utilization rates for the fee-for-service sector translate into lower enrollment charges for fee-for-service enrollees. In the limit this improved performance allows the sector to recapture all or most of its lost market share.

6.1.3 Initial Values for the Positive Fee-For-Service Modality Hospital Utilization Response

To begin the simulation exercise a set of initial parameter values must be chosen. Table 6-1 provides a list of these values.

TABLE 6-1

Initial Values for the Extended Model With a Positive Fee-For-Service Modality Hospital Utilization Response

Variable	Initial Value	
CAPHUT	0.85	patient days/person
FFSHUT	1.21	patient days/person
CAMCPM	$87.23	initial period
	$102.68	subsequent periods (1978-79 dollars)
FAMCPM	$102.68	(1978-79 dollars)
TPOP	80000	
FFSIOP	40000	(50/50 initial market split)
COSTPD	$167.86	(1978-79 dollars)
PTELAS	-0.25	
GAP	0.36	patient days/person
(DT/5)	-1/5	5 year adjustment period to close the gap (equal amount each year)
SWHUT	1	(FFS hospital utilization response in effect)

The general strategy is to generate a set of standard results employing these initial values. The results of this extended formulation of publicly financed competition are then compared to both (a) the situation in which no capitation sector exists, and (b) the baseline model. In addition, the sensitivity of the results of the extended model to various assumptions about initial parameter values is tested.

The expectation regarding potential cost savings from this variant of publicly financed competition is that a positive hospital utilization response by the fee-for-service modality will lead to increased savings relative to both the situation in which there is no publicly financed competition scheme and the baseline case.

6.1.4 Perverse Fee-For-Service Modality Ambulatory Utilization Response

An expenditure reducing response is only one possible response to lost market share. It is possible that the fee-for-service modality may react perversely. A "perverse" reaction means that the fee-for-service modality tries to maintain its market share and/or income not by improving the efficiency with which medical care is delivered but by increasing the number of ambulatory services that it provides to its remaining patient population, hence increasing ambulatory costs. Because fee-for-service ambulatory costs affect capitation payments, an increase in fee-for-service ambulatory costs causes the capitation modality's costs to rise. This in turn causes the cost to government to increase each year.

The results and sensitivity analysis of this scenario (presented in the next chapter), show how a perverse reaction could lead to significantly increased costs of providing medical services to a given community if capitation reimbursement is structured as assumed thus far in the model.

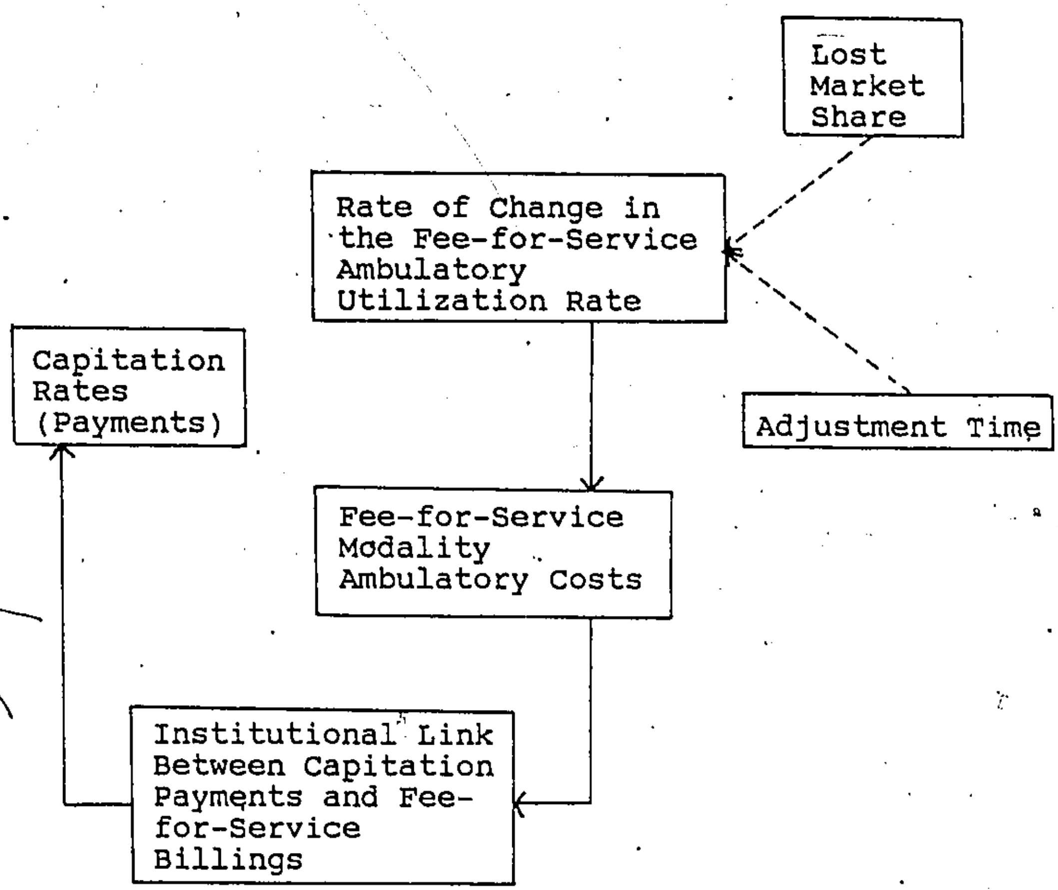
6.1.5 Model Structure for the Perverse Fee-For-Service Modality Ambulatory Utilization Response

The following flow diagram (Figure 6-2) illustrates the causal relation between ambulatory utilization and costs in the fee-for-service modality and capitation payments. It is assumed that the fee-for-service modality responds to lost market share by increasing the number of services that it provides to the modality's remaining patient population. This increased utilization is then reflected in increased ambulatory expenditure in the fee-for-service modality.

Recall that the data on fee-for-service ambulatory costs are expressed in terms of dollar expenditures per capita. Expenditures are a function of both price (fee) and quantity of services; however, for simplicity it is assumed that the reaction is channelled entirely through the quantity of services.[4] Therefore, a 10% increase (say) in fee-for-service ambulatory utilization results in a 10% increase that modality's ambulatory expenditures year.

FIGURE 6-2

Perverse Fee-For-Service Modality Ambulatory Utilization Response



The specific assumption in the extended model is that the fee-for-service modality continues to increase its ambulatory utilization rate and hence its costs by 10% each year for the duration of the simulation time horizon or until such time as it makes up the revenue lost in the first two years of the simulation analysis. Because capitation payments are linked to fee-for-service ambulatory costs, it follows that capitation reimbursement will increase in each subsequent year.[5]

The 10% increase is an arbitrary choice in that other reaction rates could have been chosen. The importance of this scenario lies not so much in the time path (or even the magnitude) of the results but rather in the fact that such a perverse response is a possibility and would actually increase community expenditures overall. This illustrates vividly one weakness in the proposed institutional arrangements for the variant of publicly financed competition modelled here.

Under this scenario, the changes in the DYNAMO equations are as follows:

(1) FFSAMC.K = CLIP(NFSAMC.K,FFSPOP.K*102.68,TIME.K,3)

i.e. the fee-for-service modality total ambulatory cost is equal to the fee-for-service modality adjusted ambulatory cost, and for years 1 and 2 is equal to the fee-for-service modality's population times $102.68.

(2) NFSAMC.K = NFSAMC.J+(DT)*(NFSAMC.J*0.10)
NFSAMC = FFSIOP*102.68

i.e. the adjusted fee-for-service modality ambulatory cost at time K equals the adjusted fee-for-service ambulatory cost at time K-1 plus an increase of 10% of the adjusted fee-for-service ambulatory cost at time K-1. The initial fee-for-service ambulatory cost (adjusted) is equal to the initial population in the fee-for-service modality times the per capita ambulatory cost of that modality.

A complete listing of the DYNAMO equations employed in this scenario is found in Appendix E.

6.1.6 Initial Values for the Perverse Fee-For-Service Modality Ambulatory Utilization Response

Table 6-2 provides the initial parameter values for use in this extension of the baseline model. In Chapter 7 a standard set of results, including sensitivity analyses, is generated for this scenario and compared with other previous results.

6.2 Alternative Capitation Reimbursement Arrangements

The preceding section illustrates one weakness of the institutional arrangements linking capitation payments to fee-for-service expenditures for ambulatory services. This refinement of the baseline model investigates the implications of an alternative arrangement for capitation reimbursement. It was assumed initially that the capitation rate was linked to per capita ambulatory costs in the fee-for-service modality, an assumption based in part on the historical arrangements in Ontario's small capitation sector. This does not, however, allow the capitation modality to turn to its competitive advantage any lowering of production costs that it

TABLE 6-2

Initial Values for the Extended Model With a Perverse Fee-For-Service Modality Ambulatory Utilization Response

Variable	Initial Value	
CAPHUT	0.85	patient days/person
FFSHUT	1.21	patient day/s person
CAMCPM	$87.23	initial period
	$102.68	subsequent periods (1978-79 dollars)
FAMCPM	$102.68	(1978-79 dollars)
TPOP	80000	
FFSIOP	40000	(50/50 initial market split)
COSTPD	$167.86	(1978-79 dollars)
PTELAS	-0.25	
NFSAMC	10 %	(percentage increase in fee-for-service ambulatory cost per year)

achieves, for example through group size or the employment of less expensive health personnel such as nurse practitioners. To investigate the potential significance of lower ambulatory costs in the capitation modality, the linkage of the capitation rate to average fee-for-service ambulatory costs is removed. The new assumption is that the capitation modality bargains independently with the Ministry of Health over reimbursement, with the outcome that capitation rates more closely reflect production costs within that modality.[6]

From the limited Canadian experience, it is not possible to determine with accuracy the actual costs of production in the capitation modality or the capitation rate that such costs might imply. Information from the Wolfson study, however, provides expenditure data on a standard benefit package provided by both modalities. The data show that it cost the Ministry of Health $87.23 per capita to provide a basic set of ambulatory primary care services to enrollees in the capitation modality, while it cost $102.68 per capita to provide the same set of benefits to the patient population in the fee-for-service modality.

Consequently, in this simulation, unlike the baseline analysis, the differential in ambulatory costs is allowed to persist through subsequent periods of the model. This persistent cost differential should lead to increased potential cost savings, and as a result could be interpreted cautiously as what could occur if capitation rates were set independently of the level of fee-for-service billings.[7]

6.2.1 Model Structure for the Alternative Capitation Reimbursement Arrangement

The model structure for this extension makes one modification to the baseline model outlined in the flow diagram Figure 3-1. Now the link between ambulatory fee-for-service modality costs and capitation payments is removed from that diagram and replaced by a bargaining process between the Ministry of Health and the capitation sector. Consumers still take account of the differences in hospital and ambulatory costs expressed through the enrollment charge when choosing between the two modalities. The relatively better performance of the capitation modality should enhance its attractiveness to consumers, and over time should allow the capitation modality to capture a larger share of the market relative to the baseline situation. This, in turn, would lead to greater cost savings for both the modality and the government.[8]

The following are the DYNAMO equations representing ambulatory costs for this scenario. The entire listing of the DYNAMO equations used in this scenario is found in Appendix E.

(1) CAPAMC.K = CAPPOP.K * (87.23)

i.e. capitation ambulatory cost at time K is the product of the capitation modality's population at time K and the average per capita cost of providing ambulatory services to that population.

(2) CAPTOT.K = CAPHCT.K + CAPAMC.K

i.e. total medical care cost in the capitation modality at time K is the sum of capitation hospital and ambulatory costs.

(3) CAPPRM.K = CAPTOT.K/CAPPOP.K

i.e. capitation average per capita cost at time K equals capitation total cost divided by the capitation modality population at time K.

(4) FFSAMC.K = FFSPOP.K * (102.68)

i.e. fee-for-service ambulatory cost at time K is the product of the fee-for-service population at time K and the average per capita cost of providing ambulatory services to that population.

(5) FFSTOT.K = FFSHCT.K + FFSAMC.K

i.e. total medical care cost in the fee-for-service modality at time K is the sum of fee-for-service modality hospital and ambulatory costs.

(6) FFSPRM.K = FFSTOT.K/FFSPOP.K

i.e. fee-for-service average per capita cost at time K equals fee-for-service total cost divided by the fee-for-service modality's population at time K.

6.2.2 Initial Values for the Alternative Capitation Reimbursement Arrangement

Table 6-3 is a list of the initial parameter values used in this scenario. The general strategy once again is to generate a standard set of results employing these parameter values. A complete sensitivity analysis of the parameter values is undertaken. Results of this scenario are compared to the results of the baseline model and those of other extensions and appear in Chapter 7.

TABLE 6-3

Initial Values for the Extended Model With An Alternative Capitation Reimbursement Arrangement

Variable	Initial Value	
CAPHUT	0.85	patient days/person
FFSHUT	1.21	patient days/person
CAMCPM	$87.23	(1978-79 dollars)
FAMCPM	$102.68	(1978-79 dollars)
TPOP	80000	
FFSIOP	40000	(50/50 initial market split)
COSTPD	$167.86	(1978-79 dollars)
PTELAS	-0.25	

This restructuring of the baseline model to allow additional scope for competition based on ambulatory care production costs could be interpreted as a proxy scenario for the effects of benefit competition. Much of the literature in the U.S. claims that capitation-type groups are able to attract consumers because they can offer a more comprehensive benefit package than their fee-for-service counterparts. The data from the Sault experience are consistent with this claim. Data from the Wolfson study show that the capitation sector can provide a standard benefit package for $87.23, whereas the fee-for-service sector provides the same benefit package at a cost of $102.68. Hence, the capitation modality can offer the same benefit package at a lower cost than the fee-for-service sector. The difference of $15.45 is the initial ambulatory cost differential between the two modalities.

Another interpretation, however, could be placed on the differential of $15.45. This difference can be interpreted as a proxy for the value of enhanced benefits provided by the capitation modality.[9] The structure of the model analyzing benefit competition is identical to that of the alternative capitation reimbursement arrangement; only the interpretation differs. Benefit competition would enhance the attractiveness of the capitation modality, enabling it to capture a greater share of the market, which would increase the magnitude of potential cost savings.

Additional qualifications are necessary, however, to the interpretation of the results of this model structure. The data on costs and utilization rates employed in the analysis are taken from the Wolfson study. Because the data in that study did not result from explicit benefit competition, the results of this model structure may reveal little about how benefit competition actually works. In addition, the enrollment elasticities used in the model are based primarily on price differentials which reflect price competition and not benefit competition.[10] As a result, the enrollment elasticity values may not be applicable to the case illustrating benefit competition.

There may be something intrinsically different about benefit competition that makes price differences bad proxies for benefit difference. Therefore, the interpretation of the model structure and results under benefit competition should be interpreted with extreme caution.

6.3 Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response

To allow for a competitive response by the fee-for-service sector to lost market share, a simulation run consisting of both the alternative capitation reimbursement arrangement and the positive hospital utilization response by the fee-for-service sector is undertaken. The structure of the model consists of the combined structure of these two responses. A detailed listing of the DYNAMO equations can be found in Appendix E. This extension captures the benefits of competition based on both ambulatory and hospital utilization and should maximize, within the confines of this model, the magnitude of the savings generated by the competitive proposal. The results of this simulation appear in Chapter 7; the policy implications are discussed in Chapter 8.

Although a simulation run representing both the alternative capitation reimbursement arrangement and the perverse response by the fee-for-service sector was not done, it is possible to analyze qualitatively the impact of this combined scenario. The results of this scenario would place it inside the ranges already estimated and would not yield new information. It would also clearly be fatal for the fee-for-service sector to act in a perverse manner in the absence of linkage of the capitation rate to fee-for-service ambulatory costs because such action would steadily worsen its market share. Note that this is quite different than what is expected to occur from modelling just the perverse response. It serves to highlight the significance of the capitation reimbursement arrangement.

Endnotes

1. The possibility of no reaction by the fee-for-service modality in terms of real servicing patterns is captured in the baseline model. One might initially think that if the fee-for-service modality did not respond to its lost market share it would continue to lose consumers because of its relative inefficiency. However, because of the linkage of capitation payments to fee-for-service ambulatory costs and the consumer choice decision, the baseline results give a measure of how much the capitation sector can hope to gain under the specified model structure and no further fee-for-service reactions.

2. Recall that "expenditures" and "costs" are used interchangeably. Capitation payments increase because the capitation rate is linked to average fee-for-service per capita expenditure lagged one year. This expenditure is also called cost because it is cost to government although it is not production cost.

3. Improvements in the form of reduced ambulatory costs would be mitigated by the linkage between fee-for-service ambulatory billings and capitation payments.

4. Allowing only quantity rather than price changes assumes that an attempt by the fee-for-service modality to recapture incomes by negotiating higher fees has been ruled out. If the fee-for-service modality didn't change utilization but instead raised price by 10% the effect would be basically the same, except that "profits" in the fee-for-service modality would be increased, given inelastic demand.

5. Although a 10% increase in ambulatory costs in the fee-for-service modality also translates into a 10% increase in capitation payments, the relative price differential (or enrollment charge) between the two sectors changes in each time period. The change in relative prices is due to the fact that average costs are changing each period because of the different patient populations.

6. The inference is that the capitation modality in the baseline model does not operate on its efficiency frontier in the production of ambulatory care or that, if it does, the benefits are not captured by the government but are retained as surplus by the capitation modality. As will be discussed in the policy chapter, this factor suggests a role for a third modality such as a community health centre, owned and operated by the Ministry of Health. By identifying and operating on the efficiency frontier, such an alternative could provide the Ministry with information on true production costs which would be extremely useful in negotiations with other modalities. Stoddart and Seldon (1984) discuss the significance of a community health centre modality in more detail.

7. The bargaining process in practice would not be straight forward. It is impossible to know just how the bargaining process with the Ministry of Health would turn out. Specifically, there is no guarantee that the Ministry of Health could negotiate capitation rates down to production costs (with normal returns to all factors of production) even if such costs were known.

8. The modelling of the assumption that the initial differences in ambulatory costs persist throughout the simulation is conservative. If capitation rates are determined independently of fee-for-service expenditures, it may initially be the case that the fee-for-service modality shows no reaction in terms of ambulatory utilization. However, as the cost differential widens it may be the case ultimately that the fee-for-service modality would react by reducing ambulatory utilization (perhaps in conjunction with reductions in hospital utilization). This would enhance potential cost savings. At the same time, however, it would lower fee-for-service physicians' incomes. The effect of publicly financed competition on fee-for-service physicians' incomes, or all physicians' incomes for that matter, is an important issue but one beyond the scope of this thesis.

9. A further note on the data employed from the Wolfson study is warranted. Wolfson estimates the cost of OHIP insured ambulatory services to be $102.68 in the fee-for-service modality, whereas the cost in the capitation modality is $87.23 for the same set of services. The study also provides estimates of additional costs for capitation enrollees which are not included as part of the capitation payment. For example, such services as physiotherapy and optometry are reimbursed on a fee-for-service basis even though these services are provided by the capitation plan. Estimates of these additional costs combined with total capitation payments amount to approximately 3.8 million dollars. If this dollar figure is divided by the number of enrollees in the capitation roster, average per capita costs in the capitation plan amount to $105.21. This is approximately the same cost as providing the standard benefit package in the fee-for-service sector. It is also argued by Wolfson that the services received by capitation enrollees, which may include such items as day surgery, counselling, 24-hour availability, etc., are different and constitute an arguably superior package of services. From these data, it seems clear that enhanced benefit packages can be offered by the capitation plan at approximately the same cost as the standard benefit package in the fee-for-service sector.

10. The structure assumed here as a proxy for benefit competition is very simplistic. Benefit competition itself, however, is very difficult to model because of the implications for the modelling of consumer preferences. It would be necessary to define the utility-maximizing choices of individuals not only on the basis of price but also on the characteristics and output of alternative modalities. The reader is referred to footnote 15 of Chapter 3.

CHAPTER 7

RESULTS OF THE EXTENDED MODELS

7.0 Introduction

Because the baseline model represents only part of what is envisaged under publicly financed competition, its results must be interpreted cautiously. The preceding chapter outlined various structural extensions of the baseline model in an attempt to model more fully a publicly-financed competitive environment. This chapter reports the results of the extended models.

The order of presentation of the results corresponds to that of the extensions in the preceding chapter. Also included are the results of a sensitivity analysis performed on each variant of the model structure. A separate section presents an overall comparison of the results of the baseline model with those of the extensions. The last section of this chapter is an assessment of the extended models. It is a distillation of what has been learned from the simulation exercise.

7.1 Fee-For-Service Reaction Functions

7.1.1 Results of a Positive Fee-For-Service Modality Hospital Utilization Response

The results of the scenario in which the fee-for-service modality responds to lost market share by reducing hospital utilization are presented in Table 7-1. The parameter values used in this scenario are found in Table 6-1.

In the absence of a publicly financed competition scheme, it would cost the government 24.47 million dollars to service a community of 80000 people entirely on a fee-for-service basis in one particular year. Over a 10 year time horizon (where constant dollars are 1978-79 dollars) at a 10% discount rate, the present value of this cost amounts to 165.40 million dollars. Under the positive response scenario, given the initial parameter values and a 5-year adjustment path for the fee-for-service modality to reach the capitation sector's hospital utilization rate, it would cost the government 139.92 million dollars (in present value, 10% discount rate) to service the same community during the same time period.[1] This amounts to 25.45 million dollars in potential savings to the government over that time period (approximately a 15% savings). The savings in this scenario are greater than in the baseline model by 7.47 million dollars. The additional

TABLE 7-1

Positive Fee-For-Service Modality Hospital Utilization Response
(5 Year Adjustment)

Year	Capitation Modality Population	Fee-for-Service Modality Population	Capitation Modality Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
0	0	80000	0.0	24.47	--
1	40000	40000	50.0	21.43	3.04
2	43300	36700	54.1	21.85	2.62
3	42723	37277	53.4	21.43	3.03
4	42354	37646	53.0	20.99	3.47
5	41967	38033	52.5	20.55	3.92
6	41559	38441	52.0	20.09	4.37
7	41128	38872	51.4	19.63	4.83
8	40672	39328	50.8	19.63	4.83
9	40672	39328	50.8	19.63	4.83
10	40672	39328	50.8	19.63	4.83
Present Value					
5%				166.99	31.35
10%				139.92	25.43
15%				120.45	20.74

savings from this scenario are attributable to the reduction in the fee-for-service hospital utilization rate.

In the positive fee-for-service hospital utilization response scenario, the enrollment pattern (or movement between sectors) is different than that found in the baseline model. In the baseline model the capitation modality, because of its cost advantage in hospital care, is able to capture an additional 3.4% of the market over the ten year time horizon. As displayed in Table 7-1, the capitation sector captures 3.4% of the market in the early part of the period, but as the simulation progresses, the sector loses most of this additional market share back to the fee-for-service sector. The net result is that the capitation modality captures only an additional 0.8% of the market.

Because the fee-for-service modality responds to lost market share by reducing its hospital utilization rate, it is able to attract back some consumers. However, not all individuals who leave the fee-for-service modality will return. A reasonable explanation can be hypothesized for this finding. It may be that once some individuals have switched to the capitation modality, they find the practice style with the capitation modality desirable, such that a change in the relative price of the fee-for-service modality will not cause them to switch back.[2]

The savings found under this scenario can be disaggregated to illustrate the significance of the various individual aspects of the publicly financed competition scheme. The sources of savings are presented in Table 7-2.

In the first year of the scheme, the only source of potential cost savings is the existence of a capitation modality servicing 50% of the market with a lower

TABLE 7-2

Positive Fee-For-Service Modality Hospital Utilization Response - Marginal Savings Attributable to the Individual Components of the Publicly Financed Competition Scheme
(million $)

Year	Existence of Capitation Modality (50% Market Share)	Consumer[1] Enrollment Decision	Linkage of Ambulatory Costs	Consumer[2] Enrollment Decision	Fee-for-[3] Service Hospital Utilization Response	Total
1	3.04	-	-	-	-	3.04
2	3.04	0.25	-0.67	-	-	2.62
3	3.04	0.25	-0.67	-0.03	.45	3.04
4	3.04	0.25	-0.67	-0.03	.89	3.48
5	3.04	0.25	-0.67	-0.03	1.33	3.92
6	3.04	0.25	-0.67	-0.03	1.78	4.37
7	3.04	0.25	-0.67	-0.03	2.24	4.83
8	3.04	0.25	-0.67	-0.03	2.24	4.83
9	3.04	0.25	-0.67	-0.03	2.24	4.83
10	3.04	0.25	-0.67	-0.03	2.24	4.83
Present Value						
5%	24.65	1.78	-4.76	-0.18	9.89	31.37
10%	20.55	1.44	-3.86	-0.15	7.46	25.45
15%	17.55	1.19	-3.20	-0.12	5.75	21.17

NOTES:

(1) Consumer decision in year 2 (based on initial enrollment charge).

(2) Consumer decision in year 3 (enrollment charge reduced due to linkage of capitation payments to fee-for-service ambulatory costs).

(3) Savings are a combination of consumers switching back to the fee-for-service modality and the fee-for-service positive hospital utilization response.

hospitalization rate and lower ambulatory care costs. Savings are calculated to be 3.04 million dollars.

In the second year, because the capitation modality can service its population at a lower cost, an enrollment charge of $75.88 is imposed on each consumer remaining with the fee-for-service sector. In order to avoid such a charge some consumers switch from the fee-for-service modality to the capitation modality. As a result, an additional 0.25 million dollars in savings can be achieved. Also, in year 2 the institutional link between fee-for-service ambulatory costs and capitation payments is also in effect (as in the baseline model). This linkage causes a reduction in potential cost savings of 0.61 million dollars in year 2.

In year 3 of the model there are two sources of potential cost savings. First, the fee-for-service sector now looks relatively better in year 3 than it did in year 2. This occurs because the capitation ambulatory cost advantage has disappeared. Because capitation rates are based on fee-for-service ambulatory costs lagged one period, capitation rates and thus capitation ambulatory costs have gone up. As a result the relative price of the fee-for-service modality has gone down. This causes some consumers to switch back to the fee-for-service modality, resulting in a reduction in cost savings of 0.03 million dollars.

During the same period, however, the fee-for-service modality tries to recapture its lost market share by reducing its hospital utilization rate toward that found in the capitation modality. This generates additional cost savings to government of 0.45 million dollars in year 3.

In subsequent years, the fee-for-service sector's performance continues to look relatively better than its previous year's performances. As a result, the enrollment charge facing consumers choosing to obtain care from the fee-for-service sector is reduced. This causes other consumers who had previously switched to the capitation modality to return to the fee-for-service sector. The enrollment decisions, combined with the continued reduction in the fee-for-service hospital utilization rate (until the hospital rate differential between the two sectors is eliminated) generates additional savings in all subsequent years.

Table 7-2 also provides the present value dollar amount of each source of savings over the 10 year time horizon for various discount rates. Employing a 10% discount rate, the existence of the capitation modality alone, servicing half the population would generate savings totalling 20.55 million dollars. The existence of the consumer choice decision in the absence of the fee-for-service hospital response generates an additional 1.29 million dollars in savings. The linkage of capitation payments to fee-for-service ambulatory costs reduces savings by 3.86 million dollars, but the positive fee-for-service hospital utilization response (combined with the corresponding consumer enrollment decisions) generates an additional 7.46 million dollars in savings. The net effect is a potential cost savings to government of 25.45 million dollars for the 10 years.

The revenue collected from the enrollment charge in this scenario also differs from the baseline model. Because the fee-for-service modality reduces its hospital utilization rate, it performs relatively better in each subsequent year (when compared to the previous year). The net result is a lower enrollment charge for those individuals remaining with the fee-for-service sector. Under the positive hospital utilization response scenario, a consumer remaining with the fee-for-service modality will pay approximately $222.00 in enrollment charges over the 10 years. Enrollment revenues collected from those individuals total 8.5 million dollars. This represents an additional source of revenue generated from the competition proposal which could be used by government as a means of financing care.

7.1.2 Sensitivity to Initial Market Share

The size of the effect warrants a sensitivity analysis on the initial parameter values. Note that the sensitivity analyses for the positive fee-for-service modality hospital utilization response varies parameter values one at a time from their initial values found in Table 6-1.

Results illustrating the significance of variation in the initial market share are summarized in Table 7-3. Potential savings range from 17.79 million dollars, when the initial capitation market share is 5% to 25.43 million dollars when the initial market share is 50%. The potential cost savings range from approximately 11% of the status quo health care costs to 16% of these costs. In comparison with the baseline model (Table 5-1), the magnitude of potential savings is significantly higher but the variability in savings is smaller. In the extended model an initial market share of 5% for the capitation modality generates savings of equivalent magnitude to the initial 50% market share in the baseline model. The positive fee-for-service response in terms of hospital

TABLE 7-3

Positive Fee-For-Service Modality Hospital Utilization Response - Sensitivity Analysis on Initial Market Share

Capitation Modality Initial Market Share (%)	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value Cost Savings to Government (million $)
50	50.8	5%	166.99	31.35
		10%	139.92	25.43
		15%	120.45	20.74
40	41.0	5%	168.81	29.53
		10%	141.61	23.23
		15%	121.63	19.56
20	21.3	5%	172.44	25.90
		10%	145.01	20.34
		15%	124.82	16.37
5	6.6	5%	175.17	23.17
		10%	147.55	17.79
		15%	127.22	13.97

utilization rate obviously enhances the attractiveness of the competitive scenario.

7.1.3 Sensitivity to the Enrollment Elasticity

Results of the variation in the enrollment elasticity are presented in Table 7-4. Potential savings range from approximately 25 million dollars when the enrollment elasticity is -0.004 (lower bound) to approximately 26 million dollars when the enrollment elasticity is -0.64 (upper bound). The potential

TABLE 7-4

Positive Fee-For-Service Modality Hospital Utilization Response - Sensitivity Analysis on Enrollment Elasticity

Enrollment Elasticity	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value Cost Savings to Government (million $)
-0.004	50.0	5%	167.42	30.92
		10%	140.31	25.03
		15%	120.39	20.80
-0.02	50.0	5%	167.40	30.95
		10%	140.29	25.06
		15%	120.97	20.22
-0.10	50.3	5%	167.26	31.08
		10%	140.16	25.19
		15%	120.26	20.94
-0.25	50.8	5%	166.99	31.35
		10%	139.92	25.43
		15%	120.45	20.74
-0.64	53.0	5%	166.28	32.06
		10%	139.27	26.08
		15%	119.44	21.76

cost savings range from approximately 15% of the status quo cost of community health care to about 16% of this cost.

7.1.4 Sensitivity to the Hospital Utilization Rate Differential

The results presented in Table 7-1 to 7-4 are based on the assumption that the initial difference in hospital utilization rates between the two modalities is approximately 30%. Table 7-5 presents the results of the positive fee-for-service response scenario under the new assumption that the original fee-for-service hospital utilization rate is 15% lower than initially assumed and therefore the initial hospital utilization rate differential is 17%. The capitation modality achieves an equilibrium level of 50.3% of the market (a gain of 267 consumers from the first period). In this case, the competitive strategy generates 12.93 million dollars of potential cost savings for the government. Expressed as a percentage of the status quo costs, these savings are approximately 9% when the hospital utilization rate differential is 17% instead of 16% when the differential is 30%.

TABLE 7-5

Positive Fee-For-Service Modality Hospital Utilization Response - Reduction in the Initial Hospital Utilization Rate Differential

Year	Capitation Modality Population	Fee-for-Service Modality Population	Capitation Modality Market Share (%)	Community Health Care Costs (million$)	Cost Savings to Government (million$)
0	0	80000	0.0	22.05	--
1	40000	40000	50.0	20.22	1.83
2	41986	38014	52.5	20.78	1.27
3	41388	38612	51.7	20.56	1.48
4	41176	38824	51.5	20.33	1.71
5	40958	39042	51.2	20.10	1.95
6	40735	39265	50.9	19.87	2.18
7	40504	39496	50.6	19.63	2.42
8	40267	39733	50.3	19.63	2.42
9	40267	39733	50.3	19.63	2.42
10	40267	39733	50.3	19.63	2.42
Present Value					
5%				162.86	15.89
10%				136.07	12.93
15%				116.99	10.25

7.1.5 Summary Results of the Sensitivity Analyses

Overall, potential cost savings appear quite sensitive to the values for the initial market share of each sector and the initial hospital utilization rate differential. Estimates of savings are considerably less sensitive to the values for the enrollment elasticity. These results are summarized in Table 7-6. Rows (E) of the table displays the results for the 'most responsive' and 'least responsive' cases. The 'most responsive' case combines an initial capitation market share of 50% and an enrollment elasticity of -0.64. The 'least responsive' case combines an initial capitation market share of 5% and an enrollment elasticity of -0.004. Row (F) of Table 7-6 displays similar results for a 15% reduction in the initial fee-for-service hospital utilization rate. The complete set of results is found in Appendix F, Tables F1 - F20A.

The assumed time horizon for the hospital utilization response by the fee-for-service sector was five years. To test the sensitivity of potential cost savings to the time horizon, a shorter adjustment period of 3 years was also simulated. An illustration of the results is presented in Table 7-7 (the complete set of results can be found in Appendix F, Tables F1B - F20C). As would be expected, the 3-year adjustment period generates greater savings than the 5-year adjustment. A 40% increase in the speed of adjustment causes an increase in cost savings of approximately 6%.

TABLE 7-6

Positive Fee-For-Service Modality Hospital Utilization Response - Summary Results of Sensitivity Analyses
(5 Year Adjustment)

Variable	Sensitivity Range Lower Bound	Sensitivity Range Upper Bound	Potential Cost Savings (million $) Lower Bound	Potential Cost Savings (million $) Upper Bound
(A) Capitation Market Share	5%	50%	17.79 [10.8]	25.43 [15.4]
(B) Enrollment Elasticity	-0.004	-0.64	25.03 [15.1]	26.08 [15.8]
(C) Capitation Market Share (15% reduction in FFS hospital utilization rate)	5%	50%	8.76 [5.9]	12.87 [8.6]
(D) Enrollment Elasticity (15% reduction in FFS hospital utilization rate)	-0.004	-0.64	12.83 [8.6]	13.11 [8.8]
(E) Most Responsive Case[1] (includes both (A) and (B)) (50%/-0.64)				26.08 [15.8]
Least Responsive Case (includes both (A) and (B)) (5%/-0.004)				17.05 [10.3]
(F) Most Responsive Case (includes both (C) and (D)) (50%/-0.64)				13.11 [8.8]
Least Responsive Case (includes both (C) and (D)) (5%/-0.004)				8.55 [5.7]
(G) % Difference[2]				
(C) vs (A)			50.8	49.4
(D) vs (B)			48.7	49.7
(F) vs (E)[3]			49.9	49.7

Note: Numbers in square brackets represent percentage of status quo costs.
(1) The detailed results for the most and least responsive cases are found in Appendix F.
(2) Results reflect the percentage decrease in potential cost savings with a 15% reduction in the fee-for-service hospital utilization rate.
(3) Numbers reflect the least and most responsive cases, respectively.

TABLE 7-7

Positive Fee-For-Service Modality Hospital Utilization Response
(3 Year Adjustment)

Year	Capitation Modality Population	Fee-for-Service Modality Population	Capitation Modality Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
0	0	80000	0.0	24.47	--
1	40000	40000	50.0	21.43	3.04
2	43300	36700	54.1	21.85	2.62
3	42723	37277	53.4	21.13	3.33
4	42109	37891	52.6	20.39	4.07
5	41441	38559	51.8	19.63	4.83
6	40709	39291	50.9	19.63	4.83
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
10	40709	39291	50.9	19.63	4.83
Present Value					
5%				165.08	33.26
10%				138.30	27.04
15%				119.07	22.16

A summary of the sensitivity analyses performed on the extended model with a 3-year adjustment is presented in Table 7-8. Potential cost savings continue to be sensitive to variation in the initial market share and the initial hospital utilization rate differential; however, the sensitivity of the results is reduced for the shorter adjustment period. A comparison of the results of the positive fee-for-service modality hospital response

TABLE 7-8

Positive Fee-For-Service Modality Hospital Utilization Response - Summary Results of Sensitivity Analyses
(3 Year Adjustment)

Variable	Sensitivity Range Lower Bound	Sensitivity Range Upper Bound	Potential Cost Savings (million $) Lower Bound	Potential Cost Savings (million $) Upper Bound
(A) Capitation Market Share	5%	50%	20.86 [12.6]	27.04 [16.3]
(B) Enrollment Elasticity	-0.004	-0.64	26.67 [16.1]	27.53 [16.6]
(C) Capitation Market Share (15% reduction in FFS hospital utilization rate)	5%	50%	10.34 [6.9]	13.77 [8.3]
(D) Enrollment Elasticity (15% reduction in FFS hospital utilization rate)	-0.004	-0.64	13.68 [9.2]	13.90 [9.3]
(E) Most Responsive Case[1] (includes both (A) and (B)) (50%/-0.64)				27.53 [16.6]
Least Responsive Case (includes both (A) and (B)) (5%/-0.004)				20.30 [12.3]
(F) Most Responsive Case (includes both (C) and (D)) (50%/-0.64)				13.90 [9.3]
Least Responsive Case (includes both (C) and (D)) (5%/-0.004)				10.18 [6.2]
(G) % Difference[2]				
(C) vs (A)			50.4	49.1
(D) vs (B)			48.7	49.5
(F) vs (E)[3]			49.9	49.5

Note: Numbers in square brackets represent percentage of status quo costs.
(1) The detailed results for the most and least responsive cases are found in Appendix F.
(2) Results reflect the percentage decrease in potential cost savings with a 15% reduction in the fee-for-service hospital utilization rate.
(3) Numbers reflect the least and most responsive cases, respectively.

scenario with the baseline model and other extended versions appears later in this chapter.

The potential cost savings reported in the above tables are based on 1978-79 dollars. To obtain an estimate of current dollar cost savings Table 7-2 is converted into 1985 dollars in Table 7-9. For a 10% discount rate and a 10 year time horizon, potential cost savings amount to 43.91 million dollars. This savings is approximately 16% of the status quo costs. Potential savings of this magnitude for a community of 80,000 people are not insignificant. They become increasingly important if the results are extended to other communities within the province.

TABLE 7-9

Positive Fee-For-Service Modality Hospital Utilization Response - Marginal Savings Attributable to the Individual Components of the Publicly Financed Competition Scheme
(1985 dollars - million $)

Year	Existence of Capitation Modality (50% Market Share)	Consumer Enrollment Decision[1]	Linkage of Ambulatory Costs	Consumer Enrollment Decision[2]	Fee-for-Service Hospital Utilization Response[3]	Total
1	5.25	-	-	-	-	5.25
2	5.25	0.43	-1.16	-	-	4.52
3	5.25	0.43	-1.16	-0.05	0.78	5.25
4	5.25	0.43	-1.16	-0.05	1.54	6.01
5	5.25	0.43	-1.16	-0.05	2.30	6.77
6	5.25	0.43	-1.16	-0.05	3.07	7.54
7	5.25	0.43	-1.16	-0.05	3.86	8.33
8	5.25	0.43	-1.16	-0.05	3.86	8.33
9	5.25	0.43	-1.16	-0.05	3.86	8.33
10	5.25	0.43	-1.16	-0.05	3.86	8.33
Present Value						
5%	42.57	3.06	-8.25	-0.31	17.06	54.13
10%	35.48	2.48	-6.68	-0.24	12.88	43.91
15%	30.30	2.05	-5.54	-0.20	9.92	36.55

Notes:

(1) Consumer decision in year 2 (based on initial enrollment charge).

(2) Consumer decision in year 3 (enrollment charge reduced due to linkage of capitation payments to fee-for-service ambulatory costs).

(3) Savings are a combination of consumers switching back to fee-for-service modality and the fee-for-service positive hospital utilization response.

7.1.6 Results of a Perverse Fee-For-Service Modality Ambulatory Utilization Response

With a positive hospital utilization response by the fee-for-service modality, the model predicts that potential cost savings can be quite substantial; however, if the fee-for-service modality attempts to regain its lost market share by providing more ambulatory services to its remaining patient population, the performance of both modalities becomes progressively worse, adding to health care costs rather than generating potential cost savings. These results are shown in Table 7-10.

Using the parameter values from Table 6-2, the simulation results predict that it would cost the government 18.55 million dollars more for the ten years than it would have cost if care had been financed entirely on a fee-for-service basis. Although the fee-for-service modality has attempted to regain its lost market share through increased ambulatory utilization, it is unable to regain the entire amount that was lost. This occurs because a hospital utilization rate differential still exists between the two modalities. At the end of the ten-year time horizon, the capitation modality's market share stands at 52.5%, which represents an increase of 5% in its initial market share. The cost to government, however, has increased substantially.

TABLE 7-10

Perverse Fee-For-Service Modality Ambulatory Utilization Response

Year	Capitation Modality Population	Fee-for-Service Modality Population	Capitation Modality Market Share (%)	Community Health Care Costs (million $)	Cost (Dis) Savings to Government (million $)
1	40000	40000	50.0	21.43	3.04
2	43300	36200	54.1	21.18	3.29
3	43300	36200	54.1	25.55	(1.09)
4	42453	37547	53.1	26.50	(2.03)
5	42393	37607	53.0	27.76	(3.30)
6	42316	37684	52.9	29.14	(4.68)
7	42239	37761	52.8	30.65	(6.19)
8	42163	37837	52.7	32.32	(7.85)
9	42087	37913	52.6	34.14	(9.68)
10	42012	37988	52.5	36.14	(11.68)
Present Value					
5%				225.57	(27.23)
10%				183.90	(18.55)
15%				153.78	(12.59)

Table 7-11 illustrates the savings attributable to the individual components of the publicly financed competition scheme. Once again, the fact that the market is initially split between the two modalities generates 3.04 million dollars per year in savings to government. The existence of the enrollment charge in the first year leads to an additional saving of 0.25 million dollars beginning in year 2. However, because capitation rates are linked to fee-for-service ambulatory costs, which increase by 10% each year as fee-for-service physicians attempt to

TABLE 7-11

Perverse Fee-For-Service Modality Ambulatory Utilization Response - Marginal Savings Attributable to the Individual Components of the Publicly Financed Competition Scheme

Year	Existence of Capitation Modality (50% Market Share)	Consumer[1] Enrollment Decision	Linkage of[2] Ambulatory Costs	Total
1	3.04	--	--	3.04
2	3.04	0.25	--	3.29
3	3.04	0.25	- 4.37	-1.09
4	3.04	0.25	- 5.32	-2.03
5	3.04	0.25	- 6.58	-3.29
6	3.04	0.25	- 7.96	-4.67
7	3.04	0.25	- 9.47	-6.18
8	3.04	0.25	-11.14	-7.85
9	3.04	0.25	-12.96	-9.67
10	3.04	0.25	-14.96	-11.67
Present Value				
5%	24.65	1.78	-53.61	-27.23
10%	20.55	1.44	-40.50	-18.55
15%	17.55	1.19	-31.29	-12.59

Notes:

(1) Consumer decision in 2nd period (based on the initial enrollment charge)

(2) Negative savings are a combination of consumers switching back to fee-for-service modality and increases in both fee-for-service and capitation ambulatory costs.

maintain incomes, potential cost savings are reduced. In year 3 the linkage of capitation payments to fee-for-service ambulatory costs reduces savings by 4.37 million dollars. In each subsequent year an additional reduction in savings occurs.

Over the ten year period the existence of the capitation modality in combination with the initial enrollment charge generates 21.99 million dollars in savings. The increasing ambulatory costs in both sectors and the resulting consumer switching reduces saving by 40.5 million dollars. The net effect is that it costs the government 18.55 million dollars more to provide services to this particular community than it would have under only fee-for-service provision.

Sensitivity analyses (Tables 7-12 and 7-13) indicate that cost (dis)savings are sensitive to the values assumed for the initial market share and the enrollment elasticity. The results appear less sensitive to the initial market share than in the previous case of a positive hospital utilization response. A comparison of the perverse and positive responses shows that the parameter values that generate the largest cost savings in the positive response also generate the largest dissavings in the perverse response..

TABLE 7-12

Perverse Fee-For-Service Modality Ambulatory Utilization Response - Sensitivity Analysis on Initial Market Share

Capitation Modality Initial Market Share (%)	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Cost (Dis)savings to Government (million $)
50	52.5	5%	225.57	(27.23)
		10%	183.90	(18.55)
		15%	153.78	(12.59)
40	43.0	5%	229.51	(31.17)
		10%	187.21	(21.86)
		15%	156.64	(15.45)
20	24.0	5%	238.33	(39.99)
		10%	194.75	(29.40)
		15%	163.23	(22.04)
5	9.8	5%	243.28	(44.94)
		10%	198.81	(33.47)
		15%	166.65	(25.46)

TABLE 7-13

Perverse Fee-For-Service Modality Ambulatory Utilization Response - Sensitivity Analysis on Enrollment Elasticity

Enrollment Elasticity	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Cost (Dis)savings to Government (million $)
-0.004	50.0	5%	220.94	(22.60)
		10%	180.33	(14.98)
		15%	150.98	(9.79)
-0.02	50.2	5%	221.22	(22.87)
		10%	180.54	(15.20)
		15%	151.14	(9.95)
-0.10	51.0	5%	222.65	(24.30)
		10%	181.64	(16.30)
		15%	152.01	(10.81)
-0.25	52.5	5%	225.57	(27.23)
		10%	183.90	(18.55)
		15%	153.78	(12.59)
-0.64	56.7	5%	235.09	(36.75)
		10%	191.24	(25.90)
		15%	159.57	(18.38)

Other results can be drawn from the above tables (and the tables found in Appendix F, Tables 1D - 20D), but these results serve to highlight the significance of a perverse competitive response by the fee-for-service modality. Of particular importance is the implication for potential savings of freeing the determination of capitation rates from fee-for-service modality costs, even if publicly financed competition does not occur.

7.2 Results of the Alternative Capitation Reimbursement Arrangement

This scenario allows the capitation rate to be set independently of fee-for-service ambulatory costs. With the existing linkage on the ambulatory side, the capitation modality is not able to take advantage of its more efficient provision of ambulatory care. If capitation rates were more closely linked to the modality's own production costs, significant cost savings could result from the provision of ambulatory care (in addition to those savings already achieved on the hospital side).

The results of independent rate setting for the capitation modality are presented in Table 7-14. Given the initial parameter values found in Table 6-3, potential cost savings amount to approximately 22 million dollars for the ten year time horizon. Because both ambulatory and hospital costs now contribute to the average cost differential between the two modalities, the capitation sector market share increases from 50% to 54% with the fee-for-service modality being unable to recapture this lost market share.

In this scenario, the existence of the capitation modality again generates approximately 3 million dollars in savings in the first year compared with what it would cost

TABLE 7-14

Alternative Capitation Reimbursement Arrangement

Year	Capitation Modality Population	Fee-for-Service Modality Population	Capitation Modality Market Share (%)	Community Health Care Costs (million$)	Cost Savings to Government (million$)
0	0	80000	0.0	24.47	--
1	40000	40000	50.0	21.43	3.04
2	43300	36700	54.1	21.18	3.29
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
10	43300	36700	54.1	21.18	3.29
Present Value					
5%				171.96	26.38
10%				143.39	21.95
15%				122.48	18.71

the government to service this community entirely on a fee-for-service basis. As a result of the cost difference and the corresponding user charge ($75.88 per person remaining with the fee-for-service sector) approximately 3300 consumers switch to the capitation modality. This results in an additional 0.25 million dollar savings in the second year. When combined with savings from the existence of the capitation modality, savings in year 2 amount to approximately 3.3 million dollars.

After this point in the simulation, nothing else changes, hence no other consumers switch. Because the institutional link between capitation rates and fee-for-service ambulatory costs has been severed, there are no further reductions in potential cost savings as had been the case in previous scenarios. The savings of 3.29 million dollars continues in each subsequent year of the time horizon. After year 2, because no further changes occur in relative prices between the two sectors, the same user charge persists throughout the remainder of the simulation. In essence, the assumption is that the consumer, when making his initial decision to switch, has taken into consideration the present value of a continuing user charge. The net result is a savings of 21.95 million dollars.

7.2.1 Sensitivity to Initial Market Share

Table 7-15 presents the results of a sensitivity analysis on the initial market share (for a given enrollment elasticity of -0.25). Potential savings to government vary from 4.79 million dollars when the initial capitation market share is 5% to a savings of approximately 22 million dollars for an initial market share of 50%. The potential savings range from approximately 3% of the status quo community health care costs to 13% of these costs.

TABLE 7-15

Alternative Capitation Reimbursement Arrangement - Sensitivity Analysis on Initial Market Share

Capitation Modality Initial Market Share (%)	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Cost Savings to Government (million $)
50	54.1	5%	171.96	26.38
		10%	143.39	21.95
		15%	122.48	18.71
40	45.0	5%	176.52	21.82
		10%	147.21	18.14
		15%	125.75	15.44
20	26.6	5%	185.65	12.69
		10%	154.83	10.51
		15%	132.27	8.92
5	12.8	5%	192.50	5.84
		10%	160.56	4.79
		15%	137.17	4.02

7.2.2 Sensitivity to the Enrollment Elasticity

Table 7-16 displays the results of a sensitivity analysis on the enrollment elasticity value with a given market split of 50/50. In this case potential cost savings range from 20.54 million dollars for an enrollment elasticity of -0.004 to 24.21 million dollars when the enrollment elasticity of -0.64. Expressed as a percentage of the status quo costs, these savings range from approximately 12% to 15%.

TABLE 7-16

Alternative Capitation Reimbursement Arrangement - Sensitivity Analysis on Enrollment Elasticity

Enrollment Elasticity	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Cost Savings to Government (million $)
-0.004	50.1	5%	173.71	24.64
		10%	144.81	20.54
		15%	123.65	17.54
-0.02	50.3	5%	173.59	24.69
		10%	144.72	20.56
		15%	123.58	17.55
-0.10	51.7	5%	173.02	25.32
		10%	144.26	21.09
		15%	123.20	17.99
-0.25	54.1	5%	171.96	26.38
		10%	143.39	21.95
		15%	122.48	18.71
-0.64	60.6	5%	169.18	29.16
		10%	141.14	24.21
		15%	120.61	20.58

7.2.3 Sensitivity to the Hospital Utilization Rate Differential

The results of a lower initial hospital utilization rate differential between the two modalities are presented in Table 7-17.[3] For a given enrollment elasticity of -0.25 and a market split of 50/50, potential cost savings for a 10 year period are 12.9 million dollars. This is a reduction of approximately 50% in potential cost savings.

TABLE 7-17

Alternative Capitation Reimbursement Arrangement - Reduction in the Initial Hospital Utilization Rate Differential

Year	Capitation Modality Population	Fee-for-Service Modality Population	Capitation Modality Market Share (%)	Community Health Care Costs (million$)	Cost Savings to Government (million$)
0	0	80000	0.0	22.05	--
1	40000	40000	50.0	20.22	1.83
2	41986	38014	52.5	20.12	1.92
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
10	41986	38014	52.5	20.12	1.92
Present Value					
5%				163.29	15.45
10%				136.14	12.87
15%				116.27	10.97

7.2.4 Summary Results of the Sensitivity Analyses

Table 7-18 provides a summary of the results of the sensitivity analyses. More detailed results can be found in Appendix G, Tables 1-20A. Once again, the results indicate that potential cost savings are extremely sensitive to the values assumed for the initial capitation market share and considerably less sensitive to the enrollment elasticity value. In addition, a lower initial hospital utilization rate differential results in approximately a 40% to 55% decrease in potential cost savings. It is apparent that the assumptions about the

TABLE 7-18

Alternative Capitation Reimbursement Arrangement - Summary Results of Sensitivity Analyses

Variable	Sensitivity Range Lower Bound	Sensitivity Range Upper Bound	Potential Cost Savings Lower Bound	Potential Cost Savings Upper Bound
(A) Capitation Market Share	5%	50%	4.79 [2.9]	21.95 [13.3]
(B) Enrollment Elasticity	-0.004	-0.64	20.54 [12.4]	24.21 [14.6]
(C) Capitation Market Share (15% reduction in FFS hospital utilization rate)	5%	50%	2.23 [1.5]	12.87 [8.7]
(D) Enrollment Elasticity (15% reduction in FFS hospital utilization rate)	-0.004	-0.64	12.35 [8.3]	13.68 [9.2]
(E) Most Responsive Case[1] (includes both (A) and (B)) (50%/-0.64)				24.21 [14.6]
Least Responsive Case (includes both (A) and (B)) (5%/-0.004)				2.09 [1.03]
(F) Most Responsive Case (includes both (C) and (D)) (50%/-0.64)				13.68 [9.2]
Least Responsive Case (includes both (C) and (D)) (5%/-0.004)				1.25 [0.8]
(G) % Difference[2]				
(C) vs (A)			53.4	41.4
(D) vs (B)			39.9	43.5
(F) vs (E)[3]			40.2	43.5

Note: Numbers in square brackets represent percentage of status quo costs.

(1) The detailed results for the most and least responsive cases can be found in Appendix G.

(2) Results reflect the percentage decrease in potential cost savings with a 15% reduction in the fee-for-service hospital utilization rate.

(3) Numbers reflect the least and most responsive cases, respectively.

initial market share value and the initial hospital utilization rate differential are very important in calculating potential cost savings. This result has significant implications for estimates of the cost saving to government of introducing the competitive scheme on a provincial scale.

As discussed in Chapter 6, the results of this scenario may also be interpreted (cautiously) as a proxy for benefit competition. The results will not be reiterated here but instead are interpreted in the context of the public policy discussion in the next chapter. Suffice to say, at this point, that benefit competition when evaluated may lead not only to significant cost savings for the community but also to a broader mix of services provided at substantially lower costs.

7.3 Results of the Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response

The scenario of an independently set capitation rate has not thus far allowed for a competitive response by the fee-for-service modality. To illustrate the impact on potential cost savings of a positive hospital utilization response by the fee-for-service modality, the model structure combines both independent capitation rate setting and a positive fee-for-service hospital utilization response.

The results are presented in Tables 7-19 and 7-20, for a 5-year and 3-year hospital utilization adjustment horizon respectively. For the 5-year adjustment response, potential cost savings to government amount to approximately 29 million dollars, while savings are approximately 31 million dollars for the 3-year adjustment response.

The savings attributable to the individual components of the competitive scheme are presented in Table 7-21 (for a 5-year adjustment response). The existence of the capitation sector and the initial enrollment response generate 3.29 million dollars in savings each year. The addition of the positive fee-for-service hospital utilization response and the independent capitation rate setting generates an additional savings in each year, totalling approximately 7.3 million dollars for the 10 year time horizon.

TABLE 7-19

Combined Alternative Capitation Reimbursement and Positive Fee-For-Service Modality Hospital Utilization Response
(5 Year Adjustment)

Year	Capitation Modality Population	Fee-for-Service Modality Population	Capitation Modality Market Share (%)	Community Health Care Costs (million$)	Cost Savings to Government (million$)
1	40000	40000	50.0	21.43	3.04
2	43300	36700	54.1	21.18	3.29
3	43300	36700	54.1	20.73	3.73
4	42938	37062	53.7	20.31	4.15
5	42556	37444	53.2	19.88	4.59
6	42155	37845	52.7	19.44	5.03
7	41731	38269	52.2	18.98	5.48
8	41281	38719	51.6	18.99	5.47
9	41281	38719	51.6	18.99	5.47
10	41281	38719	51.6	18.99	5.47
Present Value					
5%				162.29	36.06
10%				136.09	29.25
15%				116.86	24.34

TABLE 7-20

Combined Alternative Capitation Reimbursement and Positive Fee-For-Service Modality Hospital Utilization Response
(3 Year Adjustment)

Year	Capitation Modality Population	Fee-for-Service Population	Capitation Modality Market Share (%)	Community Health Care Costs (million$)	Cost Savings to Government (million$)
1	40000	40000	50.0	21.43	3.04
2	43300	36700	54.1	21.18	3.29
3	43300	36700	54.1	20.44	4.03
4	42696	37304	53.4	18.72	4.74
5	42038	37962	51.6	18.98	5.48
6	41318	38682	51.7	18.99	5.47
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
10	41318	38682	51.7	18.99	5.47
Present Value					
5%				160.43	37.91
10%				134.52	30.82
15%				115.51	25.68

TABLE 7-21

Combined Alternative Capitation Reimbursement and Positive Fee-For-Service Modality Hospital Utilization Response - Marginal Savings Attributable to the Individual Components of the Publicly Financed Competition Scheme (5 Year Adjustment)

Year	Existence of Capitation Modality (50% Market Share	Consumer Enrollment Decision	Fee-for-Service Hospital Response/ Independent Capitation Rate Setting	Total
1	3.04	--	--	3.04
2	3.04	0.25	--	3.29
3	3.04	0.25	0.45	3.74
4	3.04	0.25	0.87	4.16
5	3.04	0.25	1.30	4.59
6	3.04	0.25	1.74	5.03
7	3.04	0.25	2.18	5.48
8	3.04	0.25	2.19	5.49
9	3.04	0.25	2.19	5.49
10	3.04	0.25	2.19	5.49
Present Value				
5%	24.65	1.78	9.67	36.1
10%	20.55	1.44	7.30	29.3
15%	17.55	1.19	5.62	24.3

7.3.1 Sensitivity Analyses on Initial Market Share and Enrollment Elasticity

Tables 7-22 and 7-23 display the sensitivity analyses on the initial market share and enrollment elasticity values respectively. Once again, estimates of potential cost savings are more sensitive to the initial market share assumption and less sensitive to the enrollment elasticity.

TABLE 7-22

Combined Alternative Capitation Reimbursement and Positive Fee-For-Service Modality Hospital Utilization Response - Sensitivity Analysis on Initial Market Share
(5 Year Adjustment)

Capitation Modality Initial Market Share (%)	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Cost Savings to Government (million $)
50	51.6	5%	162.29	36.06
		10%	136.09	29.25
		15%	116.86	24.34
40	41.9	5%	164.92	33.42
		10%	138.45	26.90
		15%	119.00	22.19
20	22.6	5%	170.18	28.16
		10%	143.16	22.19
		15%	123.27	17.92
5	8.0	5%	174.13	24.21
		10%	146.69	18.66
		15%	126.48	14.71

TABLE 7-23

Combined Alternative Capitation Reimbursement and Positive Fee-For-Service Modality Hospital Utilization Response - Sensitivity Analysis on Enrollment Elasticity
(5 Year Adjustment)

Enrollment Elasticity	Capitation Modality Final Market Share (%)		Present Value of Community Health Care Costs (million $)	Present Value of Cost Savings to Government (million $)
-0.004	50.0	5%	163.03	35.32
		10%	136.75	28.60
		15%	117.44	23.75
-0.02	50.1	5%	162.98	35.36
		10%	136.71	28.64
		15%	117.40	23.79
-0.10	50.6	5%	162.74	35.60
		10%	136.49	28.85
		15%	117.21	23.98
-0.25	51.6	5%	162.29	36.06
		10%	136.09	29.05
		15%	116.86	24.34
-0.64	54.8	5%	161.07	37.27
		10%	135.02	30.32
		15%	115.90	25.29

7.3.2 Summary of Sensitivity Analyses

Tables 7-24 and 7-25 provide an overall summary of the sensitivity analyses for a 5-year and 3-year adjustment horizon respectively. The results show again that the assumption of a 15% reduction in the initial fee-for-service hospital utilization rate causes approximately a 50% reduction in potential cost savings. In addition, as

TABLE 7-24

Combined Alternative Capitation Reimbursement and Positive Fee-For-Service Modality Hospital Utilization Response - Summary Results of Sensitivity Analyses
(5 Year Adjustment)

Variable	Sensitivity Range Lower Bound	Sensitivity Range Upper Bound	Potential Cost Savings (million $) Lower Bound	Potential Cost Savings (million $) Upper Bound
(A) Capitation Market Share	5%	50%	18.66 [11.3]	29.25 [17.7]
(B) Enrollment Elasticity	-0.004	-0.64	28.60 [17.3]	30.32 [18.3]
(C) Capitation Market Share (15% reduction in FFS hospital utilization rate)	5%	50%	9.42 [6.3]	16.65 [11.2]
(D) Enrollment Elasticity (15% reduction in FFS hospital utilization rate)	-0.004	-0.64	16.39 [11.0]	17.08 [11.5]
(E) Most Responsive Case[1] (includes both (A) and (B)) (50%/-0.64)				30.32 [18.3]
Least Responsive Case (includes both (A) and (B)) (5%/-0.004)				17.41 [10.5]
(F) Most Responsive Case (includes both (C) and (D)) (50%/-0.64)				17.08 [11.5]
Least Responsive Case (includes both (C) and (D)) (5%/-0.004)				8.91 [6.0]
(G) % Difference[2]				
(C) vs (A)			49.5	43.1
(D) vs (B)			42.7	43.7
(F) vs (E)[3]			48.9	43.7

Note: Numbers in square brackets represent percentage of status quo costs.
(1) The detailed results for the most and least responsive cases are found in Appendix H.
(2) Results reflect the percentage decrease in potential cost savings with a 15% reduction in the fee-for-service hospital utilization rate.
(3) Numbers reflect the least and most responsive cases, respectively.

TABLE 7-25

Combined Alternative Capitation Reimbursement and Positive Fee-For-Service Modality Hospital Utilization Response - Summary Results of Sensitivity Analyses
(3 Year Adjustment)

Variable	Sensitivity Range Lower Bound	Sensitivity Range Upper Bound	Potential Cost Savings (million $) Lower Bound	Potential Cost Savings (million $) Upper Bound
(A) Capitation Market Share	5%	50%	21.64 [13.0]	30.82 [18.6]
(B) Enrollment Elasticity	-0.004	-0.64	30.31 [18.3]	31.68 [19.2]
(C) Capitation Market Share (15% reduction in FFS hospital utilization rate)	5%	50%	10.95 [7.3]	17.46 [11.7]
(D) Enrollment Elasticity (15% reduction in FFS hospital utilization rate)	-0.004	-0.64	17.24 [11.6]	17.82 [12.0]
(E) Most Responsive Case[1] (includes both (A) and (B)) (50%/-0.64)				31.68 [14.2]
Least Responsive Case (includes both (A) and (B)) (5%/-0.004)				20.66 [12.5]
(F) Most Responsive Case (includes both (C) and (D)) (50%/-0.64)				17.82 [12.0]
Least Responsive Case (includes both (C) and (D)) (5%/-0.004)				10.54 [7.1]
(G) % Difference[2]				
(C) vs (A)			49.4	43.3
(D) vs (B)			43.1	43.4
(F) vs (E)[3]			49.0	43.8

Note: Numbers in square brackets represent percentage of status quo costs.
(1) The detailed results for the most and least responsive cases are found in Appendix H.
(2) Results reflect the percentage decrease in potential cost savings with a 15% reduction in the fee-for-service hospital utilization rate.
(3) Numbers reflect the least and most responsive cases, respectively.

before, the magnitude of savings is greater under the 3-year hospital utilization adjustment path, although the variability in savings due to changes in parameter values is smaller. A more detailed listing of the results can be found in Appendix H, Tables 1 to 20C.

In comparison with independent capitation rate setting alone (Table 7-14), potential cost savings are increased by approximately 25% in the scenario with both independent capitation rate setting and a positive fee-for-service hospital utilization response. Of the scenarios examined here, this combined response offers the most potential for cost savings and should be a prime objective of any policy of publicly financed competition.

7.4 Overall Comparison of Alternative Model Structures

Table 7-26 presents a comparison of the savings estimates under alternative model structures, based on the initial set of parameter values, for a ten year period, discounted at 10%. When compared with the baseline model, scenarios other than the perverse ambulatory response by the fee-for-service modality generate additional savings of quite variable amounts. The most significant single influence occurs with the existence of the capitation modality. The positive hospital utilization response is also a significant determinant of potential cost savings.

TABLE 7-26

Summary of Results from Various Model Structures

Model	Best[1] Guess Results (million$)	Most[2] Responsive Case (million$)	Least[3] Responsive Case (million$)
Baseline Model	17.98 [10.8]	19.52 [11.8]	1.72 [1.0]
Positive Fee-For-Service Hospital Utilization Response	25.43 [15.4]	26.08 [15.8]	17.05 [10.3]
Perverse Fee-For-Service Ambulatory Utilization Response	-18.55 [11.2]	-14.98 [9.1]	-39.45 [23.9]
Alternative Capitation Reimbursement Arrangement	21.95 [13.3]	24.21 [14.6]	2.09 [1.03]
Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Hospital Utilization Response	29.25 [17.7]	30.32 [18.3]	17.41 [10.5]

Notes: Numbers in square brackets represent percentage of status quo costs.

(1) Best Guess results are based on the following initial parameter values: (1) enrollment elasticity of -0.25, (2) initial market split 50/50 and (3) adjustment time of 5 years for positive fee-for-service hospital utilization response.

(2) Most Responsive Case results are based on the following initial parameter values: (1) enrollment elasticity -0.64, (2) initial market split 50/50 and (3) adjustment time of 3 years. (see note 4)

(3) Least Responsive Case results are based on the following initial parameter values: (1) enrollment elasticity of -0.004, (2) initial market split 95/5 and (3) adjustment time of 5 years. (see note 4)

(4) For the FFS perverse ambulatory utilization response the Most Responsive Case assumes a 50/50 market split and a -.004 enrollment elasticity while the Least Responsive Case assumes a 95/5 market split and a -0.64 enrollment elasticity.

In addition, it is worth noting that under certain conditions a perverse response by fee-for-service practitioners can result in dissavings considerably greater than even the largest savings in other scenarios.

7.5 Assessment of the Extended Model(s)

It can generally be said that the extended model has both reinforced and enhanced the results of the baseline model. The baseline model indicated that the existence of a capitation modality, and the addition of a consumer choice decision based on an enrollment charge determined by the relative costs of the modalities could lead to cost savings for a community. A significant shortcoming of the baseline model, however, was that it did not allow for any competitive response by either the fee-for-service or capitation modalities.

Extended versions of the baseline model were attempts to allow for increased competition between the two modalities. Results indicated that extensions to augment competition generally enhanced potential savings, although further analysis is required of the marginal contribution of competition when a mature capitation sector already exists.

The extended versions of the model also reinforced the conclusions of the baseline model that savings are sensitive to the assumptions made regarding the initial parameter values. In particular, variations in initial market share, the initial hospital utilization rate differential, and (to a much lesser extent) the enrollment elasticity, cause large variations in the results. Therefore, more precise knowledge of these variables is important for discussion of adoption or experimentation with publicly financed competition.

The importance of the specific institutional framework assumed by competitive proposals is highlighted by the extended structures. First, linkage of the capitation rate to average fee-for-service ambulatory costs seems particularly ill-advised, as estimates of potential dissavings indicate. Second, the alternative capitation reimbursement scenario flags the possibility that all estimates of savings provided here may be conservative if increased competition can move practice style closer to the efficiency frontier.

The simulation model (particularly the extended versions) has highlighted several aspects of the competitive proposal that should be investigated further. Like all models, its structure is mechanical and quantitative; nevertheless, it contributes qualitatively to a more informed discussion of the consequences of a publicly financed competition scheme in the Canadian context. In the next chapter its implications for policy development are discussed.

Endnotes

1. The results reported in this chapter are in terms of present values, using a 10% discount rate unless otherwise noted. The discount rates of 5, 10 and 15% are used to provide a range of values for use in a sensitivity analysis. The choice of 10% (for the reporting of the results in the text) may be a bit high, but it imparts a conservative bias into the reporting and discussion of the savings estimates. Unless the time paths are different, the proportionate savings will be independent of the discount rate.

2. This type of behaviour is consistent with the assumption that consumer utility maximizing decisions are not based entirely on price differentials but on plan characteristics as well.

3. The hospital utilization rate differential between the two sectors is now 17% instead of the initial 30%.

CHAPTER 8

PUBLIC POLICY CONSIDERATIONS

8.0 Introduction

The intent of the thesis was to design a simulation model, and use it to examine the effects of publicly financed competition in a hypothetical community. The results of the simulation analysis contribute the first quantitative estimates of the potential economic significance of this policy direction and, as such, constitute one of the necessary steps in evaluating this direction.

The previous chapters have outlined the structural model and the possible results of such a policy. Because the estimates of the potential cost savings from this proposal are thought to be sufficiently significant for one community, it is important to discuss further issues such as the proposal's feasibility, in terms of both legislation and implementation, as well as the quantitative significance of the proposal on a provincial level. These issues are relevant for any government that is seriously considering such a policy.

The objective of this chapter is to discuss the issues of legislative feasibility and actual implementation (including critical parameter values) in the following light. How do the issues of legislative feasibility and actual implementation relate to the results of the simulation analysis and do the results provide any insight into these issues?

Once these issues have been discussed, the savings found for one community are extrapolated to the provincial level. This exercise is undertaken to discuss whether the savings are large enough at the provincial level to justify proceeding further with consideration of this policy route.

8.1 Legislative Feasibility

Any proposed policy direction must be reconciled with both federal and provincial legislation covering medical and hospital care. Therefore, the first issue that must be discussed is whether this proposal fits within existing legislation. If it does not, what legislative changes are needed? Do the model and its results contribute any information or insight regarding the changes necessary in the legislative (or institutional) arrangements?

With reference to existing legislation, the most contentious components of the publicly financed competition proposal are: (1) that consumers are asked to pay an enrollment charge out-of-pocket if they choose the more expensive modality, and (2) that once consumers have made their choices they are locked in for a specified period of time. These two assumptions are the ones most likely to be judged as contravening existing legislation..

For the interpretation of the compatibility of the competitive proposal with existing legislation it is useful to determine whether the proposal contravenes the wording of the legislation or whether it (more seriously) contravenes the spirit of the legislation. If the competitive proposal does not contravene the spirit of the legislation then the wording of the legislation may require only minor modifications to be compatible with the competitive proposal.

8.1.1 Federal Legislation

Under federal legislation, the 1984 Canada Health Act reconfirms a grant-in-aid program through which the federal government contributes financially to those provinces operating medical and hospital insurance plans. To qualify for the federal transfers, provincial plans must:

(1) provide comprehensive coverage for all medically required services that are rendered by a physician or surgeon, with no dollar limit or exclusion except on the basis that the service(s) are not medically required;

(2) provide reasonable access to insured services for insured individuals such that there is no barrier to access through financial charges or otherwise;

(3) be universally available to all eligible residents on uniform terms and conditions and must cover approximately 100% of the total eligible population;

(4) provide benefits that are portable; and

(5) be publicly administered on a non-profit basis.[1]

The first three conditions of the legislation imply that provinces must provide universal, comprehensive care to all individuals on uniform terms and conditions. In addition, individuals must have "reasonable" access to those services regardless of ability to pay.

The current set of medical and hospital services that are reimbursed by OHIP are deemed to satisfy the condition of comprehensive care. Because the variant of publicly financed competition outlined in the thesis assumes that the benefit package offered is similar to the current insurance plan, this aspect of the proposal should not pose any problems. However, within the competitive proposal, because the government covers only the cost of the less expensive plan on behalf of all individuals, the enrollment charge could be interpreted by some as a barrier to access. This would violate the criterion that care must be provided to all individuals on uniform terms and conditions. It is argued here that the enrollment charge, in the sense employed in the competitive model, contravenes only the wording of the legislation and not the spirit of the Act itself.

The federal legislation prohibits all out-of-pocket payments by individuals whether the payments are in the form of a user charge or extra-billing. The definition of a user charge for an insured health service is a charge that is authorized or permitted by a provincial health plan that is <u>not</u> payable, directly or indirectly, by the provincial health plan and does not include charges imposed by extra-billing. Extra-billing as defined by the legislation is a point-of-service charge for an insured service in addition to any amount paid for that service by the provincial health insurance plan.[2]

These charges (both the user charge and extra-billing) involve out-of-pocket expenses to the patient for the use of medical services. Both types of charges clearly violate current legislation. Extra-billing is a discriminatory point-of-service charge which transfers private money to the physician providing the service. The charge is discriminatory in that some physicians may charge some patients more for a given set of services. In this manner, the existence of extra-billing violates the condition that medical services should be provided to all individuals on uniform terms and conditions.

The enrollment charge in the competitive model does not have the same problems as those of extra-billing. The enrollment charge is not a point-of-service charge nor is it intended to transfer a sum of private funds to providers. Therefore, it is argued that the enrollment charge does not fall into the same category as extra-billing and as a consequence does not violate the current legislation as does the existence of extra-billing.

Comparison of the enrollment charge with the definition of a user charge is much more problematic. The existence of an enrollment charge <u>per se</u> may violate the condition of "reasonable" access, as does the existence of a user charge. A user charge (as normally defined) is often meant to act as a deterrent fee, reducing utilization and expenditures. Because the charge acts as a deterrent it is often faulted for reducing "reasonable" access, particularly for some segments of the population such as the poor or the aged. It therefore violates the conditions set out in the Act.

The enrollment charge in the competitive model also may violate the condition assuring "reasonable" access to care. However, the enrollment charge is not intended to act as a deterrent fee. Instead, individuals are asked to pay an enrollment charge if and only if they choose to obtain their care from the more expensive modality. The enrollment charge, which reflects the cost differential between the two modalities, therefore is not directly related to the number of services that a consumer needs (which is a function of the consumer's health status). Payment of the charge results only from choosing the less efficient modality. The charge is intended to draw a utility-maximizing decision from consumers. This decision is then expected to have an effect on provider behaviour by encouraging efficiency.

It is argued that the use of the enrollment charge in the competitive proposal would not create undue hardship upon consumers (or particular groups of consumers) and thus impede "reasonable" access to an insured set of services. Because the less costly modality is fully covered, insured services are financially accessible to all individuals. Consumers can obtain care of comparable quality and the same coverage by joining the less expensive modality.

Results from the simulation analysis indicate that the enrollment charge facing consumers under the competitive proposal is less than $100 per year per person choosing the fee-for-service modality. This amount does impede "reasonable" access.[3]

Obviously, there may be concern about whether low income individuals can afford even a small charge, and whether it will be the case that all low income individuals (and usually less healthy individuals) are forced to choose the less expensive plan. If this were the case the existence of an enrollment charge could create additional problems even if it did not restrict access. The charge may result in the less expensive sector treating a sicker population. This would result in that sector incurring additional costs in the provision of care.

In the analysis in this thesis, because the health status of the two population groups was assumed to be identical, there was no allowance for the adjustment of government payments if the two modalities treated patient populations of different health status. In principle this difficulty can be overcome by employing age-sex, health-status adjusted capitation rates. However, to adjust capitation rates for these factors necessarily entails much more research on both consumer behaviour and health status (in particular its relationship with costs).[4] This is beyond the scope of the thesis, but is an important area for further development.

User charges may alternatively be viewed as a means of financing part of the system costs. Although the enrollment charge in the competitive proposal is not intended as a revenue raising device, the revenue collected through the enrollment charge could be used to offset part of the costs of providing care.

The revenue generated by the enrollment charge is not a trivial amount. For example, in the baseline model, the enrollment charge generates approximately 16.5 million dollars (in 1978/79 dollars), over a 10 year period, discounted at 10%. This amounts to approximately 11% of the total community health care costs over the same ten year period. Investigation of alternative competition scenarios leads to a similar conclusion. For the positive fee-for-service hospital utilization response, enrollment charge revenue is 8.5 million dollars, which is approximately 6% of total community health care costs. Under the combined alternative capitation reimbursement arrangement and positive fee-for-service hospital utilization response, enrollment charge revenues are 11.8

million dollars, approximately 9% of total community health care costs.

The compatibility of the enrollment charge with current legislation is strengthened by the existence of the premium system in Ontario. Currently premiums are collected in Ontario to help finance the costs of care but are unrelated to use. Because the enrollment charge, like premiums, is unrelated to the individual's use of services, its use can be reconciled with the legislation, just as the use of premiums is reconciled.

The current structure of the premium mechanism is ignored in this variant of the competition proposal, but could easily be added to the structure of the model without affecting the model's generality. However, adding the premium structure to the model could provide another means by which the enrollment charge could be incorporated. Within the premium structure, the enrollment charge could be structured as a premium rebate. This formulation is politically appealing since the premium structure already exists in Ontario. In addition, a premium rebate for choosing the more efficient modality should, in theory, provide similar incentives to the enrollment charge.[5]

Federal legislation also does not require that providers of care be reimbursed on a fee-for-service basis, but rather that they receive "reasonable compensation" for insured services and that the mode of payment not impede access to insured services. Clearly, this allows both capitation and fee-for-service reimbursement methods as well as different organizational structures. Therefore, the existence of two alternative sectors which are organized and reimbursed differently is a legislatively feasible aspect of the competitive proposal.

In Ontario there are currently 25 Health Service Organizations (HSOs) with various organizational structures ranging from partnership to multi-specialty groups. All are reimbursed by the Ministry of Health on a capitation basis. Three of these organizations are community-sponsored while the remainder are physician-sponsored plans.[6]

Although community-sponsored HSOs tend to be more efficient than physician-based HSOs under current legislation, there is no reason to believe that the performance of either type will not be improved under the competitive proposal.[7] It should be emphasized again that the alternative modality suggested by the competitive proposal is not an abstract concept. The organization and payment mechanisms required to implement the proposal exist and are consistent with the conditions outlined in the federal legislation.

Criterion (4) states that benefits must be portable across regions. Therefore, the competitive proposal needs to be designed so that eligible residents who are temporarily absent from the province or from the particular region in which they reside can still obtain necessary care. The competitive proposal as structured in the simulation model may place some restrictions on consumers, particularly those in the capitation modality.

If an individual who normally obtains care from the fee-for-service modality is unable to do so locally, but instead receives care from some other fee-for-service provider (outside the region) then the costs of that care can still, in principle, be charged back to the consumer's original choice of the fee-for-service modality.[8]

Given that fee-for-service practice style is the dominant mode of practice within the province and that all fee-for-service providers face the same incentives, this type of charge-back should not have significant effects on utilization and costs within the fee-for-service modality.

Within the capitation modality, however, numerous problems may occur. Because capitation plans are only a small share of the total provincial market, if a consumer must seek care elsewhere, a capitation modality may not be available to the consumer. If the consumer was forced to obtain care from some other type of practice modality, charge-backs to the capitation modality would be inappropriate. If such charge-backs occurred, utilization and cost figures may be biased.

Charges, however, could be adjusted for these discrepancies and should, as a result, have no major effect on costs (as long as the decision is based on place of service rather than on dissatisfaction with the local service).[9] Such a system would not contravene existing legislation regarding portability. Consumers are not charged an additional amount and hence can carry their benefits with them; portability of benefits would still be assured.

The last criterion of the CHA legislation states that provincial plans must be administered on a non-profit basis and accountable to the provincial government. Under the competitive proposal the system is still governed by an OHIP-type insurance system in conjunction with the Ministry of Health. The insurance system reimburses both sectors, one via fee-for-service, the other via capitation. The enrollment charge would be paid to the insurance plan or to the Provincial Treasurer through the annual income tax process and not to the specific modality. Because the competitive proposal is structured under the auspices of public health insurance it has no difficulty in satisfying the last criterion of the legislation.

Consequently, a strong case can be made that the competitive proposal, and in particular the enrollment charge, do not contravene the Canada Health Act. Although this interpretation could be challenged, it would have to be resolved in the courts and ultimately is well beyond the scope of this thesis.

8.1.2 Provincial Legislation

Some further legislative issues must be resolved with reference to provincial legislation.[10] The lock-in provision of the competitive proposal is not explicitly accommodated under current provincial legislation. The Health Insurance Act of Ontario provides for the right of an insured person to seek his or her own physician.[11] The competitive proposal locks consumers into one of the two modalities for a specified period of time even though both sectors provide similar services and comparable quality. If a consumer decides to seek care outside his initial choice during the enrollment period, he can do so only by incurring some out-of-pocket expense. Therefore, some may argue that the lock-in provision restricts the individual's freedom of choice and hence contravenes part of the provincial Health Insurance Act.

Although it is true that once consumers select a particular modality they are obliged to seek care from that modality or incur an additional expense, this restriction lasts for the period of one year only. At the end of the year the consumer is again free to choose. It is argued here that this restriction on choice is not a restriction at all, and in fact patients are assured a free choice of provider.[12] In addition, a consumer is not denied any needed services although the service mix that they obtain in each modality may be quite different. The open enrollment provision also should prevent the problem of adverse selection among patients.[13] Consequently, it can be argued that the lock-in provision does not seriously contravene the provincial legislation.[14]

Both hospital and ambulatory care are insured under current legislation. However, regulations governing the provincial legislation do not link the costs of ambulatory and hospital care to a particular sector.[15] This linkage, however, is extremely important to the competition proposal. It is evident from the simulation analysis that hospital costs play a significant role in determining average per capita costs in each modality. More importantly, hospital costs are a significant determinant of the cost differential between the two sectors. The capitation modality has significantly lower hospital utilization rates per person and consequently lower hospital costs. If these costs are linked to the specific modality and in turn related to the enrollment charge and the consumer choice decision, significant savings can generally be realized.

To implement publicly financed competition, regulations must link the costs of both ambulatory and hospital care to a particular modality. This does not, however, call for a restructuring of the hospital sector, but rather a linkage and recording of costs for a particular modality. This issue, although a daunting one, is primarily a technical and management-information-system issue and should therefore not preclude the feasibility of the competitive proposal on legislative grounds.

The competitive proposal could go one step further and suggest a restructuring of the hospital sector. Evidence from the experience in the U.S. suggests that if the capitation modality owns its own hospital, it is able to achieve additional savings in the hospital sector. For example, the Kaiser Foundation in the U.S. operates with an average of two hospital beds per thousand population instead of the national average of 4.5 beds per thousand population.[16] This reduced bed supply can in turn reduce overall hospital costs. Owning or controlling a hospital allows for a greater impact on efficiency than does utilizing a hospital. As a consequence it may be possible to push the capitation modality closer to its efficiency frontier in the provision of hospital services.

If the simulation model were restructured to allow for this possibility, on the assumption that the legislative requirements and regulations governing hospital ownership and management could be changed, enhanced cost savings would be possible. Failing this restructuring of the hospital sector, it remains extremely important that legislation and regulations governing hospitals allow for the link between hospital costs and the respective modality. This link is essential to the competitive proposal.

With regard to ambulatory care, provincial regulations link average fee-for-service billing to the capitation rate.[17] As is evident from the simulation analysis, this reimbursement linkage can significantly mitigate the potential savings resulting from the competitive proposal. If the institutional link is severed and capitation rates are set or negotiated independently, then potential cost savings under both the baseline model and the various positive fee-for-service reaction scenarios can be increased substantially. Perhaps more importantly, if the link remains, a perverse fee-for-service reaction can actually increase the total costs of providing care under the competitive structure.

Obviously, the current arrangements are not optimal for the introduction of competition. Some time and effort is therefore justified to establish alternative institutional linkages on the ambulatory side. Various linkages are possible. For example, capitation rates could be set on the basis of the true production costs of the capitation modality, or the rates could be set through independent bargaining with the Ministry of Health. The linkages would have to be investigated carefully before any variant of the competitive proposal could actually be implemented.

Although there are a number of legislative changes or modifications that must be made to accommodate this variant of the publicly financed competitive proposal, the strategy itself is not an abstract proposal and under the current legislation is both realistic and potentially successful.

8.2 Implementation Issues

Just as there are a number of institutional and legislative issues that must be resolved for the success of the competitive proposal, there are a number of issues that must be discussed and resolved regarding the actual implementation of the proposal.

8.2.1 Number of Competing Plans

Within the proposal, competition, as illustrated in this thesis, is restricted to one community in which a capitation modality consisting of one plan competes with a fee-for-service modality. However, it is possible for large urban centres to have several capitation plans which compete with each other as well as with the fee-for-service modality. Although the simulation analysis does not allow for this possibility, it is expected that such competition would enhance potential savings. It is argued, however, that the competitive proposal outlined in the thesis is not unrealistic. Existing HSOs such as Flemington Park in Toronto and St. Anne's in Ottawa, although located in large urban centres, tend to consider only part of the urban area as their potential market. Consequently, even large urban areas, such as Toronto, are more likely to consist of many market areas with structures similar to that found in the simulation model.

8.2.2 Initial Capacity

As the simulation results suggest, the initial market split between the two modalities has significant implications for potential cost savings. The results indicate that savings are far greater under a market split of 50/50 than they are under the conditions of a small (say 5%) initial market share for the capitation modality. In terms of the implementation feasibility of the competitive proposal, what is important is whether a capitation modality existing in a community can handle or obtain an initial market share as large as 50%. Evidence from the U.S. tends to support the view that capitation plans start with low initial market shares (probably less than 10%). It appears, therefore, that the Sault Ste. Marie plan may be an isolated situation. It is unlikely that other communities will be able to realize a 50% initial market share unless a major effort is made to get large groups of existing fee-for-service physicians to join capitation plans as soon as they are initiated.

This raises the issue of how capitation modalities will be introduced and how big they should be initially. It appears that additional marketing studies should be undertaken to determine the initial capacity for the capitation modality. Studies would be required to determine the expected size of the initial market share of the capitation modality in communities, and also what share of the market it could be expected to capture from the fee-for-service modality over time.

The simulation results provide some information on this issue. For example, if the initial market split between the capitation and fee-for-service modality is 5/95, it is unlikely (under the assumptions of the model) that the capitation sector would ever capture 50% of the market. It should be noted, however, that the simulation results provide little information about how much capacity is actually needed because the initial market share is assumed rather than modelled.

8.2.3 Number of People Switching

In order to assess the feasibility of implementing the competitive proposal it is also necessary to look at the absolute number of people switching between modalities. The simulation results show that if the initial market split is 5/95 between the capitation and fee-for-service modalities then as few as 80 or as many as 13,500 people in a community of 80,000 people may switch under the baseline assumptions (the actual number depends upon the enrollment elasticities). Under the positive fee-for-service modality hospital utilization response as few as 100 or as many as

16,000 people could end up switching. Whether a modality has sufficient physical capacity to handle or adjust to such large numbers is an important issue which must be investigated thoroughly before introducing a capitation plan into a community.

Further research must investigate whether additional consumers can be accommodated through expansion of variable inputs or whether it is necessary to expand physical capacity. Clearly, more consideration must be given to the actual organization and introduction of the capitation modality.

8.2.4 Removal of Excess Hospital Capacity

A significant proportion of the savings that occur in the simulation analysis results from the fact that capitation enrollees use fewer hospital days than their fee-for-service counterparts. With a decrease in hospital utilization in one modality (or both modalities when competitive pressures are in effect) a reduction in the resulting excess capacity is both a necessary and sufficient condition for ensuring savings. This reduction could be accomplished in a variety of ways.

One method is for the government to negotiate with the hospitals directly regarding bed closures as the hospital utilization rates for the community fall and excess capacity becomes evident. An alternative method is to structure hospital payment mechanisms (global budgets or new mechanisms such as case based payment using Diagnostic Related Groups as in the U.S.) so that hospitals themselves decide to reduce capacity.

It is important to emphasize that if excess capacity is not removed then a significant portion of the potential savings will not be realized. Physically removing excess capacity from the system may involve some political unrest, but is a necessary requirement to ensure that potential savings are realized. Because the simulation analysis of publicly financed competition provides support for reducing excess hospital bed capacity, its results may make capacity constraints more saleable and perhaps easier to implement.

8.2.5 Data Refinements

Another feasibility issue concerns information on the variables that are identified as being critical to the simulation results. It is obvious that the initial parameter values for market share and enrollment elasticity have significant implications for potential community cost savings. Both the enrollment elasticity and initial market share values are based on sparse data found in the literature.

It would be preferable, for example, to model the consumer enrollment decision separately from the simulation model, and then use the results in the simulation model. If the probability of consumers' switching between modalities could be specified on the basis of plan characteristics and individual characteristics as well as the price differential, the model structure and results would be improved considerably.

The value of the hospital per diem cost is also important. Different communities may have different types of hospitals servicing them and as a result should face different per diem rates for hospital care.[18] Regions which have hospitals with higher per diem rates will achieve greater cost savings for any given reduction in hospital utilization. In addition, if hospital costs grow more rapidly than other provider costs, then the capitation modality and competitive pressures will have an increasingly greater effect on potential cost savings through time. Accurate information on the nature of hospital costs in particular communities is essential.

In general, the data employed in the simulation analysis should be improved. The model employed the best available data; however, the importance of reducing the variability of the estimates of cost savings may warrant more effort to improve the input data.

As an overall assessment of the implementation issues, it can be said that there are many problems which must be overcome before the competition strategy can be successfully implemented. The simulation analysis has served well in identifying areas where much more information is needed. But many questions remain unanswered; for example, what is a reasonable value for the initial market share of the capitation modality? How will these types of plans be introduced and who will practice in them? How will consumers respond to differences in practice styles as well as prices? These are just an indication of the questions that remain. Obviously, answers to these questions are beyond the scope of this thesis but they are nonetheless important for the serious consideration of the implementation of the competitive strategy.

8.3 Extrapolation of the Results to the Province

The last issue that will be discussed under the heading of public policy is whether the simulation results for the hypothetical community situation can be extrapolated to a provincial level. Is there enough information available to obtain reasonable, accurate estimates of the potential cost savings at the provincial level? If so, then potential cost savings could be weighed against the costs of implementing the proposal at both the provincial and community levels.

To estimate the potential cost savings at the provincial level the following procedure was undertaken. Given that the simulation results were based on a hypothetical community of 80,000 people, the first step was to obtain an estimate of the number of cities and regions in Ontario that were approximately that size. Data from Statistics Canada (Canada (1981)) indicate that there were approximately 34 cities or regions that had a population base greater than 50,000 people.[19] Some of these cities or regions obviously had a population much greater than 80,000 people. For centres with a population less than 100,000 people, it is assumed that the capitation modality considers the entire population as its potential market. For areas with a population greater than 100,000 it is assumed that the capitation modality considers only a portion of that population (100,000 people) to be its potential patient population. It is assumed, therefore, that within the province of Ontario there were 34 areas in which this variant of the competitive proposal could be introduced.[20]

Each area is assumed to have only one plan in the capitation sector, which rules out competition among capitation plans and likely renders estimates of provincial savings conservative.[21] Based on this standardization, the introduction of the competitive proposal in 34 areas would affect approximately 2.7 million people in Ontario. This is nearly 31% of the Ontario population in 1981.

From the results in Chapter 7, average per capita savings (or additional costs in the case of a perverse reaction) are determined under the various model structures that have been investigated. Because the simulation results are extrapolated explicitly, qualifications on the data and structure previously mentioned still apply.[22]

Table 8-1 displays the estimates of the present value of potential cost savings for the province of Ontario which result from the various model structures. Extending the results to the provincial scale yields savings ranging from 29.54 million dollars to 647.89 million dollars for the baseline model and 295.53 million dollars to 1051.49 million dollars for the model structure illustrating both the alternative capitation reimbursement arrangement and the positive fee-for-service modality hospital utilization

TABLE 8-1

Estimates of Potential Cost Savings for the Province of Ontario**
(Results from Varying Model Structure)

Model	Best Guess[1] Results (million $)	Most[2] Responsive Case (million $)	Least[3] Responsive Case (million $)
Baseline Model	596.77	647.89	29.54
Positive FFS Modality Hospital Utilization Response	844.05	913.75	283.78
Perverse FFS Modality Ambulatory Utilization Response[4]	-615.69	-497.20	-1309.32
Alternative Capitation Reimbursement Arrangement	728.54	803.55	41.49
Alternative Capitation Reimbursement Arrangement and Positive FFS Modality Hospital Utilization Response	970.83	1051.49	295.53

Notes: See following page.

Notes: (TABLE 8-1)

(1) Results are based on the following assumptions: (1) enrollment elasticity of -0.25, (2) initial market split of 50/50, (3) 5 year adjustment time for the hospital utilization response, and (4) initial hospital utilization rate differential of 30%.

(2) Results are based on the following assumptions (with the exception of the perverse FFS ambulatory utilization response (see note 4)): (1) enrollment elasticity of -0.64, (2) initial market split of 50/50, (3) 3 year adjustment time for the hospital utilization response, and (4) initial hospital utilization rate differential of 30%.

(3) Results are based on the following assumptions (with the exception of the perverse FFS ambulatory utilization response (see note 4)): (1) enrollment elasticity of -0.004, (2) initial market split of 5/95, (3) 5 year adjustment time for the hospital utilization response, and (4) initial hospital utilization rate differential of 17%.

(4) For the perverse FFS ambulatory utilization response the "most responsive" case assumes a 50/50 market split and -0.004 enrollment elasticity while the "least responsive" case assumes a 5/95 market split and -0.64 enrollment elasticity.

(**) Potential population that would be affected is 2,655,275 people which represents approximately 31% of the total provincial population (based on 1981 census figures). In addition, present values are calculated for a 10% social discount rate.

Source: For population statistics see Canada (1981).

response. These values represent ten years of savings discounted at 10%. As is evident from this table, potential savings to the government, even over 10 years, can be quite substantial. If the potential savings were converted to 1985 dollars, savings would be well over 1.5 billion dollars for the 10 year period.

From the initial simulation results, recall that potential cost savings at the community level varied substantially, depending upon the assumptions regarding initial market share. Table 8-2 presents estimates of potential cost savings on the provincial scale for varying initial market shares by model structure. The lowest cost savings occur with the assumption of an initial market split of 5/95 for the capitation and fee-for-service sector, respectively.

These savings range from 117.83 million dollars to 619.34 million dollars depending on the model structure. At a 50/50 market split, potential cost savings are much greater, ranging from 596.77 million dollars to 970.83 million dollars.

TABLE 8-2

Estimates of Potential Cost Savings for the Province of Ontario**
(Sensitivity Results from Varying the Initial Market Share and Model Structure)

Model	Initial Market Share[1] (Capitation/Fee-For-Service) 5/95	20/80	40/60	50/50
Baseline	117.83	277.14	485.92	596.77
Positive FFS Modality Hospital Utilization Response	590.47	675.10	787.62	844.05
Perverse FFS Modality Ambulatory Utilization Response	-1110.90	-975.81	-725.55	-615.69
Alternative Capitation Reimbursement Arrangement	158.98	348.63	602.08	728.54
Combined Alternative Capitation Reimbursement Arrangement and Positive FFS Modality Hospital Utilization Response	619.34	736.51	892.84	970.83

Notes:

(1) Initial Values for the other parameters are set at -0.25 for the enrollment elasticity, a 5 year FFS hospital adjustment response and a 30% initial hospital utilization rate differential.

(**) Potential population estimate is based on 2,655,275 people. In addition, present values are calculated for a 10% social discount rate.

To put these numbers in perspective, potential savings can be expressed as a percentage of the status quo costs (recall that status quo costs represent the cost of servicing the relevant population entirely on a fee-for-service basis). These results are displayed in Table 8-3 for the various model structures and initial market shares. The sensitivity of the results to variations in the initial market share show that the government could save anywhere from 2% to just over 16% of the status quo costs. For the situation which employs the 'best guess' parameter values, the government's potential savings range from approximately 11% to 18% of the status quo costs for the 10 years.

To determine whether these numbers have any policy significance it is necessary to consider two questions. The first is whether the assumptions implicit as well as explicit in the extrapolations are realistic. The second concerns the costs of implementing a competition scheme.

To address the first question, note that the direct extrapolation of the community results to the province implies that there are 34 cities or regions in Ontario which have or could have the same characteristics as the hypothetical community that was modelled.

TABLE 8-3

Estimates of Potential Cost Savings for the Province of Ontario**
(As a Percentage of Status Quo Costs)

Model	Initial Market Split (Capitation/FFS)[5] 5/95	20/80	40/60	50/50	Best[1] Guess (%)	Most[2] Resp (%)	Least[3] Resp (%)
Baseline	2.1	5.0	8.9	10.8	10.8	11.8	0.5
Positive FFS Modality Hospital Utilization Response	10.8	12.3	14.3	15.4	15.4	16.6	5.2
Perverse FFS Modality Ambulatory Utilization Response[4]	-20.3	-17.8	-13.2	-11.2	-11.2	-9.1	-23.9
Alternative Capitation Reimbursement Arrangement	2.9	6.4	10.9	13.3	13.3	14.6	0.8
Combined Alternative Capitation Reimbursement Arrangement and Positive FFS Modality Hospital Utilization Response	11.3	13.4	16.3	17.7	17.7	18.3	5.4

Notes: For notes 1 to 4 see Table 8-1.

(5) Initial values for the other parameters are set at (1) -0.25 for the enrollment elasticity, (2) a 5 year FFS modality hospital adjustment response, and (3) an initial hospital utilization rate differential of 30%.

(**) If the entire population were serviced on a FFS basis, the present value of costs for the 10 years, discounted at 10% is approximately 5490 million dollars. The potential population estimate is 2,655,275 people (approximately 31% of the total Ontario population).

Such concerns as similar benefit packages and institutional structure should pose no problems at the provincial level. These conditions can be set through the provincial plan and can apply both at the provincial level and the community level. However, assumptions such as similar health status for the patient populations and comparable quality of care may require some qualifications. If health status across the province or within communities differs systematically from that in the Sault Ste. Marie region, then the results presented in Tables 8-1 to 8-3 will be biased estimates of potential provincial cost savings, although the direction of bias cannot be anticipated.

In this case it would be necessary to perform a further disaggregation of utilization rates, so that different rates could be applied to particular groups. This obviously would involve much more information than is currently available. However, any differences would have important implications for cost savings. If utilization rates are higher than those employed in the analysis, potential savings will not be as great. The above results would then be an over-estimate of the true savings.

The assumption of equal quality of care between the capitation and fee-for-service modalities across regions of the province may also prove to be unrealistic, although this is speculative. If true, however, this would obviously affect consumer enrollment decisions and hence the actual costs and savings could differ from estimates here.

The provincial results are also based on the assumption that all consumers would share the enrollment elasticities that were used in the community model, that is, an enrollment elasticity of -0.25. In certain regions, consumers may be more or less sensitive to prices than this. As a result, different regions may have dissimilar experiences and savings. However, in this case it is hard to predict whether the results above over- or under-estimate likely savings. What is clear, however, is that further investigation of possible systematic differences in enrollment elasticity by region is desirable.

From even this brief discussion it can be concluded that the estimates of potential cost savings at the provincial level are only crude estimates. Much more needs to be done to refine these estimates.

Refined or not, estimates of savings must be weighed against the cost of implementing such a proposal.

It is beyond the scope of this thesis to measure or estimate quantitatively the costs of implementing a competitive proposal. Instead, the remainder of this section provides a brief qualitative assessment of the adjustment costs that may arise if this variant of the competition proposal is introduced on a major scale in Ontario.

First, no consideration has been given here to the costs of instituting capitation modalities within given communities. For example, there are capital costs in building multi-specialty group practices which will operate as capitation plans. There is also the issue of whether these capital costs should be borne privately or be publicly subsidized (and perhaps amortized and included in calculations of the modality cost). In addition, a large amount of information must be collected and analyzed in deciding what scale of operation to encourage and support in each community.

Second, there are costs both of providing information on the alternative modalities to consumers and of collecting information from both modalities for use in the calculation of the enrollment charge.

Third, if a different practice style such as multi-specialty, capitation-reimbursed group practice is introduced on a wide scale, this will obviously have an effect on both the required stock of doctors and the stock of allied health personnel. For example, if more nurse practitioners are needed, the training costs involved in producing them must be considered.

No doubt, there are a number of costs involved about which little information is available. The experience of the HSO system in Ontario might be used to gain knowledge of the magnitude of some of these. Experience in other provinces or from the American HMO literature might also be useful. Other costs, such as the potentially increased difficulty of managing relations between the government and the provincial medical association (long an opponent of this direction) will remain intangible though not irrelevant.

Although the above costs have not been measured and other costs may arise, the magnitude of potential savings on a provincial scale would appear to be large enough that provincial governments cannot ignore the potential significance of publicly financed competition.

8.4 Summary

The simulation analysis in the earlier chapters provided the first quantitative estimates of the significance of a particular example of publicly financed competition. The magnitude of the potential savings was large enough that a more complete discussion of savings from publicly financed competition in a policy context was necessary, consequently a brief discussion of the issues of feasibility and implementation was provided in this chapter.

From this discussion, it appears that with some minor qualifications publicly financed competition could be feasible on legislative grounds. Actual implementation of the proposal, however, requires additional research and discussion as an integral part of the policy development process. Many issues such as capacity constraints, initial market share, capital costs, and data development are significant ones that must be resolved prior to provincial implementation.

In this context, the results of the simulation analysis have served to identify and highlight some issues rather than to resolve them. Nevertheless, the magnitude of the savings, as well as the feasibility of the proposal, suggest that publicly financed competition (or, at the very least, increased use of capitation-based practice alongside fee-for-service) is a policy worth pursuing. The next step would appear to be a pilot project in an existing market situation, such as Sault Ste. Marie, whereby many of the operational and logistic issues associated with implementation could be studied.

Endnotes

1. See Canada (1984a), Canada Health Act.

2. See Canada (1984a), Canada Health Act.

3. It should be emphasized also that because the enrollment charge is not based on use at point-of-service, it is extremely difficult to argue that the charge directly affects access to care.

4. See McClure (1983) for information on the research status of risk-adjusted capitation rates.

5. In practice, however, this may be questioned. Because premiums in Ontario are often paid by employers the incentive to the consumer is weakened. However, employees may be more willing to play an active role (as might employers) if the charges that they face are differential charges based on efficiency.

6. The three community sponsored HSOs are the Sault Ste. Marie Group Health Association, Flemington Park in Toronto and St. Anne's in Ottawa.

7. The type of ownership in these practices has some influence on the organizations' attempts to increase their market shares. Under current incentives, it is thought that only community-sponsored HSOs actively seek to expand their market shares and do so by increasing efficiency within the organizational structure. This is accomplished through such actions as the increased use of nurse practitioners and the substitution of out-patient services for institutional services. Physician-sponsored HSOs thus far have not actively attempted to capture a larger share of the market. This is primarily due to the fact that with current institutional and incentive arrangements plans do not need to compete for a share of the market. (Personal communication with Mark McGuire, Executive Director, Association of Ontario Health Centres, Toronto.)

8. It is assumed that the reason the consumer sought care elsewhere was a result of location at the time of illness and not a result of dissatisfaction with his current choice of modality.

9. For example, out-of-region use charges could be omitted from the annual calculations and data on place of service could be used to decide whether out-of-region use was dissatisfaction or location at time of illness.

10. For provincial legislation and regulations see Ontario (1980c), Revised Statutes of Ontario and Ontario (1980b), Revised Regulations of Ontario, respectively.

11. See Ontario (1980c), Revised Statutes of Ontario.

12. Neither is the period of a year sacrosanct. It could be six months, for example.

13. Adverse selection exists if one modality purposely discriminates against different risk classes by attempting to service only good risks thereby lowering its costs. Whether self-selection amongst consumers exists is also an important issue. If consumers self-select to one particular modality, it may be the case that that modality gets all the good risks and hence can provide care at a lower cost per person. Evidence from the literature (see Luft (1981)) neither confirms ~~nor~~ refutes the existence of self-selection. How important a factor self-selection actually is remains to be determined. Once again the need for a more careful examination of the consumer choice decision is emphasized.

14. Once again, however, this interpretation may be challenged in the courts.

15. Except in the case of Ambulatory Care Incentive Payments (ACIP) to HSOs. Under this program capitation plans are rewarded financially for using less hospital patient days than fee-for-service practitioners.

16. See Enthoven (1980a), p. 44.

17. For a complete discussion of how capitation rates are currently calculated and the associated problems, see Chapter 4 of this thesis, Stoddart (1982b) or Seidelman et al. (1982).

18. For example, teaching hospitals have higher per diem rates than general and allied special hospitals.

19. In fact there were 25 census metropolitan areas and 9 census agglomerations that satisfied this criterion.

20. For a listing of the cities and regions involved see Appendix I.

21. For example, for a city such as Hamilton, it was assumed that the potential market facing the capitation sector in this city was 100,000 and not the population of Hamilton, which is approximately 300,000. Although Hamilton and cities of comparable size have the ability to support more than one capitation plan, for this analysis more than one plan was not considered. This may not be optimal, but more than one plan may lead to different competitive effects than have been outlined in the simulation analysis and as a result the simulation results would not be directly applicable. To remain consistent with the generation of the community results in the thesis this restriction has therefore been imposed.

22. Recall that utilization rates and cost figures employed in the simulation model are based on 1978-79 data. It is these numbers that are applied to the estimate of population. Unfortunately 1978 was not a census year and therefore as a matter of convenience 1981 population figures are employed. This should not, however, seriously affect the order of magnitude of the estimated provincial savings.

CHAPTER 9

SUMMARY

Market reform has been suggested as one possible policy direction for improving the performance of health care delivery and hence long-run cost control. Proposals for market reform contain two key features. The first is a provision for consumer cost-sharing, and the second is a provision for consumer choice between alternative health care delivery modalities. Consumer cost-sharing and choice between alternative delivery modalities are inter-related in their effect on economic efficiency.

Cost-conscious consumers have an interest in choosing an efficient provider. Providers are then more aware of the resource implications of their activities because consumers will, ceterius paribus, tend to choose least-cost providers. These features are discussed in the literature as necessary components of a successful market reform policy. However, very little analytic work on market reform has been done thus far for Canada.

This thesis has attempted to provide a preliminary investigation of market reform in the Canadian health care market. Toward this end, it has developed and employed a simulation model to investigate the potential significance of publicly financed competition in controlling health care expenditures over the longer term.

The baseline model structure was a micro-simulation of the effects of competition on health care expenditures in a single (Ontario) community. Health services in the community can be obtained from either a capitation modality or a fee-for-service modality. Both modalities offer similar benefit packages and are comparable in terms of quality of care.

In each year consumers choose to obtain their primary care from one of the two modalities. For each sector, both ambulatory and hospital costs are summed to obtain the total cost of providing care. Average per capita costs are then calculated for each sector with the government assuming responsibility for the lower cost on behalf of all individuals. Any difference in costs between modalities translates into an enrollment charge and the existence of the enrollment charge generates switching by consumers between the two modalities.

Changes in enrollment or the market share of each modality in response to cost differences impose competitive pressures on both modalities. Successful competitive pressures in the long run minimize the cost differential between the two modalities and, as a result, the total cost of providing health care to a given community is reduced.

Data pertaining to the community of Sault Ste. Marie (and taken from Wolfson (1981)) were chosen to initialize the baseline model. The results provide the first quantitative estimates of potential cost savings resulting from the introduction of publicly financed competition into a hypothetical community. The baseline model indicated that the existence of the capitation modality, and the addition of a consumer choice decision between a capitation and fee-for-service modality based upon an enrollment charge, lead to significant savings for a particular community.

Using the 'best guess' parameter values, the present value of cost savings was estimated to be approximately 18 million dollars (1978-79 dollars) for a ten year period. In 1985 dollars these savings are approximately 30 million dollars. The range of potential cost savings varied from approximately 1.5 million to 20 million dollars in present value terms for a ten year period. The magnitude of potential cost savings depends upon the assumptions made regarding the critical parameters such as the initial market share, the initial hospital utilization differential between the two modalities, and the enrollment elasticity.

Extended versions of the baseline model allowed for increased competition between the two modalities. This increased competition was modelled through (1) a fee-for-service reaction (both positive and perverse) to lost market share, and (2) a restructuring of the reimbursement arrangement for the capitation sector. The results of the extended models support the conclusions of the baseline model in that potential cost savings for a community are significant. Savings, however, again vary according to the assumptions made about the critical parameter values.

A positive fee-for-service modality reaction to lost market share through a reduction in the fee-for-service hospital utilization rate enhanced the savings attributable to publicly financed competition. Under that scenario, discounted potential cost savings were approximately 25 million dollars when the initial parameter values were used. In 1985 dollars, the savings were approximately 44 million dollars for the ten year period. The range of potential cost savings varied from approximately 10 million to 28 million dollars. This represented 6% to 17% of the status quo community health care costs, where status quo community health care costs are the costs of servicing the community of 80,000 entirely on a fee-for-service basis.

In the baseline model it was assumed that capitation rates were linked to ambulatory costs in the fee-for-service modality, an assumption that was based in part on the historical arrangements in Ontario's small capitation sector. This assumption, however, did not allow the capitation sector to lower its costs through increased efficiency. In fact, with the linkage and a perverse response by the fee-for-service sector, dissavings can occur under the competitive proposal. For example, if the fee-for-service sector tries to recapture lost market share (and hence lost income) by increasing ambulatory utilization for its remaining patient population, the linkage of fee-for-service ambulatory costs to the capitation rate increases costs rather than reducing them.

The alternative reimbursement arrangement scenario severed the linkage of the capitation rate to fee-for-service ambulatory costs. Instead, it was assumed that the capitation modality bargained independently with the Ministry of Health over reimbursement, with the outcome that the capitation rate more closely reflected the production costs in that modality.

Using the 'best guess' parameter values, potential cost savings were approximately 22 million dollars for a ten year period. Potential cost savings ranged from 1 million to 24 million dollars which was approximately 1% to 15% of status quo community health care costs.

The importance of the institutional framework assumed by the competitive proposal is highlighted by this extended model structure. The severing of the linkage of the capitation rate to fee-for-service ambulatory costs enhanced savings. The results from the alternative reimbursement scenario suggest that the estimates of savings in the simulation analyses are perhaps conservative, particularly if increased competition can move practice styles closer to the efficiency frontier.

The baseline model and the extended versions of it indicated that the existence of a capitation modality and the addition of a consumer choice decision based on an enrollment charge led to significant savings for one community. In fact, the strongest marginal contribution to savings came from the existence of the capitation modality. The marginal contribution to savings of increased competition between the two modalities is smaller than that due to the existence of the capitation modality, but it is not insignificant. Potential savings were enhanced by a reduction in the fee-for-service hospital utilization rate and by the alternative reimbursement arrangement in the capitation sector.

The savings were, however, sensitive to the assumptions made regarding the initial parameter values. In particular, variations in initial market share and the initial hospital utilization rate differential caused large variations in the results. For example, a 15% reduction in the fee-for-service hospital utilization rate reduced potential cost savings by approximately 50% in all model structures. This is clearly not an insignificant result.

Because the estimates of potential cost savings were significant for one community, the quantitative and qualitative significance of the publicly financed competition proposal was discussed at a provincial level. The extrapolation of the community results to a provincial level indicated that potential cost savings were approximately 597 million dollars when the 'best guess' parameter values were used. The range of potential cost savings for the province varied from approximately 30 million to 1052 million dollars, depending upon the model structure. In 1985 dollars, these savings are well over 1.5 billion dollars for a 10 year period.

Although potential cost savings from this variant of publicly financed competition are significantly large they are only a first estimate of the savings that are possible under such a proposal. The wide ranges of estimated savings, however, suggest a need for more precise knowledge about the parameter values for the initial market share, the initial hospital utilization differential and the enrollment elasticity.

For the successful adoption or experimentation with publicly financed competition, many other issues beyond the scope of this thesis, such as the legislative feasibility and obstacles to implementation of publicly financed competition, need to be resolved. A brief overview of these issues was provided in Chapter 8, where it was concluded that this variant of publicly financed competition might be introduced without significant changes in the legislation. The actual implementation of the proposal, however, might be more problematic and would require additional research and discussion. Issues such as capacity constraints, initial market shares, capital costs and data development pose significant problems that must be resolved prior to actual implementation.

The main contributions of the thesis are: (1) empirical estimates indicating that this variant of publicly financed competition has the potential to moderate health care costs within a community, as well as on a provincial level; (2) the identification and analysis of parameters which are critical in explaining the variation in potential savings from publicly financed competition; (3) a discussion of issues such as the legislative feasibility and problems of implementation affecting the introduction of publicly financed competition; and (4) a specific model framework, open to further refinement, with which to analyze this and other variants of publicly financed competition more thoroughly.

The methodology and the results of this thesis constitute an important step in the encouragement of a more thorough investigation of market reform in the health care market.

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APPENDIX A

RAMSAY AND WRIGHT MODEL STRUCTURE AND RESULTS

2

Ramsay and Wright (1978) present a simulation model of market response to HMO growth. There does not appear to be, however, a strong empirical basis for their results. In their model HMOs offer two main benefits: (1) health maintenance and (2) cost savings. They claim that cost containment is due to lower inflation rates and lower per capita hospital utilization in the capitation sector than occurs in the FFS sector. They analysis attempts to answer four questions:

(1) What market share might HMOs capture if current inflation and utilization trends persist?;

(2) How might HMO growth affect remaining health system costs; what costs are saved by HMO members, which costs are shifted to the other sector?;

(3) How might the traditional sector respond to HMO competition? What are the magnitudes of other sector savings due to hospital utilization reform and to excess inflation reform; and

(4) To what extent do HMO cost savings and community impact depend on HMO control of hospitals.

The model contains many feedback loops. The positive loop consists of costs driving premiums, premiums affecting membership and memberships in turn affecting costs. The negative feedback loops attempt to reduce differences in perceived and desired values of some variables. For example, the FFS sector may adjust its hospital capacity so that it tends towards a more acceptable level. The goals for these reform loops are the HMO values, which are constant over the 15 year simulation period.

The assumptions of the model are as follows:

(1) initially the HMO has 10% of the market;

(2) service benefits and quality are the same in each sector;

(3) HMO values of hospital capacity, inflation, etc., are considered the optimal values;

(4) the choice between plans is on the basis of perceived out-of-pocket premiums. It is assumed that the fraction of FFS subscribers who would switch is a function of the premium gap. For example, if the HMO premium is less than 1/2 that of the traditional sector's premium then 1/3 of the FFS subscribers would switch to the HMO sector. It is also assumed only a small percentage drop-out (.09%);

(5) the net subscription rate to the HMO depends on:

   (i) the potential net subscriptions - which is the FFS population who can potentially switch to the HMO; and

   (ii) the HMO expansion limit. This depends on the availability of expansion funds, the ability to recruit physicians, etc. In their model it is assumed that the HMO can recruit a maximum number of physicians per year (100) and that most the HMO can expand its membership is 10% per year (this is a proxy for the availability of funds for expansion);

(6) there is a saturation effect, that is, the HMO can only capture 50% of the market;

(7) estimates for the shape and scale of the premium and saturation effects are synthesized from descriptions of existing HMOs, discussions with experts and the authors' own judgements;

(8) HMO premiums are equal to HMO costs;

(9) FFS premiums are equal to FFS costs minus a deductible;

(10) inflation rates in the HMO sector are less than those in the FFS sector;

(11) a regulatory effect on costs and premiums (which is not fully explained); and

(12) different physician/population ratios in the two sectors and different staff/physician ratios.

The analysis is done for two different hospital structures. One, HMOs control their own hospitals, and two, HMOs buy hospital services from the traditional sector.

Ramsay and Wright give six different scenarios of response by the FFS sector.

(1) "no response" - the FFS sector ignores competition from the HMO sector, that is, FFS inflation and utilization rates do not adjust towards the HMO values.

(2) "resistance to HMO growth" - the FFS sector attempts to suppress HMO growth by increased regulation and supply side constraints.

(3) "reform of FFS hospital utilization" - the FFS sector reduces its hospital days per member per year.

(4) "reform of excess inflation" - the FFS sector gives attention to cost control thereby reducing FFS inflation rates.

(5) "utilization and inflation reform" - the FFS sector combines both utilization and inflation reform outlined above.

(6) "most optimistic reform package" - The FFS sector follows a more rapid adjustment of excess hospital capacity, and a more rapid reduction of excess inflation.

The results from the Ramsay and Wright study are given in Tables A-1 and A-2. (These tables differ slightly from the original tables in that corrections were made to errors in the original article). Tables A-3 and A-4 are results of the Ramsay and Wright model if not inflation response is assumed. From these results it is apparent that it is the difference in inflation rates between the two sectors that drive savings in the model.

TABLE A-1

Ramsay and Wright's Results*

	Total Community Health Costs (million $)	Total HMO Subscriber Savings (million $)	Total FFS Sector Subscribers Extra Costs (million $)	Values at End of Fifteen Year Projections: HMO Market Share (%)	HMO Premium ($/year)	FFS Sector Premium ($/year)	FFS Sector Beds/100
No Response to HMO Growth	5123	891	307	39.0	669-	1634	3.8
Strong Resistance to HMO Growth	5244	381	86	18.3	736	1482	3.4
Reform of FFS Hospital Utilization	4462	546	528	35.4	669	1146	2.5
Reform of FFS Excess Inflation	4398	509	199	34.6	669	1077	3.7
Utilization and Inflation Reform	3972	295	348	28.3	669	792	2.2
Most Optimistic Reform Package	3805	225	334	25.5	669	735	2.0

* Corrections to the original article (Ramsay and Wright (1978))
HSHARE = 0 control own hospital

TABLE A-2

Ramsay and Wright's Results*

	Total Community Health Costs (million $)	Total HMO Subscriber Savings (million $)	Total FFS Sector Subscribers Extra Costs (million $)	Values at End of Fifteen Year Projections: HMO Market Share (%)	HMO Premium ($/year)	FFS Sector Premium ($/year)	FFS Sector Beds/100
No Response to HMO Growth	5246	437	104	31.7	1010	1486	4.3
Strong Resistance to HMO Growth	5369	180	28	15.4	1093	1457	3.7
Reform of FFS Hospital Utilization	4818	165	351	22.4	1060	1135	3.0
Reform of FFS Excess Inflation	4543	315	73	29.4	784	1047	4.2
Utilization and Inflation Reform	4337	180	258	23.5	813	882	3.0
Most Optimistic Reform Package	4146	123	287	19.7	792	799	2.6

* Corrections to original article (Ramsay and Wright (1978))
HSHARE = 1 shares hospital with other sector

TABLE A-3

(No Inflation Response)

	Total Community Health Costs (million $)	Total HMO Subscriber Savings (million $)	Total FFS Sector Subscribers Extra Costs (million $)	Values at End of Fifteen Year Projections: HMO Market Share (%)	HMO Premium ($/year)	FFS Sector Premium ($/year)	FFS Sector Beds/100
No Response to HMO Growth	2130	108	25	17.3	203	197	3.3
Strong Resistance to HMO Growth	2147	29	-22	3.8	223	193	3.3
Reform of FFS Hospital Utilization	2130	108	25	17.3	203	197	3.3
Reform of FFS Excess Inflation	2130	108	25	17.3	203	197	3.3
Utilization and Inflation Reform	2127	105	20	16.7	203	196	3.3
Most Optimistic Reform Package	2127	105	20	16.7	203	196	3.3

HSHARE = 0 Controls own hospital

TABLE A-4

(No Inflation Response)

	Total Community Health Costs (million $)	Total HMO Subscriber Savings (million $)	Total FFS Sector Subscribers Extra Costs (million $)	Values at End of Fifteen Year Projections: HMO Market Share (%)	HMO Premium ($/year)	FFS Sector Premium ($/year)	FFS Sector Beds/100
No Response to HMO Growth	2163	39	-6	5.8	221	194	3.4
Strong Resistance to HMO Growth	2176	12	-15	.5	243	193	3.3
Reform of FFS Hospital Utilization	2163	39	-6	5.8	221	194	3.4
Reform of FFS Excess Inflation	2163	39	-6	5.8	221	194	3.4
Utilization and Inflation Reform	2163	39	-5	5.8	221	194	3.4
Most Optimistic Reform Package	2163	39	-5	5.8	221	194	3.4

HSHARE = 1 Shares hospital with other sector

APPENDIX B

BASELINE MODEL EQUATIONS

DYNAMO Equations For The Baseline Model

Community Size And Modality Market Share

```
C    TPOP=80000                    Total Community Population

L    FFSPOP.K=FFSPOP.J+(DT)*(PTELAS*FFSPOP.J* DPSTAR.JK)
                         FFS Modality Population

N    FFSPOP=FFSIOP
C    FFSIOP=40000            Initial FFS Population

A    CAPPOP.K=TPOP-FFSPOP.K
                    Capitation Modality Population

A    CAPFRC.K=CAPPOP.K/TPOP  Capitation Market Share

A    FFSMKT.K=FFSPOP.K/TPOP        FFS Market Share
```

Consumer Enrollment Decision

```
A    PSTAR.K=SWITCH(GOVT1.K,GOVT2.K,PREM)   Relative Price
C    PREM=0.0

C    PTELAS=-0.25              FFS Enrollment Elasticity

A    RPRIC1.K=[(FFSPRM.K-CAPPRM.K)/(CAPPRM.K)]+1
                                    Relative Price (FFS/CAP)

A    RPRIC2.KL=[(CAPPRM.K-FFSPRM.K)/(FFSPRM.K)]+1
                                    Relative Price (CAP/FFS)

R    DPSTAR.KL=(PSTAR.K-LSTAR.K)/LSTAR.K
                              % Change in Relative Price

A    LSTAR.K=SMOOTH(PSTAR.K,DEL)
                         Relative Price Lagged One Period

A    GOVT1.K=CLIP(RPRIC1.K,1,TIME.K,1)
C    DEL=1.0                            One Year Lag
A    GOVT2.K=CLIP(RPRIC2.K,1,TIME.K,1)
```

Hospital Costs

A CAPHCT.K=CAPPOP.K*CAPHUT*COSTPD.K
Capitation Hospital Costs

C CAPHUT=0.85 Capitation Hospital Utilization Rate

L COSTPD.K=COSTPD.J+(DT)*(COSTI.JK)
Cost Per Patient Day

R COSTI.KL=CLIP(COST*COSTPD.K,0,TIME.K,1)
Increase in Cost Per Patient Day

C COST=0.0

N COSTPD=167.86 Initial Cost Per Patient Day

A FFSHCT.K=FFSPOP.K*FFSHUT*COSTPD.K
FFS Hospital Costs

C FFSHUT=1.21 Initial FFS Hospital Utilization Rate

Ambulatory Costs

A CAPAMC.K=CLIP(NNCAMC.K,INCAMC.K,TIME.K,2)
Capitation Ambulatory Costs

A INCAMC.K=CAPPOP.K*(87.23)
Initial Capitation Ambulatory Costs

A NNCAMC.K=CAPPOP.K*(FFSAMC.K/FFSPOP.K)
Current Capitation Ambulatory Costs

A FFSAMC.K=(FFSPOP.K)*(102.68) FFS Ambulatory Costs

Total And Average Per Capita Costs

A CAPTOT.K=CAPHCT.K+CAPAMC.K Total Capitation Costs

A CAPPRM.K=CAPTOT.K/CAPPOP.K Average Per Capita Costs
(Capitation Modality)

A FFSTOT.K=FFSHCT.K+FFSAMC.K Total FFS Costs

A FFSPRM.K=FFSTOT.K/FFSPOP.K Average Per Capita Costs
(FFS Modality)

NOTES:

The DYNAMO simulation language incorporates the following types of structural equations (see Pugh-Roberts Associate (1984)).

L level equation - the current value of the variable at a simulated time K (denoted by the timescript .K) is equal to its value at the previous time-step (timescript .J) plus DT (the size of the time step) times the rate of change in some other variable (with timescript .JK)

R rate equation - rate variables are computed at the present time for the interval K to L. The use of the double timescript (.KL or .JK) signifies that the rate is assumed constant over the timestep.

A auxiliary equation - computed at the present time from other variables computed earlier within the present timestep.

C constants

APPENDIX C

ENROLLMENT ELASTICITY ESTIMATES

TABLE C-1

Enrollment and Premium Raw Data - Elasticity Estimates - Washington Area

(1) YEAR	(2) SMSA POP	(3) GHA POP	(4) BC/BS POP	(5) GHA PREM	(6) BC/BS PREM	(7) % CHANGE BC/BS POP	(8) REL PREM	(9) PTELAS
1964	268145	12350	255795	345	151.32	--	0.439	--
1965	268145	12669	255476	345	204.84	-0.0012	0.594	-0.004
1966	268145	12529	255616	345	204.84	-0.0005	0.594	--
1967	268145	14246	253899	367.2	233.04	-0.0067	0.635	-0.096
1968	268145	15257	252888	402.48	246.96	-0.0040	0.614	0.120
1969	268145	15699	252446	431.88	316.2	-0.0017	0.732	-0.009
1970	268145	16760	251385	539.52	353.4	-0.0042	00.655	0.0399
1971	268145	18364	249781	521.28	350.28	-0.0064	0.672	-0.247
1972	268145	19675	248470	588.36	476.88	-0.0052	0.811	-0.025
1973	268145	20213	247932	548.64	366.96	-0.0022	0.669	0.0124
1974	268145	21452	246693	457.68	397.92	-0.0050	0.869	-0.017

Notes: (9) own price elasticity $E = \frac{\%\Delta(\text{BC/BS POP})}{\%\Delta(\text{REL PREM HMO})}$

Source: Valiante (1976)

TABLE C-2

HMO and FFS Enrollment and Premium Raw Data - Elasticity Estimates - Denver Area

(1) YEAR	(2) SMSA POP	(3) FEHBP POP	(4) BC/BS POP	(5) FEHBP PREM	(6) BC/BS PREM	(7) % CHAN BC/BS POP	(8) REL PREM (HMO)	(9)* PTELAS
1970	25943	450	25493	287.04	353.4		1.231	
1971	25943	573	25370	256.92	350.28	-0.0048	1.363	-0.045
1972	25943	1850	24093	324.24	476.88	-0.0503	1.471	-0.639
1973	25943	2172	23771	391.92	366.96	-0.0133	0.936	-0.036
1974	25943	2598	23324	366	397.92	-0.0188	1.087	-0.117

* See notes Table C-1

Source: Valiante (1976)

TABLE C-3

HMO and FFS Enrollment and Premium Raw Data - Elasticity Estimates - Boston Area

(1) YEAR	(2) SMSA POP	(3) FEHBP POP	(4) BC/BS POP	(5) FEHBP PREM	(6) BC/BS PREM	(7) % CHAN BC/BS POP	(8) REL PREM (HMO)	(9)* PTELAS
1971	39725	800	38925	411.12	350.28		0.852	
1972	39725	1260	38465	484.92	476.88	-0.0118	0.983	-0.077
1973	39725	1416	38309	574.44	366.96	-0.0040	0.639	0.012
1974	39725	1565	38160	510	397.92	-0.0038	0.780	-0.018

* See notes Table C-1

Source: Valiante (1976)

TABLE C-4

HMO and FFS Enrollment and Premium Raw Data - Elasticity Estimates - Los Angeles

(1) YEAR	(2) SMSA POP	(3) KAISER POP	(4) ROOS-L POP	(5) BC/BS POP	(6) KAISER PREM	(7) ROOS-L PREM	(8) BC/BS PREM	(9) % CHAN BC/BS POP/K	(10) % CHAN BC/BS POP/R	(11) REL PREM HMO/K	(12) REL PREM HMO/R	(13) PTELAS	(14) PTELAS
1964	78115	22885	775	54455	202.8	172.08	151.32			0.746	0.879		
1965	78115	23509	744	53862	211.44	203.88	204.84	-0.0114	0.0069	0.969	1.005	-0.038	0.004
1966	78115	21947	676	55492	211.44	255.36	204.84	0.0209	0.0013	0.969	0.802		-0.006
1967	78115	22586	572	54957	242.4	263.4	233.04	-0.0115	0.0019	0.961	0.885	1.508	0.018
1968	78115	23629	583	53903	303.96	263.4	246.96	-0.0189	-0.0002	0.812	0.938	0.123	-0.003
1969	78115	18070	444	59601	344.28	307.08	316.2	0.1031	0.0026	0.918	1.030	0.791	0.026
1970	78115	19791	449	57875	401.76	256.68	353.4	-0.0288	-0.0000	0.679	1.377	0.683	-0.001
1971	78115	19895	454	57766	384.6	257.04	350.28	-0.0017	-0.0000	0.911	1.363	-0.051	0.008
1972	78115	23249	488	54378	441	359.4	476.88	-0.0580	-0.0005	1.081	1.327	-0.310	0.022
1973	78115	23453	542	54120	538.32	294.96	366.96	-0.0037	-0.0009	0.682	1.244	0.010	0.016

Notes: (a) own price elasticity = $\frac{\%\Delta(\text{BC/BS POP/K})}{\%\Delta(\text{REL PREM HMO/K})} = \frac{(9)}{(11)}$

(note: based upon BC/BS vs. Kaiser premiums holding other HMO premium constant)

(b) own price elasticity = $\frac{\%\Delta(\text{BC/BC POP/R})}{\%\Delta\ (\text{REL PREM HMO/R})} = \frac{(10)}{(12)}$

(note: based upon BC/BS vs. Roos-Loos premium holding other HMO premium constant)

Source: Valiante (1976)

TABLE C-5

HMO and FFS Enrollment and Premium Raw Data - Elasticity Estimates - New York Area

(1) YEAR	(2) SMSA POP	(3) HIP POP	(4) GHI POP	(5) BC/BS POP	(6) HIP PREM	(7) GHI PREM	(8) BC/BS PREM	(9) % CHAN BC/BS POP/H	(10) % CHAN BC/BS POP/G	(11) REL PREM HMO/H	(12) REL PREM HMO/G	(13)[a] PTELAS	(14)[b] PTELAS
1964	128171	7820	6070	114281	254.04	286.8	151.32			0.596	0.527		
1965	128171	8431	6836	112904	254.04	299.76	204.84	-0.0053	-0.0067	0.806	0.683	-0.015	-0.023
1966	128171	8750	6908	112513	254.04	384	204.84	-0.0028	-0.0006	0.806	0.533		0.003
1967	128171	11793	7609	108769	228.6	358.56	233.04	-0.0270	-0.0062	1.019	0.650	-0.102	-0.029
1968	128171	12092	7920	108159	228.6	358.56	246.96	-0.0027	-0.0028	1.080	0.689	-0.046	-0.048
1969	128171	12756	8288	107127	308.16	358.56	316.2	-0.0061	-0.0034	1.026	0.882	0.122	-0.012
1970	128171	12386	9721	106064	391.44	414.72	353.4	0.0034	-0.0133	0.903	0.852	-0.029	0.397
1971	128171	14263	10749	103159	371.28	384.84	350.28	-0.0176	-0.0096	0.943	0.910	-0.393	-0.142
1972	128171	15951	13218	99002	407.16	406.92	476.88	-0.0163	-0.0239	1.171	1.172	-0.068	-0.083
1973	128171	16789	15711	95671	381.96	367.2	366.96	-0.0084	-0.0251	0.961	0.999	0.047	0.171

(a), (b), See notes Table C-4.

Source: Valiante (1976)

TABLE C-6

HMO and FFS Enrollment and Premium Raw Data - Elasticity Estimates - Honolulu Area

(1) YEAR	(2) SMSA POP	(3) HIP POP	(4) GHI POP	(5) BC/BS POP	(6) HIP PREM	(7) GHI PREM	(8) BC/BS PREM	(9) % CHAN BC/BS POP/K	(10) % CHAN BC/BS POP/H	(11) REL PREM HMO/K	(12) REL PREM HMO/H	(13)[a] PTELAS	(14)[b] PTELAS
1964	21941	5950	12255	3736	214.2	191.4	151.32			0.706	0.791		
1965	21941	5371	12657	3913	236.04	191.4	204.84	0.1550	-0.1076	0.868	1.070	0.678	-0.304
1966	21941	4823	11572	5546	236.04	221.76	207.84	0.1400	0.2773	0.868	0.924		-2.025
1967	21941	5083	11441	5417	237.96	131.4	233.04	-0.0468	0.0236	0.979	1.774	-0.365	0.0257
1968	21941	5549	12481	3911	263.4	228.6	246.96	-0.0860	-0.1919	0.938	1.080	2.018	0.491
1969	21941	5208	12172	4561	306.12	228.6	316.2	0.0872	0.0790	1.033	1.383	0.857	0.282
1970	21941	5747	12822	3372	348.72	296.4	353.4	-0.1181	-0.1425	1.013	1.192	6.257	1.033
1971	21941	5653	12648	3640	313.56	178.32	350.28	0.0279	0.0516	1.117	1.964	0.272	0.080
1972	21941	6073	13378	2490	344.04	227.76	476.88	-0.1153	-0.2005	1.386	2.094	-0.479	-3.043
1973	21941	6090	13578	2273	367.92	333.6	366.96	-0.0068	-0.0803	0.997	1.1	0.024	0.169

(a), (b) See notes Table C-4.

Source: Vallante (1976)

TABLE C-7

HMO and FFS Enrollment and Premium Raw Data - Elasticity Estimates - Seattle Area

(1) YEAR	(2) SMSA POP	(3) HIP POP	(4) GHI POP	(5) BC/BS POP	(6) HIP PREM	(7) GHI PREM	(8) BC/BS PREM	(9) % CHAN BC/BS POP/G	(10) % CHAN BC/BS POP/W	(11) REL PREM HMO/G	(12) REL PREM HMO/W	(13)[a] PTELAS	(14)[b] PTELAS
1964	14572	2820	1652	10100	215.52	233.76	151.32			0.702	0.647		
1965	14572	2982	1721	9869	215.52	238.68	204.84	-0.0160	-0.0068	0.950	0.858	0.045	-0.021
1966	14572	2598	1639	10335	231.12	259.2	204.84	0.0389	0.0083	0.886	0.790	-0.576	-0.105
1967	14572	3006	1669	9897	240.24	259.56	233.04	-0.0394	-0.0029	0.970	0.898	-0.418	-0.021
1968	14572	3290	1802	9480	316.92	283.92	246.96	-0.0286	-0.0134	0.779	0.870	0.146	0.431
1969	14572	3363	1761	9448	353.4	283.92	316.2	-0.0077	0.0043	0.895	1.114	-0.052	0.015
1970	14572	3663	1728	9181	353.4	415.8	353.4	-0.0317	0.0035		0.850	-0.270	-0.015
1971	14572	3816	2049	8707	276.96	320.28	350.28	-0.0166	-0.0349	1.265	1.095	-0.063	-0.122
1972	14572	4503	2064	8005	339.6	364.56	476.88	-0.0789	-0.0017	1.404	1.308	-0.715	-0.009
1973	14572	4701	2319	7552	365.16	362.52	366.96	-0.0247	-0.0318	1.005	1.012	0.087	0.141

(a), (b) See notes Table C-4.

Source: Valiante (1976)

TABLE C-8

HMO and FFS Enrollment and Premium Raw Data - Elasticity Estimates - Rochester Area

(1) YEAR	(2) SMSA POP	(3) HIP POP	(4) GHI POP	(5) BC/BS POP	(6) HIP PREM	(7) GHI PREM	(8) BC/BS PREM	(9) % CHAN BC/BS POP/G	(10) % CHAN BC/BS POP/R	(11) REL PREM HMO/G	(12) REL PREM HMO/R	(13)[a] PTELAS	(14)[b] PTELAS
1973	967736	2125	1100	964511	216.6	233.64	159.36			0.736	0.682		
1974	967736	10338	3480	953918	216.6	233.64	184.8	-0.0085	-0.0024	0.853	0.791	-0.0531	-0.015
1975	967736	20737	7783	939216	248.04	258.72	230.04	-0.0109	-0.0045	0.927	0.889	-0.125	-0.036
1976	967736	27128	10614	929994	322.92	306.72	253.8	-0.0068	-0.0030	0.786	0.827	0.045	0.043
1977	967736	32961	13490	921285	360.12	346.8	305.28	-0.0062	-0.0030	0.848	0.880	-0.080	-0.048
1978	967736	36130	16132	915474	378.84	346.8	336.12	-0.0034	-0.0028	0.887	0.969	-0.074	-0.028

(a), (b) See notes Table C-4.

Source: Valiante (1976)

APPENDIX D

BASELINE MODEL - SENSITIVITY ANALYSES

This Appendix contains the results of the sensitivity analyses on the baseline model.

Tables D-1 to D-5 display the variation in the results to a change in the value of the enrollment elasticity (ranging from -0.004 to -0.64) for a given initial capitation market share of 50% and initial hospital utilization differential of 30%. Tables D-6 to D-10 are similar to the first five except the initial market share for the capitation sector is 40%. Similarly Tables D-11 to D-15 are for the assumption of a 20% initial capitation market share while D-16 to D-20 are for a 5% initial capitation market share.

Tables D-1A to D-20A are similar in nature to the previous Tables D-1 to D-20 except that the initial fee-for-service hospital utilization rate has decreased by 15% such that the differential between the two sectors is now 17%.

TABLE D-1

Baseline Model Results

(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	21.43	3.04
2	40053	39947	50.07	22.04	2.42
3	40043	39957	50.05	22.04	2.42
4	40043	39957	50.05	22.04	2.42
5	40043	39957	50.05	22.04	2.42
6	40043	39957	50.05	22.04	2.42
7	40043	39957	50.05	22.04	2.42
8	40043	39957	50.05	22.04	2.42
9	40043	39957	50.05	22.04	2.42
10	40043	39957	50.05	22.04	2.42
Present Value					
5%				178.11	20.24
10%				148.37	16.97
15%				126.61	14.58

TABLE D-2

Baseline Model Results

(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	21.43	3.04
2	40264	39736	50.33	22.03	2.43
3	40214	39786	50.27	22.03	2.43
4	40214	39786	50.27	22.03	2.43
5	40214	39786	50.27	22.03	2.43
6	40214	39786	50.27	22.03	2.43
7	40214	39786	50.27	22.03	2.43
8	40214	39786	50.27	22.03	2.43
9	40214	39786	50.27	22.03	2.43
10	40214	39786	50.27	22.03	2.43
Present Value					
5%				178.03	20.31
10%				148.31	17.03
15%				127.16	14.03

TABLE D-3

Baseline Model Results
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	21.43	3.04
2	41324	38680	51.65	21.97	2.50
3	41077	38923	51.35	21.98	2.48
4	41077	38923	51.35	21.98	2.48
5	41077	38923	51.35	21.98	2.48
6	41077	38923	51.35	21.98	2.48
7	41077	38923	51.35	21.98	2.48
8	41077	38923	51.35	21.98	2.48
9	41077	38923	51.35	21.98	2.48
10	41077	38923	51.35	21.98	2.48
Present Value					
5%				177.65	20.69
10%				148.00	17.34
15%				126.30	14.89

TABLE D-4

Baseline Model Results
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	21.43	3.04
2	43300	36700	54.13	21.85	2.62
3	42723	37277	53.40	21.88	2.58
4	42723	37277	53.40	21.88	2.58
5	42723	37277	53.40	21.88	2.58
6	42723	37277	53.40	21.88	2.58
7	42723	37277	53.40	21.88	2.58
8	42723	37277	53.40	21.88	2.58
9	42723	37277	53.40	21.88	2.58
10	42723	37277	53.40	21.88	2.58
Present Value					
5%				176.93	21.48
10%				147.42	17.98
15%				126.62	15.39

TABLE D-5

Baseline Model Results
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	21.43	3.04
2	48449	31551	60.56	21.54	2.93
3	47177	32823	58.97	21.61	2.85
4	47177	32823	58.97	21.61	2.85
5	47177	32823	58.97	21.61	2.85
6	47177	32823	58.97	21.61	2.85
7	47177	32823	58.97	21.61	2.85
8	47177	32823	58.97	21.61	2.85
9	47177	32823	58.97	21.61	2.85
10	47177	32823	58.97	21.61	2.85
Present Value					
5%				174.97	23.37
10%				145.82	19.52
15%				124.48	16.71

TABLE D-6

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	22.04	2.43
2	32063	47937	40.08	22.53	1.94
3	32051	47949	40.06	22.53	1.94
4	32051	47949	40.06	22.53	1.94
5	32051	47949	40.06	22.53	1.94
6	32051	47949	40.06	22.53	1.94
7	32051	47949	40.06	22.53	1.94
8	32051	47949	40.06	22.53	1.94
9	32051	47949	40.06	22.53	1.94
10	32051	47949	40.06	22.53	1.94
Present Value					
5%				182.15	16.20
10%				151.76	13.58
15%				129.52	11.67

TABLE D-7

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	22.04	2.43
2	32317	47683	40.40	22.51	1.95
3	32257	47743	40.32	22.51	1.95
4	32257	47743	40.32	22.51	1.95
5	32357	47743	40.32	22.51	1.95
6	32357	47743	40.32	22.51	1.95
7	32357	47743	40.32	22.51	1.95
8	32357	47743	40.32	22.51	1.95
9	32357	47743	40.32	22.51	1.95
10	32357	47743	40.32	22.51	1.95
Present Value					
5%				182.06	16.28
10%				151.69	13.66
15%				129.46	11.73

TABLE D-8

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	22.04	2.43
2	33584	46416	41.98	22.43	2.03
3	33292	46708	41.62	22.45	2.01
4	33292	46708	41.62	22.45	2.01
5	33292	46708	41.62	22.45	2.01
6	33292	46708	41.62	22.45	2.01
7	33292	46708	41.62	22.45	2.01
8	33292	46708	41.62	22.45	2.01
9	33292	46708	41.62	22.45	2.01
10	33292	46708	41.62	22.45	2.01
Present Value					
5%				181.60	16.75
10%				151.32	14.03
15%				129.15	12.04

TABLE D-9

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	22.04	2.43
2	35960	44040	44.95	22.29	2.17
3	35267	44733	44.08	22.33	2.13
4	35267	44733	44.08	22.33	2.13
5	35267	44733	44.08	22.33	2.13
6	35267	44733	44.08	22.33	2.13
7	35267	44733	44.08	22.33	2.13
8	35267	44733	44.08	22.33	2.13
9	35267	44733	44.08	22.33	2.13
10	35267	44783	44.08	22.33	2.13
Present Value					
5%				180.73	17.61
10%				150.61	14.64
15%				128.56	12.63

TABLE D-10

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	22.04	2.43
2	42139	37861	52.67	21.92	2.55
3	40613	39387	50.77	22.01	2.45
4	40613	39387	50.77	22.01	2.45
5	40613	39387	50.77	22.01	2.45
6	40613	39387	50.77	22.01	2.45
7	40613	39387	50.77	22.01	2.45
8	40613	39387	50.77	22.01	2.45
9	40613	39387	50.77	22.01	2.45
10	40613	39387	50.77	22.01	2.45
Present Value					
5%				178.38	19.96
10%				148.70	16.64
15%				126.97	14.22

TABLE D-11

Baseline Model Results

(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	23.25	1.21
2	16084	63916	20.11	23.49	0.97
3	16068	63932	20.09	23.49	0.97
4	16068	63932	20.09	23.49	0.97
5	16068	63932	20.09	23.49	0.97
6	16068	63932	20.09	23.49	0.97
7	16068	63932	20.09	23.49	0.97
8	16068	63932	20.09	23.49	0.97
9	16068	63932	20.09	23.49	0.97
10	16068	63932	20.09	23.49	0.97
Present Value					
5%				190.22	8.12
10%				158.54	6.81
15%				135.34	5.85

TABLE D-12

Baseline Model Results

(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	23.25	1.21
2	16422	63578	20.53	23.47	0.99
3	16342	63658	20.43	23.48	0.99
4	16342	63658	20.43	23.48	0.99
5	16342	63658	20.43	23.48	0.99
6	16342	63658	20.43	23.48	0.99
7	16342	63658	20.43	23.48	0.99
8	16342	63658	20.43	23.48	0.99
9	16342	63658	20.43	23.48	0.99
10	16342	63658	20.43	23.48	0.99
Present Value					
5%				190.11	8.23
10%				158.44	6.90
15%				135.26	5.93

TABLE D-13

Baseline Model Results

(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	23.25	1.21
2	18112	61888	22.64	23.37	1.09
3	17723	62277	22.15	23.39	1.07
4	17723	62277	22.15	23.39	1.07
5	17723	62277	22.15	23.39	1.07
6	17723	62277	22.15	23.39	1.07
7	17723	62277	22.15	23.39	1.07
8	17723	62277	22.15	23.39	1.07
9	17723	62277	22.15	23.39	1.07
10	17723	62277	22.15	23.39	1.07
Present Value					
5%				189.49	8.85
10%				157.94	7.40
15%				134.85	6.34

TABLE D-14

Baseline Model Results

(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	23.25	1.21
2	21281	58719	26.60	23.18	1.29
3	20356	59644	25.44	23.23	1.23
4	20356	59644	25.44	23.23	1.23
5	20356	59644	25.44	23.23	1.23
6	20356	59644	25.44	23.23	1.23
7	20356	59644	25.44	23.23	1.23
8	20356	59644	25.44	23.23	1.23
9	20356	59644	25.44	23.23	1.23
10	20356	59644	25.44	23.23	1.23
Present Value					
5%				188.33	10.01
10%				157.00	8.35
15%				134.06	7.13

TABLE D-15

Baseline Model Results

(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	23.25	1.21
2	29518	50482	36.90	22.68	1.78
3	27484	52516	34.36	22.80	1.66
4	27484	52516	34.36	22.80	1.66
5	27484	52516	34.36	22.80	1.66
6	27484	52516	34.36	22.80	1.66
7	27484	52516	34.36	22.80	1.66
8	27484	52516	34.36	22.80	1.66
9	27484	52516	34.36	22.80	1.66
10	27484	52516	34.36	22.80	1.66
Present Value					
5%				185.20	13.14
10%				154.45	10.99
15%				131.94	9.25

TABLE D-16

Baseline Model Results

(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	24.26	0.30
2	4100	75900	5.13	24.22	0.25
3	4081	75919	5.10	24.22	0.25
4	4081	75919	5.10	24.22	0.25
5	4081	75919	5.10	24.22	0.25
6	4081	75919	5.10	24.22	0.25
7	4081	75919	5.10	24.22	0.25
8	4081	75919	5.10	24.22	0.25
9	4081	75919	5.10	24.22	0.25
10	4081	75919	5.10	24.22	0.25
Present Value					
5%				196.29	2.05
10%				163.62	1.72
15%				139.71	1.48

TABLE D-17

Baseline Model Results
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	24.16	0.30
2	4502	75498	5.63	24.19	0.27
3	4407	75593	5.51	24.20	0.27
4	4407	75593	5.51	24.20	0.27
5	4407	75593	5.51	24.20	0.27
6	4407	75593	5.51	24.20	0.27
7	4407	75593	5.51	24.20	0.27
8	4407	75593	5.51	24.20	0.27
9	4407	75593	5.51	24.20	0.27
10	4407	75593	5.51	24.20	0.27
Present Value					
5%				196.14	2.20
10%				163.51	1.84
15%				139.61	1.58

TABLE D-18

Baseline Model Results
(5 % Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	24.16	0.30
2	6508	73492	8.14	24.07	0.39
3	6046	73954	7.56	24.10	0.37
4	6046	73954	7.56	24.10	0.37
5	6046	73954	7.56	24.10	0.37
6	6046	73954	7.56	24.10	0.37
7	6046	73954	7.56	24.10	0.37
8	6046	73954	7.56	24.10	0.37
9	6046	73954	7.56	24.10	0.37
10	6046	73954	7.56	24.10	0.37
Present Value					
5%				195.42	2.92
10%				162.92	2.48
15%				139.12	2.07

TABLE D-19

Baseline Model Results

(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	24.16	0.30
2	10271	69729	12.84	23.84	0.62
3	9173	70827	11.47	23.91	0.55
4	9173	70827	11.47	23.91	0.55
5	9173	70827	11.47	23.91	0.55
6	9173	70827	11.47	23.91	0.55
7	9173	70827	11.47	23.91	0.55
8	9173	70827	11.47	23.91	0.55
9	9173	70827	11.47	23.91	0.55
10	9173	70827	11.47	23.91	0.55
Present Value					
5%				194.04	4.30
10%				161.79	3.55
15%				138.19	3.00

TABLE D-20

Baseline Model Results

(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	24.16	0.30
2	20053	59947	25.07	23.25	1.21
3	17637	62363	22.05	23.40	1.07
4	17637	62363	22.05	23.40	1.07
5	17637	62363	22.05	23.40	1.07
6	17637	62363	22.05	23.40	1.07
7	17637	62363	22.05	23.40	1.07
8	17637	62363	22.05	23.40	1.07
9	17637	62363	22.05	23.40	1.07
10	17637	62363	22.05	23.40	1.07
Present Value					
5%				190.32	8.02
10%				158.77	6.57
15%				135.67	5.52

TABLE D-1A

Baseline Model Results
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	20.22	1.83
2	40032	39968	50.04	20.84	1.21
3	40022	39978	50.03	20.84	1.21
4	40022	39978	50.03	20.84	1.21
5	40022	39978	50.03	20.84	1.21
6	40022	39978	50.03	20.84	1.21
7	40022	39978	50.03	20.84	1.21
8	40022	39978	50.03	20.84	1.21
9	40022	39978	50.03	20.84	1.21
10	40022	39978	50.03	20.84	1.21
Present Value					
5%				168.32	10.42
10%				140.21	8.79
15%				119.64	7.60

TABLE D-2A

Baseline Model Results
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	20.22	18.3
2	40159	39841	50.2	20.83	1.21
3	40109	39891	50.14	20.83	1.21
4	40109	39891	50.14	20.83	1.21
5	40109	39891	50.14	20.83	1.21
6	40109	39891	50.14	20.83	1.21
7	40109	39891	50.14	20.83	1.21
8	40109	39891	50.14	20.83	1.21
9	40109	39891	50.14	20.83	1.21
10	40109	39891	50.14	20.83	1.21
Present Value					
5%				168.30	10.44
10%				140.20	8.81
15%				119.61	7.61

TABLE D-3A

Baseline Model Results
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	20.22	1.83
2	40794	39206	50.99	20.81	1.23
3	40548	39542	50.69	20.82	1.22
4	40548	39542	50.69	20.82	1.22
5	40548	39542	50.69	20.82	1.22
6	40548	39542	50.69	20.82	1.22
7	40548	39542	50.69	20.82	1.22
8	40548	39542	50.69	20.82	1.22
9	40548	39542	50.69	20.82	1.22
10	40548	39542	50.69	20.82	1.22
Present Value					
5%				168.20	10.54
10%				140.21	8.89
15%				119.56	7.68

TABLE D-4A

Baseline Model Results
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	20.22	1.83
2	41896	38014	52.48	20.78	1.27
3	41388	38612	51.74	20.80	1.25
4	41388	38612	51.74	20.80	1.25
5	41388	38612	51.74	20.80	1.25
6	41388	38612	51.74	20.80	1.25
7	41388	38612	51.74	20.80	1.25
8	41388	38612	51.74	20.80	1.25
9	41388	38612	51.74	20.80	1.25
10	41388	38612	51.74	20.80	1.25
Present Value					
5%				168.02	10.73
10%				139.97	9.04
15%				119.43	7.81

TABLE D-5A

Baseline Model Results
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50	20.22	1.83
2	45085	34915	56.36	20.68	1.36
3	43678	36322	54.60	20.73	1.32
4	43678	36322	54.60	20.73	1.32
5	43678	36322	54.60	20.73	1.32
6	43678	36322	54.60	20.73	1.32
7	43678	36322	54.60	20.73	1.32
8	43678	36322	54.60	20.73	1.32
9	43678	36322	54.60	20.73	1.32
10	43678	36322	54.60	20.73	1.32
Present Value					
5%				167.50	11.25
10%				139.54	9.47
15%				119.08	8.16

TABLE D-6A

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	20.59	1.46
2	32038	47962	40.05	21.08	0.97
3	32026	47974	40.03	21.08	0.97
4	32026	47974	40.03	21.08	0.97
5	32026	47974	40.03	21.08	0.97
6	32026	47974	40.03	21.08	0.97
7	32026	47974	40.03	21.08	0.97
8	32026	47974	40.03	21.08	0.97
9	32026	47974	40.03	21.08	0.97
10	32026	47974	40.03	21.08	0.97
Present Value					
5%				170.04	8.34
10%				141.97	7.04
15%				121.16	6.08

TABLE D-7A

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	20.59	1.46
2	32191	47809	40.24	21.07	0.97
3	32130	47870	40.16	21.08	0.97
4	32130	47870	40.16	21.08	0.97
5	32130	47870	40.16	21.08	0.97
6	32130	47870	40.16	21.08	0.97
7	32130	47870	40.16	21.08	0.97
8	32130	47870	40.16	21.08	0.97
9	32130	47870	40.16	21.08	0.97
10	32130	47870	40.16	21.08	0.97
Present Value					
5%				170.38	8.36
10%				141.95	7.05
15%				121.14	6.10

TABLE D-8A

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	20.59	1.46
2	32953	47047	41.19	21.05	1.00
3	32657	47343	40.82	21.06	0.99
4	32657	47343	40.82	21.06	0.99
5	32657	47343	40.82	21.06	0.99
6	32657	47343	40.82	21.06	0.99
7	32657	47343	40.82	21.06	0.99
8	32657	47343	40.82	21.06	0.99
9	32657	47343	40.82	21.06	0.99
10	32657	47343	40.82	21.06	0.99
Present Value					
5%				170.26	8.48
10%				141.86	7.15
155				121.06	6.18

TABLE D-9A

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	20.59	1.46
2	34383	45617	42.98	21.00	1.04
3	33665	46335	42.08	21.03	1.02
4	33665	46335	42.08	21.03	1.02
5	33665	46335	42.08	21.03	1.02
6	33665	46335	42.08	21.03	1.02
7	33665	46335	42.08	21.03	1.02
8	33665	46335	42.08	21.03	1.02
9	33665	46335	42.08	21.03	1.02
10	33665	46335	42.08	21.03	1.02
Present Value					
5%				170.03	8.71
10%				141.67	7.34
15%				120.91	6.33

TABLE D-10A

Baseline Model Results
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40	20.59	1.46
2	38102	41898	47.63	20.90	1.15
3	36413	43587	45.52	20.95	1.10
4	36413	43587	45.52	20.95	1.10
5	36413	43587	45.52	20.95	1.10
6	36413	43587	45.52	20.95	1.10
7	36413	43587	45.52	20.95	1.10
8	36413	43587	45.52	20.95	1.10
9	36413	43587	45.52	20.95	1.10
10	36413	43587	45.52	20.95	1.10
Present Value					
5%				169.42	9.33
10%				141.17	7.84
15%				120.49	6.75

TABLE D-11A

Baseline Model Results

(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	21.32	0.73
2	16051	63949	20.06	21.56	0.49
3	16035	63965	20.04	21.56	0.48
4	16035	63965	20.04	21.56	0.48
5	16035	63965	20.04	21.56	0.48
6	16035	63965	20.04	21.56	0.48
7	16035	63965	20.04	21.56	0.48
8	16035	63965	20.04	21.56	0.48
9	16035	63965	20.04	21.56	0.48
10	16035	63965	20.04	21.56	0.48
Present Value					
5%				174.57	4.17
10%				145.49	3.52
15%				124.20	3.04

TABLE D-12A

Baseline Model Results

(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	21.32	0.73
2	16254	63746	20.32	21.56	0.49
3	16174	63826	20.22	21.56	0.49
4	16174	63826	20.22	21.56	0.49
5	16174	63826	20.22	21.56	0.49
6	16174	63826	20.22	21.56	0.49
7	16174	63826	20.22	21.56	0.49
8	16174	63826	20.22	21.56	0.49
9	16174	63826	20.22	21.56	0.49
10	16174	63826	20.22	21.56	0.49
Present Value					
5%				174.54	4.21
10%				145.46	3.55
15%				124.17	3.07

TABLE D-13A

Baseline Model Results

(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	21.32	0.73
2	17271	62729	21.59	21.52	0.52
3	16876	63124	21.1	21.54	0.51
4	16876	63124	21.1	21.54	0.51
5	16876	63124	21.1	21.54	0.51
6	16876	63124	21.1	21.54	0.51
7	16876	63124	21.1	21.54	0.51
8	16876	63124	21.1	21.54	0.51
9	16876	63124	21.1	21.54	0.51
10	16876	63124	21.1	21.54	0.51
Present Value					
5%				174.38	4.37
10%				145.33	3.68
15%				124.07	3.17

TABLE D-14A

Baseline Model Results

(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	21.32	0.73
2	19178	60822	23.97	21.47	0.58
3	18220	61780	22.78	21.50	0.55
4	18220	61780	22.78	21.50	0.55
5	18220	61780	22.78	21.50	0.55
6	18220	61780	22.78	21.50	0.55
7	18220	61780	22.78	21.50	0.55
8	18220	61780	22.78	21.50	0.55
9	18220	61780	22.78	21.50	0.55
10	18220	61780	22.78	21.50	0.55
Present Value					
5%				174.08	4.67
10%				145.08	3.92
15%				123.86	3.38

TABLE D-15A

Baseline Model Results
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20	21.32	0.73
2	24135	55865	30.17	21.32	0.73
3	21385	58116	27.36	21.39	0.66
4	21385	58116	27.36	21.39	0.66
5	21385	58116	27.36	21.39	0.66
6	21385	58116	27.36	21.39	0.66
7	21385	58116	27.36	21.39	0.66
8	21385	58116	27.36	21.39	0.66
9	21385	58116	27.36	21.39	0.66
10	21385	58116	27.36	21.39	0.66
Present Value					
5%				173.25	5.49
10%				144.41	4.60
15%				123.30	3.94

TABLE D-16A

Baseline Model Results
(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	21.86	0.18
2	4060	74940	5.08	21.92	0.12
3	4041	75959	5.05	21.92	0.12
4	4041	75959	5.05	21.92	0.12
5	4041	75959	5.05	21.92	0.12
6	4041	75959	5.05	21.92	0.12
7	4041	75959	5.05	21.92	0.12
8	4041	75959	5.05	21.92	0.12
9	4041	75959	5.05	21.92	0.12
10	4041	75959	5.05	21.92	0.12
Present Value					
5%				177.69	1.05
10%				148.12	0.89
15%				126.47	0.77

TABLE D-17A

Baseline Model Results
(5 % Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	21.86	0.18
2	4302	75698	5.38	21.92	0.13
3	4207	75793	5.26	21.92	0.13
4	4207	75793	5.26	21.92	0.13
5	4207	75793	5.26	21.92	0.13
6	4207	75793	5.26	21.92	0.13
7	4207	75793	5.26	21.92	0.13
8	4207	75793	5.26	21.92	0.13
9	4207	75793	5.26	21.92	0.13
10	4207	75793	5.26	21.92	0.13
Present Value					
5%				177.66	1.09
10%				148.09	0.92
15%				126.45	0.79

TABLE D-18A

Baseline Model Results
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	21.86	0.18
2	5510	74490	6.89	21.88	0.16
3	5040	74960	6.30	21.89	0.15
4	5040	74960	6.30	21.89	0.15
5	5040	74960	6.30	21.89	0.15
6	5040	74960	6.30	21.89	0.15
7	5040	74960	6.30	21.89	0.15
8	5040	74960	6.30	21.89	0.15
9	5040	74960	6.30	21.89	0.15
10	5040	74960	6.30	21.89	0.15
Present Value					
5%				177.47	1.28
10%				147.94	1.03
15%				126.32	0.92

TABLE D-19A

Baseline Model Results
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	21.86	0.18
2	7774	72226	9.72	21.81	0.23
3	6637	73363	8.30	21.85	0.20
4	6637	73363	8.30	21.85	0.20
5	6637	73363	8.30	21.85	0.20
6	6637	73363	8.30	21.85	0.20
7	6637	73363	8.30	21.85	0.20
8	6637	73363	8.30	21.85	0.20
9	6637	73363	8.30	21.85	0.20
10	6637	73363	8.30	21.85	0.20
Present Value					
5%				177.10	1.64
10%				147.64	1.37
15%				126.07	1.17

TABLE D-20A

Baseline Model Results
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5	21.86	0.18
2	13661	66339	17.08	21.63	0.41
3	10987	69013	13.73	21.71	0.33
4	10987	69013	13.73	21.71	0.33
5	10987	69013	13.73	21.71	0.33
6	10987	69013	13.73	21.71	0.33
7	10987	69013	13.73	21.71	0.33
8	10987	69013	13.72	21.71	0.33
9	10987	69013	13.72	21.71	0.33
10	10987	69013	13.72	21.71	0.33
Present Value					
5%				176.13	2.62
10%				146.84	2.17
15%				125.40	1.84

APPENDIX E

EXTENSIONS TO THE BASELINE MODEL

MODEL EQUATIONS

Appendix E-1

DYNAMO Equations For The Positive Fee-For-Service Modality Hospital Utilization Response

Community Size And Modality Market Share

```
C    TPOP=80000                             Total Community Population

L    FFSPOP.K=FFSPOP.J+(DT)*(PTELAS*FFSPOP.J* DPSTAR.JK)
                                            FFS Modality Population

N    FFSPOP=FFSIOP
C    FFSIOP=40000                           Initial FFS Population

A    CAPPOP.K=TPOP-FFSPOP.K
                                            Capitation Modality Population

A    CAPFRC.K=CAPPOP.K/TPOP                 Capitation Market Share

A    FFSMKT.K=FFSPOP.K/TPOP                          FFS Market Share
```

Consumer Enrollment Decision

```
A    PSTAR.K=SWITCH(GOVT1.K,GOVT2.K,PREM)   Relative Price
C    PREM=0.0

C    PTELAS=-0.25                           FFS Enrollment Elasticity

A    RPRIC1.K=[(FFSPRM.K-CAPPRM.K)/(CAPPRM.K)]+1
                                                 Relative Price (FFS/CAP)

A    RPRIC2.KL=[(CAPPRM.K-FFSPRM.K)/(FFSPRM.K)]+1
                                                 Relative Price (CAP/FFS)

R    DPSTAR.KL=(PSTAR.K-LSTAR.K)/LSTAR.K
                                            % Change in Relative Price

A    LSTAR.K=SMOOTH(PSTAR.K,DEL)
                                   Relative Price Lagged One Period

A    GOVT1.K=CLIP(RPRIC1.K,1,TIME.K,1)
C    DEL=1.0                                         One Year Lag
A    GOVT2.K=CLIP(RPRIC2.K,1,TIME.K,1)
```

Hospital Costs

```
A     CAPHCT.K=CAPPOP.K*CAPHUT*COSTPD.K
                                          Capitation Hospital Costs

C     CAPHUT=0.85      Capitation Hospital Utilization Rate

L     COSTPD.K=COSTPD.J+(DT)*(COSTI.JK)
                                          Cost Per Patient Day

R     COSTI.KL=CLIP(COST*COSTPD.K,0,TIME.K,1)
                                 Increase in Cost Per Patient Day
C     COST=0.0

N     COSTPD=167.86       Initial Cost Per Patient Day

A     FFSHCT.K=FFSPOP.K*AFSHUT.K*COSTPD.K
                                          FFS Hospital Costs

C     FFSHUT=1.21      Initial FFS Hospital Utilization Rate

L     AFSHUT.K=AFSHUT.J+SWHUT*((DT/5))*(AAGAP.J)
                         FFS Adjusted Hospital Utilization Rate

N     AFSHUT=FFSHUT           Adjustment Pattern of Hospital
C     SWHUT=1.0               Utilization Rate
A     AGAP.K=CLIP(0,GAP.K,TIME.K,7)
A     AAGAP.K=STEP(AGAP.K,2)

A     GAP.K=CAPHUT-FFSHUT
                Hospital Utilization Rate Differential
```

Ambulatory Costs

```
A     CAPAMC.K=CLIP(NNCAMC.K,INCAMC.K,TIME.K,2)
                                      Capitation Ambulatory Costs

A     INCAMC.K=CAPPOP.K*(87.23)
                         Initial Capitation Ambulatory Costs

A     NNCAMC.K=CAPPOP.K*(FFSAMC.K/FFSPOP.K)
                         Current Capitation Ambulatory Costs

A     FFSAMC.K=(FFSPOP.K)*(102.68) FFS Ambulatory Costs
```

Total And Average Per Capita Costs

A	CAPTOT.K=CAPHCT.K+CAPAMC.K	Total Capitation Costs
A	CAPPRM.K=CAPTOT.K/CAPPOP.K	Average Per Capita Costs (Capitation Modality)
A	FFSTOT.K=FFSHCT.K+FFSAMC.K	Total FFS Costs
A	FFSPRM.K=FFSTOT.K/FFSPOP.K	Average Per Capita Costs (FFS Modality)

APPENDIX E-2

DYNAMO Equations For The Perverse Fee-For-Service Modality Ambulatory Utilization Response

Community Size and Modality Market Share

```
C    TPOP=80000                    Total Community Population

L    FFSPOP.K=FFSPOP.J+(DT)*(PTELAS*FFSPOP.J*DPSTAR.JK)
                                   FFS Modality Population

N    FFSPOP=FFSIOP
C    FFSIOP=40000                         Initial FFS Population

A    CAPPOP.K=TPOP-FFSPOP.K        Capitation Modality Population

A    CAPFRC.K=CAPPOP.K/TPOP        Capitation Market Share
```

Consumer Enrollment Decision

```
A    PSTAR.K=SWITCH(GOVT1.K,GOVT2.K,PREM)   Relative Price
C    PREM=0.0

C    PTELAS=-0.25                  FFS Enrollment Elasticity

A    RPRIC1.K=[(FFSPRM.K-CAPPRM.K)/(CAPPRM.K)]+1
                                          Relative Price (FFS/CAP)

A    RPRIC2.K=[(CAPPRM.K-FFSPRM.K)/(FFSPRM.K)]+1
                                          Relative Price (CAP/FFS)

R    DPSTAR.KL=(PSTAR.K-LSTAR.K)/LSTAR.K
                                   % Change in Relative Price

A    LSTAR.K=SMOOTH(PSTAR.K,DEL)
                              Relative Price Lagged One Period

A    GOVT1.K=CLIP(RPRIC1.K,1,TIME.K,1)
C    DEL=1.0                                 One Year Lag
A    GOVT2.K=CLIP(RPRIC2.K,1,TIME.K,1)
```

Hospital Costs

```
A    CAPHCT.K=CAPPOP.K*CAPHUT*COSTPD.K
                                          Capitation Hospital Costs

C    CAPHUT=0.85          Capitation Hospital Utilization Rate
```

```
L     COSTPD.K=COSTPD.J+(DT)*(COSTI.JK)
                                        Cost Per Patient Day

R     COSTI.KL=CLIP(COST*COSTPD.K,0,TIME.K,1)
                                Increase in Cost Per Patient Day
C     COST=0.0

N     COSTPD=167.86          Initial Cost Per Patient Day

A     FFSHCT.K=FFSPOP.K*FFSHUT*COSTPD.K  FFS Hospital Costs

C     FFSHUT=1.21                  FFS Hospital Utilization Rate
```

Ambulatory Costs

```
A     CAPAMC.K=CLIP(NNCAMC.K,INCAMC.K,TIME.K,3)
                                    Capitation Ambulatory Costs

A     INCAMC.K=CAPPOP.K*(87.23)
                         Initial Capitation Ambulatory Costs

A     NNCAMC.K=CAPPOP.K*(FFSAMC.K/FFSPOP.K)
                         Current Capitation Ambulatory Costs

A     FFSAMC.K=CLIP(NFSAMC.K,FFSPOP.K*102.68,TIME.K,3)
                             Current FFS Ambulatory Costs

L     NFSAMC.K=NFSAMC.J+(DT)*(NFSAMC.J*0.10)
                                Adjusted FFS Ambulatory Costs

N     NFSAMC=FFSIOP*102.68      Initial FFS Ambulatory Costs
```

Total And Average Per Capita Costs

```
A     CAPTOT.K=CAPHCT.K+CAPAMC.K   Total Capitation Costs

A     CAPPRM.K=CAPTOT.K/CAPPOP.K   Average Per Capita Costs
                                   (Capitation Modality)

A     FFSTOT.K=FFSHCT.K+FFSAMC.K       Total FFS Costs

A     FFSPRM.K=FFSTOT.K/FFSPOP.K   Average Per Capita Costs
                                   (Capitation Modality)
```

APPENDIX E-3

DYNAMO Equations For The Alternative Capitation Reimbursement Arrangement

Community Size And Modality Market Share

```
C     TPOP=80000                      Total Community Population

L     FFSPOP.K=FFSPOP.J+(DT)*(PTELAS*FFSPOP.J*DPSTAR.JK)
                                           FFS Modality Population

N     FFSPOP=FFSIOP
C     FFSIOP=40000                         Initial FFS Population

A     CAPPOP.K=TPOP-FFSPOP.K
                            Capitation Modality Population

A     CAPFRC.K=CAPPOP.K/TPOP  Capitation Market Share
```

Consumer Choice Decision

```
A     PSTAR.K=SWITCH(GOVT1.K,GOVT2.K,PREM)   Relative Price
C     PREM=0.0

C     PTELAS=-0.25                    FFS Enrollment Elasticity

A     RPRIC1.K=[(FFSPRM.K-CAPPRM.K)/(CAPPRM.K)]+1
                                      Relative Price (FFS/CAP)

A     RPRIC2.K=[(CAPPRM.K-FFSPRM.K)/(FFSPRM.K)]+1
                                      Relative Price (CAP/FFS)

R     DPSTAR.KL=(PSTAR.K-LSTAR.K)/LSTAR.K
                                      % Change in Relative Price

A     LSTAR.K=SMOOTH(PSTAR.K,DEL)
                            Relative Price Lagged One Period

A     GOVT1.K=CLIP(RPRIC1.K,1,TIME.K,1)
C     DEL=1.0                                   One Year Lag
A     GOVT2.K=CLIP(RPRIC2.K,1,TIME.K,1)
```

Hospital Costs

```
A    CAPHCT.K=CAPPOP.K*CAPHUT*COSTPD.K
                                        Capitation Hospital Costs

C    CAPHUT=0.85   Capitation Hospital Utilization Rate

L    COSTPD.K=COSTPD.J+(DT)*(COSTI.JK)
                                              Cost Per Patient Day

R    COSTI.KL=CLIP(COST*COSTPD.K,0,TIME>K,1)
                                   Increase in Cost Per Patient Day
C    COST=0.0

N    COSTPD=167.86       Initial Cost Per Patient Day

A    FFSHUT.K=FFSPOP.K*FFSHUT*COSTPD.K
                                             FFS Hospital Costs

C    FFSHUT=1.21                  FFS Hospital Utilization Rate
```

Ambulatory Costs

```
A    CAPAMC.K=CAPPOP.K*(87.23)  Capitation Ambulatory Costs

A    FFSAMC.K=(FFSPOP.K)*(102.68) FFS Ambulatory Costs
```

Total And Average Per Capita Costs

```
A    CAPTOT.K=CAPHCT.K+CAPAMC.K    Total Capitation Costs

A    CAPPRM.K=CAPTOT.K/CAPPOP.K    Average Per Capita Costs
                                      (Capitation Modality)

A    FFSTOT.K=FFSHCT.K+FFSAMC.K    Total FFS Costs

A    FFSPRM.K=FFSTOT.K/FFSPOP.K    Average Per Capita Costs
                                      (FFS Modality)
```

APPENDIX E-4

DYNAMO Equations For The Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response

Community Size And Modality Market Share

```
C    TPOP=80000                      Total Community Population

L    FFSPOP.K=FFSPOP.J+(DT)*(PTELAS*FFSPOP.J*DPSTAR.JK)
                                     FFS Modality Population

N    FFSPOP=FFSIOP
C    FFSIOP=40000                    Initial FFS Population

A    CAPPOP.K=TPOP-FFSPOP.K
                                Capitation Modality Population

A    CAPFRC.K=CAPPOP.K/TPOP          Capitation Market Share

A    FFSMKT.K=FFSPOP.K/TPOP                    FFS Market Share
```

Consumer Enrollment Decision

```
A    PSTAR.K=SWITCH(GOVT1.K,GOVT2.K,PREM)     Relative Price
C    PREM=0.0

C    PTELAS=-0.25                    FFS Enrollment Elasticity

A    RPRIC1.K=[(FFSPRM.K-CAPPRM.K)/(CAPPRM.K)]+1
                                     Relative Price (FFS/CAP)

A    RPRIC2.K=[(CAPPRM.K-FFSPRM.K)/(FFSPRM.K)]+1
                                     Relative Price (CAP/FFS)

R    DPSTAR.KL=(PSTAR.K-LSTAR.K)/LSTAR.K
                                     % Change in Relative Price

A    LSTAR.K=SMOOTH(PSTAR.K,DEL)
                                Relative Price Lagged One Period

A    GOVT1.K=CLIP(RPRIC1.K,1,TIME.K,1)
C    DEL=1.0                                   One Year Lagged
A    GOVT2.K=CLIP(RPRIC2.K,1,TIME.K,1)
```

Hospital Costs

```
A    CAPHCT.K=CAPPOP.K*CAPHUT*COSTPD.K
                                  Capitation Hospital Costs

C    CAPHUT=0.85     Capitation Hospital Utilization Rate

L    COSTPD.K=COSTPD.J+(DT)*(COSTI.JK)
                                       Cost Per Patient Day

R    COSTI.KL=CLIP(COST*COSTPD.K,0,TIME.K,1)
                                  Increase in Per Patient Day
C    COST=0.0

N    COSTPD=167.86       Initial Cost Per Patient Day

A    FFSHCT.K=FFSPOP.K*AFSHUT*COSTPD.K    FFS Hospital Costs

C    FFSHUT=1.21      Initial FFS Hospital Utilization Rate

L    AFSHUT.K=AFSHUT.J+SWHUT*((DT)/5)*(AAGAP.J)
             FFS Adjusted Hospital Utilization Rate

N    AFSHUT=FFSHUT     Adjustment Pattern of Hospital
C    SWHUT=1.0         Utilization Rate Differential
A    AGAP.K=CLIP(0,GAP.K,TIME.K,7)
A    AAGAP.K=STEP(AGAP.K,2)

A    GAP.K=CAPHUT-FFSHUT
              Hospital Utilization Rate Differential
```

Ambulatory Costs

```
A    CAPAMC.K=CAPPOP.K*(87.23)  Capitation Ambulatory Costs

A    FFSAMC.K=(FFSPOP.K)*(102.68) FFS Ambulatory Costs
```

Total And Average Per Capita Costs

```
A    CAPTOT.K=CAPHCT.K+CAPAMC.K    Total Capitation Costs

A    CAPPRM.K=CAPTOT.K/CAPPOP.K    Average Per Capita Costs
                                   (Capitation Modality)

A    FFSTOT.K=FFSHCT.K+FFSAMC.K        Total FFS Costs

A    FFSPRM.K=FFSTOT.K/FFSPOP.K    Average Per Capita Costs
                                   (FFS Modality)
```

APPENDIX F

MODEL EXTENSIONS

POSITIVE FEE-FOR-SERVICE MODALITY HOSPITAL UTILIZATION RESPONSE RESULTS AND PERVERSE FEE-FOR-SERVICE MODALITY AMBULATORY UTILIZATION RESPONSE RESULTS

TABLE F-1

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40053	39947	50.07	22.04	2.42
3	40043	39957	50.05	21.56	2.90
4	40036	39964	50.05	21.08	3.39
5	40030	39970	50.04	20.60	3.87
6	40023	39977	50.03	20.11	4.35
7	40016	39984	50.02	19.63	4.83
8	40008	39992	50.01	19.63	4.83
9	40008	39992	50.01	19.63	4.83
10	40008	39992	50.01	19.63	4.83
Present Value					
5%				167.42	30.92
10%				140.31	25.03
15%				120.39	20.80

TABLE F-2

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.20)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40264	39736	50.33	22.03	2.43
3	40214	39786	50.27	21.55	2.91
4	40183	39817	50.23	21.07	3.39
5	40150	39850	50.19	20.59	3.87
6	40116	39884	50.14	20.11	4.35
7	40080	39920	50.10	19.63	4.83
8	40042	30099	50.05	19.63	4.83
9	40042	39958	50.05	19.63	4.83
10	40042	29958	50.05	19.63	4.83
Present Value					
5%				167.40	30.95
10%				140.29	25.06
15%				120.97	20.22

TABLE F-1

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	41320	38680	51.65	21.97	2.50
3	41077	38923	51.34	21.51	2.95
4	40923	39077	51.15	21.05	3.42
5	40762	39238	50.95	20.58	3.89
6	40594	39406	50.74	20.11	4.36
7	40417	39583	50.52	19.63	4.83
8	40231	39769	50.29	19.63	4.83
9	40231	39769	50.29	19.63	4.83
10	40231	39759	40.29	19.63	4.83
Present Value					
5%				167.26	31.08
10%				140.16	25.19
15%				120.26	20.94

TABLE F-4

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(30% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	43300	36700	54.13	21.85	2.62
3	42723	37277	53.40	21.43	3.03
4	42354	37646	52.94	20.99	3.47
5	41967	38033	52.46	20.55	3.92
6	41559	38441	51.95	20.09	4.37
7	41128	38872	51.41	19.63	4.83
8	40672	39328	50.84	19.63	4.83
9	40672	39328	50.84	19.63	4.83
10	40672	39328	50.84	19.63	4.83
Present Value					
5%				166.99	31.35
10%				139.92	25.43
15%				120.45	20.74

TABLE F-5

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	48449	31551	60.56	21.54	2.93
3	47177	32823	58.97	21.22	3.25
4	46347	33653	57.93	20.85	3.61
5	45461	34539	56.83	20.46	4.00
6	44512	35488	55.64	20.06	4.41
7	43494	36506	54.37	19.63	4.83
8	42397	37603	53.00	19.63	4.83
9	42397	37603	53.00	19.63	4.83
10	42397	37603	53.00	19.63	4.83
Present Value					
5%				166.28	32.06
10%				139.27	26.08
15%				119.44	21.75

TABLE F-6

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32063	47937	40.08	22.53	1.94
3	32051	47949	40.06	21.95	2.52
4	32044	47956	40.06	21.37	3.20
5	32036	47964	40.05	20.79	3.68
6	32028	47972	40.03	20.21	4.25
7	32019	47981	40.02	19.63	4.83
8	32010	47990	40.01	19.63	4.83
9	32010	47990	40.01	19.63	4.83
10	32010	47990	40.01	19.63	4.83
Present Value					
5%				169.33	29.02
10%				142.09	23.26
15%				122.06	19.13

TABLE F-7

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32317	47683	40.40	22.51	1.95
3	32257	47743	40.32	21.94	2.53
4	32219	47781	40.27	21.36	3.10
5	32180	47820	40.23	20.79	3.68
6	32139	47861	40.17	20.21	4.26
7	32096	47904	40.12	19.63	4.83
8	32051	47949	40.06	19.63	4.83
9	32051	47949	40.06	19.63	4.83
10	32051	47949	40.06	19.63	4.83
Present Value					
5%				169.29	29.05
10%				142.06	23.29
15%				122.03	19.16

TABLE F-8

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.000	22.04	2.43
2	33584	46416	41.98	22.43	2.03
3	33292	46708	41.62	21.89	2.58
4	33107	46893	41.38	21.33	3.13
5	32914	47086	41.14	20.77	3.70
6	32712	47288	40.89	20.20	4.26
7	23500	47500	40.63	19.63	4.83
8	32277	47723	40.35	29.63	4.83
9	32277	47723	40.35	29.63	4.83
10	32277	47723	40.35	29.63	4.83
Present Value					
5%				169.13	29.22
10%				141.90	23.44
15%				121.90	19.30

TABLE F-9

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	35960	44040	44.95	22.29	2.17
3	35267	44733	44.08	21.79	2.67
4	34825	45175	43.53	21.27	3.20
5	34360	45640	42.95	20.73	3.73
6	33871	46129	42.34	20.19	4.28
7	33354	46646	41.69	19.63	4.83
8	32806	47094	41.01	19.63	4.83
9	32806	47094	41.01	19.63	4.83
10	32806	47094	41.01	19.63	4.83
Present Value					
5%				168.80	29.53
10%				141.61	23.73
15%				121.63	19.56

TABLE F-10

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	42139	37861	52.67	21.92	2.55
3	40613	39387	50.77	21.53	2.93
4	39617	40383	49.52	21.09	3.37
5	38553	41447	48.19	20.63	3.83
6	37415	42585	46.17	20.14	4.32
7	36193	43807	45.24	19.63	4.83
8	34876	45124	43.60	19.63	4.83
9	34876	45124	43.60	19.63	4.83
10	34876	45124	43.60	19.63	4.83
Present Value					
5%				167.95	30.39
10%				140.84	24.51
15%				120.92	20.27

TABLE F-11

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16084	63916	20.11	23.49	0.97
3	16068	63932	20.09	27.72	1.74
4	16058	63942	20.07	21.95	2.52
5	16048	63952	20.06	21.18	3.29
6	16037	63963	20.05	20.40	4.06
7	16025	63975	20.03	19.63	4.83
8	16013	63987	20.02	19.63	4.83
9	16013	63987	20.02	10.63	4.83
10	16013	63987	20.02	10.63	4.83
Present Value					
5%				173.13	25.21
10%				145.64	19.71
15%				125.40	15.79

TABLE F-12

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16422	63578	20.53	23.47	0.99
3	16342	63658	20.43	22.71	1.76
4	16292	63708	20.37	21.94	2.51
5	16240	63760	20.30	21.17	3.29
6	16185	63815	20.23	20.40	4.06
7	16128	63872	20.16	19.63	4.83
8	16068	63932	20.09	19.63	4.83
9	16068	63932	20.09	19.63	4.83
10	16068	63932	20.09	10.63	4.83
Present Value					
5%				173.09	25.26
10%				145.60	19.75
15%				125.36	15.83

TABLE F-13

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	18112	61888	22.64	23.37	1.09
3	17723	62277	22.15	22.64	1.82
4	17746	62524	21.85	21.90	2.57
5	17219	62781	21.52	21.15	3.32
6	16950	63050	21.19	20.39	4.07
7	16167	63333	20.83	19.63	4.83
8	16370	63630	20.46	19.63	4.83
9	16370	63630	20.46	19.63	4.83
10	16370	63630	20.46	19.63	4.83
Present Value					
5%				172.86	25.48
10%				145.39	19.95
15%				125.18	16.01

TABLE F-14

Positive Fee-Fee-For Service Modality Hospital Utilization Response - 5 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	21281	58719	26.60	23.18	1.29
3	20356	59644	25.44	22.51	1.95
4	19767	60233	24.71	21.81	2.65
5	19147	60853	23.93	21.10	3.36
6	18494	61506	23.12	20.37	4.09
7	17805	62195	22.26	19.63	4.83
8	17075	62925	21.34	19.63	4.83
9	17075	62925	21.34	19.63	4.83
10	17075	62925	21.34	19.63	4.83
Present Value					
5%				172.44	25.90
10%				145.01	20.34
15%				124.82	16.37

TABLE F-15

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	29518	50482	36.90	22.68	1.78
3	27484	52516	34.36	22.17	2.30
4	26156	53844	32.70	21.58	2.88
5	24730	55262	30.92	20.97	3.50
6	23220	56780	29.03	20.34	4.15
7	21590	58410	26.99	19.63	4.83
8	19835	60165	24.79	19.63	4.83
9	19835	60165	24.79	19.63	4.83
10	19835	60165	24.79	19.63	4.83
Present Value					
5%				171.30	27.04
10%				143.97	21.38
15%				123.87	17.32

TABLE F-16

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4100	75900	5.13	24.22	0.25
3	4081	75919	5.10	23.30	1.16
4	4069	75931	5.09	23.38	2.08
5	4057	75943	5.07	21.47	3.00
6	4044	75956	5.05	20.55	3.92
7	4030	75970	5.04	19.63	4.83
8	4016	75884	5.02	19.63	4.83
9	4016	75984	5.02	19.63	4.83
10	4016	75984	5.02	19.63	4.83
Present Value					
5%				175.98	22.36
10%				148.30	17.05
15%				127.90	13.29

TABLE F-17

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -.002)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4502	75498	5.63	24.19	0.27
3	4407	75593	5.51	23.28	1.18
4	4347	75653	5.43	22.37	2.09
5	4285	75715	5.36	21.46	3.00
6	4220	75780	5.27	20.55	3.92
7	4152	75848	5.19	19.63	4.83
8	4080	75920	5.10	19.63	4.83
9	4080	75920	5.10	19.63	4.83
10	4080	75920	5.10	19.63	4.83

TABLE F-18

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	6500	73429	8.14	24.07	0.39
3	6046	73954	7.56	23.20	1.26
4	5753	74247	7.19	22.32	2.14
5	5448	74552	6.81	21.43	3.03
6	5128	74872	6.41	20.53	3.93
7	4792	75208	5.99	19.63	4.83
8	4439	75561	5.55	19.63	4.83
9	4439	75561	5.55	19.63	4.83
10	4439	75561	5.55	19.63	4.83
Present Value					
5%				175.67	22.67
10%				148.01	17.34
15%				127.64	13.55

TABLE F-19

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	10271	69729	12.84	23.84	0.62
3	9173	70827	11.47	23.05	1.41
4	8473	71527	10.59	22.22	2.24
5	7737	72263	9.67	21.38	3.09
6	6972	73038	8.70	20.51	3.95
7	6143	73857	7.68	19.63	4.83
8	5277	74723	6.60	19.63	4.83
9	5277	74723	6.60	19.63	4.83
10	5277	74723	6.60	19.63	4.83
Present Value					
5%				175.17	23.17
10%				147.55	17.79
15%				127.22	13.97

TABLE F-20

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.06	24.16	0.30
2	20053	59947	25.07	23.25	1.21
3	17637	62363	22.05	22.64	1.82
4	16060	63940	20.01	21.95	2.52
5	14376	65624	17.97	21.22	3.25
6	12573	67427	15.72	20.44	4.02
7	10638	69362	13.30	19.63	4.83
8	8554	71446	10.69	19.63	4.83
9	8554	71446	10.69	19.63	4.83
10	8554	71446	10.69	19.63	4.83
Present Value					
5%				173.81	24.53
10%				146.32	19.03
15%				126.09	15.10

TABLE F-1A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40032	39968	50.04	20.84	1.21
3	40022	39978	50.03	20.60	1.45
4	40018	39982	50.02	20.35	1.69
5	40015	39985	50.02	20.11	1.93
6	40011	39989	50.01	19.87	2.18
7	40007	39993	50.01	19.63	2.42
8	40003	39997	50.00	19.63	2.42
9	40003	39997	50.00	19.63	2.42
10	40003	39997	50.00	19.63	2.42
Present Value					
5%				163.98	15.77
10%				136.28	12.83
15%				116.53	10.71

TABLE F-2A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40159	39841	50.20	20.83	1.21
3	40109	39891	50.14	20.59	1.45
4	40091	39909	50.11	20.35	1.69
5	40073	39927	50.09	20.11	1.94
6	40055	39945	50.07	19.87	2.18
7	40036	39964	50.05	19.63	2.42
8	40017	39983	50.02	19.63	2.42
9	40017	39983	50.02	19.63	2.42
10	40017	39983	50.02	19.63	2.42
Present Value					
5%				169.27	15.77
10%				136.18	12.83
15%				117.14	10.10

TABLE F-3A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40794	39206	50.99	20.81	1.83
3	40548	39452	50.69	20.58	1.46
4	40461	39539	50.58	20.35	1.70
5	40372	39628	50.47	20.11	1.94
6	40282	39718	50.35	19.87	2.18
7	40188	39812	50.24	19.63	2.42
8	40093	39907	50.12	19.63	2.42
9	40093	39907	50.12	19.63	2.42
10	40093	39907	50.12	19.63	2.42
Present Value					
5%				162.93	15.81
10%				136.14	12.87
15%				116.40	10.74

TABLE F-4A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	41986	38014	52.48	20.78	1.27
3	41388	38612	51.74	20.56	1.48
4	41176	38824	51.47	20.33	1.71
5	40958	39042	51.20	20.10	1.95
6	40735	39265	50.92	19.87	2.18
7	40504	39496	50.63	19.63	2.42
8	40267	39733	50.33	19.63	2.42
9	40267	39733	50.33	19.63	2.42
10	40267	39733	50.33	19.63	2.42
Present Value					
5%				162.86	15.88
10%				136.08	12.93
15%				116.99	10.25

TABLE F-5A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	45085	34915	56.36	20.68	1.36
3	43678	36322	54.60	20.51	1.54
4	43168	36832	53.96	20.30	1.75
5	42639	37361	53.30	20.08	1.97
6	42091	37909	52.61	19.86	2.19
7	41521	38479	51.90	19.63	2.42
8	40930	39070	51.16	19.63	2.42
9	40930	39070	51.16	19.63	2.42
10	40930	39070	51.16	19.63	2.42
Present Value					
5%				162.67	16.08
10%				135.90	13.11
15%				116.27	10.97

TABLE F-6A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32038	47962	40.05	21.08	0.97
3	32026	47974	40.03	20.79	1.26
4	32022	47978	40.03	20.50	1.55
5	32018	47982	40.02	20.21	1.84
6	32013	47987	40.02	19.92	2.13
7	32009	47991	40.01	19.63	2.42
8	32004	47996	40.01	19.63	2.42
9	32004	47996	40.01	19.63	2.42
10	32004	47996	40.01	19.63	2.42
Present Value					
5%				163.99	14.75
10%				137.13	11.88
15%				117.43	9.81

TABLE F-7A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32191	47809	40.24	21.07	0.97
3	32130	47870	40.16	20.79	1.26
4	32109	47891	40.14	20.50	1.55
5	32088	47912	40.11	20.21	1.84
6	32066	47934	40.08	19.92	2.13
7	32044	47956	40.05	19.63	2.42
8	32020	47980	40.03	19.63	2.42
9	32020	47980	40.03	19.63	2.42
10	32020	47980	40.03	19.63	2.42
Present Value					
5%				163.98	14.76
10%				137.13	11.88
15%				117.42	9.82

TABLE F-8A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32953	47047	41.19	21.05	1.00
3	32657	47343	40.82	20.77	1.27
4	32553	47447	40.69	20.49	1.56
5	32447	47553	40.56	20.20	1.84
6	32338	47662	40.42	19.92	2.13
7	32226	47774	40.28	19.63	2.42
8	32111	47889	40.14	19.63	2.42
9	32111	47889	40.14	19.63	2.42
10	32111	47889	40.14	19.63	2.42
Present Value					
5%				163.94	14.81
10%				137.08	11.93
15%				117.38	9.86

TABLE F-9A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	34383	45617	42.98	21.01	1.04
3	33665	46335	42.08	20.75	1.30
4	33411	46589	41.76	20.47	1.57
5	33150	46850	41.44	20.20	1.85
6	32882	47118	41.10	19.91	2.13
7	32605	47395	40.76	19.63	2.42
8	32320	47680	40.40	19.63	2.42
9	32320	47680	40.40	19.63	2.42
10	32320	47680	40.40	19.63	2.42
Present Value					
5%				163.85	14.89
10%				137.00	12.00
15%				117.31	9.93

TABLE F-10A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	38102	41898	47.63	20.90	1.15
3	36413	43587	45.52	20.86	1.18
4	35801	44199	44.75	20.43	1.62
5	35167	44833	43.96	20.17	1.88
6	34509	45491	43.14	19.90	2.14
7	33826	46174	42.28	19.63	2.42
8	33115	46885	41.39	19.63	2.42
9	33115	46885	41.39	19.63	2.42
10	33115	46885	41.39	19.63	2.42
Present Value					
5%				163.78	14.96
10%				136.94	12.07
15%				117.25	9.99

TABLE F-11A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16051	63949	20.06	21.56	0.49
3	16035	63965	20.04	21.18	0.87
4	16029	63971	20.04	20.79	1.26
5	16023	63977	20.03	20.40	1.64
6	16018	63982	20.02	20.02	2.03
7	16012	63988	20.01	19.63	2.42
8	16005	63995	20.01	19.63	2.42
9	16005	63995	20.01	19.63	2.42
10	16005	63995	20.01	19.63	2.42
Present Value					
5%				166.02	12.73
10%				139.03	9.98
15%				119.22	8.02

TABLE F-12A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16254	63746	20.32	21.56	0.49
3	16174	63826	20.22	21.17	0.87
4	16146	63854	20.18	20.79	1.26
5	16117	63883	20.15	20.40	1.65
6	16088	63912	20.11	20.02	2.03
7	16058	63942	20.07	19.63	2.42
8	16027	63973	20.03	19.63	2.42
9	16027	63973	20.03	19.63	2.42
10	16027	63973	20.03	19.63	2.42
Present Value					
5%				166.01	12.74
10%				139.02	9.99
15%				119.21	8.03

TABLE F-13A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	17271	62729	21.59	21.52	0.52
3	16876	63124	21.10	21.16	0.89
4	16738	63262	20.92	20.78	1.27
5	16596	63404	20.75	20.40	1.65
6	16450	63550	20.56	20.01	2.03
7	16301	63699	20.38	19.63	2.42
8	16148	63852	20.19	19.63	2.42
9	16148	63852	20.19	19.63	2.42
10	16148	63852	20.19	19.63	2.42
Present Value					
5%				165.95	12.80
10%				138.97	10.04
15%				119.16	8.08

TABLE F-14A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	19178	60822	23.97	21.47	0.58
3	18220	61780	22.78	21.12	0.92
4	17882	62118	22.35	20.76	1.29
5	17534	62466	21.92	20.38	1.66
6	17175	62825	21.47	20.01	2.04
7	16807	63193	21.01	19.63	2.42
8	16427	63573	20.53	19.63	2.42
9	16427	63573	20.53	19.63	2.42
10	16427	63573	20.53	19.63	2.42
Present Value					
5%				165.83	12.91
10%				138.86	10.15
15%				119.06	8.18

TABLE F-15A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	24135	55865	30.17	21.32	0.73
3	21884	58116	27.36	21.03	1.01
4	21069	58931	26.34	20.70	1.35
5	20223	59777	25.28	20.35	1.70
6	19346	60654	24.18	20.00	2.05
7	18434	61566	23.04	19.63	2.42
8	17487	62513	21.86	19.63	2.42
9	17487	62513	21.86	19.63	2.42
10	17487	62513	21.86	19.63	2.42
Present Value					
5%				165.52	13.23
10%				138.58	10.43
15%				118.80	8.44

TABLE F-16A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.87	0.18
2	4060	75940	5.08	21.92	0.12
3	4041	75959	5.05	21.47	0.58
4	4035	75965	5.04	21.01	1.04
5	4028	75972	5.03	20.55	1.50
6	4021	75979	5.03	20.09	1.96
7	4014	75986	5.02	19.63	2.42
8	4006	75994	5.01	19.63	2.42
9	4006	75994	5.01	19.63	2.42
10	4006	75994	5.01	19.63	2.42
Present Value					
5%				167.54	11.21
10%				140.46	8.55
15%				120.57	6.67

TABLE F-17A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	4302	75698	5.38	21.92	0.13
3	4207	75793	5.26	21.46	0.59
4	4173	75827	5.22	21.00	1.04
5	4139	75861	5.17	20.55	1.50
6	4105	75895	5.13	20.09	1.96
7	4069	75931	5.09	19.63	2.42
8	4032	75968	5.04	19.63	2.42
9	4032	75968	5.04	19.63	2.42
10	4032	75968	5.04	19.63	2.42
Present Value					
5%				167.52	11.22
10%				140.44	8.57
15%				120.55	6.69

TABLE F-18A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	5510	74490	6.89	21.88	0.17
3	5041	74960	6.30	21.44	0.61
4	4896	75124	6.10	20.99	1.06
5	4708	75292	5.88	20.54	1.51
6	4535	75465	5.67	20.09	1.96
7	4358	75642	5.45	19.63	2.42
8	4176	75824	5.22	19.63	2.42
9	4176	75824	5.22	19.63	2.42
10	4176	75824	5.22	19.63	2.42
Present Value					
5%				167.45	11.29
10%				140.38	12.07
15%				120.49	6.75

TABLE F-19A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	7774	72226	9.72	21.81	0.24
3	6637	73363	8.30	21.40	0.64
4	6235	73765	7.79	20.97	1.08
5	5821	74179	7.28	20.53	1.52
6	5396	74604	6.74	20.08	1.97
7	4958	75042	6.20	19.63	2.42
8	4507	75493	5.63	19.63	2.42
9	4507	75493	5.63	19.63	2.42
10	4507	75493	5.63	19.63	2.42
Present Value					
5%				167.31	11.43
10%				140.25	8.76
15%				120.38	6.86

TABLE F-20A

Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	13661	66339	17.08	21.63	0.41
3	10987	69013	13.73	21.30	0.75
4	10019	69981	12.52	20.90	1.15
5	9015	70985	11.27	20.48	1.57
6	7973	72027	9.97	20.06	1.98
7	6891	73109	8.61	19.63	2.42
8	5766	74234	7.21	19.63	2.42
9	5766	74234	7.21	19.63	2.42
10	5766	74234	7.21	19.63	2.42
Present Value					
5%				166.94	11.81
10%				139.91	9.10
15%				120.06	7.18

TABLE F-1B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40053	39947	50.07	22.04	2.42
3	40043	39957	50.05	21.33	3.13
4	40032	39968	50.04	20.43	4.03
5	40021	39979	50.03	19.63	4.83
6	40009	39991	50.01	19.63	4.83
7	40009	39991	50.01	19.63	4.83
8	40009	39991	50.01	19.63	4.83
9	40009	39991	50.01	19.63	4.83
10	40009	39991	50.01	19.63	4.83
Present Value					
5%				165.48	32.86
10%				138.68	26.67
15%				119.00	22.19

TABLE F-2B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40264	39736	50.33	22.03	2.43
3	40214	39786	50.27	21.23	3.23
4	40162	39838	50.20	20.43	4.03
5	40105	39895	50.13	19.63	4.83
6	40045	39955	50.06	19.63	4.83
7	40045	39955	50.06	19.63	4.83
8	40045	39955	50.06	19.63	4.83
9	40045	39955	50.06	19.63	4.83
10	40045	39955	50.06	19.63	4.83
Present Value					
5%				165.38	32.96
10%				138.58	26.76
15%				119.52	21.67

TABLE F-3B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	41320	38680	51.65	21.97	2.50
3	41077	38923	51.35	21.20	3.27
4	40820	39180	51.03	20.42	4.05
5	40544	39456	50.68	19.63	4.83
6	40245	39755	50.31	19.63	4.83
7	40245	39755	50.31	19.63	4.83
8	40245	39755	50.31	19.63	4.83
9	40245	39755	50.31	19.63	4.83
10	40245	39755	50.31	19.63	4.83
Present Value					
5%				165.28	33.06
10%				138.49	26.86
15%				118.83	22.36

TABLE F-4B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	43300	36700	54.13	21.85	2.62
3	42723	37277	53.40	21.13	3.33
4	42109	37891	52.64	20.39	4.07
5	41441	38559	51.80	19.63	4.83
6	40709	39291	50.89	19.63	4.83
7	40709	39291	50.89	19.63	4.83
8	40709	39291	50.89	19.63	4.83
9	40709	39291	50.89	19.63	4.83
10	40709	39291	50.89	19.63	4.83
Present Value					
5%				165.08	33.26
10%				138.30	27.04
15%				119.07	22.12

TABLE F-5B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	48449	31551	50.56	21.54	2.93
3	47177	32823	58.97	20.95	3.51
4	45794	34206	57.24	20.32	4.15
5	44250	35750	55.31	19.63	4.83
6	42514	37486	53.14	19.63	4.83
7	42514	37486	53.14	19.63	4.83
8	42514	37486	53.14	19.63	4.83
9	42514	37486	53.14	19.63	4.83
10	42514	37486	53.14	19.63	4.83
Present Value					
5%				164.55	33.78
10%				137.81	27.53
15%				118.20	22.99

TABLE F-6B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32063	47937	40.08	22.53	1.94
3	32051	47949	40.06	21.56	2.90
4	32039	47961	40.05	20.60	3.87
5	32025	47975	40.03	19.63	4.83
6	32011	47989	40.01	19.63	4.83
7	32011	47989	40.01	19.63	4.83
8	32011	47989	40.01	19.63	4.83
9	32011	47989	40.01	19.63	4.83
10	32011	47989	40.01	19.63	4.83
Present Value					
5%				166.90	31.44
10%				140.03	25.31
15%				120.31	20.88

TABLE F-7B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32317	47683	40.40	22.51	1.95
3	32257	47743	40.32	21.55	2.91
4	32194	47806	40.24	20.59	3.87
5	32126	47874	40.16	19.63	4.83
6	32054	47946	40.07	19.63	4.83
7	32054	47946	40.07	19.63	4.83
8	32054	47946	40.07	19.63	4.83
9	32054	47946	40.07	19.63	4.83
10	32054	47946	40.07	19.63	4.83
Present Value					
5%				166.87	31.47
10%				140.01	25.34
15%				120.29	20.90

TABLE F-8B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	33584	46416	41.98	22.43	2.03
3	33292	46708	41.62	21.51	2.95
4	32984	47016	41.23	20.58	3.89
5	32653	47347	40.82	19.63	4.83
6	32293	47707	40.37	19.63	4.83
7	32293	47707	40.37	19.63	4.83
8	32293	47707	40.37	19.63	4.83
9	32293	47707	40.37	19.63	4.83
10	32293	47707	40.37	19.63	4.83
Present Value					
5%				166.75	31.59
10%				139.90	25.45
15%				120.18	21.01

TABLE F-9B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs[1] (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	35960	44040	44.95	22.29	2.17
3	35267	44733	44.08	21.43	3.03
4	34531	45469	43.16	20.55	3.92
5	33729	46271	42.16	19.63	4.83
6	32851	47149	41.06	19.63	4.83
7	32851	47149	41.06	19.63	4.83
8	32851	47149	41.06	19.63	4.83
9	32851	47149	41.06	19.63	4.83
10	32851	47149	41.06	19.63	4.83
Present Value					
5%				166.51	31.83
10%				139.68	25.67
15%				119.98	21.22

TABLE F-10B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	42139	37861	52.67	21.92	2.55
3	40613	39387	50.77	21.22	3.25
4	38953	41047	48.69	20.46	4.01
5	37100	42900	46.38	19.63	4.83
6	35017	44983	43.77	19.63	4.83
7	35017	44983	43.77	19.63	4.83
8	35017	44983	43.77	19.63	4.83
9	35017	44983	43.77	19.63	4.83
10	35017	44983	43.77	19.63	4.83
Present Value					
5%				165.89	32.45
10%				139.09	26.25
15%				119.43	21.76

TABLE F-11B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	18112	61888	22.64	23.37	1.09
3	17723	62277	22.15	22.14	2.33
4	17312	62688	21.64	20.89	3.57
5	16870	63130	21.09	19.63	4.83
6	16391	63609	20.49	19.63	4.83
7	16391	63609	20.49	19.63	4.83
8	16391	63609	20.49	19.63	4.83
9	16391	63609	20.49	19.63	4.83
10	16391	63609	20.49	19.63	4.83
Present Value					
5%				169.70	28.64
10%				142.72	22.63
15%				122.89	18.30

TABLE F-12B

Positive Fee-for-Service Modality Hospital Utilization Response - 3 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.20)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16084	63916	20.11	23.49	0.97
3	16068	63932	20.09	22.20	2.26
4	16052	63948	20.06	20.92	3.55
5	16034	63966	20.04	19.63	4.83
6	16014	63986	20.02	19.63	4.83
7	16014	63986	20.02	19.63	4.83
8	16014	63986	20.02	19.63	4.83
9	16014	63986	20.02	19.63	4.83
10	16014	63986	20.02	19.63	4.83
Present Value					
5%				169.89	28.45
10%				142.90	22.45
15%				123.06	18.13

TABLE F-13B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16422	63578	20.53	23.47	0.99
3	16342	63658	20.43	22.19	2.27
4	16259	63741	20.32	20.91	3.55
5	16169	63831	20.21	19.63	4.83
6	16072	63928	20.09	19.63	4.83
7	16072	63928	20.09	19.63	4.83
8	16072	63928	20.09	19.63	4.83
9	16072	63928	20.09	19.63	4.83
10	16072	63928	20.09	19.63	4.83
Present Value					
5%				169.86	28.48
10%				142.87	22.48
15%				123.03	18.16

TABLE F-14B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	21281	58719	26.60	23.18	1.28
3	20356	59644	25.44	22.03	2.43
4	19374	60626	24.22	20.85	3.61
5	18305	61695	22.88	19.63	4.83
6	17135	62865	21.42	19.63	4.83
7	17135	62865	21.42	19.63	4.83
8	17135	62865	21.42	19.63	4.83
9	17135	62865	21.42	19.63	4.83
10	17135	62865	21.42	19.63	4.83
Present Value					
5%				169.38	28.96
10%				142.42	22.92
15%				122.62	18.57

TABLE F-15B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	29518	50482	36.90	22.68	1.78
3	27484	52516	34.36	21.74	2.72
4	25270	54730	31.59	20.73	3.73
5	22800	57200	28.50	19.63	4.83
6	20023	59977	25.03	19.63	4.83
7	20023	59977	25.03	19.63	4.83
8	20023	59977	25.03	19.63	4.83
9	20023	59977	25.03	19.63	4.83
10	20023	59977	25.03	19.63	4.83
Present Value					
5%				168.54	29.80
10%				141.64	23.70
15%				121.89	19.30

TABLE F-16B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4100	75900	5.13	24.22	0.25
3	4081	75919	5.10	22.69	1.78
4	4061	75939	5.08	21.16	3.30
5	4040	75960	5.05	19.63	4.83
6	4017	74983	5.02	19.63	4.83
7	4017	74983	5.02	19.63	4.83
8	4017	74983	5.02	19.63	4.83
9	4017	74983	5.02	19.63	4.83
10	4017	74983	5.02	19.63	4.83
Present Value					
5%				172.14	26.20
105				145.05	20.30
15%				125.13	16.06

TABLE F-17B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4502	75498	5.63	24.19	0.27
3	4407	75593	5.51	22.67	1.79
4	4307	75693	5.38	21.15	3.31
5	4200	75800	5.25	19.63	4.83
6	4085	75915	5.11	19.63	4.83
7	4085	75915	5.11	19.63	4.83
8	4085	75915	5.11	19.63	4.83
9	4085	75915	5.11	19.63	4.83
10	4085	75915	5.11	19.63	4.83
Present Value					
5%				172.10	26.24
10%				145.01	20.33
15%				125.09	16.10

TABLE F-18B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	6508	73492	8.14	24.07	0.39
3	6046	73954	7.56	22.61	1.86
4	5558	74442	6.95	21.13	3.34
5	5033	74967	6.29	19.63	4.83
6	4465	75535	5.58	19.63	4.83
7	4465	75535	5.58	19.63	4.83
8	4465	75535	5.58	19.63	4.83
9	4465	75535	5.58	19.63	4.83
10	4465	75535	5.58	19.63	4.83
Present Value					
5%				171.91	26.44
10%				144.83	28.40
15%				124.92	16.27

TABLE F-19B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	10271	69729	12.84	23.84	0.62
3	9173	70827	11.47	22.48	1.98
4	8007	71993	10.00	21.08	3.38
5	6737	73263	8.40	19.63	4.83
6	5348	74652	6.67	19.63	4.83
7	5348	74652	6.67	19.63	4.83
8	5348	74652	6.67	19.63	4.83
9	5348	74652	6.67	19.63	4.83
10	5348	74652	6.67	19.63	4.83
Present Value					
5%				171.53	26.81
10%				144.48	20.86
15%				124.60	16.59

Table F-20B

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	20053	59947	25.07	23.25	1.21
3	17637	62363	22.05	22.14	2.32
4	15008	64992	18.76	20.94	3.53
5	12075	67925	15.09	19.63	4.83
6	8777	71223	10.97	19.63	4.83
7	8777	71223	10.97	19.63	4.83
8	8777	71223	10.97	19.63	4.83
9	8777	71223	10.97	19.63	4.83
10	8777	71223	10.97	19.63	4.83
Present Value					
5%				170.54	27.80
10%				143.56	21.79
15%				123.73	17.46

TABLE F-1C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40032	39968	50.04	20.84	1.21
3	40022	39978	50.03	20.43	1.61
4	40016	39984	50.02	20.03	2.01
5	40010	39990	50.01	19.63	2.42
6	40003	39997	50.00	19.63	2.42
7	40003	39997	50.00	19.63	2.42
8	40003	39997	50.00	19.63	2.42
9	40003	39997	50.00	19.63	2.42
10	40003	39997	50.00	19.63	2.42
Present Value					
5%				161.97	16.78
10%				135.33	13.68
15%				115.80	11.43

TABLE F-2C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40159	39841	50.20	20.83	1.21
3	40109	39891	50.14	20.43	1.61
4	40080	39220	50.10	20.03	2.02
5	40049	39951	50.06	19.63	2.42
6	40018	39982	50.02	19.63	2.42
7	40018	39982	50.02	19.63	2.42
8	40018	39982	50.02	19.63	2.42
9	40018	39982	50.02	19.63	2.42
10	40018	39982	50.02	19.63	2.42
Present Value					
5%				161.96	16.78
10%				135.32	13.69
15%				116.41	10.83

TABLE F-3C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40794	39206	50.99	20.81	1.23
3	40548	39452	50.67	20.42	1.62
4	40403	39597	50.50	20.03	2.02
5	40253	39747	50.32	19.63	2.42
6	40096	39904	50.12	19.63	2.42
7	40096	39904	50.12	19.63	2.42
8	40096	39904	50.12	19.63	2.42
9	40096	39904	50.12	19.63	2.42
10	40096	39904	50.12	19.63	2.42
Present Value					
5%				161.93	16.81
10%				135.30	13.71
15%				115.77	11.47

TABLE F-4C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	41986	38014	52.46	20.78	1.27
3	41388	38612	51.74	20.41	1.64
4	41035	38965	51.29	20.02	2.03
5	40665	39335	50.83	19.63	2.42
6	40278	39722	50.35	19.63	2.42
7	40278	39722	50.35	19.63	2.42
8	40278	39722	50.35	19.63	2.42
9	40278	39722	50.35	19.63	2.42
10	40278	39722	50.35	19.63	2.42
Present Value					
5%				161.88	16.87
10%				135.24	13.77
15%				115.72	11.52

TABLE F-5C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	45085	34915	56.36	20.68	1.36
3	43678	36322	54.60	20.36	1.69
4	42828	37172	53.54	20.00	2.04
5	41926	38074	52.41	19.63	2.42
6	40965	39035	51.21	19.63	2.42
7	40965	39035	51.21	19.63	2.42
8	40965	39035	51.21	19.63	2.42
9	40965	39035	51.21	19.63	2.42
10	40965	39035	51.21	19.63	2.42
Present Value					
5%				161.73	17.01
10%				135.11	13.90
15%				115.60	11.64

TABLE F-6C

Positive Fee-For-Service Modality Hospital Utilization Response- 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32038	47962	40.05	21.08	0.97
3	32026	47974	40.03	20.60	1.45
4	32019	47981	40.02	20.11	1.93
5	32012	47988	40.02	19.63	2.42
6	32004	47996	20.01	19.63	2.42
7	32004	47986	20.01	19.63	2.42
8	32004	47986	20.01	19.63	2.42
9	32004	47986	20.01	19.63	2.42
10	32004	47986	20.01	19.63	2.42
Present Value					
5%				162.78	15.97
10%				136.11	12.90
15%				116.55	10.69

TABLE F-7C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32191	47809	40.24	21.07	0.97
3	32130	47870	40.16	20.59	1.45
4	32095	47905	40.12	20.11	1.94
5	32059	47941	40.07	19.63	2.42
6	32021	47979	40.03	19.63	2.42
7	32021	47979	40.03	19.63	2.42
8	32021	47979	40.03	19.63	2.42
9	32021	47979	40.03	19.63	2.42
10	32021	47979	40.03	19.63	2.42
Present Value					
5%				162.77	15.97
10%				136.10	12.91
15%				116.55	10.69

TABLE F-8C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32953	47047	41.19	21.05	1.00
3	32657	47343	40.82	20.58	1.46
4	32484	47516	40.61	20.11	1.94
5	32304	47696	40.38	19.63	2.42
6	32116	47884	40.15	19.63	2.42
7	32116	47884	40.15	19.63	2.42
8	32116	47884	40.15	19.63	2.42
9	32116	47884	40.15	19.63	2.42
10	32116	47884	40.15	19.63	2.42
Present Value					
5%				162.74	16.01
10%				136.07	12.94
15%				116.52	10.72

TABLE F-9C

Positive Fee-For-Service Modality/Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	34383	45617	42.98	21.01	1.04
3	33665	46335	42.08	20.56	1.48
4	33242	46758	41.56	20.10	1.95
5	32799	47201	41.00	19.63	2.42
6	32333	47667	40.42	19.63	2.42
7	32333	47667	40.42	19.63	2.42
8	32333	47667	40.42	19.63	2.42
9	32333	47667	40.42	19.63	2.42
10	32333	47667	40.42	19.63	2.42
Present Value					
5%				162.67	16.08
10%				136.01	13.00
15%				116.46	10.78

TABLE F-10C

Positive Fee-For-Service Modality-Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	38102	41898	47.63	20.90	1.15
3	36413	43587	45.52	20.51	1.54
4	35394	44606	44.24	20.08	1.97
5	34311	45689	42.89	19.63	2.42
6	33158	46842	41.45	19.63	2.42
7	33158	46842	41.45	19.63	2.42
8	33158	46842	41.45	19.63	2.42
9	33158	46842	41.45	19.63	2.42
10	33158	46842	41.45	19.63	2.42
Present Value					
5%				162.49	16.25
10%				135.84	13.17
15%				116.31	10.93

TABLE F-11C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16051	63949	20.06	21.56	0.49
3	16035	63965	20.04	20.92	1.13
4	16025	63975	20.03	20.27	1.77
5	16016	63984	20.02	19.63	2.42
6	16006	63994	20.01	19.63	2.42
7	16006	63994	20.01	19.63	2.42
8	16006	63994	20.01	19.63	2.42
9	16006	63994	20.01	19.63	2.42
10	16006	63994	20.01	19.63	2.42
Present Value					
5%				164.40	14.35
10%				137.66	11.35
15%				118.05	91.87

TABLE F-12C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16254	63746	20.32	21.56	0.49
3	16174	63826	20.22	20.92	1.13
4	16127	63873	20.16	20.27	1.77
5	16079	63921	20.10	19.63	2.42
6	16028	63972	20.04	19.63	2.42
7	16028	63972	20.04	19.63	2.42
8	16028	63972	20.04	19.63	2.42
9	16028	63972	20.04	19.63	2.42
10	16028	63972	20.04	19.63	2.42
Present Value					
5%				164.39	14.35
10%				137.66	11.35
15%				118.05	9.19

TABLE F-13C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	17271	62729	21.59	21.52	0.52
3	16876	63124	21.10	20.90	1.15
4	16645	63355	20.81	20.27	1.78
5	16405	63595	20.51	19.63	2.42
6	16154	63846	20.19	19.63	2.42
7	16154	63846	20.19	19.63	2.42
8	16154	63846	20.19	19.63	2.42
9	16154	63846	20.19	19.63	2.42
10	16154	63846	20.19	19.63	2.42
Present Value					
5%				164.34	14.40
10%				137.61	11.40
15%				118.00	9.24

TABLE F-14C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	19178	60822	23.97	21.47	0.58
3	18220	61780	22.78	20.87	1.17
4	17656	62344	22.07	20.26	1.79
5	17065	62935	21.33	19.63	2.42
6	16444	63556	20.56	19.63	2.42
7	16444	63556	20.56	19.63	2.42
8	16444	63556	20.56	19.63	2.42
9	16444	63556	20.56	19.63	2.42
10	16444	63556	20.56	19.63	2.42
Present Value					
5%				164.26	14.49
10%				137.53	11.48
15%				117.93	9.31

TABLE F-15C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	24135	55865	30.17	21.32	0.73
3	21884	58116	27.34	20.80	1.25
4	20525	59475	25.66	20.23	1.82
5	19081	60919	23.85	19.63	2.42
6	17544	62456	21.93	19.63	2.42
7	17544	62456	21.93	19.63	2.42
8	17544	62456	21.93	19.63	2.42
9	17544	62456	21.93	19.63	2.42
10	17544	62456	21.93	19.63	2.42
Present Value					
5%				164.02	14.72
10%				137.31	11.70
15%				117.72	9.52

TABLE F-16C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	4060	75940	5.08	21.92	0.12
3	4041	75959	5.05	21.16	0.89
4	4030	75970	5.04	20.39	1.65
5	4019	75981	5.02	19.63	2.42
6	4007	75993	5.01	19.63	2.42
7	4007	75993	5.01	19.63	2.42
8	4007	75993	5.01	19.63	2.42
9	4007	75993	5.01	19.63	2.42
10	4007	75993	5.01	19.63	2.42
Present Value					
5%				165.62	13.13
10%				138.83	10.18
15%				119.18	8.06

TABLE F-17C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	4302	75698	5.38	21.92	0.13
3	4207	75793	5.26	21.16	0.89
4	4151	75849	5.19	20.39	1.65
5	4094	75906	5.12	19.63	2.42
6	4034	75966	5.04	19.63	2.42
7	4034	75966	5.04	19.63	2.42
8	4034	75966	5.04	19.63	2.42
9	4034	75966	5.04	19.63	2.42
10	4034	75966	5.04	19.63	2.42
Present Value					
5%				165.61	13.14
10%				138.82	10.19
15%				119.17	8.07

TABLE F-18C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	5510	74990	6.89	21.88	0.17
3	5041	74960	6.30	21.14	0.91
4	4767	75234	5.96	20.39	1.66
5	4481	75119	5.60	19.63	2.42
6	4183	75817	5.23	19.63	2.42
7	4183	75817	5.23	19.63	2.42
8	4183	75817	5.23	19.63	2.42
9	4183	75817	5.23	19.63	2.42
10	4183	75817	5.23	19.63	2.42
Present Value					
5%				165.55	13.19
10%				138.77	14.17
15%				119.12	8.12

TABLE F-19C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	7774	72226	9.72	21.81	0.24
3	6637	73363	8.30	21.11	0.94
4	5967	74034	7.46	20.38	1.67
5	5264	74736	6.58	19.63	2.42
6	4528	75472	5.66	19.63	2.42
7	4528	75472	5.66	19.63	2.42
8	4528	75472	5.66	19.63	2.42
9	4528	75472	5.66	19.63	2.42
10	4528	75472	5.66	19.63	2.42
Present Value					
5%				165.45	13.30
10%				138.67	10.34
15%				119.03	8.21

TABLE F-20C

Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Fee-For-Service Hospital Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	13661	66339	17.08	21.63	0.41
3	10987	69013	13.73	21.02	1.03
4	9373	70627	11.72	20.34	1.71
5	7659	72341	9.57	19.63	2.42
6	5833	74167	7.29	19.63	2.42
7	5833	74167	7.29	19.63	2.42
8	5833	74167	7.29	19.63	2.42
9	5833	74167	7.29	19.63	2.42
10	5833	74167	7.29	19.63	2.42
Present Value					
5%				165.17	13.58
10%				138.41	10.60
15%				118.79	8.45

TABLE F-1D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40053	39947	50.07	21.42	3.04
3	40053	39947	50.07	24.78	-0.31
4	40039	39961	50.05	25.87	-1.41
5	40038	39962	50.05	27.07	-2.61
6	40036	39964	50.05	28.40	-3.93
7	40035	39965	50.04	29.85	-5.39
8	40034	39966	50.04	31.45	-6.70
9	40032	39968	50.04	33.22	-8.75
10	40031	39969	50.04	35.15	-10.69
Present Value					
5%				220.94	-22.60
10%				180.33	-14.98
15%				150.98	- 9.79

TABLE F-2D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40264	39736	50.33	21.41	3.06
3	40264	39736	50.33	24.82	-0.36
4	40196	39804	50.25	25.91	-1.44
5	40189	39811	50.24	27.11	-2.65
6	40183	39817	50.23	28.44	-3.98
7	40176	39824	50.22	29.90	-5.44
8	40169	39831	50.21	31.51	-7.04
9	40163	39837	50.20	33.27	-8.81
10	40156	39844	50.20	35.21	-10.75
Present Value					
5%				221.22	-22.87
10%				180.54	-15.20
15%				151.44	- 9.95

TABLE F-3D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	41320	38680	51.65	21.33	3.14
3	41320	38680	51.65	25.06	-0.60
4	40979	39021	51.22	26.10	-1.64
5	40950	39050	51.19	27.33	-2.86
6	40917	39083	51.15	28.67	-4.21
7	40885	39115	51.11	30.15	-5.69
8	40853	39147	51.07	31.77	-7.31
9	40821	39179	51.03	33.56	-9.09
10	40789	39211	50.99	35.22	-11.06
Present Value					
5%				222.65	-24.30
10%				181.64	-16.30
15%				152.01	-10.81

TABLE F-4D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	43300	36700	54.13	21.18	3.29
3	43300	36700	54.13	25.55	-1.09
4	42453	37547	53.07	26.50	-2.03
5	42393	37607	52.99	27.76	-3.30
6	42316	37684	52.90	29.14	-4.68
7	42239	37761	52.80	30.65	-6.19
8	42163	37837	52.70	32.32	-7.85
9	42087	37913	52.61	34.14	-9.68
10	42012	37988	52.51	36.14	-11.68
Present Value					
5%				225.57	-27.23
10%				183.90	-18.55
15%				153.78	-12.59

TABLE F-5D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	48449	31551	60.56	20.79	3.68
3	48449	31551	60.56	27.18	-2.72
4	46343	33658	57.93	27.74	-3.28
5	46284	33716	57.86	29.15	-4.68
6	46107	33893	57.63	30.64	-6.17
7	45938	34062	57.42	32.27	-7.81
8	45768	34232	57.21	34.06	-9.60
9	45600	34400	57.00	36.02	-11.55
10	45434	34566	56.79	38.16	-13.70
Present Value					
5%				235.09	-36.75
10%				191.24	-25.90
15%				159.57	-18.38

TABLE F-6D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32063	47937	40.08	22.03	2.43
3	32063	47937	40.08	25.26	-0.80
4	32047	47953	40.06	26.35	-1.89
5	32045	47955	40.06	27.55	-3.09
6	32044	47956	40.06	28.88	-4.42
7	32042	47958	40.05	30.33	-5.87
8	32041	47959	40.05	31.94	-7.47
9	32039	47961	40.04	33.70	-9.24
10	32037	47963	40.05	35.64	-11.17
Present Value					
5%				225.10	-26.75
10%				183.83	-18.48
15%				153.99	-12.80

TABLE F-7D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32317	47683	40.40	22.01	2.45
3	32317	47683	40.40	25.30	-0.84
4	32235	47765	40.29	26.39	-1.92
5	32227	47773	40.28	27.59	-3.13
6	32219	47781	40.27	28.92	-4.46
7	32211	47789	40.26	30.38	-5.92
8	32203	47797	40.25	31.99	-7.52
9	32195	47805	40.24	33.75	-9.29
10	32187	47813	40.23	35.69	-11.23
Present Value					
5%				225.36	-27.02
10%				184.03	-18.69
15%				154.15	-12.96

TABLE F-8D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	33584	46416	41.98	21.92	2.55
3	33584	46416	41.98	25.53	-1.06
4	33175	46825	41.47	26.57	-2.11
5	33140	46860	41.42	27.80	-3.33
6	33101	46899	41.38	29.14	-4.68
7	33062	46938	41.33	30.62	-6.16
8	33023	46977	41.28	32.25	-7.78
9	32985	47015	41.23	34.03	-9.57
10	32947	47053	41.18	35.99	-11.53
Present Value					
5%				226.72	-28.37
10%				185.07	-19.72
15%				154.96	-13.77

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TABLE F-9D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	35960	44040	44.95	21.74	2.73
3	35960	44040	44.95	25.99	-1.53
4	34944	45056	43.68	26.95	-2.49
5	34872	45128	43.59	28.21	-3.75
6	34779	45221	43.47	29.59	-5.13
7	34687	45313	43.36	31.11	-6.65
8	34595	45405	43.24	32.77	-8.31
9	34504	45496	43.13	34.60	-10.14
10	34414	45586	43.02	36.60	-12.14
Present Value					
5%				229.51	-31.17
10%				187.21	-21.86
15%				156.64	-15.45

TABLE F-10D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	42139	37861	52.67	21.27	3.20
3	42139	37861	52.67	27.56	-3.10
4	39611	40389	49.51	28.15	-3.69
5	39541	40459	49.43	29.56	-5.09
6	39329	40671	49.16	31.05	-6.58
7	39125	40875	48.91	32.68	-8.22
8	38922	41078	48.65	34.47	-10.01
9	38720	41280	48.40	36.43	-11.97
10	38521	41479	48.15	38.58	-14.11
Present Value					
5%				238.66	-40.32
10%				194.25	-28.91
15%				162.18	-20.99

TABLE F-11D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16084	63916	20.11	23.24	1.22
3	16084	63916	20.11	26.23	-1.76
4	16063	63937	20.08	27.32	-2.85
5	16060	63940	20.08	28.52	-4.06
6	16058	63942	20.07	29.84	-5.38
7	16056	63944	20.07	31.30	-6.84
8	16054	63946	20.07	32.90	-8.44
9	16052	63948	20.07	34.66	-10.20
10	16050	63950	20.06	36.60	-12.14
Present Value					
5%				233.41	-35.07
10%				190.83	-25.49
15%				160.03	-18.84

TABLE F-12D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.35	1.22
2	16422	63578	20.53	23.22	1.25
3	16422	63578	20.53	26.26	-1.80
4	16313	63687	20.39	27.35	-2.89
5	16303	63697	20.38	28.56	-4.09
6	16292	63708	20.37	29.88	-5.42
7	16281	63719	20.35	31.34	-6.88
8	16271	63729	20.34	32.95	-8.49
9	16260	63740	20.33	34.71	-10.25
10	16250	63750	20.31	36.66	-12.19
Present Value					
5%				233.64	-35.30
10%				191.01	-25.66
15%				160.17	-18.98

TABLE F-13D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.22
2	16422	63578	20.53	23.22	1.25
3	16422	63578	20.53	26.26	-1.80
4	16313	63687	20.39	27.35	-2.89
5	16303	63697	20.38	28.56	-4.09
6	16292	63708	20.37	29.88	-5.42
7	16281	63719	20.35	31.34	-6.88
8	16271	63729	20.34	32.95	-8.49
9	16260	63740	20.33	34.71	-10.25
10	16250	63750	20.31	36.66	-12.19
Present Value					
5%				233.64	-35.30
10%				191.01	-25.66
15%				160.17	-18.98

TABLE F-14D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	21281	58719	26.60	23.85	0.62
3	21281	58719	26.60	26.88	-2.42
4	19925	60075	24.91	27.86	-3.39
5	19830	60170	24.79	29.12	-4.66
6	19706	60294	24.63	30.51	-6.04
7	19583	60417	24.48	32.02	-7.56
8	19460	60540	24.33	33.69	-9.23
9	19339	60661	24.17	35.52	-11.05
10	19218	60782	24.02	37.52	-13.06
Present Value					
5%				238.33	-39.99
10%				194.75	-29.40
15%				163.23	-22.04

TABLE F-15D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	29518	50482	36.90	22.22	2.24
3	29518	50482	36.90	28.33	-3.86
4	26147	53853	32.68	28.96	-4.50
5	26055	53945	32.57	30.37	-5.91
6	25772	54228	32.22	31.87	-7.40
7	25500	54500	31.88	33.51	-9.04
8	25229	52771	31.54	35.30	-10.84
9	24960	55040	31.20	37.26	-12.80
10	24695	55305	30.87	39.41	-14.95
Present Value					
5%				245.79	-47.45
10%				200.28	-34.93
15%				167.38	-26.19

TABLE F-16D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4100	75900	5.12	24.15	0.31
3	4100	75900	5.12	26.95	-2.49
4	4074	75926	5.09	28.04	-3.58
5	4072	75928	5.09	29.25	-4.78
6	4069	75931	5.09	30.57	-6.11
7	4067	75933	5.08	32.03	-7.56
8	4064	75936	5.08	33.63	-9.16
9	4062	75938	5.08	35.39	-10.93
10	4059	75941	5.07	37.73	-13.26
Present Value					
5%				239.91	-41.56
10%				196.25	-30.91
15%				164.67	-23.48

TABLE F-17D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4502	75498	5.63	23.12	0.34
3	4502	75498	5.63	26.98	-2.52
4	4372	75628	5.46	28.07	-3.61
5	4359	75641	5.45	29.28	-4.82
6	4347	75653	5.43	30.61	-6.14
7	4334	75666	5.42	32.07	-7.60
8	4322	75678	5.40	33.67	-9.21
9	4309	75691	5.39	35.44	-10.97
10	4297	75703	5.37	37.38	-12.92
Present Value					
5%				239.86	-41.52
10%				196.24	-30.90
15%				164.68	-23.49

TABLE F-18D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	6508	73492	8.14	23.97	0.49
3	6508	73492	8.14	27.16	-2.70
4	5860	74140	7.33	28.22	-3.76
5	5904	74196	7.26	29.45	-4.99
6	5743	75257	7.18	30.80	-6.33
7	5681	74319	7.10	32.28	-7.81
8	5620	74380	7.03	33.90	-9.44
9	5559	74441	6.95	35.69	-11.23
10	5499	74501	6.87	37.65	-13.19
Present Value					
5%				240.96	-42.62
10%				197.07	-31.72
15%				165.31	-24.12

TABLE F-19D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	10271	69729	12.84	23.68	0.78
3	10271	69729	12.84	27.55	-3.08
4	8661	71339	10.83	28.54	-4.08
5	8548	71452	10.69	29.80	-5.34
6	8401	71599	10.50	31.19	-6.73
7	8255	71745	10.32	32.71	-8.24
8	8109	71891	10.14	34.37	-9.91
9	7965	72035	9.96	36.20	-11.74
10	7822	72178	9.78	38.21	-13.75
Present Value					
5%				243.28	-44.94
10%				198.81	-33.47
15%				166.65	-25.46

TABLE F-20D

Perverse Fee-For-Service Modality Ambulatory Utilization Response
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	20053	59947	25.07	22.94	1.52
3	20053	59947	25.07	28.90	-4.44
4	16050	63950	20.06	29.57	-5.11
5	15940	64060	19.93	30.98	-6.52
6	15604	64396	19.51	32.48	-8.02
7	15281	64719	19.10	34.12	-9.66
8	14959	65041	18.70	35.92	-11.46
9	14640	65360	18.30	37.89	-13.42
10	14325	65675	17.91	40.04	-15.58
Present Value					
5%				251.15	-52.81
10%				204.79	-39.45
15%				171.29	-30.10

APPENDIX G

MODEL EXTENSIONS

ALTERNATIVE CAPITATION REIMBURSEMENT ARRANGEMENT RESULTS

TABLE G-1

Alternative Capitation Reimbursement Arrangement
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40053	39947	50.07	21.42	3.04
3	40053	39947	50.07	21.42	3.04
4	40053	39947	50.07	21.42	3.04
5	40053	39947	50.07	21.42	3.04
6	40053	39947	50.07	21.42	3.04
7	40053	39947	50.07	21.42	3.04
8	40053	39947	50.07	21.42	3.04
9	40053	39947	50.07	21.42	3.04
10	40053	39947	50.07	21.42	30.04
Present Value					
5%				173.71	24.64
10%				144.81	20.54
15%				123.65	20.54

TABLE G-2

Alternative Capitation Reimbursement Arrangement
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.05
2	40264	39736	50.33	21.41	3.05
3	40264	39736	50.33	21.41	3.05
4	40264	39736	50.33	21.41	3.05
5	40264	39736	50.33	21.41	3.05
6	40264	39736	50.33	21.41	3.05
7	40264	39736	50.33	21.41	3.05
8	40264	39736	50.33	21.41	3.05
9	40264	39736	50.33	21.41	3.05
10	40264	39736	50.33	21.41	3.05
Present Value					
5%				173.59	24.69
10%				144.72	20.56
15%				123.58	17.55

TABLE G-3

Alternative Capitation Reimbursement Arrangement
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	41320	38680	51.65	21.33	3.14
3	41320	38680	51.65	21.33	3.14
4	41320	38680	51.65	21.33	3.14
5	41320	38680	51.65	21.33	3.14
6	41320	38680	51.65	21.33	3.14
7	41320	38680	51.65	21.33	3.14
8	41320	38680	51.65	21.33	3.14
9	41320	38680	51.65	21.33	3.14
10	41320	38680	51.65	21.33	3.14
Present Value					
5%				173.02	25.32
10%				144.26	21.09
15%				123.20	17.99

TABLE G-4

Alternative Capitation Reimbursement Arrangement
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	43300	36700	54.13	21.18	3.29
3	43300	36700	54.13	21.18	3.29
4	43300	36700	54.13	21.18	3.29
5	43300	36700	54.13	21.18	3.29
6	43300	36700	54.13	21.18	3.29
7	43300	36700	54.13	21.18	3.29
8	43300	36700	54.13	21.18	3.29
9	43300	36700	54.13	21.18	3.29
10	43300	36700	54.13	21.18	3.29
Present Value					
5%				171.96	26.38
10%				143.39	21.95
15%				122.48	18.71

TABLE G-5

Alternative Capitation Reimbursement Arrangement
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	2.143	3.04
2	48449	31551	60.56	20.79	3.68
3	48449	31551	60.56	20.79	3.68
4	48449	31551	60.56	20.79	3.68
5	48449	31551	60.56	20.79	3.68
6	48449	31551	60.56	20.79	3.68
7	48449	31551	60.56	20.79	3.68
8	48449	31551	60.56	20.79	3.68
9	48449	31551	60.56	20.79	3.68
10	48449	31551	60.56	20.79	3.68
Present Value					
5%				169.18	29.16
10%				141.14	24.21
15%				120.61	20.58

TABLE G-6

Alternative Capitation Reimbursement Arrangement
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32063	47937	40.08	22.03	2.43
3	32063	47937	40.08	22.03	2.43
4	32063	47937	40.08	22.03	2.43
5	32063	47937	40.08	22.03	2.43
6	32063	47937	40.08	22.03	2.43
7.	32063	47937	40.08	22.03	2.43
8	32063	47937	40.08	22.03	2.43
9	32063	47937	40.08	22.03	2.43
10	32063	47937	40.08	22.03	2.43
Present Value					
5%				178.62	19.72
10%				148.91	16.44
15%				127.15	14.04

TABLE G-7

Alternative Capitation Reimbursement Arrangement
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32317	47683	40.40	22.01	2.45
3	32317	47683	40.40	22.01	2.45
4	32317	47683	40.40	22.01	2.45
5	32317	47683	40.40	22.01	2.45
6	32317	47683	40.40	22.01	2.45
7	32317	47683	40.40	22.01	2.45
8	32317	47683	40.40	22.01	2.45
9	32317	47683	40.40	22.01	2.45
10	32317	47683	40.40	22.01	2.45
Present Value					
5%				178.49	19.86
10%				148.80	16.55
15%				127.06	14.13

TABLE G-8

Alternative Capitation Reimbursement Arrangement
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	33584	46416	41.98	21.92	2.55
3	33584	46416	41.98	21.92	2.55
4	33584	46416	41.98	21.92	2.55
5	33584	46416	41.98	21.92	2.55
6	33584	46416	41.98	21.92	2.55
7	33854	46416	41.98	21.92	2.55
8	33854	46416	41.98	21.92	2.55
9	33854	46416	41.98	21.92	2.55
10	33858	46416	41.98	21.92	2.55
Present Value					
5%				177.80	20.54
10%				148.24	17.10
15%				126.60	14.59

TABLE G-9

Alternative Capitation Reimbursement Arrangement
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	35960	44040	44.95	21.74	2.73
3	35960	44040	44.95	21.74	2.73
4	35960	44040	44.95	21.74	2.73
5	35960	44040	44.95	21.74	2.73
6	35960	44040	44.95	21.74	2.73
7	35960	44040	44.95	21.74	2.73
8	35960	44040	44.95	21.74	2.73
9	35960	44040	44.95	21.74	2.73
10	35960	44040	44.95	21.74	2.73
Present Value					
5%				176.52	21.02
10%				147.21	18.14
15%				125.75	15.44

TABLE G-10

Alternative Capitation Reimbursement Arrangement
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	42139	37861	52.67	21.27	3.20
3	42139	37861	52.67	21.27	3.20
4	42139	37861	52.67	21.27	3.20
5	42139	37861	52.67	21.27	3.20
6	42139	37861	52.67	21.27	3.20
7	42139	37861	52.67	21.27	3.20
8	42139	37861	52.67	21.27	3.20
9	42139	37861	52.67	21.27	3.20
10	42139	37861	52.67	21.27	3.20
Present Value					
5%				173.19	25.15
10%				144.51	20.84
15%				123.51	17.68

TABLE G-11

Alternative Capitation Reimbursement Arrangement
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16084	63916	20.11	23.24	1.22
3	16084	63916	20.11	23.24	1.22
4	16084	63916	20.11	23.24	1.22
5	16084	63916	20.11	23.24	1.22
6	16084	63916	20.11	23.24	1.22
7	16084	63916	20.11	23.24	1.22
8	16084	63916	20.11	23.24	1.22
9	16084	63916	20.11	23.24	1.22
10	16084	63916	20.11	23.24	1.22
Present Value					
5%				188.46	9.89
10%				157.11	8.24
15%				134.15	7.04

TABLE G-12

Alternative Capitation Reimbursement Arrangement
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16422	63578	20.53	23.22	1.25
3	16422	63578	20.53	23.22	1.25
4	16422	63578	20.53	23.22	1.25
5	16422	63578	20.53	23.22	1.25
6	16422	63578	20.53	23.22	1.25
7	16422	63578	20.53	23.22	1.25
8	16422	63578	20.53	23.22	1.25
9	16422	63578	20.53	23.22	1.25
10	16422	63578	20.53	23.22	1.25
Present Value					
5%				188.27	10.07
10%				156.96	8.39
15%				134.03	7.16

TABLE G-13

Alternative Capitation Reimbursement Arrangement
(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	18112	61888	22.64	23.09	1.37
3	18112	61888	22.64	23.09	1.37
4	18112	61888	22.64	23.09	1.37
5	18112	61888	22.64	23.09	1.37
6	18112	61888	22.64	23.09	1.37
7	18112	61888	22.64	23.09	1.37
8	18112	61888	22.64	23.09	1.37
9	18112	61888	22.64	23.09	1.37
10	18112	61888	22.64	23.09	1.37
Present Value					
5%				187.36	10.98
10%				156.22	9.13
15%				133.42	7.77

TABLE G-14

Alternative Capitation Reimbursement Arrangement
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	21281	58719	26.60	22.85	1.62
3	21281	58719	26.60	22.85	1.62
4	21281	58719	26.60	22.85	1.62
5	21281	58719	26.60	22.85	1.62
6	21281	58719	26.60	22.85	1.62
7	21281	58719	26.60	22.85	[illegible]
8	21281	58719	26.60	22.85	[illegible]
9	21281	58719	26.60	22.85	1.62
10	21281	58719	26.60	22.85	1.62
Present Value					
5%				185.65	12.69
10%				154.83	10.51
15%				132.27	8.92

TABLE G-15

Alternative Capitation Reimbursement Arrangement
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	29518	50482	36.90	22.22	2.24
3	29518	50482	36.90	22.22	2.24
4	29518	50482	36.90	22.22	2.24
5	29518	50482	36.90	22.22	2.24
6	29518	50482	36.90	22.22	2.24
7	29518	50482	36.90	22.22	2.24
8	29518	50482	36.90	22.22	2.24
9	29518	50482	36.90	22.22	2.24
10	29518	50482	36.90	22.22	2.24
Present Value					
5%				181.21	17.14
10%				151.23	14.11
15%				129.29	11.90

TABLE G-16

Alternative Capitation Reimbursement Arrangement
(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4100	75900	5.13	24.15	0.31
3	4100	75900	5.13	24.15	0.31
4	4100	75900	5.13	24.15	0.31
5	4100	75900	5.13	24.15	0.31
6	4100	75900	5.13	24.15	0.31
7	4100	75900	5.13	24.15	0.31
8	4100	75900	5.13	25.15	0.31
9	4100	75900	5.13	25.15	0.31
10	4100	75900	5.13	25.15	0.31
Present Value					
5%				195.83	2.52
10%				163.25	2.09
15%				139.40	1.79

TABLE G-17

Alternative Capitation Reimbursement Arrangement
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4502	75498	5.63	24.12	0.34
3	4502	75498	5.63	24.12	0.34
4	4502	75498	5.63	24.12	0.34
5	4502	75498	5.63	24.12	0.34
6	4502	75498	5.63	24.12	0.34
7	4502	75498	5.63	24.12	0.34
8	4502	75498	5.63	24.12	0.34
9	4502	75498	5.63	24.12	0.34
10	4502	75498	5.63	24.12	0.34
Present Value					
5%				195.61	2.73
10%				163.08	2.27
15%				139.26	1.93

TABLE G-18

Alternative Capitation Reimbursement Arrangement
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	6508	73492	8.14	23.97	0.49
3	6508	73492	8.14	23.97	0.49
4	6508	73492	8.14	23.97	0.49
5	6508	73492	8.14	23.97	0.49
6	6508	73492	8.14	23.97	0.49
7	6508	73492	8.14	23.97	0.49
8	6508	73492	8.14	23.97	0.49
9	6508	73492	8.14	23.97	0.49
10	6508	73492	8.14	23.97	0.49
Present Value					
5%				194.53	3.81
10%				162.20	3.15
15%				138.53	2.66

TABLE G-19

Alternative Capitation Reimbursement Arrangement
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	10271	69729	12.84	23.68	0.78
3	10271	69729	12.84	23.68	0.78
4	10271	69729	12.84	23.68	0.78
5	10271	69729	12.84	23.68	0.78
6	10271	69729	12.84	23.68	0.78
7	10271	69729	12.84	23.68	0.78
8	10271	69729	12.84	23.68	0.78
9	10271	69729	12.84	23.68	0.78
10	10271	69729	12.84	23.68	0.78
Present Value					
5%				192.50	5.84
10%				160.56	4.79
15%				137.17	4.02

TABLE G-20

Alternative Capitation Reimbursement Arrangement
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	20053	59947	25.07	22.94	1.52
3	20053	59947	25.07	22.94	1.52
4	20053	59947	25.07	22.94	1.52
5	20053	59947	25.07	22.94	1.52
6	20053	59947	25.07	22.94	1.52
7	20053	59947	25.07	22.94	1.52
8	20053	59947	25.07	22.94	1.52
9	20053	59947	25.07	22.94	1.52
10	20053	59947	25.07	22.94	1.52
Present Value					
5%				187.23	11.11
10%				156.28	9.06
15%				133.63	7.56

TABLE G-1A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40032	39968	50.04	20.22	1.83
3	40032	39968	50.04	20.22	1.83
4	40032	39968	50.04	20.22	1.83
5	40032	39968	50.04	20.22	1.83
6	40032	39968	50.04	20.22	1.83
7	40032	39968	50.04	20.22	1.83
8	40032	39968	50.04	20.22	1.83
9	40032	39968	50.04	20.22	1.83
10	40032	39968	50.04	20.22	1.83
Present Value					
5%				163.92	14.82
10%				136.65	12.35
15%				116.69	10.55

TABLE G-2A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40159	39841	50.20	20.21	1.83
3	40159	39841	50.20	20.21	1.83
4	40159	39841	50.20	20.21	1.83
5	40159	39841	50.20	20.21	1.83
6	40159	39841	50.20	20.21	1.83
7	40159	39841	50.20	20.21	1.83
8	40159	39841	50.20	20.21	1.83
9	40159	39841	50.20	20.21	1.83
10	40159	39841	50.20	20.21	1.83
Present Value					
5%				163.88	14.86
10%				136.62	12.39
15%				116.62	10.58

TABLE G-3A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40794	39206	50.99	20.18	1.86
3	40794	39206	50.99	20.18	1.86
4	40794	39206	50.99	20.18	1.86
5	40794	39206	50.99	20.18	1.86
6	40794	39206	50.99	20.18	1.86
7	40794	39206	50.99	20.18	1.86
8	40794	39206	50.99	20.18	1.86
9	40794	39206	50.99	20.18	1.86
10	40794	39206	50.99	20.18	1.86
Present Value					
5%				163.68	150.69
10%				136.45	125.56
15%				116.52	107.16

TABLE G-4A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	41986	38014	52.48	20.12	1.92
3	41986	38014	52.48	20.12	1.92
4	41986	38014	52.48	20.12	1.92
5	41986	38014	52.48	20.12	1.92
6	41986	38014	52.48	20.12	1.92
7	41986	38014	52.48	20.12	1.92
8	41986	38014	52.48	20.12	1.92
9	41986	38014	52.48	20.12	1.92
10	41986	38014	52.48	20.12	1.92
Present Value					
5%				163.29	15.45
10%				136.14	12.87
15%				116.27	10.97

TABLE G-5A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	45085	34915	56.36	19.99	2.04
3	45085	34915	56.36	19.99	2.04
4	45085	34915	56.36	19.99	2.04
5	45085	34915	56.36	19.99	2.04
6	45085	34915	56.36	19.99	2.04
7	45085	34915	56.36	19.99	2.04
8	45085	34915	56.36	19.99	2.04
9	45085	34915	56.36	19.99	2.04
10	45085	34915	56.36	19.99	2.04
Present Value					
5%				162.28	16.46
10%				135.32	13.68
15%				115.59	11.65

TABLE G-6A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32038	47962	40.05	20.58	1.46
3	32038	47962	40.05	20.58	1.46
4	32038	47962	40.05	20.58	1.46
5	32038	47962	40.05	20.58	1.46
6	32038	47962	40.05	20.58	1.46
7	32038	47962	40.05	20.58	1.46
8	32038	47962	40.05	20.58	1.46
9	32038	47962	40.05	20.58	1.46
10	32038	47962	40.05	20.58	1.46
Present Value					
5%				166.89	11.86
10%				139.12	9.89
15%				118.80	8.44

TABLE G-7A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32191	47809	40.24	20.58	1.47
3	32191	47809	40.24	20.58	1.47
4	32191	47809	40.24	20.58	1.47
5	32191	47809	40.24	20.58	1.47
6	32191	47809	40.24	20.58	1.47
7	32191	47809	40.24	20.58	1.47
8	32191	47809	40.24	20.58	1.47
9	32191	47809	40.24	20.58	1.47
10	32191	47809	40.24	20.58	1.47
Present Value					
5%				166.84	11.91
10%				139.08	9.93
15%				118.77	8.48

TABLE G-8A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32953	47047	41.19	20.54	1.51
3	32953	47047	41.19	20.54	1.51
4	32953	47047	41.19	20.54	1.51
5	32953	47047	41.19	20.54	1.51
6	32953	47047	41.19	20.54	1.51
7	32953	47047	41.19	20.54	1.51
8	32953	47047	41.19	20.54	1.51
9	32953	47047	41.19	20.54	1.51
10	32953	47047	41.19	20.54	1.51
Present Value					
5%				166.59	12.16
10%				138.88	10.13
15%				118.60	8.64

TABLE G-9A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	34383	45617	42.98	20.48	1.57
3	34383	45617	42.98	20.48	1.57
4	34383	45617	42.98	20.48	1.57
5	34383	45617	42.98	20.48	1.57
6	34383	45617	42.98	20.48	1.57
7	34383	45617	42.98	20.48	1.57
8	34383	45617	42.98	20.48	1.57
9	34383	45617	42.98	20.48	1.57
10	34383	45617	42.98	20.48	1.57
Present Value					
5%				166.12	12.62
10%				138.51	10.50
15%				118.29	8.95

TABLE G-10A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(40% Initial Market Share, Enrollment Elasticity [illegible]64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	38102	41898	47.63	20.31	1.74
3	38102	41898	47.63	20.31	1.74
4	38102	41898	47.63	20.31	1.74
5	38102	41898	47.63	20.31	1.74
6	38102	41898	47.63	20.31	1.74
7	38102	41898	47.63	20.31	1.74
8	38102	41898	47.63	20.31	1.74
9	38102	41898	47.63	20.31	1.74
10	38102	41898	47.63	20.31	1.74
Present Value					
5%				164.92	13.83
10%				137.53	11.48
15%				117.48	9.76

TABLE G-11A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16051	63949	20.06	21.31	0.73
3	16051	63949	20.06	21.31	0.73
4	16051	63949	20.06	21.31	0.73
5	16051	63949	20.06	21.31	0.73
6	16051	63949	20.06	21.31	0.73
7	16051	63949	20.06	21.31	0.73
8	16051	63949	20.06	21.31	0.73
9	16051	63949	20.06	21.31	0.73
10	16051	63949	20.06	21.31	0.73
Present Value					
5%				172.80	5.94
10%				144.06	4.95
15%				123.01	4.23

TABLE G-12A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16254	63746	20.32	21.30	0.74
3	16254	63746	20.32	21.30	0.74
4	16254	63746	20.32	21.30	0.74
5	16254	63746	20.32	21.30	0.74
6	16254	63746	20.32	21.30	0.74
7	16254	63746	20.32	21.30	0.74
8	16254	63746	20.32	21.30	0.74
9	16254	63746	20.32	21.30	0.74
10	16254	63746	20.32	21.30	0.74
Present Value					
5%				172.74	6.01
10%				144.01	5.00
15%				122.97	4.27

TABLE G-13A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	17271	62729	21.59	21.26	0.79
3	17271	62729	21.59	21.26	0.79
4	17271	62729	21.59	21.26	0.79
5	17271	62729	21.59	21.26	0.79
6	17271	62729	21.59	21.26	0.79
7	17271	62729	21.59	21.26	0.79
8	17271	62729	21.59	21.26	0.79
9	17271	62729	21.59	21.26	0.79
10	17271	62729	21.59	21.26	0.79
Present Value					
5%				172.41	6.34
10%				143.73	5.27
15%				122.74	4.50

TABLE G-14A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.31	0.73
2	19178	60822	23.97	21.17	0.88
3	19178	60822	23.97	21.17	0.88
4	19178	60822	23.97	21.17	0.88
5	19178	60822	23.97	21.17	0.88
6	19178	60822	23.97	21.17	0.88
7	19178	60822	23.97	21.17	0.88
8	19178	60822	23.97	21.17	0.88
9	19178	60822	23.97	21.17	0.88
10	19178	60822	23.97	21.17	0.88
Present Value					
5%				171.79	6.96
10%				143.23	5.78
15%				122.33	4.91

TABLE G-15A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	24135	55865	30.17	20.94	1.10
3	24135	55865	30.17	20.94	1.10
4	24135	55865	30.17	20.94	1.10
5	24135	55865	30.17	20.94	1.10
6	24135	55865	30.17	20.94	1.10
7	24135	55865	30.17	20.94	1.10
8	24135	55865	30.17	20.94	1.10
9	24135	55865	30.17	20.94	1.10
10	24135	55865	30.17	20.94	1.10
Present Value					
5%				170.18	8.56
10%				141.93	7.08
15%				121.25	5.99

TABLE G-16A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	4060	75940	5.08	21.86	0.19
3	4060	75940	5.08	21.86	0.19
4	4060	75940	5.08	21.86	0.19
5	4060	75940	5.08	21.86	0.19
6	4060	75940	5.08	21.86	0.19
7	4060	75940	5.08	21.86	0.19
8	4060	75940	5.08	21.86	0.19
9	4060	75940	5.08	21.86	0.19
10	4060	75940	5.08	21.86	0.19
Present Value					
5%				177.25	1.50
10%				147.76	1.25
15%				126.17	1.07

TABLE G-17A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	4302	75698	5.38	21.85	0.20
3	4302	75698	5.38	21.85	0.20
4	4302	75698	5.38	21.85	0.20
5	4302	75698	5.38	21.85	0.20
6	4302	75698	5.38	21.85	0.20
7	4302	75698	5.38	21.85	0.20
8	4302	75698	5.38	21.85	0.20
9	4302	75698	5.38	21.85	0.20
10	4302	75698	5.38	21.85	0.20
Present Value					
5%				177.17	1.58
10%				147.70	1.31
15%				126.12	1.12

TABLE G-18A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	5510	74490	6.89	21.79	0.25
3	5510	74490	6.89	21.79	0.25
4	5510	74490	6.89	21.79	0.25
5	5510	74490	6.89	21.79	0.25
6	5510	74490	6.89	21.79	0.25
7	5510	74490	6.89	21.79	0.25
8	5510	74490	6.89	21.79	0.25
9	5510	74490	6.89	21.79	0.25
10	5510	74490	6.89	21.79	0.25
Present Value					
5%				176.77	1.97
10%				147.38	1.63
15%				125.85	1.39

TABLE G-19A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	7774	68226	9.72	21.69	0.36
3	7774	68226	9.72	21.69	0.36
4	7774	68226	9.72	21.69	0.36
5	7774	68226	9.72	21.69	0.36
6	7774	68226	9.72	21.69	0.36
7	7774	68226	9.72	21.69	0.36
8	7774	68226	9.72	21.69	0.36
9	7774	68226	9.72	21.69	0.36
10	7774	68226	9.72	21.69	0.36
Present Value					
5%				176.04	2.71
10%				146.78	2.21
15%				125.36	1.88

TABLE G-20A

Alternative Capitation Reimbursement Arrangement
(Reduction in the Initial Fee-For-Service Utilization Rate)
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	13661	66339	17.08	21.42	0.62
3	13661	66339	17.08	21.42	0.62
4	13661	66339	17.08	21.42	0.62
5	13661	66339	17.08	21.42	0.62
6	13661	66339	17.08	21.42	0.62
7	13661	66339	17.08	21.42	0.62
8	13661	66339	17.08	21.42	0.62
9	13661	66339	17.08	21.42	0.62
10	13661	66339	17.08	21.42	0.62
Present Value					
5%				174.13	4.62
10%				145.23	3.78
15%				124.08	3.16

APPENDIX H

MODEL EXTENSIONS

COMBINED ALTERNATIVE CAPITATION REIMBURSEMENT ARRANGEMENT AND POSITIVE FEE-FOR-SERVICE MODALITY HOSPITAL UTILIZATION RESPONSE RESULTS

TABLE H-1

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40053	39947	50.07	21.42	3.04
3	40053	39947	50.07	20.94	3.52
4	40046	39954	50.06	20.46	4.00
5	40040	39960	50.05	19.98	4.49
6	40033	39967	50.04	19.49	4.97
7	40026	39974	50.03	19.01	5.45
8	40018	39982	50.02	19.01	5.45
9	40018	39982	50.02	19.01	5.45
10	40018	39982	50.02	19.01	5.45
Present Value					
5%				161.03	35.32
10%				136.75	28.60
15%				117.44	23.75

TABLE H-2

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40264	39736	50.33	21.41	3.06
3	40264	39736	50.33	20.93	3.54
4	40233	39767	50.29	20.45	4.01
5	40200	39800	50.25	19.97	4.49
6	40166	39834	50.21	19.49	4.97
7	40130	39870	50.16	19.01	5.45
8	40093	39907	50.12	19.01	5.45
9	40093	39907	50.12	19.01	5.45
10	40093	39907	50.12	19.01	5.45
Present Value					
5%				162.95	35.36
10%				136.71	28.64
15%				117.40	23.79

TABLE H-3

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
~~2~~	41320	38680	51.65	21.33	3.14
3	41320	38680	51.65	20.86	3.60
4	41167	38833	51.46	20.40	4.06
5	41007	38993	51.26	19.94	4.53
6	40840	39160	51.05	19.47	4.99
7	40665	39335	50.83	19.00	5.46
8	40480	39520	50.50	19.00	5.46
9	40480	39520	50.50	19.00	5.46
10	40480	39520	50.50	19.00	5.46
Present Value					
5%				162.74	35.60
10%				136.49	28.85
15%				117.21	23.98

TABLE H-4

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	43300	36700	54.13	21.18	3.29
3	43300	36700	54.13	20.73	3.73
4	42938	37062	53.67	20.31	4.15
5	42556	37444	53.20	19.88	4.59
6	42155	37845	52.69	19.44	5.03
7	41731	38269	52.16	18.98	5.48
8	41281	38719	51.60	18.99	5.47
9	41281	38719	51.60	18.99	5.47
10	41281	38719	51.60	18.99	5.47
Present Value					
5%				162.29	36.06
10%				136.09	29.25
15%				116.86	24.34

TABLE H-5

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	48449	31551	60.56	20.79	3.68
3	48449	31551	60.56	20.41	4.06
4	47651	32349	59.56	20.07	4.40
5	46799	33201	58.50	19.71	4.76
6	45887	34113	57.36	19.33	5.13
7	44908	35092	56.15	18.94	5.53
8	43854	36146	54.82	18.95	5.51
9	43854	36146	54.82	18.95	5.51
10	43854	36146	54.82	18.95	5.51
Present Value					
5%				161.07	37.27
10%				135.02	30.32
15%				115.90	25.29

TABLE H-6

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.0004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32063	47937	40.08	22.03	2.44
3	32063	47937	40.08	21.45	3.01
4	32056	47944	40.07	20.87	3.59
5	32048	47952	40.06	20.29	4.17
6	32040	47960	40.05	19.71	4.75
7	32031	47969	40.04	19.13	5.33
8	32022	47968	40.02	19.13	5.33
9	32022	47968	40.02	19.13	5.33
10	32022	47968	40.02	19.13	5.33
Present Value					
5%				165.81	32.54
10%				139.23	26.11
15%				119.70	21.49

TABLE H-7

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity-0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32317	47683	40.40	22.01	2.45
3	32317	47683	40.40	21.44	3.03
4	32279	47721	40.35	20.86	3.60
5	32240	47760	40.30	20.29	4.18
6	32199	47801	40.25	19.71	4.75
7	32156	47844	40.20	19.13	5.33
8	32111	47889	40.14	19.13	5.33
9	32111	47889	40.14	19.13	5.33
10	32111	47889	40.14	19.13	5.33
Present Value					
5%				165.75	32.59
10%				139.18	26.16
15%				119.65	21.54

TABLE H-8

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	33584	46416	41.98	21.92	2.55
3	33584	46416	41.98	21.35	3.11
4	33401	46599	41.75	20.80	3.66
5	33209	46791	41.51	20.25	4.22
6	33008	46992	41.26	19.69	4.78
7	32797	47203	40.10	19.12	5.34
8	32576	47424	40.72	19.13	5.34
9	32576	47424	40.72	19.13	5.34
10	32576	47424	40.72	19.13	5.34
Present Value					
5%				165.46	32.88
10%				138.93	26.42
15%				119.43	21.76

TABLE H-9

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment (40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	35960	44040	44.95	21.74	2.73
3	35960	44040	44.95	21.20	3.26
4	35525	44475	44.41	20.69	3.77
5	35068	44932	43.84	20.17	4.29
6	34586	45414	43.23	19.64	4.82
7	34077	45923	42.60	19.10	5.36
8	33538	46462	41.92	19.11	5.35
9	33538	46462	41.92	19.11	5.35
10	33538	46462	41.92	19.11	5.35
Present Value					
5%				164.92	33.42
10%				138.45	26.90
15%				119.00	22.19

TABLE H-10

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital-Utilization Response - 5 Year Adjustment (40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	42139	37861	52.67	21.27	3.20
3	42139	37861	52.67	20.81	3.66
4	41181	38819	51.48	20.40	4.06
5	40159	39841	50.20	19.97	4.49
6	39064	40936	48.83	19.52	4.94
7	37890	42110	47.36	19.04	5.42
8	36625	43375	45.78	19.06	5.40
9	36625	43375	45.78	19.06	5.40
10	36625	43375	45.78	19.06	5.40
Present Value					
5%				163.46	34.88
10%				137.16	28.18
15%				117.85	23.34

TABLE H-11

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16084	63916	20.11	23.24	1.22
3	16084	63916	20.11	22.47	1.99
4	16074	63926	20.09	21.70	2.77
5	16064	63936	20.08	20.93	3.54
6	16053	63947	20.07	20.15	4.31
7	16041	63959	20.05	19.38	5.08
8	16029	63971	20.04	19.38	5.08
9	16029	63971	20.04	19.38	5.08
10	16029	63971	20.04	19.38	5.08
Present Value					
5%				171.36	26.98
10%				144.20	21.14
15%				124.21	16.98

TABLE H-12

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16422	63578	20.53	23.22	1.25
3	16422	63578	20.53	22.45	2.01
4	16372	63628	20.47	21.68	2.78
5	16320	63680	20.40	20.92	3.55
6	16265	63735	20.33	20.15	4.32
7	16208	63792	20.26	19.38	5.09
8	16148	63852	20.19	19.38	5.08
9	16148	63852	20.19	19.38	5.08
10	16148	63852	20.19	19.38	5.08
Present Value					
5%				171.29	27.05
10%				144.14	21.21
15%				124.15	17.04

TABLE H-13

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	18112	61888	22.64	23.09	1.37
3	18112	61888	22.64	22.34	2.12
4	17868	62132	22.34	21.61	2.86
5	17612	62388	22.01	20.87	3.60
6	17344	62656	21.68	20.11	4.35
7	17063	62937	21.33	19.37	5.10
8	16768	63232	20.96	19.37	5.09
9	16768	63232	20.96	19.37	5.09
10	16768	63232	20.96	19.37	5.09
Present Value					
5%				170.91	27.43
10%				143.80	21.55
15%				123.85	17.34

TABLE H-14

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	21281	58719	26.60	22.85	1.62
3	21281	58719	26.60	22.14	2.32
4	20700	59300	25.88	21.46	3.00
5	20090	59910	25.11	20.77	3.70
6	19448	60552	24.31	20.06	4.40
7	18679	61231	23.46	19.34	5.12
8	18050	61950	22.56	19.35	5.11
9	18050	61950	22.56	19.35	5.11
10	18050	61950	22.56	19.35	5.11
Present Value					
5%				170.18	28.16
10%				143.16	22.19
15%				123.27	17.92

TABLE H-15

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment (20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	29518	50482	36.90	22.22	2.24
3	29518	50482	36.90	21.61	2.85
4	28241	51759	35.30	21.07	3.39
5	26878	53122	33.60	20.50	3.97
6	25419	54581	31.77	19.90	4.57
7	23853	56147	29.82	19.26	5.20
8	22166	57834	27.71	19.29	5.18
9	22166	57834	27.71	19.29	5.18
10	22166	57834	27.71	19.29	5.18
Present Value					
5%				168.21	30.11
10%				141.44	23.90
15%				121.74	19.45

TABLE H-16

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment (5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4100	75900	5.13	24.15	0.31
3	4100	75900	5.13	23.24	1.23
4	4088	75912	5.11	22.32	2.15
5	4076	75924	5.09	21.40	3.06
6	4063	75937	5.08	20.48	3.98
7	4049	75951	5.06	19.57	4.90
8	4035	75965	5.04	19.57	4.90
9	4035	75965	5.04	19.57	4.90
10	4035	75965	5.04	19.57	4.90
Present Value					
5%				175.54	22.81
10%				147.93	17.41
15%				127.60	13.59

TABLE H-16

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4502	75498	5.63	24.12	0.34
3	4502	75498	5.63	23.21	1.25
4	4442	75558	5.55	22.30	2.16
5	4380	75620	5.47	21.39	3.07
6	4315	75685	5.39	20.48	3.99
7	4247	75753	5.31	19.56	4.90
8	4176	75824	5.22	19.56	4.90
9	4176	75824	5.22	19.56	4.90
10	4176	75824	5.22	19.56	4.90
Present Value					
5%				175.44	22.90
10%				147.85	17.49
15%				127.53	13.66

TABLE H-17

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	6508	73492	8.14	23.97	0.49
3	6508	73492	8.14	23.08	1.38
4	6218	73782	7.77	22.21	2.26
5	5914	74086	7.39	21.33	3.14
6	5596	74404	6.70	20.44	4.02
7	5263	74737	6.58	19.55	4.92
8	4912	75088	6.14	19.55	4.91
9	4912	75088	6.14	19.55	4.91
10	4912	75088	6.14	19.55	4.91
Present Value					
5%				174.99	23.35
10%				147.45	24.89
15%				127.17	14.02

TABLE H-19

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	10271	69729	12.84	23.68	0.78
3	10271	69729	12.84	22.84	1.62
4	9582	70418	11.98	21.21	3.25
5	8857	71143	11.07	21.21	3.25
6	8094	71143	10.12	20.37	4.09
7	7288	72712	9.11	19.52	4.95
8	6435	73565	8.04	19.53	4.93
9	6435	73565	8.04	19.53	4.93
10	6435	73565	8.04	19.53	4.93
Present Value					
5%				174.13	24.21
10%				146.69	18.66
15%				126.48	14.71

TABLE H-20

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	20053	59947	25.07	22.94	1.52
3	20053	59947	25.07	22.22	2.25
4	18537	61463	23.17	21.57	2.89
5	16918	63082	21.15	20.89	3.57
6	15185	64815	18.98	20.18	4.29
7	13325	66675	16.66	19.42	5.04
8	11322	68678	14.15	19.45	5.01
9	11322	68678	14.15	19.45	5.01
10	11322	68678	14.15	19.45	5.01
Present Value					
5%				171.82	26.52
10%				144.66	20.69
15%				124.67	16.52

TABLE H-1A

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40032	39968	50.04	20.22	1.83
3	40032	39968	50.04	19.98	2.07
4	40028	39972	50.04	19.74	2.31
5	40025	39975	50.03	19.49	2.55
6	40021	39979	50.03	19.25	2.79
7	40017	39983	50.02	19.01	3.04
8	40013	39987	50.02	19.01	3.04
9	40013	39987	50.02	19.01	3.04
10	40013	39987	50.02	19.01	3.04
Present Value					
5%				158.58	20.16
10%				136.62	16.39
15%				113.58	13.66

TABLE H-2A

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40159	39841	50.20	20.21	1.83
3	40159	39841	50.20	19.97	2.08
4	40141	39859	50.18	19.73	2.32
5	40124	39876	50.15	19.49	2.56
6	40105	39895	50.13	19.25	2.80
7	40087	39913	50.11	19.01	3.04
8	40067	39933	50.08	19.01	3.04
9	40067	39933	50.08	19.01	3.04
10	40067	39933	50.08	19.01	3.04
Present Value					
5%				158.56	20.18
10%				132.60	16.41
15%				113.56	13.68

TABLE H-3A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40794	39206	50.99	20.18	1.86
3	40794	39206	50.99	19.95	2.10
4	40709	39291	50.89	19.71	2.33
5	40620	39380	50.78	19.48	2.57
6	40530	39470	50.66	19.24	2.81
7	40437	39563	50.55	19.00	3.04
8	40342	39658	50.43	19.01	3.04
9	40342	39658	50.43	19.01	3.04
10	40342	39658	50.43	19.01	3.04
Present Value					
5%				158.46	20.28
10%				132.52	16.49
15%				113.49	13.75

TABLE H-4A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	41986	38014	52.48	20.13	1.92
3	41986	38014	52.48	19.90	2.15
4	41778	38222	52.22	19.68	2.37
5	41564	38436	51.95	19.45	2.60
6	41343	38657	51.68	19.22	2.82
7	41116	38884	51.40	18.99	3.05
8	40883	39117	51.10	18.99	3.05
9	40883	39117	51.10	18.99	3.05
10	40883	39117	51.10	18.99	3.05
Present Value					
5%				158.28	20.47
10%				132.36	16.65
15%				113.34	13.89

TABLE H-5A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrolment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.81
2	45085	34915	56.36	19.99	2.06
3	45085	34915	56.36	19.78	2.27
4	44595	35405	55.74	19.58	2.46
5	44087	35913	55.11	19.38	2.66
6	43559	36441	54.45	19.18	2.87
7	43012	36988	53.77	18.96	3.08
8	42443	37557	53.05	18.97	3.07
9	42443	37557	53.05	18.97	3.07
10	42443	37557	53.05	18.97	3.07
Present Value					
5%				157.78	20.96
10%				131.93	17.08
15%				112.97	14.27

TABLE H-6A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.0064)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32038	47962	40.05	20.58	1.46
3	32038	47962	40.05	20.29	1.75
4	32034	47966	40.04	20.00	2.04
5	32030	27970	40.04	19.71	2.33
6	32025	27975	40.03	19.42	2.62
7	32021	47979	40.03	19.13	2.91
8	32016	47984	40.02	19.13	2.91
9	32016	47984	40.02	19.13	2.91
10	32016	47984	40.02	19.13	2.91
Present Value					
5%				160.47	18.27
10%				134.28	14.73
15%				115.07	12.17

TABLE H-7A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32191	47809	40.24	20.58	1.47
3	32191	47809	40.24	20.29	1.76
4	32170	47830	40.21	20.00	2.05
5	32148	47852	40.19	19.71	2.34
6	32126	47874	40.16	19.42	2.62
7	32104	47896	40.13	19.13	2.91
8	32081	47919	40.10	19.13	2.91
9	32081	47919	40.10	19.13	2.91
10	32081	47919	40.10	19.13	2.91
Present Value					
5%				160.45	18.30
10%				134.26	14.75
15%				115.05	12.19

TABLE H-8A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32953	47047	41.19	20.54	1.51
3	32953	47047	41.19	20.26	1.79
4	32850	47150	41.06	19.98	2.07
5	32744	47256	40.93	19.69	2.35
6	32636	47364	40.80	19.41	2.64
7	32525	47475	40.66	19.13	2.92
8	32411	47589	40.51	19.13	2.92
9	32411	47589	40.51	19.13	2.92
10	32411	47589	40.51	19.13	2.92
Present Value					
5%				160.33	18.41
10%				134.16	14.85
15%				114.96	12.28

TABLE H-9A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.56	1.46
2	34383	45617	42.98	20.48	1.57
3	34383	45617	42.98	20.20	1.85
4	34133	45867	42.67	19.93	2.11
5	33876	46124	42.35	19.66	2.38
6	33612	46388	42.02	16.39	5.66
7	33340	46660	41.68	19.11	2.93
8	33059	46941	41.32	19.12	2.93
9	33059	46941	41.32	19.12	2.93
10	33059	46941	41.32	19.12	2.93
Present Value					
5%				157.76	20.99
10%				132.10	16.90
15%				113.30	13.94

TABLE H-10A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	38102	41898	47.63	20.31	1.74
3	38102	41898	47.63	20.05	1.99
4	37514	42486	46.89	19.82	2.23
5	36904	43096	46.13	19.58	2.47
6	36271	43729	45.34	19.33	2.71
7	35614	44386	44.52	19.08	2.97
8	34932	45068	43.67	19.09	2.96
9	34932	45068	43.67	19.09	2.96
10	34932	45068	43.67	19.09	2.96
Present Value					
5%				159.52	19.23
10%				133.45	15.56
15%				114.34	12.91

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TABLE H-11A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16051	63949	20.06	21.31	0.73
3	16051	63949	20.06	20.93	0.12
4	16045	63955	20.06	20.54	1.51
5	16040	63961	20.05	20.15	1.89
6	16034	63966	20.04	19.68	2.37
7	16028	63972	20.04	19.38	2.67
8	16021	63979	20.03	19.38	2.67
9	16021	63979	20.03	19.38	2.67
10	16021	63979	20.03	19.38	2.67
Present Value					
5%				164.18	14.56
10%				137.55	11.56
15%				117.99	92.47

TABLE H-12A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16254	63746	20.32	21.30	0.74
3	16254	63746	20.32	20.92	1.13
4	16226	63774	20.28	20.53	1.51
5	16198	63802	20.25	20.15	1.90
6	16168	63832	20.21	19.77	2.28
7	16138	63862	20.17	19.38	2.67
8	16108	63892	20.14	19.38	2.67
9	16108	63892	20.14	19.38	2.67
10	16108	63892	20.14	19.38	2.67
Present Value					
5%				164.22	14.52
10%				137.58	11.43
15%				118.02	9.22

TABLE H-13A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	17271	62729	21.59	21.26	0.79
3	17271	62729	21.59	20.88	1.17
4	17134	62866	21.42	20.50	1.54
5	16993	63007	21.24	20.13	1.92
6	16848	63152	21.06	19.75	2.30
7	16700	63300	20.88	19.37	2.68
8	16548	63452	20.69	19.37	2.67
9	16548	63452	20.69	19.37	2.67
10	16548	63452	20.69	19.37	2.67
Present Value					
5%				164.07	14.68
10%				137.44	11.57
15%				117.89	9.35

TABLE H-14A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	19178	60822	23.97	21.17	0.88
3	19178	60822	23.97	20.80	1.24
4	18844	61156	23.56	20.45	1.60
5	18502	61498	23.13	20.09	1.96
6	18149	61851	22.69	19.72	2.32
7	17786	62214	22.23	19.35	2.69
8	17412	62588	21.77	19.36	2.69
9	17412	62588	21.77	19.36	2.69
10	17412	62588	21.77	19.36	2.69
Present Value					
5%				163.77	14.98
10%				137.18	11.83
15%				117.66	9.58

TABLE H-15A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.12	0.73
2	24135	55865	30.17	20.94	1.10
3	24135	55865	30.17	20.61	1.44
4	23351	56649	29.19	20.30	1.75
5	22539	57461	28.18	19.98	2.07
6	21695	58305	27.12	19.65	2.40
7	20819	59181	26.02	19.31	2.74
8	19909	60091	24.89	19.32	2.73
9	19909	60091	24.89	19.32	2.73
10	19909	60091	24.89	19.32	2.73
Present Value					
5%				162.98	15.76
10%				136.49	12.51
15%				117.06	10.18

TABLE H-16A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	4060	75940	5.08	21.86	0.19
3	4060	75940	5.08	21.40	0.64
4	4054	75946	5.07	20.94	1.10
5	4047	75953	5.06	20.48	1.56
6	4040	75960	5.05	19.57	2.48
7	4033	75967	5.04	19.57	2.48
8	4026	75975	5.03	19.57	2.48
9	4026	75975	5.03	19.57	2.48
10	4026	75975	5.03	19.57	2.48
Present Value					
5%				167.09	11.65
10%				140.10	8.91
15%				120.27	6.97

TABLE H-19A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	7774	72226	9.72	21.69	0.36
3	7774	72226	9.72	21.26	0.79
4	7378	72622	9.22	20.83	1.22
5	6971	73029	8.71	19.97	2.08
6	6552	73448	7.65	19.53	2.51
7	6121	73879	7.65	19.53	2.51
8	5677	74323	7.10	19.54	2.51
9	5677	74323	7.10	19.54	2.51
10	5677	74323	7.10	19.54	2.51
Present Value					
5%				166.52	12.21
10%				139.59	9.42
15%				119.82	7.42

TABLE H-20A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	13661	66339	17.08	21.42	0.62
3	13661	66339	17.08	21.02	1.03
4	12730	67270	15.91	20.65	1.39
5	11765	68235	14.71	20.27	1.77
6	10763	69237	13.45	19.88	2.17
7	9723	70277	12.15	19.48	2.57
8	8642	71358	10.80	19.50	2.55
9	8642	71358	10.80	19.50	2.55
10	8642	71358	10.80	19.50	2.55
Present Value					
5%				165.58	13.47
10%				138.78	10.23
15%				119.10	8.14

TABLE H-1B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40053	39947	50.07	21.42	3.04
3	40053	39947	50.07	20.62	3.84
4	40042	39958	50.05	19.82	4.65
5	40031	39969	50.04	19.01	5.45
6	40019	39981	50.02	19.01	5.45
7	40019	39981	50.02	19.01	5.45
8	40019	39981	50.02	19.01	5.45
9	40019	39981	50.02	19.01	5.45
10	40019	39981	50.02	19.01	5.45
Present Value					
5%				161.01	37.34
10%				135.04	30.31
15%				115.98	25.21

TABLE H-2B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	40264	39736	50.33	21.41	3.06
3	40264	39736	50.33	19.81	4.65
4	40212	39788	50.27	19.01	5.46
5	40156	39844	50.19	19.01	5.45
6	40095	39905	50.12	19.01	5.45
7	40095	39905	50.12	19.01	5.45
8	40095	39905	50.12	19.01	5.45
9	40095	39905	50.12	19.01	5.45
10	40095	39905	50.12	19.01	5.45
Present Value					
5%				159.55	38.79
10%				133.74	31.60
15%				114.82	26.37

TABLE H-3B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	41320	38680	51.65	21.33	3.14
3	41320	38680	51.65	20.55	3.91
4	41065	38935	51.33	19.78	4.68
5	40791	39209	50.99	19.00	5.46
6	40493	39507	50.62	19.00	5.46
7	40493	39507	50.62	19.00	5.46
8	40493	39507	50.62	19.00	5.46
9	40493	39507	50.62	19.00	5.46
10	40493	39507	50.62	19.00	5.46
Present Value					
5%				160.78	37.56
10%				134.84	30.51
15%				115.80	25.39

TABLE H-4B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	43300	36700	54.13	21.18	3.29
3	43300	36700	54.13	20.44	4.03
4	42696	37304	53.57	19.72	4.74
5	42038	37962	52.55	18.98	5.48
6	41318	38682	51.65	18.99	5.47
7	41318	38682	51.65	18.99	5.47
8	41318	38682	51.65	18.99	5.47
9	41318	38682	51.65	18.99	5.47
10	41318	38682	51.65	18.99	5.47
Present Value					
5%				160.43	37.91
10%				134.52	30.82
15%				115.51	25.68

TABLE H-5B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	21.43	3.04
2	48449	31551	60.56	20.79	3.68
3	48449	31551	50.56	21.05	4.31
4	47119	32881	58.90	19.56	4.90
5	45635	34365	57.04	18.92	4.54
6	43966	36034	54.96	18.95	5.51
7	43966	36034	54.96	18.95	5.51
8	43966	36034	54.96	18.95	5.51
9	43966	36034	54.96	18.95	5.51
10	43966	36034	54.96	18.95	5.51
Present Value					
5%				159.46	38.87
10%				133.67	31.68
15%				114.74	26.45

TABLE H-6B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32063	47937	40.08	22.03	2.43
3	32063	47937	40.08	21.07	3.40
4	32051	47949	40.06	20.10	4.36
5	32037	47963	40.05	19.13	5.33
6	32023	47977	40.03	19.13	5.33
7	32023	47977	40.03	19.13	5.33
8	32023	47977	40.03	19.13	5.33
9	32023	47977	40.03	19.13	5.33
10	32033	47977	40.03	19.13	5.33
Present Value					
5%				163.38	34.96
10%				137.18	28.16
15%				117.95	23.24

TABLE H-7B

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	32317	47683	40.40	22.01	2.45
3	32317	47683	40.40	21.05	3.41
4	32254	47746	40.32	20.09	4.37
5	32187	47813	40.23	19.13	5.33
6	32114	47886	40.14	19.13	5.33
7	32114	47886	40.14	19.13	5.33
8	32114	47886	40.14	19.13	5.33
9	32114	47886	40.14	19.13	5.33
10	32114	47886	40.14	19.13	5.33
Present Value					
5%				163.34	35.00
10%				137.14	28.20
15%				117.91	23.28

TABLE H-8B

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	33584	46416	41.98	21.92	2.55
3	33584	46416	41.98	20.98	3.48
4	33278	46722	41.60	20.06	4.41
5	32949	47051	41.19	19.12	5.34
6	32592	47408	40.74	19.13	5.34
7	32592	47408	40.74	19.13	5.34
8	32592	47408	40.74	19.13	5.34
9	32592	47408	40.74	19.13	5.34
10	32592	47408	40.74	19.13	5.34
Present Value					
5%				163.11	35.23
10%				136.94	28.40
15%				117.73	23.46

TABLE H-9B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	35960	44040	44.95	21.74	2.73
3	35960	44040	44.95	20.85	3.62
4	35235	44765	44.04	19.99	4.48
5	34446	45554	43.06	19.10	5.37
6	33582	46418	41.98	19.11	5.35
7	33582	46418	41.98	19.11	5.35
8	33583	46418	41.98	19.11	5.35
9	33583	46418	41.98	19.11	5.35
10	33583	46418	41.98	19.11	5.35
Present Value					
5%				162.69	35.65
10%				136.56	28.78
15%				117.38	23.81

TABLE H-10B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	22.04	2.43
2	42139	37861	52.67	21.27	3.20
3	42139	37861	52.67	20.50	3.96
4	40543	39457	50.68	19.80	4.67
5	38762	41238	48.45	19.03	5.43
6	36760	43240	45.94	19.06	5.40
7	36760	43240	45.94	19.06	5.40
8	36760	43240	45.94	19.06	5.40
9	36760	43240	45.94	19.06	5.40
10	36760	43240	45.94	19.06	5.40
Present Value					
5%				161.54	36.81
10%				135.54	29.81
15%				116.46	24.73

TABLE H-11B

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16084	63916	20.11	23.24	1.22
3	16084	63916	20.11	21.96	2.51
4	16068	63392	20.09	20.67	3.80
5	16050	63950	20.06	19.38	5.08
6	16030	63970	20.04	19.38	5.08
7	16030	63970	20.04	19.38	5.08
8	16030	63970	20.04	19.38	5.08
9	16030	63970	20.04	19.38	5.08
10	16030	63970	20.04	19.38	5.08
Present Value					
5%				168.13	30.21
10%				141.47	23.88
15%				121.88	19.31

TABLE H-12B

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	16422	63578	20.53	23.22	1.25
3	16422	63578	20.53	21.94	2.51
4	16339	63661	20.42	20.66	3.80
5	16249	63751	20.31	19.74	4.73
6	16152	63848	20.19	19.74	4.72
7	16152	63848	20.19	19.74	4.72
8	16152	63848	20.19	19.74	4.72
9	16152	63848	20.19	19.74	4.72
10	16152	63848	20.19	19.74	4.72
Present Value					
5%				169.65	28.69
10%				142.59	22.75
15%				122.73	18.47

TABLE H-13B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	18112	61888	22.64	23.09	1.37
3	18112	61888	22.64	21.84	2.62
4	17705	62295	22.13	20.61	3.85
5	17265	62735	21.58	19.36	5.10
6	16789	63211	20.99	19.37	5.09
7	16789	63211	20.99	19.37	5.09
8	16789	63211	20.99	19.37	5.09
9	16789	63211	20.99	19.37	5.09
10	16789	63211	20.99	19.37	5.09
Present Value					
5%				167.72	30.57
10%				141.15	24.20
15%				121.59	19.60

TABLE H-14B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	23.25	1.21
2	21281	58719	26.60	22.82	1.62
3	21281	58719	26.60	21.67	2.80
4	20314	59686	25.39	20.52	3.95
5	19261	60739	24.08	19.33	5.13
6	18109	61891	22.64	19.35	5.11
7	18109	61891	22.64	19.35	5.11
8	18109	61891	22.64	19.35	5.11
9	18109	61891	22.64	19.35	5.11
10	18109	61891	22.64	19.35	5.11
Present Value					
5%				167.21	31.14
10%				140.64	24.70
15%				121.13	20.06

TABLE H-15B

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.25	1.21
2	29518	50482	36.90	22.22	2.24
3	29518	50482	36.90	21.21	1.26
4	27390	52610	34.24	20.27	4.20
5	25016	54984	31.27	19.24	5.22
6	22346	57654	27.93	19.28	5.18
7	22346	57654	27.93	19.28	5.18
8	22346	57654	27.93	19.28	5.18
9	22346	57654	27.93	19.28	5.18
10	22346	57654	27.93	19.28	5.18
Present Value					
5%				165.67	32.67
10%				139.28	26.07
15%				119.89	21.30

TABLE H-16B

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4100	75900	5.13	24.15	0.31
3	4100	75900	5.13	22.62	1.84
4	4080	75920	5.10	21.10	3.37
5	4059	75941	5.07	19.57	4.90
6	4036	75964	5.05	19.57	4.90
7	4036	75964	5.05	19.57	4.90
8	4036	75964	5.05	19.57	4.90
9	4036	75964	5.05	19.57	4.90
10	4036	75964	5.05	19.57	4.90
Present Value					
5%				171.70	26.65
10%				144.69	20.66
15%				124.83	16.36

TABLE H-17B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	4502	75498	5.63	24.12	0.34
3	4502	75498	5.63	22.60	1.86
4	4402	75598	5.50	21.08	3.38
5	4296	75704	5.37	19.56	4.90
6	4181	75819	5.23	19.56	4.90
7	4181	75819	5.23	19.56	4.90
8	4181	75819	5.23	19.56	4.90
9	4181	75819	5.23	19.56	4.90
10	4181	75819	5.23	19.56	4.90
Present Value					
5%				171.63	26.72
10%				144.62	20.72
15%				124.77	16.42

TABLE H-18B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.30
2	6508	73492	8.14	23.97	0.49
3	6508	73492	8.14	22.49	1.97
4	6024	73976	7.53	21.03	3.44
5	5503	74497	6.88	19.54	4.94
6	4937	75063	6.17	19.55	4.92
7	4937	75063	6.17	19.55	4.92
8	4937	75063	6.17	19.55	4.92
9	4937	75063	6.17	19.55	4.92
10	4937	75063	6.17	19.55	4.92
Present Value					
5%				171.27	27.07
10%				144.31	28.99
15%				124.48	16.71

TABLE H-19B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.10
2	10271	69729	12.84	23.68	0.78
3	10271	69729	12.84	22.28	2.18
4	9122	70878	11.40	20.92	1.55
5	7873	72127	9.84	19.51	4.96
6	6505	73495	8.13	19.53	4.94
7	6505	73495	8.13	19.53	4.94
8	6505	73495	8.13	19.53	4.94
9	6505	73495	8.13	19.53	4.94
10	6505	73495	8.13	19.53	4.94
Present Value					
5%				170.60	27.75
10%				143.70	21.64
15%				123.93	17.26

TABLE H-20B

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	24.16	0.10
2	20053	59947	25.07	22.94	1.52
3	20053	59947	25.07	21.73	2.73
4	17526	62474	21.91	20.62	1.85
5	14706	65294	18.38	19.40	5.06
6	11536	68468	14.42	19.45	5.06
7	11536	68468	14.42	19.45	5.06
8	11536	68468	14.42	19.45	5.06
9	11536	68468	14.42	19.45	5.06
10	11536	68468	14.42	19.45	5.06
Present Value					
5%				168.78	29.56
10%				142.08	23.26
15%				122.47	18.72

TABLE H-17A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	4302	75698	5.38	21.85	0.20
3	4302	75698	5.38	21.39	0.65
4	4269	75731	5.34	20.94	1.11
5	4235	75765	5.29	20.48	1.57
6	4200	75800	5.25	20.02	2.02
7	4165	75836	5.21	19.57	2.48
8	4128	75872	5.16	19.57	2.48
9	4128	75872	5.16	19.57	2.48
10	4128	75872	5.16	19.57	2.48
Present Value					
5%				167.06	11.69
10%				140.06	8.95
15%				120.24	7.00

TABLE H-18A

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 5 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	5510	74490	6.89	21.79	0.25
3	5510	74490	6.89	21.34	0.70
4	5346	74654	6.68	20.90	1.15
5	5179	74821	6.47	20.45	1.59
6	5007	74993	6.26	20.0[illegible]	2.04
7	4831	75169	6.04	19.55	2.49
8	4651	75350	5.81	19.56	2.49
9	4651	75350	5.81	19.56	2.49
10	4651	75350	5.81	19.56	2.49
Present Value					
5%				166.87	11.88
10%				139.90	9.26
15%				120.09	7.15

TABLE H-1C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40032	39968	50.04	20.22	1.83
3	40032	39968	50.04	19.82	2.23
4	40026	39974	50.03	19.41	2.63
5	40020	39980	50.03	19.01	3.04
6	40014	39986	50.02	19.01	3.04
7	40014	39986	50.02	19.01	3.04
8	40014	39986	50.02	19.01	3.04
9	40014	39986	50.02	19.01	3.04
10	40014	39986	50.02	19.01	3.04
Present Value					
5%				157.57	21.17
10%				131.78	17.24
15%				112.85	14.39

TABLE H-2C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40159	39841	50.20	20.21	1.83
3	40159	39841	50.20	19.81	2.24
4	40130	39870	50.16	19.41	2.64
5	40100	39900	50.12	19.01	3.04
6	40068	39932	50.09	19.01	3.04
7	40068	39932	50.09	19.01	3.04
8	40068	39932	50.09	19.01	3.04
9	40068	39932	50.09	19.01	3.04
10	40068	39932	50.09	19.01	3.04
Present Value					
5%				157.55	21.19
10%				131.75	17.26
15%				112.84	14.40

TABLE H-3C

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	40794	39206	50.99	20.18	1.86
3	40794	39206	50.99	19.79	2.26
4	40651	39349	50.81	19.40	2.65
5	40502	39498	50.63	19.00	3.04
6	40346	39654	50.43	19.01	3.04
7	40346	39654	50.43	19.01	3.04
8	40346	39654	50.43	19.01	3.04
9	40346	39654	50.43	19.01	3.04
10	40346	39654	50.43	19.01	3.04
Present Value					
5%				157.48	21.27
10%				131.68	17.33
15%				112.78	14.46

TABLE H-4C

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	41986	38014	52.48	20.13	1.92
3	41986	38014	52.48	19.75	2.30
4	41639	38361	52.05	19.37	2.67
5	41275	38725	51.59	18.99	3.06
6	40893	39107	51.12	19.00	3.05
7	40893	39107	51.12	19.00	3.05
8	40893	39107	51.12	19.00	3.05
9	40893	39107	51.12	19.00	3.05
10	40893	39107	51.12	19.00	3.05
Present Value					
5%				157.32	21.42
10%				131.55	17.46
15%				112.66	14.58

TABLE H-5C

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(50% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	40000	40000	50.00	20.22	1.83
2	45085	34915	56.36	19.99	2.06
3	45085	34915	56.36	19.64	2.41
4	44268	35732	55.34	19.31	2.74
5	43400	36600	54.25	18.96	3.09
6	42477	37523	53.10	18.97	3.07
7	42477	37523	53.10	18.97	3.07
8	42477	37523	53.10	18.97	3.07
9	42477	37523	53.10	18.97	3.07
10	42477	37523	53.10	18.97	3.07
Present Value					
5%				156.92	21.83
10%				131.19	17.82
15%				112.34	14.90

TABLE H-6C

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32038	47962	40.05	20.58	1.46
3	32038	47962	40.05	20.10	1.95
4	32031	47969	40.04	19.62	2.43
5	32024	47976	40.03	19.13	2.91
6	32016	47984	40.02	19.13	2.91
7	32016	47984	40.02	19.13	2.91
8	32016	47984	40.02	19.13	2.91
9	32016	47984	40.02	19.13	2.91
10	32016	47984	40.02	19.13	2.91
Present Value					
5%				159.26	19.49
10%				133.26	15.75
15%				114.19	13.05

TABLE H-7C

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32191	47809	40.24	20.58	1.47
3	32191	47809	40.24	20.10	1.95
4	32156	47844	40.20	19.61	2.43
5	32119	47881	40.15	19.13	2.91
6	32082	47918	40.10	19.13	2.91
7	32082	47918	40.10	19.13	2.91
8	32082	47918	40.10	19.13	2.91
9	32082	47918	40.10	19.13	2.91
10	32082	47918	40.10	19.13	2.91
Present Value					
5%				159.24	19.50
10%				133.24	15.77
15%				114.18	13.06

TABLE H-8C

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	32953	47047	41.19	20.54	1.51
3	32953	47047	41.19	20.07	1.98
4	32781	47219	40.98	19.60	2.45
5	32602	47398	40.75	19.13	2.92
6	32415	47585	40.52	19.13	2.92
7	32415	47585	40.52	19.13	2.92
8	32415	47585	40.52	19.13	2.92
9	32415	47585	40.52	19.13	2.92
10	32415	47585	40.52	19.13	2.92
Present Value					
5%				159.14	19.60
10%				133.16	15.85
15%				114.10	13.14

TABLE H-9C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	34383	45617	42.98	20.48	1.57
3	34383	45617	42.98	20.02	2.03
4	33967	46033	42.46	19.57	2.48
5	33530	46470	41.91	19.11	2.94
6	33072	46928	41.34	19.12	2.93
7	33072	46928	41.34	19.12	2.93
8	33072	46928	41.34	19.12	2.93
9	33072	46928	41.34	19.12	2.93
10	33072	46928	41.34	19.12	2.93
Present Value					
5%				158.96	19.78
10%				133.00	16.01
15%				113.96	13.28

TABLE H-10C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(40% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	32000	48000	40.00	20.59	1.46
2	38102	41898	47.63	20.31	1.74
3	38102	41898	47.63	19.88	2.16
4	37122	42878	46.40	19.49	2.56
5	36081	43919	45.10	19.07	2.98
6	34972	45028	43.72	19.09	2.96
7	34972	45028	43.72	19.09	2.96
8	34972	45028	43.72	19.09	2.96
9	34972	45028	43.72	19.09	2.96
10	34972	45028	43.72	19.09	2.96
Present Value					
5%				158.48	20.27
10%				132.57	16.44
15%				113.58	13.66

TABLE H-11C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16051	63949	20.06	21.31	0.73
3	16051	63949	20.06	20.67	1.38
4	16041	63959	20.05	20.03	2.02
5	16032	63968	20.04	19.38	2.67
6	16022	63978	20.03	19.38	2.67
7	16022	63978	20.03	19.38	2.67
8	16022	63978	20.03	19.38	2.67
9	16022	63978	20.03	19.38	2.67
10	16022	63978	20.03	19.38	2.67
Present Value					
5%				162.64	16.19
10%				136.24	12.77
15%				116.87	10.37

TABLE H-12C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	16254	63746	20.32	21.30	0.74
3	16254	63746	20.32	20.66	1.38
4	16208	63792	20.26	20.02	2.03
5	16159	63841	20.20	19.38	2.67
6	16109	63891	20.14	19.38	2.67
7	16109	63891	20.14	19.38	2.67
8	16109	63891	20.14	19.38	2.67
9	16109	63891	20.14	19.38	2.67
10	16109	63891	20.14	19.38	2.67
Present Value					
5%				162.61	16.13
10%				136.21	12.80
15%				116.85	10.39

TABLE H-13C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.71
2	17271	62729	21.59	21.26	0.79
3	17271	62729	21.59	20.63	1.42
4	17042	62958	21.30	20.00	2.05
5	16803	63197	21.00	19.37	2.68
6	16554	63446	20.69	19.37	2.67
7	16554	63446	20.69	19.37	2.67
8	16554	63446	20.69	19.37	2.67
9	16554	63446	20.69	19.37	2.67
10	16554	63446	20.69	19.37	2.67
Present Value					
5%				162.48	16.26
10%				136.10	12.91
15%				116.75	10.49

TABLE H-14C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.71
2	19178	60822	23.97	21.17	0.88
3	19178	60822	23.97	20.56	1.49
4	18622	61378	23.28	19.96	2.09
5	18040	61960	22.55	19.35	2.70
6	17429	62571	21.79	19.36	2.69
7	17429	62571	21.79	19.36	2.69
8	17429	62571	21.79	19.36	2.69
9	17429	62571	21.79	19.36	2.69
10	17429	62571	21.79	19.36	2.69
Present Value					
5%				162.24	16.50
10%				135.89	13.12
15%				116.56	10.68

TABLE H-15C

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(20% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	16000	64000	20.00	21.32	0.73
2	24135	55865	30.17	20.94	1.10
3	24135	55865	30.17	20.38	1.67
4	22829	67171	28.54	19.85	2.19
5	21441	58559	26.80	19.30	2.75
6	19963	60037	24.95	19.32	2.73
7	19963	60037	24.95	19.32	2.73
8	19963	60037	24.95	19.32	2.73
9	19963	60037	24.95	19.32	2.73
10	19963	60037	24.95	19.32	2.73
Present Value					
5%				161.59	17.16
10%				135.32	13.69
15%				116.05	11.19

TABLE H-16C

Combined Alternative Capitation Reimbursement Arrangement and
Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.004)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	4060	75940	5.08	21.86	0.19
3	4060	75940	5.08	21.10	0.95
4	4049	75951	5.06	20.33	1.72
5	4038	75962	5.05	19.57	2.48
6	4026	75974	5.03	19.57	2.48
7	4026	75974	5.03	19.57	2.48
8	4026	75974	5.03	19.57	2.48
9	4026	75974	5.03	19.57	2.48
10	4026	75974	5.03	19.57	2.48
Present Value					
5%				165.17	13.57
10%				138.47	10.54
15%				118.88	8.36

TABLE H-17C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.02)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	4302	75698	5.38	21.85	0.20
3	3204	75698	5.38	21.09	0.96
4	4247	75753	5.31	20.33	1.72
5	4189	75811	5.25	19.56	2.48
6	4129	75871	5.16	19.57	2.48
7	4129	75871	5.16	19.57	2.48
8	4129	75871	5.16	19.57	2.48
9	4129	75871	5.16	19.57	2.48
10	4129	75871	5.16	19.57	2.48
Present Value					
5%				165.14	13.60
10%				138.44	10.56
15%				118.86	8.38

TABLE H-18C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.10)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	5510	74490	6.89	21.79	0.25
3	5510	74490	6.89	21.04	1.00
4	5237	74763	6.55	20.30	1.75
5	4954	75046	6.19	19.52	2.52
6	4954	75342	5.82	19.56	2.49
7	4658	75342	5.82	19.56	2.49
8	4658	75342	5.82	19.56	2.49
9	4658	75342	5.82	19.56	2.49
10	4658	75342	5.82	19.56	2.49
Present Value					
5%				164.96	13.78
10%				138.29	14.73
15%				118.72	8.52

TABLE H-19C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.25)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	7774	72226	9.72	21.69	0.36
3	7774	72226	9.72	20.96	1.08
4	7114	72886	8.89	20.25	1.79
5	6423	73577	8.03	19.53	2.52
6	5697	74303	7.12	19.54	2.51
7	5697	74303	7.12	19.54	2.51
8	5697	74303	7.12	19.54	2.51
9	5697	74303	7.12	19.54	2.51
10	5697	74303	7.12	19.54	2.51
Present Value					
5%				164.70	14.04
10%				138.06	10.95
15%				118.51	8.73

TABLE H-20C

Combined Alternative Capitation Reimbursement Arrangement and Positive Fee-For-Service Modality Hospital Utilization Response - 3 Year Adjustment
(Reduction in the Initial Hospital Utilization Rate Differential)
(5% Initial Market Share, Enrollment Elasticity -0.64)

Time Period	Capitation Modality Population	Fee-For-Service Modality Population	Capitation Market Share (%)	Community Health Care Costs (million $)	Cost Savings to Government (million $)
1	4000	76000	5.00	21.86	0.18
2	13661	66339	17.08	21.42	0.62
3	13661	66339	17.08	20.75	1.29
4	12109	67891	13.08	20.13	1.92
5	10461	69539	13.08	19.47	2.58
6	8706	71294	10.88	19.49	2.55
7	8706	71294	10.88	19.49	2.55
8	8706	71294	10.88	19.49	2.55
9	8706	71294	10.88	19.49	2.55
10	8706	71294	10.88	19.49	2.55
Present Value					
5%				163.93	14.82
10%				137.38	11.63
15%				117.91	9.33

APPENDIX I

ONTARIO POPULATION DATA

TABLE I-1

Ontario Population Estimates 1981

City/Region	Population
Census Metropolitan Area	
Ontario	
Total	8,534,260
Male	4,210,650
Female	4,323,615
Hamilton	
Total	303,200
Male	147,645
Female	155,755
Cambridge	
Total	76,305
Male	37,595
Female	38,710
Kitchener	
Total	138,370
Male	67,935
Female	70,435
Waterloo	
Total	49,245
Male	24,535
Female	24,710
London	
Total	251,200
Male	120,705
Female	130,495
Oshawa	
Total	116,680
Male	57,795
Female	58,885

Gloucester	
Total	72,085
Male	36,160
Female	35,925
Burlington	
Total	114,460
Male	56,775
Female	57,685
Nepean	
Total	83,975
Male	41,925
Female	42,050
Ottawa	
Total	291,850
Male	137,870
Female	153,980
Niagara Falls	
Total	70,505
Male	34,285
Female	36,220
St. Catharines	
Total	122,600
Male	59,745
Female	62,855
Sudbury	
Total	90,695
Male	44,490
Female	46,204
Thunder Bay	
Total	110,945
Male	55,390
Female	55,560
Brampton	
Total	148,505
Male	74,730
Female	73,775

East York	
Total	101,135
Male	47,125
Female	54,010
Etobicoke	
Total	297,330
Male	144,865
Female	152,460
Markham	
Total	76,565
Male	38,055
Female	38,510
Mississauga	
Total	313,670
Male	156,770
Female	156,905
North York	
Total	555,600
Male	269,625
Female	285,975
Oakville	
Total	75,335
Male	37,465
Female	37,870
Scarborough	
Total	439,555
Male	214,665
Female	224,895
Toronto	
Total	592,630
Male	287,835
Female	304,795
York	
Total	133,990
Male	64,610
Female	69,390

Windsor	
Total	189,875
Male	92,015
Female	97,860

<u>Census Agglomerations</u>

Barrie	
Total	60,830
Male	30,010
Female	30,820
Brantford	
Total	86,985
Male	42,380
Female	44,605
Cornwall	
Total	52,605
Male	25,650
Female	26,955
Guelph	
Total	77,400
Male	37,865
Female	39,535
Kingston	
Total	111,810
Male	55,095
Female	56,715
North Bay	
Total	56,435
Male	27,825
Female	28,610
Peterborough	
Total	84,800
Male	41,105
Female	43,695
Sarnia	
Total	83,310
Male	41,615
Female	41,695

Sault Ste Marie	
Total	86,390
Male	43,070
Female	43,320
Total	2,655,275
Male	1,319,125
Female	1,336,150

Source:

Canada (1981), Census of Canada.