A STUDY OF
POPULATION NEEDS-BASED FUNDING
APPLIED TO HEALTH CARE AND PHYSICIAN SERVICES IN
BRITISH COLUMBIA

BY
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ABSTRACT

The BC Ministry of Health has developed a Population Needs-Based Funding (PNBF) model, which allocates funding to Health Regions based on the characteristics and utilization patterns of the residents of their region.

The model has several flaws that limit its ability for successful implementation. Technical flaws include extensive data quality issues, poor population segmentation techniques and the reliance on outdated data. The model is sensitive to small data variations, leading to variations in regional funding allocations. The model’s intrinsic reliance on historical utilization rates and the absence of defined performance measures, core services, and an implementation plan affect its ability to effectively resolve the current inequities in fund distribution.

A survey was deployed to solicit physician opinion on the PNBF model and the potential regionalization of the Medical Services Plan (MSP) budget. The respondents demonstrated little support for the prospect of regionalized funding, for both the delivery of health care services and physician remuneration. Yet, little satisfaction was expressed with the current funding system, with physicians voicing frustrations with the bureaucracy and politics affecting their ability to deliver quality patient care.

The regionalization of the MSP budget would likely confine physician fee negotiations to the regional level. The legal agreements currently in place do not explicitly restrict the regionalization of the MSP budget, but restrict the administration of such change. Physicians would potentially be subjected to changes in their access to resources, their level of professional autonomy, pay equity, and the administration of remuneration.

The BC PNBF model is unsatisfactory. Further development and analysis of alternate funding formulas is recommended, including exploration of the applicability of Adjusted Clinical Groups. As well, input from stakeholders including patients and physicians must be considered in future model development.
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GLOSSARY

Acute care: care delivered to patient experiencing sudden illness or trauma, with a hospital stay of between 1-59 days.

Ambulatory care: Any contact with a physician which occurs while the patient is not a hospital in-patient, such as office visits, as well as visits to emergency rooms, out-patient clinics or house calls.

Available Amount: Total annual funds available through the Medical Services Plan for rendering benefits under the Medicare Protection Act in the fiscal year specified by the Medical Services Commission; approximately $1.9 Billion in 2000/2001.

BCNU: British Columbia Nurses Union

BCMA: British Columbia Medical Association

Capitation: A fixed prospective payment for the care of pre-enrolled patients over a defined period of time.

CHSPR: The Centre for Health Services and Policy Research

CIHI: Canadian Institute for Health Information

CMG: Case Mix Group

Continuing Care (residential and community): Long term care provided in the home or community, including home care and nursing homes.

Discharge Abstract Database (DAD): Database of all hospital records. Each record also includes a Resource Intensity Weight.

Fee-for-service: A method of payment in which a physician receives a payment each time he/she provides a reimbursable service, as defined in the provincial fee schedule.

HABC: Health Association of British Columbia

Medical Services Commission (MSC): Tripartite body composed of nine representatives equally distributed between government, the medical profession and the public to generally administer the MSP beneficiaries. The MSC is established under the authority of the Medicare Protection Act, with a mandate to facilitate reasonable access to quality medical, health and
diagnostic services for residents of BC; and to develop more effective and affordable methods of managing the services under the MSP (Province of BC, 2001, Annual report, p.22).

**Medical Service Plan (MSP):** Mandatory medical insurance plan for residents of British Columbia. Insures medically required services provided by general practitioners, specialists and supplementary health care practitioners, as well as insuring laboratory services and diagnostic procedures (Prov. of BC, 2001, MSP of BC, para.1).

**MSDES:** Ministry of Social Development and Employment Security

**Non-Status Indian:** An Indian person who is not registered as an Indian under the *Indian Act*. This may be because his or her ancestors were never registered, or because he or she lost Indian status under former provisions of the *Indian Act* (Indian and Northern Affairs, 1997).

**PharmaCare:** The province's drug insurance program that assists British Columbia residents in paying for eligible prescription drugs and designated medical supplies (Prov. of BC, 2001, PharmaCare, para.1).

**PNBF Model:** Population Needs-Based Funding Model

**Resource Intensity Weight (RIW):** resource allocation methodology for estimating a hospital’s inpatient-specific costs for both acute and day procedure care (Canadian Institute for Health Information, 2001).

**RNABC:** Registered Nurses Association of British Columbia

**Status Indian:** Person confirmed by Registrar to be descended from individuals who were recognized as members of an Indian band, or whose names appeared on a former list (Indian and Northern Affairs, 1997).
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1. INTRODUCTION

In 1993, the Ministry of Health of British Columbia announced a health reform initiative called "New Directions for a Healthy BC". The intention was to promote community-based alternatives to traditional institutional-based care, with the goal of eventually completely decentralizing the health care system in BC. This would encourage the participation of regional decision-makers, ensuring that health services adequately represent and address specific local health care needs. This signalled the birth of regionalization in BC.

A subsequent report in late 1996, "Better Teamwork, Better Care", refined the number of regions, and established a single layer of governance for each geographic area (British Columbia Medical Association, 1997, p.3). Control over funding for all health care services (excluding provincially-funded tertiary care programs, Medical Services Plan, PharmaCare, and the BC Ambulance Service) was granted to the Regional Authorities in April 1997.

However, according to many health policy makers, this current system is no longer acceptable: as demand for scarce resources increases, so do disparities in access. By modifying the fund distribution method and removing restrictions on expenditures, the regions in turn would be empowered to develop and implement policies, and organize and allocate staff and resources to directly address inequities in the delivery of health care for their residents. Revisions to the funding methodology are intended to make "more effective use of the extensive resources...dedicated to health care" (Prov. of BC, 1996, p. ii).

Understanding how the changes to the funding methodology may affect accessibility and equity in health care delivery, for both patients and physicians, requires greater definition.
2. BACKGROUND

2.1 CURRENT FUNDING MODEL

As is well publicized by today’s media, the funds available for health care expenditures are short in supply and high in demand. The current system operates with the Ministry of Health holding control over fund allocations to various provincially created health organizations, which in turn, are responsible for the delivery of health care. There are currently 11 Regional Health Boards (RHB), 34 Community Health Councils (CHC) and seven Community Health Services Societies (CHSS) in BC. CHSSs are an amalgamation of several CHCs in a particular geographic area.

Note: The RHBs and CHSSs are herein referred to as “regions”, while “Health Authorities” will refer to all of the above.

The Regional Operations Department of the Ministry of Health provides the funding, policy direction and support to the Health Authorities through the use of regional teams. Health Authorities are required to plan and deliver health services, maintain a balanced budget and report on performance in accordance with planned initiatives. Meanwhile, the Operational Support Branch provides the centralized short-term and long-term fiscal planning, while evaluating and monitoring the use of health care funding by the Health Authorities (Prov. of BC, 2001, Annual Report, p.19-20).

Specific funds are allocated for specific purposes. As a result, the regional representative bodies have minimal control over the distribution of health care funding to the residents within their district. Fund allocations by the Ministry of Health are primarily based on historical data, with annual adjustments for inflation. Overall, Regional Health Authorities (RHAs) are often of the opinion that funds could be allocated among the regions in a more equitable and consistent manner.¹

¹ M. Burd, BC Ministry of Health (personal communication, July 20, 2001) and L. Kallstrom and L. Okotinsky, HABC (personal communication, August 14, 2001)
2.2 Historical Model Development

Concurrent with the introduction of regionalization to the province in 1993, the Ministry began developing a funding methodology to support the decentralization initiative. The stated purpose of the initial model was to ensure that all communities were allocated funds equitably based on the needs of their residents. The Ministry believed that the issues with the health care system were not due to funding shortages, but rather a misalignment of resources.

A report on the initial model was released in 1995, with a final report completed in November 1996. This model was not designed to address the adequacy of aggregate funding, but rather to equitably distribute the operating funds to the regions. The model was based on the concept that the regions would manage financial resources while providing core health services as mandated by the Ministry. The model was designed to include funding for core services in the acute, continuing and community care sectors. Tertiary and provincially based services, as well as capital funding were excluded from the model.

How did it work?

The first step was to adjust the regional populations based on age and gender. Weightings were assigned to age groups from the analysis of utilization data. Subsequently, an additional adjustment was made to account for health status. The use of Standard Mortality Ratios to relate socio-economic conditions to health was identified as a poor proxy; it was proposed that an alternate socio-economic status proxy be applied and weighted to represent health care need. These adjustments were intended to account for differences in regional population characteristics. The second step was to account for interregional flow for acute care services. The third and final step was to adjust for cost differentials in providing services across regions. These adjustments are intended to account for differences attributable to access.

No special adjustments were made for the Aboriginal population, recognizing both the difficulty in acquiring a valid population figure and the fact that the relatively poorer health status would be reflected in the regions' health status calculations (Rana, 1995, p.22).
Aborted Implementation

The model was never implemented, for reasons which are unclear. However, it is known that some stakeholders had concerns with the proposed funding model; the BC Health Association, representing the Regional Health Authorities in BC, officially responded with the following main points (BCHA, 1995, p. 1):

- They supported the general concept of a regional funding formula dependent on population characteristics.
- They were disappointed with exclusion of the Medical Services Plan in the model – this was the model’s primary weakness, and they hoped this would be rectified in the future.
- They were disappointed with the closed development process, and the lack of model transparency.
- They stressed the importance of accurate population and utilization data.
3. POPULATION NEEDS-BASED FUNDING MODEL

3.1 POPULATION NEEDS-BASED FUNDING APPROACH

A Population Needs-Based Funding (PNBF) model is based on the theory that the characteristics of a population drive the population’s relative need for health care services. Populations of equal size do not have equal health needs. Differences in the age, gender and socio-economic status of residents should result in different utilization needs. Applying this methodology is an attempt to resolve funding inequities that occur amongst regions, when the characteristics of the population are not considered.

Hence, a PNBF model attempts to ensure that available health care funds are allocated amongst regions based on the relative (not absolute) needs of their residents, in a fair and consistent manner. As well, other factors are considered in the allocation model, such as geographic factors, which may affect the cost of delivering health care. Subsequently, the regions are expected to develop policies and programs that better address the health care requirements of their population.

Similar PNBF models have been applied with measured success in numerous countries (and provinces) of varying population and geographic sizes. Along with BC, many other jurisdictions are considering this approach (Ernst & Young et al, 1995).

In general, the concept of the model is well accepted, as it is based on the indisputable principles of equity, fairness and consistency. However, in the absence of a solid implementation plan, adequate and accurate supporting data, and universally accepted performance metrics, a PNBF model’s effectiveness and acceptance are limited.

Current Model Development

In May 2000, the Ministry of Health was instructed to refine the previous BC PNBF model. The intent was to have a model ready for consideration for the 2001/2002 fiscal year.
Information Support, a division under the Corporate Shared Services for Ministry of Health Services and Ministry of Health Planning, developed the current version of the PNBF model. The current responsibilities of the Information Support Department include the following:

- Planning, monitoring and evaluating of Health Authorities;
- Manage health expenditure data;
- Statistical analysis of funding expenditures.

After the rededication of resources to model development, the political scene changed in BC, with the election of a majority Liberal government. However, interest in a PNBF model has not waned. The new government has stated the following as initial priorities:

- Develop a transparent population-based funding formula
- Consider the advisability of including PharmaCare, ambulance services, and the Medical Services Plan funding in Regional Authority budgets.

The Joint Advisory Committee, the Operational Funding Standing Committee and the Health Association of BC have approved the current BC PNBF model for implementation. Consultation has also occurred with various Chief Executive Officers and Chief Financial Officers of current Health Authorities throughout the province. Additional stakeholders, such as the BC Medical Association, have not been formally invited to analyse or comment on the proposed model.

**Alternative Models**

Alternate approaches to the funding model were examined, including the use of a regression model to predict regional fund allocations based on characteristics of the region. However, based on the analysis of a regression model applied to Ontario Hospital Funding, it was decided that a regression model would be inappropriate. The Ontario model found that the removal or addition of a parameter affected the predictive ability of the regression model. Based on this experience, the developers of the BC PNBF model claim regression is “never robust”, and therefore, would be inadequate as an alternative approach. Interestingly, no work has been done to determine the “robustness” of the BC PNBF model – no sensitivity analysis has been
performed to determine the effect of the various assumptions in the model. This will be discussed in further detail in Section 3.5.

Objectives of the Model

The objective of the funding model is to allocate funds based on the “needs” of the population, where needs are defined by the characteristics of a region’s residents (Prov. of BC, 2001, Population Needs Based Funding).

The model is developed with the intention of meeting five guiding principles, as defined by the Health Association of BC:

1. Fair – no penalty for factors beyond control;
2. Equitable – equal funding for equal need;
3. Understandable – simple, yet demonstrating the relationship between need and funding;
4. Practical – based on available data;
5. Comprehensive – allocate funding for as many service sectors as possible.

The model does not provide regions with explicit instructions on how to allocate the funds, nor what services to provide to its residents. The belief is that the Regional Health Authorities are better equipped than the Ministry of Health to determine the most effective way to deliver health care services that meet the needs of their residents. Consequently, the regional health administration will be responsible for the health status of their residents.

Scope

The BC PNBF model is not intended to function as an allocation tool for all health care funds transferred from the Ministry of Health to the regions. Rather, its intent is to allocate funds for specific services and programs within the regions. The distribution of health care funds in BC is shown in Figure 1 (Prov. of BC, 2000, Estimates, p.158)
The BC PNBF model allocates funds for Acute Care and Continuing Care (Residential and Community) programs. These service sectors were chosen for development first since they affect the greatest number of residents and consume the greatest proportion of funding, as shown in Figure 1. Future initiatives include funding for Mental Health and Public & Preventive Services.

The model currently excludes payments for Tertiary and Provincial Programs, PharmaCare, Ambulance Services and payments to physicians from the Medical Services Plan. However, this does not prevent their incorporation in the future.

Capital expenditures (both construction and diagnostic) are not included in the model. These funds will continue to be centrally allocated by the Ministry of Health.

### 3.2 Description of Model

The BC PNBF model is based on the existence of 18 regions comprised of the eleven (11) current Regional Health Boards and seven (7) Community Health Services Societies. The
current regional boundaries will not change. The Nisga’a Health Authority is the only geographic area in BC excluded from coverage by the PNBF model.

As well, the Ministry of Health will initially assume the responsibility of allocating the money granted to the CHSSs to the CHCs within them. This will minimize political battles among CHCs competing for funds from their governing CHSS. A model for local allocations within the CHSSs will be developed in the future.

Service Sector Fund Allocation

The aggregate funds available for health care are divided into service sectors, such as acute care or mental health. The model does not determine the allocations required for each service sector. Rather, the sector funding is determined by the Ministry, based on historical allocations, trends in spending patterns and discussion with the Health Authorities. Transfers between service sectors are allowed on a one-way basis; funds can be transferred out of the acute care funding pool, but no funds can be transferred into the acute care funding pool from any other funding pool.

Population Segmentation

The model segments the population of BC by the age, gender and socio-economic status (SES) of its residents.

Age
According to the model developers, the most relevant factor in determining an individual’s need for service is age. The model segments the population of BC based on nineteen, 5-year age groups, ranging from <1, 1-4, 5-9...80-84, >85.

Gender
Gender is also used as a segmenting variable. Differences in an individual’s need for health services based on gender occur during childbearing years and end-of-life years.
Socio-Economic Status

Another factor used in the BC PNBF model is the socio-economic status (SES) of residents. The SES categories (and % of population) are as follows:

- Aboriginal (3.8%)
- Welfare & Disabled (4.7%)
- Premium Assistance (18.6%) ²
- No Premium Assistance (72.9%)

The SES variable is intended to serve as a proxy for wealth, which in turn is related to one’s need for health care.

This resulted in 152 mutually exclusive population segments.

Population Estimates

The population estimates for the SES segments in each region are generated from a variety of data sources.

BC Aggregate population

Federal census data is unavailable at a health regional level. The population of BC at an aggregate and regional level is provided by BC Statistics, from the P.E.O.P.L.E. 25 (Population Extrapolation for Organizational Planning with Less Error) estimate.

Aboriginals

The model uses two different data sources to determine Aboriginal population levels. Medical Service Plan (MSP) records provide an aggregate of approximately 105,000 Aboriginals in the province, along with their regional distribution in the province. Those counted in the MSP database are those Aboriginals who have registered as Status Indian, and have their MSP premiums funded by the Federal Government. However, according to census data (1996

² A patient is eligible for premium assistance if his/her annual gross income is between $12,000 and $20,000. A patient earning less than $12,000 annually is eligible for welfare.
counts, projected forward to 98/99), there are approximately 153,000 Aboriginals living in BC. (Note: the census definition of Aboriginal is a self-defined identity; therefore including Status and Non-Status Indians. As well, census data is available by age segments, but not by region.) The population estimates per region are calculated by applying the regional distributions from the MSP data to the aggregate census Aboriginal count. Therefore, the count of Aboriginals is truly an estimate, and has not been validated.

**Welfare and Disabled (W&D)**
The model again uses two different data sources to determine the number of residents classified as Welfare and Disabled. The aggregate number of W&D residents according to the MSP database differed from the aggregate found in the Ministry of Social Development and Employment Security (MSDES) database. Since the MSP database does not include Aboriginals (while the MSDES database does) and contains the utilization records, the aggregate number of W&D is determined from the MSP database. The MSDES database is considered to contain more accurate information on the regional residence of patients, since MSDES is in continual contact with these patients. Therefore, the regional distribution found in the MSDES database is applied to the MSP aggregate population to determine regional population figures.

**Premium Assistance (PA)**
Similar adjustments are made to the population of residents receiving premium assistance. The resulting regional population figures are calculated by applying the MSDES regional distribution to the aggregate MSP population.

**Non-Premium Assistance (NPA)**
This population is calculated as the difference between the aggregate BC population and the Aboriginal census count and MSP counts for W&D and PA. There were no attempts to validate the accuracy of the NPA population figures. This group is comprised of about 73% of the residents of BC.

**Utilization Rates**
Utilization rates are determined differently for the acute care and continuing care sectors.
Acute care

Using the Discharge Abstract Database (for non-tertiary care records), hospitalization records are assigned to the 152 segments of the population. For each segment, the total workload per capita is calculated by dividing the aggregate workload (or weighted cases) by the population in each group. No differentiation is made among regions; all expected workload rates are calculated at a provincial level. The result is an average Resource Intensity Weight/person for each segment of the population. Applied to the population estimates for a region, the result is the region’s aggregate expected workload (EWL). The EWLS are aggregated across all regions, and each region’s EWL is adjusted to represent their relative workload.

The process of assigning a Resource Intensity Weight is fairly complex and opaque; the following is a simplified summary. All hospitalization records are classified into one of 585 diagnostic-related grouping known as Case Mix Groups (CMG), as developed by the Canadian Institute for Health Information. A CMG classifies patients that are similar in terms of clinical characteristics and resource usage. Each case is then assigned a Resource Intensity Weight (RIW) based on its CMG and whether it is a “typical” or “atypical” (ended in death, transfer, sign out, or unusually long length of stay) case. The purpose of using an RIW weighting is to estimate the relative need for resources for similar types of cases, based on the best available cost data. The Canadian Institute for Health Information (CIHI) calculates RIWs annually based on over 2 million case records, to reflect current practice patterns and cost profiles (CIHI, 2001). Recent updates to the RIW calculation process include the use of Canadian cost accounting data from Ontario (Poole et al., 1998, p.23). Therefore, each typical RIW value is an average across Canada.

Therefore, an RIW represents the typical experience of a patient with their given diagnosis, age, gender and other relevant factors. RIW assignments for similar cases will not vary by acute care facility; however, the cost per RIW may differ among acute care facilities.

Hence, the average RIW per acute care facility reflects the case-mix differences among facilities.
Continuing care
Residential and community care utilization records are translated from units of visits, days, and hours to a common measurement of dollars of services provided. For community care services (home support, direct care and adult day care), an average cost per unit is calculated. For residential care (personal care, intermediate care 1,2, and 3, and extended care), a weighting or workload per day is calculated for each element and multiplied by the estimated average cost of one (1) weighted day.

Using these measures, province-wide residential and community care average dollars spent per capita are calculated for each population segment. Again, by multiplying the per capita rate by the population estimates for a region, the result is the region’s aggregate expected cost to deliver community care. Similar to the acute care model, since the aggregate cost is likely greater than the total funds available, each region’s dollar allocation is subsequently adjusted to represent their relative workload.

A mathematical summary of the PNBF base model (including population and utilization) can be found in Appendix J.

Population Growth Rates
Population growth is incorporated in both the acute and continuing care models by adjusting the region’s expected workload by the region-specific population growth rate. Almost all regions experienced population growth; however, this does not necessarily translate to increased funding. A region will only experience increased funding if its expected workload increases as a proportion of the total provincial expected workload.

Interregional Flow

Acute care
The adjustment for interregional flow is designed to accommodate services received outside of the patient’s region of residence, due to the unavailability of needed resources within their home region or unanticipated hospitalization while travelling. Adjustments for interregional
flow are made to the region's expected workload. As expected, regions such as Vancouver experience the largest inflow of patients.

The interregional flow adjustment uses data that is one-year old, and does not represent any planned program changes or the addition of new institutions which may provide more services to residents and non-residents of the region. The model developers are attempting to develop a strategy to account for these expected changes in interregional flow as they occur.

*Continuing care*

Adjustment for interregional flow only applies to residential care provided, not community care. Specifically, the interregional flows apply to residents who left their home region for care in a facility outside of their region. Difficulties arise in determining interregional flows, since patients moving to a residential care facility typically change their address accordingly. Adjustments are made to regional workload figures, calculated as weighted days for residential care based on the level of care provided, and as dollars per unit of care for community care services.

At this point in the model, 92% of the funds available for acute care and 99% of the funds available for continuing care have been allocated using the population estimates, utilization rates/expected workloads and interregional flow adjustments. Further adjustments are made to account for the less quantifiable differences among regions such as geography and the presence of teaching hospitals, as described below.

*Remoteness Adjustment*

The basis of including a remoteness adjustment is to account for the higher cost of delivering care in remote or rural areas, due to travel, isolation and/or climate conditions. This is a commonly held opinion, but no cost data was available to confirm or measure actual regional cost differences.

*Acute care*

4% of available acute care funds are reserved to adjust for remoteness. Adjustments are made to regional expected workloads based on Northern Isolation Allowance (NIA) guidelines in
place that allocate points to remote communities, based on their degree of isolation. Generally, the greater the distance from a major centre/acute care facility, the more points allocated. The funds available are shared proportionally among regions based on their relative NIA score.

*Continuing care*

Only 1% of the funding pool is allocated to adjust for remoteness in the continuing care model. This is based on the assumption that isolation is less of a factor for continuing care services. The 1% allocation is shared among regions based on their NIA score and expected workload.

*Complexity Adjustment*

The purpose of the complexity adjustment is to adjust for those regions that provide acute care services at a higher cost, due to additional obligations such as clinical teaching. The exact definition of the complexity adjustment is not yet complete; there is a perceived need for an adjustment, yet there is still uncertainty on how to best calculate it. However, the population of a region is not a factor in the calculation of the complexity adjustment.

*Acute care*

The purpose of the complexity adjustment is to recognize the additional costs borne by larger regions providing high tech, high cost services. Capital, Vancouver, and Simon Fraser health regions are all found to have higher average costs for secondary, tertiary and quaternary cases, due to extra overhead costs and diseconomies of scale. 4% of the total acute care funding pool is allocated to address this issue.

*Continuing care*

No adjustment is made for complexity in the continuing care model.

*Model Development References*

A bibliography of sources referenced in the development of the model is unavailable from the Ministry of Health for review.
Results

Fund allocation is based on the distribution of the aggregate provincial expected workload among regions. Based on the assumption that 100% of the funds available will be allocated, each region receives its relative share of service sector funds.

The Ministry applied the model using the most recent data available, to determine how allocations would differ among regions using the model compared to current allocations. Figure 2 illustrates the difference between actual funding and model allocated funding for the 2000/2001 fiscal year (Prov. of BC, 2001, Population Needs Based Funding).

Figure 2: Actual vs. Model Aggregate Funding Allocations 2000/2001
<table>
<thead>
<tr>
<th>Region</th>
<th>Actual ($M)</th>
<th>Model ($M)</th>
<th>Difference ($M)</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Okanagan</td>
<td>$58.59</td>
<td>$60.87</td>
<td>$2.28</td>
<td>3.89%</td>
</tr>
<tr>
<td>South Okanagan Similkia</td>
<td>$137.79</td>
<td>$152.39</td>
<td>$14.60</td>
<td>10.60%</td>
</tr>
<tr>
<td>Thompson</td>
<td>$84.37</td>
<td>$81.67</td>
<td>$-2.70</td>
<td>-3.20%</td>
</tr>
<tr>
<td>Fraser Valley</td>
<td>$101.99</td>
<td>$109.21</td>
<td>$7.22</td>
<td>7.08%</td>
</tr>
<tr>
<td>South Fraser Valley</td>
<td>$205.15</td>
<td>$215.98</td>
<td>$10.83</td>
<td>5.28%</td>
</tr>
<tr>
<td>Simon Fraser</td>
<td>$263.24</td>
<td>$273.46</td>
<td>$10.22</td>
<td>3.88%</td>
</tr>
<tr>
<td>Central Vancouver Island</td>
<td>$114.32</td>
<td>$119.22</td>
<td>$4.90</td>
<td>4.29%</td>
</tr>
<tr>
<td>Northern Interior</td>
<td>$73.64</td>
<td>$67.42</td>
<td>$-6.22</td>
<td>-8.45%</td>
</tr>
<tr>
<td>Vancouver</td>
<td>$617.24</td>
<td>$549.24</td>
<td>$-68.00</td>
<td>-11.02%</td>
</tr>
<tr>
<td>North Shore</td>
<td>$86.56</td>
<td>$90.74</td>
<td>$4.18</td>
<td>4.83%</td>
</tr>
<tr>
<td>Capital</td>
<td>$221.45</td>
<td>$242.50</td>
<td>$21.05</td>
<td>9.51%</td>
</tr>
<tr>
<td>East Kootenay</td>
<td>$40.54</td>
<td>$39.43</td>
<td>$-1.11</td>
<td>-2.74%</td>
</tr>
<tr>
<td>West Kootenay-Boundary</td>
<td>$50.76</td>
<td>$49.66</td>
<td>$-1.10</td>
<td>-2.17%</td>
</tr>
<tr>
<td>Coast Garibaldi</td>
<td>$27.46</td>
<td>$26.01</td>
<td>$-1.45</td>
<td>-5.28%</td>
</tr>
<tr>
<td>Upper Is/Central Coast</td>
<td>$56.73</td>
<td>$57.75</td>
<td>$1.02</td>
<td>1.80%</td>
</tr>
<tr>
<td>Cariboo</td>
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<td>$28.90</td>
<td>$0.66</td>
<td>2.34%</td>
</tr>
<tr>
<td>North West</td>
<td>$50.63</td>
<td>$50.80</td>
<td>$0.17</td>
<td>0.34%</td>
</tr>
<tr>
<td>Peace Laird</td>
<td>$28.67</td>
<td>$32.14</td>
<td>$3.47</td>
<td>12.10%</td>
</tr>
</tbody>
</table>

Table 1: Actual vs. Model Aggregate Funding Allocations 2000/2001

The differences in final funding allocations (after all adjustments are applied) are as great as a gain of 12.10%, or $3.47 Million, in the Peace Laird region, and a loss of 11.02%, or $68 Million, in the Vancouver/Richmond region, shown in Table 1.

The Joint Advisory Committee (JAC), and Operational Funding Standing Committee (OFSC) have reviewed the model and its results; however, the results of the review are unavailable from the Ministry of Health. Further information on the mandates and membership of JAC and OFSC can be found in Appendix H.

### 3.3 Model Strengths

Strength #1: Attempt at Fairness and Equity

A population needs-based funding model demonstrates very good intentions from a philosophical point of view – to provide a more fair and equitable means of allocating funds based on current regional needs rather than the existing method based on historical funding patterns.
Strength #2: Consideration of Special Factors
The model recognizes the need for special adjustments to accommodate for interregional flow and the remoteness of some regions. The cost of providing care differs from region to region. The model recognizes that disparities exist.

Strength #3: Responsive to Needs
Compared to historical-data based models, a PNBF endeavours to be more responsive to changes in the characteristics, and hence the needs, of the population over time.

3.4 Model Weaknesses

In the BC PNBF model, a number of weaknesses threaten the stability and validity of the resulting fund allocations. Some weaknesses are related to the delivery and access to care, while others are more technical in nature, related to the actual workings of the model. The weaknesses have been divided as such.

Accessibility and Delivery of Health Care

Weakness #1: Model does not address unmet need
The stated purpose of the model is to better allocate funds to address the health care needs of regional residents. However, by relying on historical utilization data, the model is only capable of allocations based on previous known and met needs, and not demand. Therefore, the model is not truly a population NEEDS based funding model, since it assumes need is defined by past utilization patterns. Recognizing that absolute “need” is difficult to measure, it is still incorrect to state that this funding approach sufficiently addresses the important unmet needs of the population.

Utilization rates are not reflective of need because they are based on the current availability of services. Residents are only capable of using the services that are available to them; therefore, the utilization rates for a given population segment are highly dependent on whether those individuals had access to the services they needed.
Therefore, existing resource availability in the community or region will heavily influence utilization data. The reliance on utilization data will perpetuate current inequities in the system. As stated by Starfield et al, “Inclusion of prior utilization greatly improves prediction of future costs, but its incorporation into a reimbursement system would reward provider organizations that have been unable to control utilization” (Starfield et al, 1991, p 67).

The model assumes that certain population segments “need” services more because they are higher users. Do those individuals with a “low” SES status, such as individuals receiving premium assistance, actually NEED more health care, or are they simply greater users? There is a distinction between usage and need. Usage is not necessarily driven by need. A method that examines diagnostic trends among population segments would better understand needs for health care services. The use of prior utilization records encourages inefficient care (Hutchison et al, 1999, p.25).

This begs the question of how it was determined that the current funding model is not sufficiently meeting the needs of patients, if its fund allocations were primarily based on historical records. What indication is there that the current funding methodology is not meeting patient needs, if there is no measure of unmet needs?

The model is based on relative, not absolute, need. The model does not respond to the issue of whether entitlements are sufficient to meet health care needs of regions. Hence, the model is more appropriately named a population usage-based funding model, rather than a population needs-based funding model.

Weakness #2: Proportional Distribution of Funds
Since the funds are relatively distributed, the model does nothing to determine whether the funds allocated are adequate or not. The model simply determines the proportion of funds a region should receive, based on the perceived needs of its residents relative to the needs of other regions in the province. The model does not address the problem it claims to, which is to allocate funds to meet the needs of the population. At no point does the model determine whether the funds allocated will actually meet the needs of the population. A region’s entitlement does not equate to the required funds to deliver the health care services the residents need.
As the Ministry of Health noted in their initial model in 1996, an inherent flaw in a proportional model is the focus on relative, not absolute, need. Although it is recognized that determining the aggregate funds available for health care services is beyond the direct scope of the model, it is important to note that a proportional distribution is useless if the aggregate available funds are insufficient. Therefore, it cannot be stated that the model will meet the needs of the population. Relative need does not translate to absolute need, and this model does nothing to examine the gap.

Weakness #3: Regional Boundaries unexamined
Not only are the population estimates fundamental to the model’s success, so are the regional boundaries chosen. The model developers have assumed that the boundaries of the existing 11 Regional Health Boards and 7 Community Health Services Societies are sufficient and accurate for the provision of funds.

Should there be fewer or more regions? Should regions be based on geography or population or neither? Geographic boundaries should be defined to reflect established patterns of health service use, to minimize interregional flow and the accompanying inefficiencies (Hutchison et al, 1999, p. 23). The location of a regional boundary can have huge ramifications on the effectiveness of the model, simply by the inclusion or exclusion of a major centre.

Further research into the appropriateness of the boundaries should be considered prior to implementation. The implementation of such massive changes to the funding formula provides a unique opportunity to re-examine and modify existing assumptions about appropriate regional boundaries. At the time of writing, the regional boundaries are in fact under review, likely resulting in a reduction in the overall number of regions. However, the review of the regional boundaries is not underway with respect to the model, and will not directly address the suitability of the regional boundaries for model implementation.

Weakness #4: Service Sector Allocation unexamined
Although the Ministry of Health uses historical data to determine service sector allocations, the model does not attempt to validate the accuracy or adequacy of these distributions. Again, this is due to the model’s focus on relative need, not actual need for funds. The model does not attempt to determine how the “lump sum” allocated to health care in the province of BC should
be best allocated among the service sectors. This is ironic and puzzling, since the model should be capable of indicating which service sectors are most in need of funds, due to the extensive use of utilization data. The aggregate funds allocated to each service sector will obviously affect the funds distributed to a region to deliver health care services. Allocations to service sectors should be consistent with the model methodology. For example, if the percentage of BC residents who were over 65 years old increased, would this not affect the level of funding required by the Long-Term care sector?

Weakness #5: Funds non-transferable between service sectors
One of the major advantages of a PNBF model in general is the flexibility that it permits a decentralized body to reallocate resources appropriately to deliver the services required. However, the BC PNBF model places restrictions on the allowed fund transfers between service sectors, so there are limited opportunities for reallocation of resources to better address the needs of the population. Specifically, transfers into the acute care sector allocation are prohibited.

Weakness #6: Core Services Implicitly Defined
In calculating the utilization rates, the model developers implicitly define which services will and will not be delivered by health regions. Utilization records for all health care services, excluding tertiary services, are used to determine utilization rates for each age/gender/SES segment.

However, the regions will not be required to provide these same services to its residents under the BC PNBF model. The regions operating as mutually exclusive units may lead to the exclusion of services, reckoning it will be less expensive to send patients to another region rather than provide the resource-intensive services themselves. If several regions assume this position and do not look beyond their regional boundaries, the availability of certain lower priority, less utilized services in the province may be reduced significantly. This lack of integration of services may lead to greater inefficiencies in the delivery of health care.

*Additional note: An explicit definition of which services were excluded (i.e. a definition of tertiary services) was unavailable from the Ministry of Health.*
Weakness #7: No Performance Measures Defined
The underlying reason for developing and implementing this model is the perception that things are not working – something is “broken” with the delivery of health care in BC. The resulting action seems to be to initiate change, in this case, by implementing a PNBF model and granting regions additional responsibilities.

But it is never clearly defined exactly what is not working, what is broken. It is very difficult to know what to improve if it is not clearly defined what is not working. If what needs to be improved is not clear, it is impossible to know what to measure, or how to gauge improvements. Without measuring, how can it be known whether this change is actually improving or minimizing the impact of the perceived problem? What reason is there to believe that a PNBF model will fix or remove the problem, if there is no explicit definition of the problem?

As well, if the problem exists with some aspect of the current system, what is the logic in allowing past utilization rates to drive the model? Such an entrenched integration of historical data does not allow for escape or change from the allegedly flawed system.

Weakness #8: Inability to measure impact on patients
Ultimately, the big question is: How will the implementation of this model affect patient access to care? The theory is that patient care will improve, since the regions will be better equipped and empowered to deliver the services required by their residents. However, if regions choose to not provide certain resource-intensive, non-essential services, clearly this will affect patient accessibility to services. There has been no work to determine how to measure the impact of this scenario on patients.

Weakness #9: Correctly Allocated money does not guarantee Correctly Spent money
Admittedly, this is not a new problem – it is relevant to the current funding system as well. Although the regions will supposedly have the money required to adequately deliver the services needed by their residents, this does not guarantee that the funds will be allocated as such. Allocating the regions the right amount of funds is only half of the picture – the other half is ensuring the funds are used correctly to deliver the services needed. The model states that it will facilitate addressing the needs of the population, but meanwhile, there is no
guarantee that the money will actually be allocated in an effective and efficient manner. As a result, how does one measure the model’s effectiveness without understanding where the weakness lies – in the allocation or in the spending?

Technical Flaws with BC PNBF Model

Weakness #10: Accuracy of Residential Addresses
Without accurate information on the addresses of residents, the model will misallocate funds. Population statistics are the backbone of this model. This is the biggest data quality issue with this model.

The model developers have admitted that numerous address discrepancies exist between the Medical Services Plan (MSP) and the Ministry of Social Development and Employment Security (MSDES) databases, for Welfare & Disable and Premium Assistance patients. In fact, the inaccuracies are determined to be so great, that the MSP population data distribution is not used in the model. For example, the number of Welfare & Disabled residents in the two databases for a given region varied by up to 11,000 people (over 1% of the population in that region). The existence of inaccuracies are even more disturbing, since according to The Centre for Health Services and Policy Research (CHSPR), the MSDES database should update the MSP address records on a periodic basis. To combat this problem, the developers apply population distributions from the MSDES database for Welfare & Disabled and Premium Assistance residents, applied to the aggregate MSP population numbers.

With Welfare & Disabled and Premium Assistance patients, there is a unique opportunity to compare MSP addresses with a separate MSDES address database. However, for the 73% of the population not receiving premium assistance (NPA), there is no such external database for comparative purposes.

There are a number of potential problems with the accuracy of recorded addresses for NPA patients.
First, upon enrolment, there is no standard “trusted id” source from which a resident’s address is recorded. Residents may have incentive to misinform MSP of their address of residence if they desire access to a specific facility that is only available to residents of a particular region.

Second, a resident’s address is not necessarily up-to-date. It is up to the employer (if paying MSP premium) or resident (if paying himself/herself) to report an address change, either by notifying MSP or when seeking care from a hospital. Otherwise, an update does not occur.

Third, NPA residents are particularly susceptible to changing addresses – their higher level of income affords them the ability to choose and change their place of residence.

Fourth, due to the high population density in the Lower Mainland, a short move across a bridge to another “city” may correspond to a move to a different health region. This may be common for students or renters.

Despite the many opportunities for address errors in the MSP database, the model assumes that these addresses are correct when allocating funds. Given that address records are inaccurate in the Welfare & Disabled and Premium Assistance databases, and given the criteria for an address update, it is very likely that addresses for many NPA residents are out-of-date. Using a conservative estimate that addresses for 2% (or 1 in 50) NPA residents are incorrect, the result is a wrongful allocation of approximately 58,900 residents.³ Ten of eighteen regions in the province have an NPA population of fewer than 100,000. Four of these regions have an NPA population of less than 58,900. The misallocation of NPA individuals, if not consistent across all regions, can have considerable financial consequences.

Note: Pharmacists have access to update resident addresses as well. However, this is entirely dependent on whether a patient requires prescriptions drugs and whether a pharmacist reviews and verifies the address with the patient when filing a prescription.

³ 2% * 2,943,135 (NPA estimated population) = 58,863
Weakness #11: Migration
Both inter-provincial and intra-provincial migration should be accounted for in the BC PNBF model. The impact of its exclusion is to under-finance those regions receiving an influx of residents, such as Vancouver, and to over-finance those regions with departing residents, such as Northern Interior. This finding is illustrated in Section 3.5.3.

Weakness #12: Segmentation by Non-Premium Assistance
Using the lack of receipt of premium assistance as an indicator of socio-economic status is inadequate. Currently 73%, or almost 3 in 4, of British Columbians are categorized as such in the BC PNBF model. However, residents are denoted as NPA by default – by calculating the difference between the total population for a region and the sum of the three other SES populations. Currently, there is no way to validate the NPA populations by region.

A resident is classified as NPA if his/her individual earnings are more than $20,000 before taxes in a calendar year. However, according to the National Council of Welfare, the before tax low-income cut-off (LICO) for 2000 was $18,371 for a single person living in a city of 500,000+ residents (Welfare, 2001). Therefore, an individual earning barely over the LICO in Vancouver (only $1,629 more a year) is not eligible for premium assistance, and therefore categorized as NPA. The hourly wage for this individual is approximately $9.19/hour\(^4\), while the minimum wage in BC is $8.00/hour, as of 11/01/01. As a result, individuals earning barely over the LICO are calculated to have the same health care needs as individuals earning $200,000 a year. This contradicts the underlying assumption in the model that income or poverty is an indicator of health care need.

Therefore, the NPA segmentation is a poor proxy for health care need.

Weakness #13: Aboriginal segmentation
The model is based on the assumption that all Aboriginals in the province have the same utilization rates, regardless of their socio-economic status. In other words, this segmentation serves as segmentation on race, rather than as a measure of low income. Aboriginals who have identified themselves as Status or Non-Status Indians in the census do not necessarily have

\(^4\) Assume 40 hours/week * 50 weeks = 2,000 hours. $18,371/2,000 hours = $9.19/hour
poorer living conditions; they have simply indicated their membership of a particular race. However, the model assumes that the 153,000 Aboriginals counted by the census have the same utilization rate as the 105,000 Aboriginals for whom there are MSP utilization records. The assumption that all Aboriginals in the province have the same high utilization level could result in over-allocation of funds to regions with high Aboriginal population counts.

Another concern with Aboriginal segmentation based on MSP utilization records is that registration as a Status Indian is voluntary. Therefore, Status Indians that are covered by spouse or employer’s MSP coverage may not be identified as Status Indian, affecting the accuracy of the MSP utilization database regardless (Prov. of BC, BC Vital Stats, 2001).

Weakness #14: Use of Exclusively Demographics for Population Segmentation
Although segmentation by age and gender is relatively easy due to the availability and relative accuracy of the data, according to Verhulst et al., “Demographics are relatively crude proxies, since a large amount of variation in illness levels exists between individuals, even after accounting for age and gender” (Verhulst et al, 2001, p. 330). Age and gender only explain a small amount of the variation in resources used by patients (Verhulst et al, 2001, p.330). As well, the addition of the SES segmenting variable adds little value to the model, based on the small percentage of the population categorized (27%) and the data source inaccuracies. Therefore, defining population segments with these three variables may not capture the true differences in the population utilization rates.

Weakness #15: The dangers of averages
When calculating the utilization rates, an average Resource Intensity Weight (RIW) per person in each segment of the population is determined. However, there are dangers in using averages. Averages are not ideal when data is heavily skewed, with a long “tail” distribution. This allows outliers to disproportionately affect the average. A better measure is the median, representing the true data midpoint. Therefore, the median RIW per person in each population segment would be a more accurate representation of utilization.

Note: The Ministry has not provided any data on the actual distributions of RIWs for analysis.
Weakness #16: Use of Resource Intensity Weights (RIW) to calculate utilization

The use of RIWs is subject to criticism from some physicians, as not being truly representative of the resource requirements for a given procedure in a given facility.

It is logical to assume that the average RIW for a given population segment is consistent across regions in the province – this is a fair assumption, given no evidence to indicate otherwise. However, if a region has a higher than average RIW overall for a given population segment, it will be penalized by the assignment of the average RIW for each patient in that age group in the region. The interregional flow adjustments for a regional centre treating more complex, resource intensive cases are based on the average RIWs from other regions as well. It is likely that the inflow from other regions to major centres is for more specialized, resource intense, complex cases based on the assumption that patients will generally not leave their region for care, unless travelling. Using the averages to determine inflow short changes the major regional centres of the RIW allocations they are entitled to for services provided. An interesting comparison would be to examine the aggregate RIWs (or Expected Work Load) allocated by the model to a larger region compared to the actual aggregate RIWs of services provided over a given year.

Also, RIWs for Canada are calculated based on cost data primarily from Ontario. Until ample data is available to calculate RIWs with primarily BC data, the RIWs will continue to be weighted based on cost accounting data from other provinces. Since cost accounting data is currently unavailable in BC, it is impossible to do any validation work to determine the accuracy of the RIW assigned to BC cases.

Finally, the RIWs are vulnerable to manipulation on a provincial scale. Although utilization rates are calculated as a provincial rate, prevalent manipulation of diagnostic codes at the facility level could result in RIW “creep” for some Case Mix Groups (CMGs) or age/gender/SES groups. Diagnostic creep is a viable concern – it has been identified as one of the major potential concerns with the ACG model (see Appendix F).

Weakness #17: Determination of Remoteness and Complexity Adjustment Values

For the acute care model, a total of 8% of aggregate funding is arbitrarily assigned to account for the adjustments for remoteness (4%) and complexity (4%). However, there is no objective
information on how it was determined that 4% was a sufficient, yet not overly generous amount for both adjustments. Instead, 4% is determined to be reasonable and fair by the subjective analysis of the Joint Advisory Committee and the Health Association of BC. (Note: 4% represents $90 Million, in the 00/01 model) No testing has been done to determine the ability of this number to meet the perceived need for an adjustment.

Similarly, 1% is allocated to adjust for remoteness in the continuing care model, without any testing to determine the adequacy of this allocation to address any isolation issues in delivering community and residential care.

Other provinces have had difficulty defining how and what amount to adjust for complexity. When Alberta was in the initial stages of developing a similar model, after conducting several studies, they found that it was difficult to identify and report on the indirect education costs for teaching hospitals (“Alberta’s Acute Care”, 1989, p. 7).

Weakness #18: Lag in Interregional flow data
As stated previously, the use of interregional flow data that is at least one year out-of-date will result in a minimum one-year lag in reallocation of funding to accommodate changes in program offerings or available facilities.

For example, if a community such as Trail adds a new specialty program, such as the services of orthopaedic surgeons, the flow of patients will be affected. Fewer patients will be transferred to similar programs in other regions, and more patients might transfer to Trail from nearby regions.

The historical interregional flow adjustment will assume the same inflow and outflow of patients, and funding will not be allocated to accommodate the development of such a program. Therefore, it will be up to the Ministry of Health to allocate special funding, external to the model, for a particular initiative. However, this contradicts the basic reasoning behind implementing the model – to allow the regions to allocate funds as they see fit, without parallel funding streams. Consequently, the creation of programs will only occur at the expense of others, restricting the ability of a region to initiate new programs.
Weakness #19: Application of generic population growth rates
Using region-specific population growth rates does not adequately account for the faster growth rate among Aboriginals than among other SES groups. For example, the Status Indian population has grown at a compound rate of 3.9% annually since 1991, while the overall population of BC has grown at 2.2% (Indian and Northern Affairs, 1997).

Weakness #20: Exclusion of Nisga’a Health Authority
The Federal government provides block funding for the provision of health care for Status Indians living in the Nisga’a Health Authority. However, the Nisga’a people also rely on acute care services in the North West region. The BC PNBF model does not allocate funds to the North West region to account for the delivery of care to the Nisga’a people. At the same time, no federal funding is transferred from the Nisga’a Health Authority to the North West region for the provision of care. According to physicians in the region, the Nisga’a people represent approximately 30% of those seeking acute care in the region.

3.5 Sensitivity Analysis

Since the BC PNBF model is highly dependent on the quality of population-related data, a sensitivity analysis is undertaken to determine the effect of small, known fluctuations in the data. The analysis requires the reconstruction of the BC PNBF model, followed by a study of the effects of known Aboriginal population undercounts, and intra-provincial migration.

3.5.1 Reproduction of Base Allocation

The first step is to use the population figures and utilization rates, as provided by the Ministry of Health, to recreate the base allocations, prior to adjustments for population growth, interregional flow, remoteness, and complexity.

Explicit population numbers for each of the 152 segments in each region were requested on numerous occasions from the Ministry to determine the source of the discrepancy. However, despite the stated objective of model transparency, the Ministry did not provide this data.
Therefore, population numbers are calculated based on known age and gender distributions in the regions, based on limited spreadsheet printouts made available by the Ministry of Health. Upon entry of the data, it is discovered that the calculated EWL values did not match those provided by the Ministry of Health. Specifically, different population or utilization rates from those provided must have been used in order to complete their calculations.

The differences in funds allocated by the Ministry of Health base model and the calculated base model vary as much as $36 Million in the Capital region, and $26.5 Million in the South Okanagan Similk region.

Having no alternate data, despite not matching the MOH numbers, the numbers calculated serve as the base of the model.

Note: Since explicit population counts in the 152 segments over the 18 regions were not provided, these numbers are calculated using aggregate percentage distributions provided by the Ministry. Knowing the total population of each SES group in each region, and knowing the distribution by age and gender in each SES, the disaggregate population numbers are calculated approximately. Two approaches were attempted: using the aggregate populations by age by SES, and the aggregate populations by region by SES. Using both of these methods, the results are extraordinarily similar. Therefore, using the data available to us, the best estimate possible is as shown in the Master spreadsheet in Appendix G.

Several of the figures used in the model are based on assumptions. The sensitivity analysis tests the strength of these assumptions, and demonstrates the model's robustness, or lack thereof.

3.5.2 ABORIGINAL POPULATION

The explicit number of Aboriginals living in the province of BC is truly unknown, even to Statistics Canada, BC Statistics and the Ministry of Health. Various sources of data provide dramatically different counts of Aboriginals in BC.
The aggregate Aboriginal population figure chosen for use in the model is the census estimate of Aboriginals living in BC, stated as 153,224. However, the MSP database (used for utilization calculations) only has 105,471 Aboriginals (Status Indians) listed in the province. The difference between these numbers can be explained to some degree, since the census is a "self-defined" count, including both Status and Non-Status Indians, while the MSP records only count those Status Indians whose premiums are paid by the Federal Government.

The 1996 census count of Aboriginals is confirmed to be incorrect. Statistics Canada admits that due to inaccessibility issues, approximately 44,000 Aboriginals are missing from their national count:

Under coverage in the 1996 Census was considerably higher among Aboriginal people than among other segments of the population due to the fact that enumeration was not permitted, or was interrupted before it could be completed, on 77 Indian reserves and settlements. These geographic areas are called incompletely enumerated Indian reserves and settlements... In 1996, an estimated 44,000 people were living on reserves and settlements that were incompletely enumerated”. (Stats Canada, 1998, para. 58)

According to Statistics Canada, BC accounts for 17.5% of the Aboriginals living in Canada. Consequently, it is assumed that approximately 7,700 (17.5% of 44,000) Aboriginals are missing from the BC census count.

However, it is recognized that those Aboriginals missed in the census are likely included in the MSP database, classified as Welfare & Disabled or otherwise, particularly if the individual is a non-Status Indian. Based on the assumption that a Status and non-Status Indian would have similar utilization rates, 7,700 individuals are transferred proportionally from the aggregate populations of the other three categories to become Aboriginal. Although a crude method of reallocating residents, it serves the purpose of demonstrating the effect of incorrect regional population counts by SES group. (Further results can be found in Appendix G).

A summary of the regions most affected by this misclassification is found in Table 2. The columns "$ Difference" and "% Difference" represent the change in funding from the calculated allocation before and after the reallocation of Aboriginals.
Table 2: Effect of Aboriginal Reallocation on Regional Funding

<table>
<thead>
<tr>
<th>RHB/CHSS</th>
<th>$ Difference</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>North West</td>
<td>$459,303</td>
<td>0.97</td>
</tr>
<tr>
<td>Cariboo</td>
<td>$124,818</td>
<td>0.32</td>
</tr>
<tr>
<td>Peace Laird</td>
<td>$99,980</td>
<td>0.30</td>
</tr>
<tr>
<td>Northern Interior</td>
<td>$193,547</td>
<td>0.28</td>
</tr>
<tr>
<td>Thomson</td>
<td>$192,385</td>
<td>0.27</td>
</tr>
<tr>
<td>North Shore</td>
<td>($102,166)</td>
<td>-0.11</td>
</tr>
<tr>
<td>South Fraser Valley</td>
<td>($320,190)</td>
<td>-0.11</td>
</tr>
</tbody>
</table>

The impact is significant for regions such as the North West, which will receive an additional $459K in funding annually, representing approximately 1% of their annual budget. Meanwhile, regions such as the South Fraser Valley will see their allocation reduced by $320K annually.

In a previous section, the inaccuracies of assuming the application of Aboriginal utilization rates applied to all Aboriginals were discussed. Nevertheless, this examination demonstrates that regardless of the methodology used, inaccurate population counts have a potentially significant impact on the final fund allocations. The model is sensitive to the population figures, and inaccuracies have significant implications.

3.5.3 MIGRATION

Inter-regional migration is the population flow among the regions of BC, which affects the annual population figures in many regions of BC. In relation to the BC PNBF model, the characteristics of the migrants will affect the services and facilities a region will need to provide to meet the needs of its residents.

Migration data for the funding year are not included in the BC PNBF model. The model is based on population estimates (along with all other related data) from previous years. Although the adjustment for population growth should account for inter-regional migration, according to the Ministry of Health, the growth considered may not be applicable to the funding year. For example, population growth between 1999/2000 and 2000/2001 could be
used for 2001/2002 funding (Prov. of BC, 2001, PNBF, p.15). This does not account for the migration of individuals during the 2001/2002 funding year. Therefore, funding for these individuals will not be correctly allocated in 2001/2002, since their new home region will be expected to provide care, while the funds are allocated to the resident’s old region of residence.

BC Stats projects regional migration levels based on historical data and information on future developments or projects that could impact the population of a region. An example of such a project might be a mine or pulp and paper mill closure, subject to swings in the local economy. In 1998/99, 91,200 people migrated within BC (BC Stats 2000). Intra-provincial migrants are of all ages, with the largest group (35%) being mid-20 to mid-30 year olds. The movement of this population segment also entails the movement of their children. Seniors (>65 years of age) made up 7% of intra-provincial migration in 1998/99 (BC Stats n.d.).

Migration projections for the next several years by BC Stats show annual increases in the thousands in net intra-provincial flow in the regions of Vancouver Island – Coast (particularly the Capital and Nanaimo areas) and Thompson-Okanagan. These predicted increases are due to the expected migration of baby boomers (aged 55+) to these regions. Conversely, the most recent BC Stats predictions are for annual net decreases in the thousands from the Mainland-Southwest region. Industry development in the North Coast region (Kitimat-Terrace) is expected to substantially minimize the net outflow of migrants to other regions. These intra-provincial migration trends are consistent for both short-term (next 5 years) and long-term (>5 years) projections (BC Stats, n.d., Migration Assumptions). However, these projections are subject to change.

Net migration data is available from BC Stats, for all Local Health Areas in the province (BC Stats, 2001). The regions experiencing the greatest net gain or loss in residents in 1998/99 are as illustrated in Table 3.
Table 3: BC Regional Migration, 1998/99

In order to understand the effect of migration on fund allocations, each region's net migration during 1998/99 is introduced to the model. Migration data is not available by SES group; therefore, the net migration is assumed to retain the same distribution as the current residents of the region.

The resulting difference in fund allocations is substantial for some regions, especially those that experience a net gain in residents over the course of the year. Again, the funding model will adjust for these differences, but only at least a year later. In the meantime, these calculations demonstrate the excessive or insufficient regional funding during the year of migration.

Table 4 illustrates which regions have the most significant difference in funding when migration is accounted for:

Table 4: Effect of Migration on Fund Allocations

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Table 4: Effect of Migration on Fund Allocations

5 98/99 represents the most recent regional migration data available from BC Stats. Due to lag, 98/99 would likely be the data used in the 2001/2002 PNBF funding model.
Regions such as Vancouver/Richmond are under-funded by the amounts shown in Table 4 when migration is not considered in the model. Conversely, regions such as Northern Interior are allocated excessive funds, as illustrated above. The % Difference column illustrates the percentage change in funding for each region. Complete analysis can be found in Appendix G.

Therefore, regardless of future migratory trends, this analysis illustrates that migration affects fund allocations to regions.

**Effect of Under/Over Fund Allocations**

Health region administrators are required to manage regions under very strict budgetary constraints. Anywhere from 80%-95% of the costs in delivering regional health care services are fixed costs, with little flexibility. This leaves only 5%-20% of regional budgets available for discretionary expenditures. As a result, the impact of a 1% cut in funding is far more substantial than it initially appears.

### 3.6 Future Initiatives

Clearly, the model will evolve over time, as stakeholder concerns are heard and addressed, and additional data is made available.

The following are the only potential future initiatives known, based on limited information from the Ministry of Health. All ongoing model development will be completed in consultation with JAC and OFSC, and will be based on proposals for change from the Ministry and Health Authorities.

According to the Ministry of Health, future efforts will include investigation into:

- The development of similar comprehensive funding models for Mental Health and Promotion/Prevention services.
- Further work to obtain better estimates of the Aboriginal population
- "Clean-up" of the Client Registry, which maintains the backbone of registered patient information (information such as name, DOB, address, etc.)

- Using Adjusted Clinical Groups (ACGs) rather than Age/Sex/SES segments to determine a population's relative need for health care.

- Revision of complexity factor adjustment – both the amount allocated and how to properly allocate the funds

- Use of target interregional referral patterns rather than historical records

*Adjusted Clinical Groups*

Adjusted Clinical Groups (ACGs) were developed by Johns Hopkins University to describe the morbidity of a population. Based on past diagnostic data, patients are classified into an ACG, which relates to their relative need for health care. There is evidence to support the relationship between ACG and utilization of health care services, using BC specific data. ACGs do not group across similar illnesses; instead, they group across unrelated illnesses requiring similar resource intensities.

Using ACGs would allow for better recognition of the needs of a population, categorizing by actual morbidity rather than by age/sex/SES. Although ACGs are still based on past utilization records, and do not address unmet need (you must get a diagnosis to be in the system), they are proven predictors of health care expenditures.

However, the successful application of ACGs would still be highly dependent on the accuracy of patient address records and ICD-9 (International Classification of Disease, 9th revision) diagnosis coding.
Future research work at the University of British Columbia may include the incorporation of socio-economic status into the model, to determine if it affects utilization, given the same level of morbidity.\(^6\)

The Ministry of Health is currently working with the Johns Hopkins representatives to determine if and how the ACG methodology could be incorporated into the PNBF model to proportionally allocate funds.

A summary of the ACG methodology, and a comparison to the exclusive use of age/sex adjustments is found in Appendix F.

### 3.7 Implementation

Even the most well designed model with perfect data will fail if implementation is not carefully planned, monitored and modified as required.

The Ministry’s current, tentative plan is to implement the model gradually, prior to full-scale implementation. It is not explicitly defined how gradual implementation would occur – which funds would be affected, when full-scale implementation would occur, etc. In the meantime, all remaining funding will be allocated as per the current funding mechanism, following historical funding patterns.

However, the “how’s” of implementation have not been explicitly defined. The following are recommended considerations prior to implementation:

- **Implementation requires a plan**
  Planning will reduce uncertainty, clarify objectives and improve efficiency of implementation. It is difficult to develop a funding model without some perspective of the implementation policy. To ensure the successful implementation of such an expansive model, it is critical that an appropriate plan be developed considering:
    - What model components will be implemented?

\(^6\) R. Reid (personal communication, October 2, 2001)
- Who will have reporting/auditing responsibilities?
- Whose suggestions (which stakeholders) will be integrated into the implementation plan?
- How will the impact of model implementation be measured? What indicators will be used to demonstrate an improvement to the system?
- How will the model be implemented – in stages?
- When will various implementation stages occur?

**Accountability must be part of the plan**

Accountability is made up of two parts: 1) Compliance with policy and 2) Performance as measured against indicators. The implementation plan must include defined policies, as well as indicators that demonstrate whether the policies are being followed or not, at both a provincial or regional level. The indicators must also correspond directly to the objectives specified in the implementation plan.

Accountability measures are required for both the implementation team and the Regional Health Authorities. The implementation team should be subject to an external review process to ensure that schedules are met, individual commitments are kept, and overriding policies are followed.

Currently, the Health Authorities adhere to the Health Services Management Framework, a high level outline of policies and regulations to be followed. This framework was developed and agreed to concurrently with the introduction of regionalization in BC. Currently, there are no performance measurement monitoring systems in place – there are no specific follow-up activities by the Ministry to ensure that health authorities are adhering to the agreement.

The Ministry of Health Planning has developed a generic Accountability Framework, which is a theoretical outline of the roles and responsibilities of government and Health Authorities, as well as defined tools of accountability, such as standards, policies, and requirements. However, this framework only includes the process – the “what” and the “how” – and not the specific performance metrics. The Health Authority reporting requirement should include performance measures, targets and key indicators, to demonstrate how effective the region is at achieving
their objectives and provincial service standards, and following provincial policy, based on the fund allocation decisions they have made.

Further definition of the roles and responsibilities will occur once it is firmly established how many Health Authorities will be maintained in BC. Consideration will be given to how the government will ensure accountability while still maintaining the regional autonomy associated with the model. Clearly, defining the specifics of the Accountability Framework is an essential step prior to implementation.\(^7\)

An example of business plans and annual report requirements for the Health Authorities can be found in Alberta’s approach to implementation. Further information on Alberta’s Health Authority business plan and annual reporting requirements is found in Appendix B.

- **Defined performance measures**

A key component to the implementation plan is a method of measuring how the implementation of the model has changed the delivery of health care in BC. The implementation plan should define what the model should accomplish – what part of health care delivery will be improved? From that definition, it will be possible to define what must be measured to determine how the model has affected the provision of care.

Some possible measures that could be used both quantitatively and qualitatively, to measure the performance of the BC PNBF model are as follows (Fyke, 2001, p.48):

- Utilization Analysis, including duplication, use and misuse of services
- Costs of delivering programs and services
- Workforce Morale, including physicians and nurses
- Wait times/Patient accessibility to services
- Disease or condition-specific outcomes associated with services
- Any other measure that would illustrate the model’s ability to facilitate the effective and efficient delivery of health care services.

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\(^7\) C. Luke, BC Ministry of Health Planning (personal communication, November 6, 2001)
• **No-loss provision**

One method to assist those regions with reduced budgets, as calculated by the PNBF model, is to include a no-loss provision. A no-loss provision would effectively ease the transition for regions, by minimizing a calculated cut in funding to a freeze in funding. For example, with the PNBF model, the Vancouver/Richmond region would experience an 11% cut in funding. Without a no-loss provision, the results for this region could be catastrophic.

Although this exception cannot last forever, it is important that the no-loss provision remains in effect while errors are eliminated from the model and until regions have had adequate opportunity to adjust to the reduction in funding. For example, in Alberta, a no-loss provision was in place for the first three years after model implementation, and phased out gradually to allow regions the opportunity to adjust (See Appendix B).

• **Stakeholder buy in**

Successful implementation is dependent on buy-in from stakeholders, including policy makers, public and providers (Hutchison et al, 1999, p. v). Stakeholder opinion must be considered in further model developments and modifications, as well as implementation strategies.

• **Determine how to improve data quality**

Data quality, especially population estimates, is absolutely critical to the model’s ability to accurately allocate sufficient funds to the regions. Although the model developers believe the data is adequate to facilitate immediate implementation, there should be several information system improvements undertaken concurrently. Often, the quality of data is related to how frequently it is used or referenced. If awareness is increased among the “data keepers” of the importance of data accuracy, it will assist in improving data quality (Hutchison et al, 1999, p.29). However, this is not enough. Specific initiatives and explicit plans must be prepared, targeted on improving the data collection administration and monitoring process, to minimize and control future data quality concerns.

• **Estimate cost of implementation and administration**

Implementation and administration at the provincial and regional levels will introduce additional costs. Implementing a model without approximating the additional costs incurred by introducing change is illogical.
The provincial government will assume new costs, since determining fund allocations with the model will be more work than allocating funds based on historical budgets. Upon completion, the model will have four separate components (one per service sector), each requiring maintenance and revisions. The costs will vary with the number of adjusters used and data sources used as well (Hutchison et al, 1999, p.30).

Indisputably, this is a more difficult funding process for Regional Health Boards to manage. In Alberta, the Health Authorities experienced “costs” associated with implementation, including additional training of regional staff to administer the finances and prepare the required annual reporting requirements. In Saskatchewan, the provincial government incurs additional costs by assisting the regions with their annual planning, budgeting and monitoring process.

- Measure the effect on patients

Although the purpose of the model is to facilitate improvements in providing the right care to patients at the right time and in the right place, measurements must be taken to ensure this is the case. For example, service availability and access (using data other than utilization records), as well as wait times, could be measured to determine the ultimate effect of the model on patients. However, a distinction will be required between the model’s allocation of funds, and the regional decision makers’ allocations, to ensure that the correct stage in the process is credited with the effect, good or bad, on patients.

3.8 Stakeholder Opinion

According to BC Statistics, in the year 2000, over 10% of those employed across all industries in BC were directly associated with the delivery of health care services (BC Stats, n.d., Employment). Hence, the stakeholders affected by this model extend beyond patients – the ripple of implementation may extend to over 200,000 professionals and labourers in the province.

Opinions were solicited from some of the key employee stakeholder groups, as follows:
3.8.1 Health Association of British Columbia (HABC)

The Health Association of BC is a non-profit, non-government association. Their members include the province’s health authorities and other health organizations. They provide their members with leadership, advocacy and support services (HABC, 2001).

The HABC has been continually supportive of implementing a PNBF model in BC. In 1999, the HABC prepared a letter for the then Minister of Health, expressing their strong support for the implementation of a population based funding formula (HABC, 1999). The HABC has been working with the Ministry of Health in developing this current model. Although the HABC does not have an official position statement prepared, and will not until the model is officially released, the following are unofficial opinions of the HABC on the model on behalf of their members:

- Most of the health authorities in BC support the model, especially at a fundamental, philosophical level. The conflicting opinions are in the details.
- The inclusion of a no-loss provision is essential, to ensure ample opportunity for health authorities to adjust accordingly to changes in funding levels.
- They believe that the more all-inclusive the model the better, including tertiary services and capital expenditures.
- Implementation should occur in its full capacity, without concurrent directed funding, regardless of its potential flaws. This will facilitate a better understanding of the model strengths and weaknesses. They also support a minimum three-year funding cycle.
- They are interested in seeing further exploration of the ACG methodology. As well, they would be interested in further work on segmenting the non-premium assistance SES group.
- No specific measure should be used to determine the impact of the model. Rather, the model will highlight best practices by differences in utilization rates among regions.
- Incentives for "gaming" among regions must be avoided, such as a requirement for regions to "bill" other regions for services.

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8 L. Kallstrom & L. Okotinsky, HABC (personal communication, August 14, 2001).
3.8.2 Health Employers Association of British Columbia (HEABC)

The HEABC represents the interests of over 400 publicly funded health care Employers in British Columbia. The HEABC negotiates and administers the industry-wide health care Collective Agreements on behalf of these Employers (HEABC, 2001).

The HEABC does not have an official position on the model methodology. They do not have a policy or advocacy aspect to their organization, and will only become involved if implementation and the allocation of funds result in Human Resource or Labour Relations issues.\footnote{M. Arbogast, HEABC (personal communication, August 28, 2001)}

3.8.3 Registered Nurses Association of British Columbia (RNABC)

The RNABC is a regulatory organization, as indicated in their mission statement:

“Our mission is safe and appropriate nursing practice, regulated by nurses in the public interest, and achieved by promoting good practice, preventing poor practice and intervening when practice is unacceptable” (RNABC, 2001).

The RNABC have no official position on the model development or implementation, and therefore could not provide a statement.\footnote{J. Wearing, RNABC (personal communication, October 18, 2001)}

3.8.4 British Columbia Nurses Union (BCNU)

The BCNU was unavailable for comment on this topic.
3.9 Comparison of BC with Other Provincial Models

Since other provinces in Canada have adopted the same approach to regionalization and fund allocations, it is reasonable to not only compare the BC model to those in other provinces, but also to learn from the experiences of others in the same Canadian context. Specifically, comparisons are made to the models implemented in Alberta and Saskatchewan. Although the BC model and the Alberta and Saskatchewan models are based on the same fundamental principle, to allocate funds according to population needs, there are differences in the mechanics and execution of the models.

3.9.1 Alberta

- More inclusive model
  The Alberta funding model provides funding for more services than the BC model. Fund allocations for Acute In-Patient Care, Hospital Based Ambulatory Care, Continuing Care, Home Care, PPP (Protection, Prevention, Promotion), and Private Clinics are all included in the Alberta funding model.

- Have Implemented
  Alberta implemented their funding model in 1998.

- Service sector funding pool allocation
  Unlike BC’s model, Alberta includes the determination of the service sector allocations as part of the model. Using historical utilization and expenditure records, Alberta’s model calculates the distribution of aggregate funds as required by the population. Alberta recognizes the importance of applying the most recent utilization and expenditure data available to ensure the accurate distribution of funds.

- SES deemed insignificant over 65
  Alberta built their model on the assumption that socio-economic status is insignificant once a resident is 65 years or older. Therefore, all residents over 65 were classified in the Non-Premium Assistance segment. This was partly due to the fact that most individuals, regardless
of socio-economic status, have an increased need for health care as of 65. Also, it was noted that most individuals apply for premium assistance as of age 65, regardless of their previous SES status. Therefore, the SES indicator was no longer indicative of need for health care. Also, it was noted that not many Aboriginals live past 65; therefore, the SES segmentation would have little effect on that socio-economic group. The result was the segmentation of over 82% of the population as Non-Premium Assistance.

- **Use of Costing data**

  Alberta developed a method to assign costing weights to all activity data. Cases are grouped using the Refined Diagnosis Related Grouping Methodology, and average costs per case are determined using data collected in Alberta and Ontario. The use of cost data is unique and provides a better estimate of actual relative expenditures, rather than the use of RIWs as in the BC model, since Alberta applies the actual cost of providing the service in their province. However, the cost data is used to determine relative fund allocations, similar to the BC model.

- **No complexity adjustment**

- **"No Loss" Subsidy included**

- **Data quality and reliability**

  Alberta relies on the population figures from their Population Registry File rather than census population data. Their central registry is a count of all Albertans who are eligible for medical benefits. When the central registry was compared to census data, the populations were within 3% of each other. (This, of course, was not the case for the Aboriginal counts, which are known to vary from the census count due to the different definitions for qualification.)

  Alberta may have a more effective method of maintaining data quality since their internal population records so accurately match census population data. As stated previously, data integrity is crucial to the successful application of this model. The BC Ministry of Health should strive to achieve the same minimal error levels in their locally maintained patient databases.

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11 M. Lynch, Alberta Ministry of Health (personal communication, August 24, 2001)
Experiences from Alberta

Testimonies from representatives at the Alberta Medical Association (AMA) provide some insight into Alberta’s implementation experiences with their PNBF model. There was confusion as to the roles and responsibilities of regions and physicians under the new arrangement. As well, almost all regions ran huge deficits in the initial years.

However, access and equity issues have been brought to the attention of the AMA. A president of one of the less populated, larger geographic regions stated that the model is not allocating sufficient funds to allow for the proper allocation of services. Home care standards differ by region as well. For example, in an urban centre such as Edmonton, patients will receive services such as the replacement of an intravenous line in their home, while rural patients must go to a hospital for this same service.

Inequities in access to physiotherapy services have also been noted. In Alberta, community-based services are funded only at those clinics that have been awarded a contract. There are no standards in community-based Physiotherapy as to what services, or coverage, a region is required to provide. As a result, some clinics are not chosen for contract funding, and are required to charge user fees for all visits. In primarily rural regions, patients will have anywhere from 15-20 sessions paid for, while in urban areas, coverage may only extend to one session, with additional sessions at the expense of the user.

Modifications have been made as well. For example, the region’s residents elected two-thirds of Regional Health Board members for the first time in October 2001. Prior to this change, Board membership was via government appointment only.

To the knowledge of those interviewed, there has not been an official AMA report or survey initiative to solicit opinions of physicians on the model or the implications of implementation.

Discussion with a representative from the Alberta Ministry of Health stated that there has been no specific initiative to measure the potential impact of the model over the past few years. No specific data has been gathered or reports generated, primarily because there was difficulty in determining exactly what to measure. As well, parallel dedicated funding has continued to
occur in conjunction with the model, potentially attesting to the model’s inability to adequately allocate funds.

Please refer to Appendix B for a more extensive description of the population needs-based funding model in Alberta.

3.9.2 SASKATCHEWAN

- **Use Indicators, not SES**

  The Saskatchewan model uses “needs indicators” beyond age and gender, rather than socio-economic status, as used in the BC model. These needs indicators include premature death rates, low birth rates, and whether a patient lives alone or not.

- **No use of Utilization Data**

  Utilization data was initially used as an indicator for need; however, since utilization data is driven by accessibility and availability, other need indicators were applied, as mentioned previously. Therefore, utilization data is not used at any point in the fund allocation process, removing any potential bias in fund allocation based on previous use of services.

- **No additional adjusters**

  In Saskatchewan, there are no additional adjustments made to regional fund allocations beyond an age/sex/needs indicator, cost and interregional flow adjustment. There is no complexity adjustment, no remoteness adjustment, and no population growth adjustment.

The cost adjustment in the Saskatchewan model is designed to accommodate for regional differences in the provision of services, accounting for additional travel time requirements and less populated communities.

- **Have Implemented**

  Saskatchewan implemented their funding model during the 1994-95 fiscal year.
Experiences from Saskatchewan

According to the testimony of a CEO of a medium sized health district in the province, the best period for needs-based funding was in 1995-96, immediately following initial implementation. Since that time, the system has eroded from a needs-based methodology to what is considered a rules-based methodology – the provincial government provides financial assistance to regions running deficits. This particular CEO claims that there is not much “science” to the process as it currently stands.

Please refer to Appendix C for a more extensive description of the population needs-based funding model in Saskatchewan.
4. PHYSICIAN OPINION

4.1 SURVEY PROCESS

The purpose of the physician survey was to determine physician views about the possible introduction of a Population Needs Based Funding model to allocate funds to the Health Regions for all care including physician services.

Process

All physician data was based on the BCMA database of physician information as compiled at the BCMA from the Ministry of Health, the Colleges, and the physicians themselves.

Assumptions

Some general assumptions were required to initially filter the data.

1. The physician's "preferred" address was used as opposed to a home or business address. The preferred address ensures that the BCMA respects the physicians' request to receive mail at a particular address. If only one address was provided, it was the default. Physicians with incomplete mailing addresses were removed from the population.

2. Members who indicated that they did not wish to receive any mail outs from the BCMA were excluded from the data.

3. All preferred addresses that were not in BC were excluded. Due to the nature of the survey, it was not practical to distribute surveys to those practising or residing outside of the province.

4. Since the survey was targeted at actively practising physicians, all physicians with a "Personal Membership Class" code of 21 or 22 were removed from the population. In
the membership database, code 21 represents non-practising for less than 25 years, and code 22 represents not practising for greater than 25 years.

5. To reduce bias, it would have been ideal to distribute the survey to both members and non-members of the BCMA. However, most of the listed non-members are prior members who have since revoked their membership. As a result, it was decided that the likelihood of receiving responses from these physicians would be very low, and outweighed by the expense of distribution.

Stratification

The final population of physicians was determined by applying assumptions to define the type of physician (GP or Specialist), and the population of the physician’s practice community (Urban, Non-Urban or Rural).

A General Practitioner was defined as having “Practice Type” code equal to 0 (General Practice), 61 (GP’s Unknown) or 63 (General Practice – Primary Care) in the membership database. The Ministry of Health assigns these codes to all physicians based on the services that comprise their primary source of income. This code has the disadvantage of not being assigned by the physicians themselves and may not be representative of how physicians regard themselves as practitioners. Nonetheless, the Society of General Practitioners relies on these codes to define potential members. Thus, the decision was made to adopt the same definition. All remaining “Practice Type” codes were assumed to represent specialists by default.

Ideally, the issue of whether a physician was a GP or a Specialist could have been defined by their membership in the appropriate College or Society. However, this information was unavailable. As well, enrolment in a College or Society is optional for a physician. Therefore, establishing a population of physicians based on the College and Society membership lists would have limited the number of physicians identified for use in the survey distribution.

Rural, Non-Urban and Urban communities were defined using pre-established definitions. A complete list of communities can be found in Appendix I.
• **Rural:** Physicians practising in the Northern Isolation Allowance (NIA) communities were determined to represent Rural physicians. The Ministry of Health and the BCMA have agreed on communities qualifying for the NIA. Physicians in NIA communities are in remote areas, such as 100 Mile House, Terrace and Revelstoke. (It is worth noting that some additional communities that are not outlined in NIA were considered rural for this survey. This includes communities such as Fruitvale, Blind Bay and Lac Le Jeune).

• **Non-Urban:** In 2000, the Physician Recruitment and Retention Plan (PRRP) established a list of focal communities. This list was comprised of NIA communities, as well as other developed, yet non-urban communities, such as Nelson and Hope. Physicians practising in these non-urban (not NIA) communities were identified as Non-Urban Physicians.

• **Urban:** Urban physicians were defined as practising in a non-NIA, non-rural, non-PRRP community. This included communities such as Vancouver, Victoria and Kamloops.

The physicians were segmented according to their GP/Specialist status, as well as their community of practice. The population of each stratified group is found in Table 5:

<table>
<thead>
<tr>
<th></th>
<th>GP</th>
<th>Specialist</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>301</td>
<td>90</td>
<td>391</td>
</tr>
<tr>
<td>Urban</td>
<td>2562</td>
<td>3551</td>
<td>6113</td>
</tr>
<tr>
<td>Non-Urban</td>
<td>359</td>
<td>155</td>
<td>514</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3222</td>
<td>3796</td>
<td>7018</td>
</tr>
</tbody>
</table>

Table 5: Segmented Physician Populations

**Sample Size Calculations**

Since surveying the entire BCMA membership would be extremely costly, inferential statistics are invoked in the survey distribution and analysis.

Subsequently, the sample sizes were calculated using the following parameters:

- A margin of error of ±5% (E = 0.05);
• A confidence level of 95%, (sample will include population value 95 times out of 100 samples of the same size) \((z=1.96)\);
• A sample proportion of 0.5 (most conservative value) \((\hat{p} = 0.5)\).

Applying these values to the initial sample size equation is as follows:

\[
n = \frac{z^2 \hat{p} (1 - \hat{p})}{E^2} = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384
\]

This states that the sample size should be 384. The finite population correction factor is applied, since the population is stratified with 384 being larger than 5% of any of the stratified group sizes. The variable \(N\) represents the population of the stratified groups.

\[
n' = \frac{n}{1 + \frac{(n-1)}{N}} \quad \text{Finite Population Correction Factor}
\]

A similar, focused survey completed in 1998 resulted in a 47% response rate from urban physicians, and 61% response rate from rural physicians. (BCMA Rural Committee, 1998, p. 29) Therefore, it was subsequently determined by BCMA staff that a 50% response rate overall would be both reasonable and expected. All sample sizes were adjusted accordingly (multiplied by 2) as seen in the calculations below to achieve the desired return rate.

The required sample sizes, \(n'\), for the stratified groups are calculated as presented in Table 6:
<table>
<thead>
<tr>
<th>Stratified Physician Group</th>
<th>$n'$</th>
<th>Resulting Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural – GP</td>
<td>169</td>
<td>301 (population of Rural GPs)</td>
</tr>
<tr>
<td>Rural – Specialist</td>
<td>73</td>
<td>90 (population of Rural Specialists)</td>
</tr>
<tr>
<td>Non-urban – GP</td>
<td>186</td>
<td>359 (population of Non-urban GPs)</td>
</tr>
<tr>
<td>Non-urban – Specialist</td>
<td>111</td>
<td>155 (population of Non-urban Specialists)</td>
</tr>
<tr>
<td>Urban – GP</td>
<td>334</td>
<td>668</td>
</tr>
<tr>
<td>Urban – Specialist</td>
<td>347</td>
<td>694</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>2267</td>
</tr>
</tbody>
</table>

Table 6: Stratified Physician Group Sample Sizes

The sample selection from the population of urban GPs and Specialists was done randomly, using a random number generator.

Survey Development

The survey was developed to address these key questions:

- What do physicians think of the current funding model?
- What do physicians think of a population needs-based funding model?
- What do physicians think of granting control over all health care fund allocations (including physician payments) to the Regional Health Authorities?
- What do physicians think of payment mechanisms other than fee-for-service?

The survey was subject to numerous revisions, based on feedback from the following contributors:

- BCMA Regionalized Budgets Project Group members
- BCMA Council on Health Economics and Policy (CHEP) committee members
- BCMA Communications Department
- BCMA Economics and Policy Department
- BCMA Executive
- Canadian Medical Association
The survey was accompanied by a President’s cover letter outlining the significance and potential implications of the survey topic. A copy of the President’s letter and the survey can be found in Appendix E.

Distribution

The survey was distributed via mail. Alternate distribution methods were examined such as e-mail or a web-based survey. However, it was noted that only 51% (3605/7018) of the physician population have listed e-mail addresses. Since only half of all active members have listed e-mail addresses, it was agreed that limiting distribution of the survey to ONLY physicians with e-mail access would produce a potentially biased sample.

Furthermore, it was assumed that only 51% of physicians would have access to a web-based survey. Without eliminating half of the physicians eligible to receive a survey, it would be impossible to use either distribution method exclusively. It also meant the development of two surveys – one for use in the mail, and another for electronic data collection.

Distribution by fax was also considered, and rejected. Only 73% (5133/7018) of the physician population have listed fax numbers, so an alternate distribution method would be required concurrently. As well, the lack of anonymity of faxing a completed survey was expected to dissuade physicians from responding.

Therefore, the decision was made to distribute all surveys in the same format, to eliminate any biases associated with using various media for distribution. Mail was chosen for the following reasons:

- Timing of the project accommodated the speed associated with distribution and collection of mail surveys.
- Promise of anonymity. While confidentiality was promised with all methods, collection of the survey by mail was the only truly anonymous approach.
• All physicians have at least one address (home or business) listed in the membership database.

Follow-up letters were distributed to the physicians within two weeks of receipt of the survey. The follow-up letter was distributed using both mail and e-mail, in the interest of saving costs and the absence of risk of bias or anonymity issues.

A copy of the follow-up letter can be found in Appendix E.

Pre-test

Due to the limited time and limited stratified physicians in rural and non-urban areas, it was not feasible to perform any pre-testing of the survey. Ideally, factor analysis could be used during a testing period, to eliminate any redundant questions. However, since this was not possible, the survey relied on the extensive development review process to eliminate redundant questions. As well, pre-testing may have drawn too much attention to the sensitive survey topic prior to distribution province-wide, resulting in media or other attention that could bias other respondents.

Tests for data entry accuracy:

In order to minimize the opportunity for data entry errors, a Microsoft Access 2000 database was established, complete with field constraints, which produced error messages if unexpected data was entered. Although there is no guarantee that this method eliminated overall data entry error, it eliminated obvious errors. As well, the database was established to gather information on <no response> replies, when a respondent neglected to answer a particular question.
4.2 SURVEY RESULTS

A total of 898 surveys were returned as of October 17, 2001. This sample is sufficiently large enough that comments can be made on the overall opinions of the BCMA membership, based on the calculation below:

\[
n' = \frac{384}{(384-1) + \frac{1}{7018}} = 364
\]

The required sample size is 364, for 95% confidence.

Note: All subsequent analysis was completed using Microsoft Access 2000 and SPSS v.10.

4.2.1 RESPONDENT INFORMATION

Analysis was undertaken to ensure that responses were received from a representative cross-section of physicians.

Gender

As illustrated in Table 7, the response from male/female physicians was a 77%/22% split.

Currently, the BCMA membership has a 75%/25% male/female split, as per the BCMA Membership database. A chi-squared test confirmed that the difference between the distribution of responses and the distribution of expected responses was not significant.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>688</td>
<td>77%</td>
</tr>
<tr>
<td>Female</td>
<td>199</td>
<td>22%</td>
</tr>
<tr>
<td>&lt;No response&gt;</td>
<td>11</td>
<td>1%</td>
</tr>
</tbody>
</table>

\[n=898\]

Table 7: Respondent Gender
General Practitioner/Specialist

To verify that the views of both GPs and Specialists have been gathered by the survey, analysis of the distribution of responses indicates a representative sample. Although the distribution ratio was 46/54% GP/Specialist, the distribution was based on a strict classification in the membership database. Physicians may classify themselves as GPs, although they may provide speciality services occasionally, such as obstetrics and gynaecology, and consequently not be defined as GPs in the membership database. Therefore, a higher number of self-defined GP respondents was expected, and is confirmed in Table 8 below.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP/FP</td>
<td>561</td>
<td>62%</td>
</tr>
<tr>
<td>Medical Specialist</td>
<td>143</td>
<td>16%</td>
</tr>
<tr>
<td>Surgical Specialist</td>
<td>104</td>
<td>12%</td>
</tr>
<tr>
<td>Diagnostic Specialist</td>
<td>23</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>58</td>
<td>6%</td>
</tr>
<tr>
<td>&lt;No response&gt;</td>
<td>9</td>
<td>1%</td>
</tr>
</tbody>
</table>

n=898

Table 8: Respondent Type of Physician

Physicians indicating “Other” classified themselves as the following:

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP with Specialty</td>
<td>22</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>14</td>
</tr>
<tr>
<td>Anaesthesiologist</td>
<td>8</td>
</tr>
<tr>
<td>Psychiatrist</td>
<td>4</td>
</tr>
<tr>
<td>Rural Physician</td>
<td>3</td>
</tr>
<tr>
<td>Other Miscellaneous</td>
<td>7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>58</td>
</tr>
</tbody>
</table>

Table 9: Distribution of “Other” Physician Types

The chi-squared test confirmed that the distribution of respondents did not follow the distribution of survey recipients, as explained above. However, weighting will not be introduced to account for these differences. Distributions vary depending on the data source. For example, physician counts by the BCMA exhibit a 56%/44% distribution of GP/Specialists in 1999/2000, excluding physicians earning below a payment cut-off (BCMA, 2000, MSP
Payment Data, p. A5). Therefore, there are numerous ways of defining the GP/Specialist distribution.

Rural/Non-urban/Urban

The survey did not ask for a physician’s community of practice to protect the anonymity of the physician.

Knowing the first three digits of the postal codes that correspond to the rural/non-urban/urban communities, it is possible to separate the records. However, some overlap occurred, where designated rural and non-urban communities would share the same first three digits of their postal codes. Specifically, postal codes beginning with VOE, VON, VOR, and VOX were affected. Further examination of the communities associated with these postal codes revealed that it was possible to make postal codes mutually exclusive.\(^\text{12}\) However, in doing so, a small amount of error is introduced, since some communities are classified differently as the result of creating mutually exclusive groups. Ultimately, the impact of this error is minimal, since the purpose of the non-urban stratification is to separate out communities that might otherwise be incorrectly classified as urban.

<table>
<thead>
<tr>
<th>Postal code</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>146</td>
<td>16%</td>
</tr>
<tr>
<td>Non-urban</td>
<td>232</td>
<td>26%</td>
</tr>
<tr>
<td>Urban</td>
<td>463</td>
<td>52%</td>
</tr>
<tr>
<td>Out-of-province</td>
<td>2</td>
<td>0.2%</td>
</tr>
<tr>
<td>Invalid</td>
<td>8</td>
<td>0.8%</td>
</tr>
<tr>
<td>&lt;No response&gt;</td>
<td>47</td>
<td>5%</td>
</tr>
</tbody>
</table>

\(^{n=898}\)

Table 10: Respondents by Postal Code

The resulting proportions are shown in Table 11, when the invalid/no response/out-of-province respondents are removed from the calculations:

\(^{12}\) This was possible due to postal code/community listings available at Canada Post’s website at: http://www.postescanada.ca/CPC2/addrm/hh/home.html (Accessed October 2001)
Table 11: Respondents by Postal Code, Invalid Responses Removed

<table>
<thead>
<tr>
<th>Postal code</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>146</td>
<td>17%</td>
</tr>
<tr>
<td>Non-urban</td>
<td>232</td>
<td>28%</td>
</tr>
<tr>
<td>Urban</td>
<td>463</td>
<td>55%</td>
</tr>
</tbody>
</table>

n=841

Table 12: Distribution of Physicians in BCMA Membership

<table>
<thead>
<tr>
<th>Postal code</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>391</td>
<td>6%</td>
</tr>
<tr>
<td>Non-urban</td>
<td>514</td>
<td>7%</td>
</tr>
<tr>
<td>Urban</td>
<td>6113</td>
<td>87%</td>
</tr>
</tbody>
</table>

N=7018

The distribution of physicians in the BCMA membership population as shown in Table 12 is clearly different from that of the survey respondents, further confirmed by a chi-squared test as seen in Table 13.

<table>
<thead>
<tr>
<th></th>
<th>Observed N</th>
<th>Expected N</th>
<th>Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>146</td>
<td>46.9</td>
<td>99.1</td>
</tr>
<tr>
<td>Non-Urban</td>
<td>232</td>
<td>61.6</td>
<td>170.4</td>
</tr>
<tr>
<td>Urban</td>
<td>463</td>
<td>732.5</td>
<td>-269.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>841</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$\chi^2 = 780, \text{df}=2, \text{Significance level} = 0.000$

Table 13: Chi-squared Test of Observed vs. Expected Respondent Distribution

Therefore, the distribution of respondents does not represent the distribution of the population. Of course, this was to be expected, based on the intentional over-sampling of rural and non-urban physicians.

Therefore, it is recognized that the raw survey results will likely over represent the views of non-urban and rural physicians and under represent the views of urban physicians. Therefore, weighting will be used when commenting on the opinions of physicians overall. Using weighted cases will ensure that overall comments made are representative of the population of BCMA members, rather than of the respondent distribution.
Note: Weightings were calculated by comparing the population distribution to the respondent distribution. (Population % + Respondent %)

Rural: 0.35 \hspace{1cm} \text{Non-urban: } 0.25 \hspace{1cm} \text{Urban: } 1.58
\hspace{1cm} (6\%/17\%) \hspace{1cm} (7\%/28\%) \hspace{1cm} (87\%/55\%)

The responses related to the size of the physician’s community of practice do not provide conclusive evidence of the rural, non-urban or urban distribution of responses, since the size of a community is not necessarily related to its location in the province. Regardless, the respondent distribution is illustrated in Table 14, for informative purposes.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5,000</td>
<td>60</td>
<td>7%</td>
</tr>
<tr>
<td>5,001 - 10,000</td>
<td>90</td>
<td>10%</td>
</tr>
<tr>
<td>10,001 - 25,000</td>
<td>172</td>
<td>19%</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>105</td>
<td>12%</td>
</tr>
<tr>
<td>50,001 - 100,000</td>
<td>121</td>
<td>13%</td>
</tr>
<tr>
<td>100,001 - 250,000</td>
<td>128</td>
<td>14%</td>
</tr>
<tr>
<td>Greater than 250,000</td>
<td>207</td>
<td>23%</td>
</tr>
<tr>
<td>&lt;No response&gt;</td>
<td>15</td>
<td>2%</td>
</tr>
</tbody>
</table>

\text{Table 14: Population Size of Practice Community}

Additional Respondent Information

Over 80\% of respondents have over 10 years experience practising as a physician, as illustrated in Table 15.

However, it is interesting to note that 33\% of respondents have practised in BC for 10 years or less. Therefore, many respondents have practised medicine in other parts of the country or world, and may have different perspectives on the effect of implementing a population needs-based funding model.
Table 15: Years Practising Medicine

<table>
<thead>
<tr>
<th>Response</th>
<th>Practising Medicine</th>
<th>Practising Medicine in BC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>0-5 years</td>
<td>61</td>
<td>7%</td>
</tr>
<tr>
<td>6-10 years</td>
<td>113</td>
<td>12%</td>
</tr>
<tr>
<td>11-20 years</td>
<td>287</td>
<td>32%</td>
</tr>
<tr>
<td>21-30 years</td>
<td>278</td>
<td>31%</td>
</tr>
<tr>
<td>Over 30 years</td>
<td>131</td>
<td>15%</td>
</tr>
<tr>
<td>&lt;No response&gt;</td>
<td>28</td>
<td>3%</td>
</tr>
</tbody>
</table>

n=898

As well, the majority of responding physicians practise full-time, with 88% working more than 30 clinical hours a week.

Table 16: Clinical Hours per Week

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer than 30</td>
<td>75</td>
<td>8%</td>
</tr>
<tr>
<td>30-60</td>
<td>555</td>
<td>62%</td>
</tr>
<tr>
<td>More than 60</td>
<td>236</td>
<td>26%</td>
</tr>
<tr>
<td>&lt;No response&gt;</td>
<td>32</td>
<td>4%</td>
</tr>
</tbody>
</table>

n=898

Bias of Non-Respondents

Since the surveys were returned anonymously, there was no opportunity to follow-up with non-respondents to gather their opinions. During the survey design, we chose to exclude individually identifying markings on surveys since it would have violated the anonymity of the survey. The BCMA did not want to upset physicians with follow up initiatives to determine why the survey was not returned, given the sensitivity of the topic.

With the exception of the distribution of rural/non-urban/urban respondents, the respondents are demographically representative of the physician population. As a result, bias from non-respondents is not a concern, since the lack of a difference among responders and non-responders argues that responders are a representative sample of practising physicians. Because non-respondents are demographically similar to respondents, it is hypothesized that the reasons for not responding to the survey are not related to opinions on the subject matter.
Other Data Clean up

Note that the 57 respondents that did not provide BOTH a practice type and postal code were not included in the analysis.

4.2.2 Current Regional Funding Model Opinion

The first section of the survey was designed to gather physician opinion on the current funding model in place in BC.

Funding Equity

First, physicians were asked whether they believe funding is distributed equitably in the province of BC.

Overall, a chi-squared test using weighted data confirms that there is no difference in opinion among physicians from different locations in the province and different types of practice, as illustrated in Table 17. By weighting the data, it is possible to assume that any overall conclusions from the data analysis apply to the entire BC Medical Association membership population.

The majority (58.3%) of physicians do not believe that funding is distributed equitably amongst the regions in BC. Surprisingly few physicians overall (less than 8%) believe that funding is distributed equitably.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Rural GP</th>
<th>Rural Specialist</th>
<th>Non-Urban GP</th>
<th>Non-Urban Specialist</th>
<th>Urban GP</th>
<th>Urban Specialist</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>7.1% (3)</td>
<td>10.3% (4)</td>
<td>5.0% (1)</td>
<td>8.5% (35)</td>
<td>7.5% (24)</td>
<td>8.0% (67)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>76.2% (32)</td>
<td>88.9% (8)</td>
<td>64.1% (25)</td>
<td>65.0% (13)</td>
<td>54.3% (223)</td>
<td>59.2% (190)</td>
<td>58.3% (491)</td>
</tr>
<tr>
<td>Not sure/No opinion</td>
<td>16.7% (7)</td>
<td>11.1% (1)</td>
<td>23.1% (9)</td>
<td>30.0% (6)</td>
<td>35.0% (144)</td>
<td>33.3% (107)</td>
<td>32.5% (274)</td>
</tr>
<tr>
<td>No Response</td>
<td>2.6% (1)</td>
<td></td>
<td></td>
<td></td>
<td>2.2% (9)</td>
<td></td>
<td>1.2% (10)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (42)</td>
<td>100% (9)</td>
<td>100% (39)</td>
<td>100% (20)</td>
<td>100% (411)</td>
<td>100% (321)</td>
<td>100% (842)</td>
</tr>
</tbody>
</table>

n=842; χ² = 22.05; df=15; Significance level = 0.11

Table 17: Distribution of Funding Equity (weighted data)
However, using the unweighted, raw data, it is shown that there is a difference among physician responses based on their practice location, not their practice type, as shown in Table 18. Further chi-squared analysis shows that the differences in the opinions of rural physicians and those of both their urban and non-urban colleagues are statistically significant. Specifically, rural physicians are more likely to respond “no” than urban or non-urban physicians.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Rural</th>
<th>Non-Urban</th>
<th>Urban</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6.2% (9)</td>
<td>7.8% (18)</td>
<td>8.0% (37)</td>
<td>7.6% (64)</td>
</tr>
<tr>
<td>No</td>
<td>78.8% (115)</td>
<td>65.1% (151)</td>
<td>56.4% (261)</td>
<td>62.7% (527)</td>
</tr>
<tr>
<td>Not sure/No opinion</td>
<td>15.1% (22)</td>
<td>25.4% (59)</td>
<td>34.3% (159)</td>
<td>28.5% (240)</td>
</tr>
<tr>
<td>No Response</td>
<td>1.7% (4)</td>
<td>1.3% (6)</td>
<td>1.2% (10)</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (146)</td>
<td>100% (232)</td>
<td>100% (463)</td>
<td>100% (841)</td>
</tr>
</tbody>
</table>

n=841; $\chi^2 = 27.55; df=6; Significance level = 0.000

Table 18: Distribution of Funding Equity by Physician Location

**Funding Adequacy**

When asked about the adequacy of funding available, physician responses are consistent, regardless of their location and type of practice. As Table 19 shows, using weighted data, at least 75% of respondents in each category are of the opinion that their region is poorly funded to supply required health services.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Rural GP</th>
<th>Rural Specialist</th>
<th>Non-Urban GP</th>
<th>Non-Urban Specialist</th>
<th>Urban GP</th>
<th>Urban Specialist</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Funded</td>
<td>2.5% (1)</td>
<td>5.0% (1)</td>
<td>1.9% (8)</td>
<td>0.6% (2)</td>
<td>1.4% (12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>About Right</td>
<td>12.5% (5)</td>
<td>20.0% (2)</td>
<td>17.5% (7)</td>
<td>15.0% (3)</td>
<td>10.5% (43)</td>
<td>9.3% (30)</td>
<td>10.7% (90)</td>
</tr>
<tr>
<td>Poorly Funded</td>
<td>87.5% (35)</td>
<td>80.0% (8)</td>
<td>75.0% (30)</td>
<td>80.0% (16)</td>
<td>85.4% (351)</td>
<td>88.5% (284)</td>
<td>86.0% (724)</td>
</tr>
<tr>
<td>No Response</td>
<td>6.0% (2)</td>
<td>2.2% (9)</td>
<td>1.6% (5)</td>
<td>1.9% (16)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (40)</td>
<td>100% (10)</td>
<td>100% (40)</td>
<td>100% (20)</td>
<td>100% (411)</td>
<td>100% (321)</td>
<td>100% (842)</td>
</tr>
</tbody>
</table>

n=842; $\chi^2 = 13.3; df=15; Significance level = 0.58

Table 19: Adequacy of Funding (weighted data)

A significance level of greater than 0.05 indicates that there is no difference among the column percentages, which represent the percentage of each physician category that provided that
particular response. Therefore, all physicians are consistent in their views on the adequacy – or inadequacy – of funding, regardless of location or type of practice.

Relative Fund Allocations for Least Well-Funded Areas

When physicians were asked to identify the least funded areas in their regions, the following resulted:

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital/Acute Care</td>
<td>567</td>
<td>71.1%</td>
</tr>
<tr>
<td>Long Term Care</td>
<td>383</td>
<td>48.0%</td>
</tr>
<tr>
<td>Capital Construction</td>
<td>160</td>
<td>20.1%</td>
</tr>
<tr>
<td>Capital Diagnostic Equipment</td>
<td>281</td>
<td>35.2%</td>
</tr>
<tr>
<td>Community Based Services</td>
<td>171</td>
<td>21.4%</td>
</tr>
<tr>
<td>Home Care</td>
<td>183</td>
<td>22.9%</td>
</tr>
<tr>
<td>Preventative Services</td>
<td>140</td>
<td>17.5%</td>
</tr>
<tr>
<td><strong>Total Responses</strong></td>
<td><strong>1885</strong></td>
<td></td>
</tr>
</tbody>
</table>

Note: Total % of cases (236.2%) exceeds 100% since multiple responses were permitted
43 missing cases; 798 valid cases

Table 20: Frequency of Responses for Least Well-Funded Areas

Note: In answering this question, a number of physicians did not limit themselves to choosing only 2 least-funded areas, but rather provided a relative ranking for all of the listed areas of health care. All data was included in the analysis.

As Table 20 shows, Hospital/Acute care funding was by far the most commonly identified least well-funded area of health care, followed by Long Term care and Capital Diagnostic Equipment. 71.1% of all cases, or respondents, chose Hospital Acute Care as one of the least well-funded areas of health care in their region.

Physicians were also asked to rank the relative level of funding in their region for their selected least well-funded areas, choosing from Better, About the Same, or Worse.

Rank: Better
There were 52 cases, or 6% of respondents, who chose the “Better” ranking for at least one of the options listed. The most chosen service was Community Based Services, which was chosen
by 17, or 32.7%, of those who chose “Better” as a ranking. An alternative wording would be that if a physician were to choose “Better” as a ranking, his/her most likely choice would be Community Based Services.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital/Acute Care</td>
<td>10</td>
<td>19.2%</td>
</tr>
<tr>
<td>Long Term Care</td>
<td>15</td>
<td>28.8%</td>
</tr>
<tr>
<td>Capital Construction</td>
<td>12</td>
<td>23.1%</td>
</tr>
<tr>
<td>Capital Diagnostic Equipment</td>
<td>8</td>
<td>15.4%</td>
</tr>
<tr>
<td>Community Based Services</td>
<td>17</td>
<td>32.7%</td>
</tr>
<tr>
<td>Home Care</td>
<td>14</td>
<td>26.9%</td>
</tr>
<tr>
<td>Preventative Services</td>
<td>6</td>
<td>11.5%</td>
</tr>
<tr>
<td><strong>Total Responses</strong></td>
<td><strong>82</strong></td>
<td></td>
</tr>
</tbody>
</table>

Note: Total % of cases (157.7%) exceeds 100% since multiple responses were permitted
789 missing cases; 52 valid cases

Table 21: “Better” Relative Ranking of Least Well-Funded Areas

Rank: About the Same
There were 424 cases, or respondents, who chose the “About the Same” ranking for at least one of the options listed. 48.1%, or 204, of those who chose “About the Same” as a ranking, chose it for Hospital/Acute care. The second most chosen option was Long Term care, indicated by 41% of the valid respondents.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital/Acute Care</td>
<td>204</td>
<td>48.1%</td>
</tr>
<tr>
<td>Long Term Care</td>
<td>174</td>
<td>41.0%</td>
</tr>
<tr>
<td>Capital Construction</td>
<td>62</td>
<td>14.6%</td>
</tr>
<tr>
<td>Capital Diagnostic Equipment</td>
<td>102</td>
<td>24.1%</td>
</tr>
<tr>
<td>Community Based Services</td>
<td>84</td>
<td>19.8%</td>
</tr>
<tr>
<td>Home Care</td>
<td>91</td>
<td>21.5%</td>
</tr>
<tr>
<td>Preventative Services</td>
<td>84</td>
<td>19.8%</td>
</tr>
<tr>
<td><strong>Total Responses</strong></td>
<td><strong>801</strong></td>
<td></td>
</tr>
</tbody>
</table>

Note: Total % of cases (188.9%) exceeds 100% since multiple responses were permitted
417 missing cases; 424 valid cases

Table 22: “About the Same” Relative Ranking of Least Well-Funded Areas
Rank: Worse

There were 526 cases, or respondents, who chose the “Worse” ranking for at least one of the options listed. 64.3%, or 338, of all those who chose “Worse” as a ranking for at least one option, chose it for Hospital/Acute care. The second most chosen option was Long Term care, indicated by 35.4% of the cases. Therefore, if a physician were to choose “Worse” as a ranking, the most likely choice would be Hospital/Acute care.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital/Acute Care</td>
<td>338</td>
<td>64.3%</td>
</tr>
<tr>
<td>Long Term Care</td>
<td>186</td>
<td>35.4%</td>
</tr>
<tr>
<td>Capital Construction</td>
<td>81</td>
<td>15.4%</td>
</tr>
<tr>
<td>Capital Diagnostic Equipment</td>
<td>166</td>
<td>31.6%</td>
</tr>
<tr>
<td>Community Based Services</td>
<td>59</td>
<td>11.2%</td>
</tr>
<tr>
<td>Home Care</td>
<td>75</td>
<td>14.3%</td>
</tr>
<tr>
<td>Preventative Services</td>
<td>47</td>
<td>8.9%</td>
</tr>
<tr>
<td>Total Responses</td>
<td>952</td>
<td></td>
</tr>
</tbody>
</table>

Note: Total % of cases (181.0%) exceeds 100% since multiple responses were permitted
315 missing cases; 526 valid cases

Table 23: “Worse” Relative Ranking of Least Well-Funded Areas

Summary – Physician Opinion on Current Funding Model

- The majority (58.3%) of physicians do not believe that funding is distributed equitably in amongst the regions in BC. Surprisingly few physicians overall (less than 8%) believe that funding is distributed equitably. However, the distribution of responses were significantly different between:

  ➔ Rural and Non-urban/Urban physicians: rural physicians are more likely to respond that funding is not equitably distributed compared to urban or non-urban physicians

- An overwhelming majority of physicians (86%) believe that their region is poorly funded to supply the health services under their jurisdiction.
- The most commonly identified least well funded area is hospital/acute care, chosen by 71.1% of respondents, followed by Long Term care, chosen by 48% of respondents. Relative ranking of the level of funding in a physician's region produced the following results:
  - *Better*: 6% of physicians state that funding in at least one area is “Better”, relative to other regions. The most commonly chosen service is Community Based Services.
  - *About the Same*: 50% of physicians state that funding in at least one area is “About the Same”, relative to other regions. The most commonly chosen service is Hospital/Acute Care, followed by Long Term Care.
  - *Worse*: 63% of physicians state that funding in at least one area is “Worse”, relative to other regions. Again, the most commonly chosen service is Hospital/Acute Care, followed by Long Term Care.

### 4.2.3 Population Needs-Based Funding Model Opinion

The second section of the survey was designed to gather physician opinion on the proposed population needs-based funding model as well as their opinion on remuneration methods and administration.

**Awareness Level**

First, physicians were asked about their awareness level of the model under development. A chi-squared test shows that there are no differences in responses based on the type and practice location of a physician. Again, these are not actual counts, but rather weighted cases to ensure representation of the BCMA membership population.

Approximately 6 out of 10 physicians were not aware that this model is currently under consideration, while only 1 out of 20 were highly aware, prior to receiving this survey.
Table 24: Awareness Level (weighted data)

Regional Health Board Ability

Physicians were also asked to provide an opinion on their current Regional Health Board's ability to effectively manage the delivery of health services.

<table>
<thead>
<tr>
<th>Awareness Level</th>
<th>Rural GP</th>
<th>Rural Specialist</th>
<th>Non-Urban GP</th>
<th>Non-Urban Specialist</th>
<th>Urban GP</th>
<th>Urban Specialist</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Aware</td>
<td>4.9% (2)</td>
<td>10.0% (1)</td>
<td>5.3% (2)</td>
<td>5.0% (1)</td>
<td>7.3% (30)</td>
<td>5.3% (17)</td>
<td>6.3% (53)</td>
</tr>
<tr>
<td>Somewhat Aware</td>
<td>39.0% (16)</td>
<td>40.0% (4)</td>
<td>36.8% (14)</td>
<td>30.0% (6)</td>
<td>34.3% (141)</td>
<td>33.0% (106)</td>
<td>34.1% (287)</td>
</tr>
<tr>
<td>Not Aware</td>
<td>56.1% (23)</td>
<td>50.0% (5)</td>
<td>57.9% (22)</td>
<td>65.0% (13)</td>
<td>58.4% (240)</td>
<td>61.7% (198)</td>
<td>59.6% (501)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (41)</td>
<td>100% (10)</td>
<td>100% (38)</td>
<td>100% (20)</td>
<td>100% (411)</td>
<td>100% (321)</td>
<td>100% (841)</td>
</tr>
</tbody>
</table>

n=841; $\chi^2 = 3.01$; df=10; Significance level = 0.98

Table 25: Regional Health Board Ability (weighted data)

The use of weighted cases allows the responses to better mimic the BC Medical Association membership population distribution.

However, comparison of responses by rural and non-urban physicians indicated a significant difference of opinion. Urban physicians are less likely to have confidence in the capabilities of their current Regional Health Boards, compared to their rural colleagues. Conversely, rural physicians are more likely to rate the Regional Health Boards as "Extremely capable" or "Capable", compared to their urban colleagues.
Effect of Regional Health Authority granted full decision-making powers

Physicians were asked to comment on the how they thought the situation might change (choosing from better, worse, no difference) if the Regional Health Authority was granted full decision-making power over fund allocations within their region.

Response: Better
Of the sample size of 841 physicians, 361 ranked at least one area as likely to get better, if the Regional Health Authorities gain control over fund allocations in their region. The most commonly ranked as likely to get better is physician involvement in decision making, chosen by 64.8% of the valid cases. This means that 64.8% of those who chose “Better” for one or more of the areas chose better for physician involvement in decision-making.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal pay for equal work</td>
<td>94</td>
<td>26.0%</td>
</tr>
<tr>
<td>Ability to negotiate satisfactory working contracts</td>
<td>152</td>
<td>42.1%</td>
</tr>
<tr>
<td>Bed Availability</td>
<td>182</td>
<td>50.4%</td>
</tr>
<tr>
<td>Access to OR facilities</td>
<td>200</td>
<td>55.4%</td>
</tr>
<tr>
<td>Physician involvement in decision making</td>
<td>234</td>
<td>64.8%</td>
</tr>
<tr>
<td>No. of Docs practising in the region</td>
<td>121</td>
<td>33.5%</td>
</tr>
<tr>
<td><strong>Total Responses</strong></td>
<td>983</td>
<td></td>
</tr>
</tbody>
</table>

Note: Total % of cases (272.3%) exceeds 100% since multiple responses were permitted
480 missing cases; 361 valid cases

Table 26: Improved Situation under Regional Health Authority Control

Response: Worse
522 of the responding physicians ranked at least one area where the situation would worsen, in their opinion. The ability to negotiate satisfactory working contracts and conditions was chosen by 73% of those who ranked at least one area as likely to get worse. This means that almost half (45.3%) of all responding physicians believe that this particular area would worsen.\(^\text{13}\)

\(^{13}\) \(\frac{522}{841} \times 62\% \times 0.73 = 45.3\%\)
Table 27: Worsened Situation under Regional Health Authority Control

**Response: No Difference**

Over 70% (596/841) of responding physicians believe that granting the Regional Health Authorities full decision-making power over these areas would make no difference to the situation. The most commonly identified area that would not see any change is equal pay for equal work, identified by 67.4% of valid cases, or physicians who identified at least one area as not likely to change. The next most commonly identified area was with respect to the number of physicians practising in the region, chosen by 62.2% of the valid respondents.

Table 28: No Difference in Situation under Regional Health Authority Control

**Delivery and management of Health Care Services (Excluding Physician payments)**

Physicians were asked to choose which body would be best suited to manage the delivery of health services, and the allocation of health care funds, excluding FFS physician payments.
Over 40% of all respondents are in favour of answer (c), an independent "arm’s length" body, more than double the number of respondents choosing the second most occurring answer. However, there is a statistically significant difference in opinion among physicians, indicated by the significant chi-squared value.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Rural</th>
<th>Non-Urban</th>
<th>Urban</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GP</td>
<td>Specialist</td>
<td>GP</td>
<td>Specialist</td>
</tr>
<tr>
<td>Regional Health Authority</td>
<td>25.6% (11)</td>
<td>10.0% (1)</td>
<td>22.5% (9)</td>
<td>19.0% (4)</td>
</tr>
<tr>
<td>Ministry of Health</td>
<td>14.0% (6)</td>
<td>10.0% (1)</td>
<td>15.0% (6)</td>
<td>19.0% (4)</td>
</tr>
<tr>
<td>Arm’s length body</td>
<td>30.2% (13)</td>
<td>40.0% (4)</td>
<td>37.5% (15)</td>
<td>38.1% (8)</td>
</tr>
<tr>
<td>Other</td>
<td>7.0% (3)</td>
<td>20.0% (2)</td>
<td>5.0% (2)</td>
<td>9.5% (2)</td>
</tr>
<tr>
<td>Not Sure/No Opinion</td>
<td>20.9% (9)</td>
<td>20.0% (2)</td>
<td>15.0% (6)</td>
<td>14.3% (3)</td>
</tr>
<tr>
<td>No Response</td>
<td>2.3% (1)</td>
<td></td>
<td>5.0% (2)</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (43)</td>
<td>100% (10)</td>
<td>100% (40)</td>
<td>100% (21)</td>
</tr>
</tbody>
</table>

n=843; $\chi^2 = 41.6; \text{df} = 25; \text{Significance level} = 0.02$

Table 29: Delivery of Health Care Services Excluding Physician Payments (weighted data)

Using unweighted data, further cross tab analysis shows that the difference in rural and urban response distribution is significant. Rural physicians are more likely to choose Regional Health Authorities, while urban physicians are more likely to choose an independent “arm’s length” body. The results are presented in Table 30.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Rural</th>
<th>Urban</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Health Authority</td>
<td>24.0% (35)</td>
<td>15.6% (72)</td>
<td>17.6% (107)</td>
</tr>
<tr>
<td>Ministry of Health</td>
<td>12.3% (18)</td>
<td>10.6% (49)</td>
<td>11.0% (67)</td>
</tr>
<tr>
<td>Arm’s length body</td>
<td>31.5% (46)</td>
<td>44.7% (207)</td>
<td>41.5% (253)</td>
</tr>
<tr>
<td>Other</td>
<td>10.3% (15)</td>
<td>6.0% (28)</td>
<td>7.1% (43)</td>
</tr>
<tr>
<td>Not Sure/No Opinion</td>
<td>20.5% (30)</td>
<td>18.4% (85)</td>
<td>18.9% (115)</td>
</tr>
<tr>
<td>No Response</td>
<td>1.4% (2)</td>
<td>4.8% (22)</td>
<td>3.9% (24)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (146)</td>
<td>100% (463)</td>
<td>100% (609)</td>
</tr>
</tbody>
</table>

n=609; $\chi^2 = 15.76; \text{df}=5; \text{Significance Level} = 0.008$

Table 30: Rural vs. Urban Physician Opinion – Delivery of Health Care Services, Excluding Physician Payments

Additional analysis revealed a difference in opinion between the urban GPs and specialists, as illustrated in Table 31. Urban GPs are more likely to have no opinion, while urban specialists are more likely to favour the Ministry of Health or Regional Health Authorities.
Table 31: Urban GP vs. Specialist Opinion – Delivery of Health Care Services, Excluding Physician Payments

This question gave physicians the opportunity to choose “Other”, and provide their own suggestions as to who would be best suited, other than the options provided to them. Overall, the “Other” comments revolved around the participation of physicians in the decision making process. The most commonly occurring responses can be summarized as follows:

- Physician Committees – 17 suggestions
  
The suggestions included having physician committees, physician managers, or other health care professionals as the source of decision making. Several of the responses indicated that these representatives must also be local to the area.

- One of the above + physician input – 11 suggestions
  
  These physicians chose one of the given options, under the condition that physician input plays an integral role.

- Local Community Based Authority – 8 suggestions
  
  Under the condition that the decision makers have health care expertise

- Private – 6 suggestions

- BCMA – 4 suggestions

- Elected Regional Health Board – 3 suggestions

Management and Allocation of Physician Payments

Physicians were subsequently asked which body they would prefer to manage and allocate existing physician payments. Overall, answer (d), an independent “arm’s length” body, is the most common response, followed by answer (e), the BCMA, and answer (c), a Tri-Partite
Medical Services Commission, the current body in place. Again, these results are based on weighted data, to ensure the views are representative of the membership population.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Rural GP</th>
<th>Rural Specialist</th>
<th>Non-Urban GP</th>
<th>Non-Urban Specialist</th>
<th>Urban GP</th>
<th>Urban Specialist</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Health Authority</td>
<td>4.9% (2)</td>
<td>10.0% (1)</td>
<td>5.1% (2)</td>
<td>4.8% (1)</td>
<td>1.9% (8)</td>
<td>8.4% (27)</td>
<td>4.9% (41)</td>
</tr>
<tr>
<td>Ministry of Health</td>
<td>9.8% (4)</td>
<td>10.0% (1)</td>
<td>12.8% (5)</td>
<td>19.0% (4)</td>
<td>2.7% (11)</td>
<td>5.9% (19)</td>
<td>5.2% (44)</td>
</tr>
<tr>
<td>Medical Services Commission</td>
<td>22.0% (9)</td>
<td>10.0% (1)</td>
<td>20.5% (8)</td>
<td>19.0% (4)</td>
<td>17.0% (70)</td>
<td>17.1% (55)</td>
<td>17.4% (147)</td>
</tr>
<tr>
<td>Arm’s length body</td>
<td>26.8% (11)</td>
<td>20.0% (2)</td>
<td>25.6% (10)</td>
<td>23.8% (5)</td>
<td>32.6% (134)</td>
<td>37.4% (120)</td>
<td>33.5% (282)</td>
</tr>
<tr>
<td>BC Medical Association</td>
<td>24.4% (10)</td>
<td>20.0% (2)</td>
<td>15.4% (6)</td>
<td>14.3% (3)</td>
<td>25.8% (106)</td>
<td>15.9% (51)</td>
<td>21.1% (178)</td>
</tr>
<tr>
<td>Other</td>
<td>10.0% (1)</td>
<td>2.6% (1)</td>
<td>4.8% (1)</td>
<td>3.4% (14)</td>
<td>3.4% (11)</td>
<td>3.3% (28)</td>
<td></td>
</tr>
<tr>
<td>Not Sure/No Opinion</td>
<td>9.8% (4)</td>
<td>20.0% (2)</td>
<td>12.8% (5)</td>
<td>9.5% (2)</td>
<td>12.7% (52)</td>
<td>7.5% (24)</td>
<td>10.6% (89)</td>
</tr>
<tr>
<td>No Response</td>
<td>2.4% (1)</td>
<td>5.1% (2)</td>
<td>4.8% (1)</td>
<td>3.9% (16)</td>
<td>4.4% (14)</td>
<td>4.0% (34)</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (41)</td>
<td>100% (10)</td>
<td>100% (39)</td>
<td>100% (21)</td>
<td>100% (411)</td>
<td>100% (321)</td>
<td>100% (843)</td>
</tr>
</tbody>
</table>

n=843; χ²=59.7; df=35; Significance level = 0.006

Table 32: Management and Allocation of Physician Payments (weighted data)

Analysis of weighted data reveals that a statistically significant difference is found among physicians. Further analysis of unweighted raw data shows that a statistically significant difference is found between the opinions of non-urban and urban physicians. Urban physicians are more likely to choose an independent “arm’s length” body or the BC Medical Association than their non-urban colleagues, while the non-urban physicians are more likely to choose the Ministry of Health than urban physicians.

As well, the opinions of urban GPs are different from those of urban Specialists. Urban GPs are more likely to favour the BC Medical Association than urban specialists, while urban specialists are more likely to favour the Regional Health Authorities.

This question also gave physicians the opportunity to choose “Other”, and provide their own suggestions as to who would be best suited, other than the options provided to them. The most commonly occurring responses are combinations of the options above, and can be summarized as follows:

- BCMA and Ministry of Health – 3 suggestions
- BCMA and Independent Arm’s Length Body – 2 suggestions
- Tri-partite Medical Services Commission and Independent Arm’s Length Body – 2 suggestions
Physician FFS payments as RHA responsibilities

When asked if physician fee-for-service payments should be included as part of the direct financial and administrative responsibilities of Regional Health Authorities, the majority (75%) of responding physicians disagree to some degree. This view is representative of the BC Medical Association membership population.

Overall, physician opinion on this question is consistent across all physician practice locations and types.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Rural GP</th>
<th>Non-Urban GP</th>
<th>Urban GP</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specialist</td>
<td>GP</td>
<td>Specialist</td>
<td>GP</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>4.8% (2)</td>
<td>0.7% (3)</td>
<td>2.5% (8)</td>
<td>1.5% (13)</td>
</tr>
<tr>
<td>Agree</td>
<td>7.1% (3)</td>
<td>2.6% (1)</td>
<td>10.0% (2)</td>
<td>8.5% (35)</td>
</tr>
<tr>
<td>Neutral</td>
<td>7.1% (3)</td>
<td>5.3% (2)</td>
<td>5.0% (1)</td>
<td>12.7% (52)</td>
</tr>
<tr>
<td>Disagree</td>
<td>31.0% (13)</td>
<td>34.2% (13)</td>
<td>25.0% (5)</td>
<td>27.0% (111)</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>47.6% (20)</td>
<td>55.3% (21)</td>
<td>55.0% (11)</td>
<td>47.0% (193)</td>
</tr>
<tr>
<td>No Response</td>
<td>2.4% (1)</td>
<td>2.6% (1)</td>
<td>5.0% (1)</td>
<td>4.1% (17)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (42)</td>
<td>100% (38)</td>
<td>100% (20)</td>
<td>100% (411)</td>
</tr>
</tbody>
</table>

n=840; χ²=32.6; df=25; Significance level = 0.14

Table 33: Physician Payments as Regional Responsibility (weighted data)

Further cross tab analysis with unweighted data shows that non-urban GP opinion is different from urban GP opinion. Non-urban GPs are more likely to disagree with the concept than urban GPs, as seen in Table 34.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Non-urban GP</th>
<th>Urban GP</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>0.7% (1)</td>
<td>0.8% (2)</td>
<td>0.8% (3)</td>
</tr>
<tr>
<td>Agree</td>
<td>3.3% (5)</td>
<td>8.8% (22)</td>
<td>6.8% (27)</td>
</tr>
<tr>
<td>Neutral</td>
<td>6.0% (9)</td>
<td>13.3% (33)</td>
<td>10.5% (42)</td>
</tr>
<tr>
<td>Disagree</td>
<td>34.7% (52)</td>
<td>28.1% (70)</td>
<td>30.6% (122)</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>55.3% (83)</td>
<td>49.0% (122)</td>
<td>51.4% (205)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (150)</td>
<td>100% (249)</td>
<td>100% (399)</td>
</tr>
</tbody>
</table>

n=399; χ²=10.9; df=4; Significance level = 0.027

Table 34: Non-urban vs. Urban GP Opinion on Physician Payments as Regional Responsibility
Types of physician payments as Regional Health Authority responsibility

When asked to indicate which physician payments should be included as part of the direct financial and administrative responsibilities of the Regional Health Authorities, the responses are summarized in Table 35. Note that physicians were encouraged to check as many as apply, thus explaining the total number of responses exceeding the 818 valid cases. (Note: in this example a respondent, or case, is valid if they checked at least one of the options. 23 respondents did not choose any of the options.)

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>All payments</td>
<td>72</td>
<td>8.8%</td>
</tr>
<tr>
<td>Only Fee-for-service payments</td>
<td>5</td>
<td>0.6%</td>
</tr>
<tr>
<td>Only Alternate payment contracts</td>
<td>138</td>
<td>16.9%</td>
</tr>
<tr>
<td>Only on-call payments</td>
<td>147</td>
<td>18.0%</td>
</tr>
<tr>
<td>Alternate and on-call payments</td>
<td>344</td>
<td>42.1%</td>
</tr>
<tr>
<td>None of the above</td>
<td>181</td>
<td>22.1%</td>
</tr>
<tr>
<td>Not sure/No opinion</td>
<td>57</td>
<td>7.0%</td>
</tr>
<tr>
<td>Total Responses</td>
<td>944</td>
<td></td>
</tr>
</tbody>
</table>

Note: Total % of cases (115.4%) exceeds 100% since multiple responses were permitted
23 missing cases; 818 valid cases

Table 35: Types of Physician Payments as Regional Health Authority Responsibility

The most commonly chosen option is “Alternate payment contracts and on-call payments”, chosen by 42.1% of the 818 valid respondents. This option was substantially more popular than the next most frequently chosen option, “None of the above”. Worthy of note is the relatively extremely low percent of cases who chose Fee-for-service, at only 0.6% of cases.

Preferred Means of Remuneration

Physicians were asked to provide information on their preferred method of remuneration. Over half of responding physicians prefer the current method, fee-for-service. Also worthy of note is the extremely low number of responses in favour of capitation (Less than 1%). These findings are representative of the opinions of the BC Medical Association membership population.
The result of the chi-squared test with unweighted data shows that the opinions on remuneration method do not vary across physician location or practice type.

Further analysis was performed to determine if preferences varied by the age of the physician, where the number of years practising served as a proxy for age. The results are the same – the age of the practitioner does not affect his/her preference for fee-for-service (see Table 37).

This question also gave physicians the opportunity to choose “Other”, and provide their own suggestions as to their favoured method of remuneration, other than the options provided to them. 10% of responding physician chose this option, and their responses can be summarized as follows:

- Salary, with Benefits – 34 suggestions
- Fee-for-service combinations – 42 suggestions in total
Many responses were based on a combination of fee-for-service and other payment mechanisms:

- Fee-for-service and on-call payments – 14 suggestions
- Fee-for-service and contract – 10 suggestions
- Fee-for-service and sessional payments – 7 suggestions
- Other blended approaches – 7 suggestions
- Fee-for-service and salary – 4 suggestions

- Incentive pay based on quality of care delivered, size of practice, etc. – 6 suggestions
- Patient – 5 suggestions
- Private Funding – 4 suggestions

Hence, the most common suggestions by physicians focused on salary-based remuneration, and blended approaches other than fee-for-service and capitation.

**Interest level in alternate payment mechanisms**

When asked to express their interest level in pursuing physician payment mechanisms other than fee-for-service, physicians are split almost evenly three ways, as seen in Table 38. This result is interesting, since in the previous question, over 50% of physicians stated that they would prefer fee-for-service. This shows that although physicians prefer fee-for-service, this does not mean they are unwilling to explore alternate payment options. Cross tab analysis with both weighted and unweighted data indicated that the responses are independent of the practice type or location of the physician.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Rural GP</th>
<th>Rural Specialist</th>
<th>Non-Urban GP</th>
<th>Non-Urban Specialist</th>
<th>Urban GP</th>
<th>Urban Specialist</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Interested</td>
<td>34.1% (14)</td>
<td>20.0% (2)</td>
<td>27.5% (11)</td>
<td>35.0% (7)</td>
<td>32.4% (133)</td>
<td>34.0% (109)</td>
<td>32.7% (276)</td>
</tr>
<tr>
<td>Neutral</td>
<td>34.1% (14)</td>
<td>30.0% (3)</td>
<td>42.5% (17)</td>
<td>30.0% (6)</td>
<td>38.0% (156)</td>
<td>34.0% (109)</td>
<td>36.2% (305)</td>
</tr>
<tr>
<td>Not Interested</td>
<td>31.7% (13)</td>
<td>50.0% (5)</td>
<td>27.5% (11)</td>
<td>35.0% (7)</td>
<td>29.2% (120)</td>
<td>32.1% (103)</td>
<td>30.7% (259)</td>
</tr>
<tr>
<td>No Response</td>
<td>2.5% (1)</td>
<td>0.5% (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.4% (3)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (41)</td>
<td>100% (10)</td>
<td>100% (40)</td>
<td>100% (20)</td>
<td>100% (411)</td>
<td>100% (321)</td>
<td>100% (843)</td>
</tr>
</tbody>
</table>

n=843; χ²=11.4; df=15; Significance level = 0.72

Table 38: Interest in Alternate Payment Mechanisms
Region-specific fee schedules

Physicians were asked to provide their opinion on the idea of developing region-specific fee schedules, for fee-for-service payments. As Table 39 shows, the results are varied – while 58% of all physicians oppose the idea to some degree, almost 25% support the idea. A chi-squared test using weighted data confirms that opinions vary in the BC Medical Association membership based on physician practice type and location.

<table>
<thead>
<tr>
<th>Column % (Count)</th>
<th>Rural</th>
<th>Non-Urban</th>
<th>Urban</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GP</td>
<td>Specialist</td>
<td>GP</td>
<td>Specialist</td>
</tr>
<tr>
<td>Strongly Support</td>
<td>12.2% (5)</td>
<td>10.0% (1)</td>
<td>10.3% (4)</td>
<td>10.0% (2)</td>
</tr>
<tr>
<td>Somewhat Support</td>
<td>26.8% (11)</td>
<td>10.0% (1)</td>
<td>28.2% (11)</td>
<td>25.0% (5)</td>
</tr>
<tr>
<td>Neutral</td>
<td>14.6% (6)</td>
<td>20.0% (2)</td>
<td>15.4% (6)</td>
<td>10.0% (2)</td>
</tr>
<tr>
<td>Somewhat Oppose</td>
<td>17.1% (7)</td>
<td>10.0% (1)</td>
<td>17.9% (7)</td>
<td>20.0% (4)</td>
</tr>
<tr>
<td>Strongly Oppose</td>
<td>29.3% (12)</td>
<td>40.0% (4)</td>
<td>28.2% (11)</td>
<td>35.0% (7)</td>
</tr>
<tr>
<td>No Response</td>
<td>10.0% (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>100% (41)</td>
<td>100% (10)</td>
<td>100% (39)</td>
<td>100% (20)</td>
</tr>
</tbody>
</table>

\( n=843; \chi^2=48.7; \text{df}=25; \text{Significance level}=0.003 \)

Table 39: Region-Specific Fee Schedules (weighted data)

Using unweighted data and cross tab analysis, it is confirmed that the opinion of urban physicians is different from rural and non-urban physicians. Urban physicians are more likely to somewhat or strongly oppose the idea, compared to rural and non-urban physicians. Non-urban and rural physicians are more likely to somewhat or strongly support the idea compared to urban physicians.

Meanwhile, the opinions of urban GPs are different from the opinions of urban Specialists, where Specialists are more likely to strongly oppose the idea.

Summary – Physician Opinion on Population Needs-Based Funding Model

- Approximately 60% of physicians were unaware that this model is currently under consideration
- Almost 70% of physicians rate their current Regional Health Board as incapable to some degree at effectively managing the delivery of health care services. Urban physicians are
more likely to have less confidence in the capabilities of their current Regional Health Boards.

- If Regional Health Authorities are granted control over fund allocations in their region, physicians believe the following would occur:
  - 43% believe at least one of the listed matters would improve; 64.8% chose physician involvement in decision-making
  - 62% believe at least one of the listed matters would worsen; 73% chose the ability to negotiate satisfactory working contracts and conditions
  - 71% believe there would be no difference in at least one of the listed matters; 67.4% chose equal pay for equal work

- Overall, the favoured body to manage the delivery of health services and the allocation of health care funds (excluding fee-for-service physician payments) is an independent "arm's length" body, chosen by 43.5% of respondents. However, the distribution of responses are significantly different between:
  - Rural and Urban Physicians: rural physicians favour the Regional Health Authorities, while urban physicians favour an independent "arm's length" body.
  - Urban GPs and Urban Specialists: the GPs are more likely to have no opinion, while the specialists are more likely to favour the Regional Health Authority or the Ministry of Health.

- Overall, the favoured body to manage and allocate existing physician payments is an independent "arm's length" body, chosen by 33.5% of respondents. The second most popular response is the BC Medical Association, with 21.1% in favour. However, the distribution of responses are significantly different between:
  - Urban and non-urban physicians: urban physicians are more likely to choose an independent "arm's length" body or the BC Medical Association, while non-urban physicians are more likely to favour the Ministry of Health.
  - Urban GPs and Urban Specialists: the GPs are more likely to favour the BC Medical Association, while the specialists are more likely to favour the Regional Health Authorities.
• The majority (75%) of physicians disagree with the concept of including physician fee-for-service payments as part of the direct financial and administrative responsibilities of the Regional Health Authorities.

• When asked which payment(s) should be part of the direct financial and administrative responsibilities of the Regional Health Authorities, alternate payment contracts and on-call payments are the most frequently chosen option, chosen by 42% of respondents.

• Overall, fee-for-service is preferred by the majority (51.6%) of physicians as the method of remuneration. However, a number of physicians chose “Other”, and expressed interest in a salaried, with benefits, payment option. Less than 1% chose Capitation.

• Interest in pursuing alternate payment mechanisms is split evenly three ways, among very interested (32.7%), neutral (36.2%) and not interested (30.7%).

• The majority of physicians (58%) oppose, to some degree, the idea of region-specific fee schedules. However, the distribution of responses are significantly different between:
  → Rural/non-urban and urban physicians: Rural and non-urban physicians are more likely to somewhat or strongly support the idea compared to the opinions of urban physicians.
  → Urban GPs and Urban Specialists: Urban Specialists are more likely to strongly oppose the idea, compared to the opinions of the urban GPs.

4.2.4 COMMENTS SUMMARY

Physicians had the opportunity to provide any further comments on the survey topic. Numerous physicians shared their thoughts on the potential implementation of the PNBF model, and the impact it will have on their particular region, patients and practice. Most comments shared a pessimistic tone with regards to the proposed funding model and its implementation. The comments received can be summarized as follows:
- **Local Politics create negative influence**
  - Shifts focus away from patients
  - Restricts global vision of medical services delivery
  - Service availability vulnerable to local politically charged environment
  - Current situation is political infighting in rural regions

- **System is already plagued by bureaucracy**
  - Two-level system will further restrain access and accountability
  - More administration means more costs, inefficiencies and delays
  - System is fraught with political compromises that have no relevance to addressing health needs
  - Could lead to further recruitment difficulties in regions

- **Overall dissatisfaction with Regional Health Boards**
  - Little or no health care expertise
  - Biased government appointment process
  - Little to no trust in abilities
  - No vision
  - Driven by personal and political agendas
  - Accountability must be introduced
  - Very uncomfortable with idea of regional control over remuneration

- **Regionalization will encourage unhealthy competition among regions**
  - Lack of uniform health care delivery standards across province
  - May result in inter- and intra-regional competition among hospitals and physicians
  - Regional disparities in physician remuneration will be disruptive
  - Destructive to health care service delivery and patients

- **Concern over loss of united physician voice**
  - Negotiations must occur at provincial, not regional level
  - Jeopardize BCMA collective bargaining ability and influence
  - Region specific fee schedules will lead to discord in profession
• Diminished physician voice if regions administer payments
• Government’s attempt to divide and conquer physicians

**Local input is necessary in regional decision making**
• Remote communities fear loss of voice on Regional Health Board
• Require decision making ability at hospital level
• Plan must be sensitive to needs of each hospital and community
• Some flexibility to remunerate physicians based on regional needs

**More flexibility with alternate payment options at regional level**
• Options to fee-for-service would be preferred by some physicians
• Current FFS schedule unfairly compensates certain services

**Concern over implementation and development process**
• No clear goal defined
• Model should be tested before implementation and provide evidence of its performance
• Concern over accuracy of data available to Ministry

Less frequent comments focused on the following topics:

**Responsibility deflection from provincial government to regions**
• Responsibility without power
• Provincial government maintains fund control

**Regionalization has not served the province well thus far**
• Excessive administration costs
• Communities try to dominate within region

**Fee differential for walk in clinics vs. office based practice**
• More important to resolve than regional fee schedules
• Dissatisfaction with equal pay for unequal commitment to patient
• **Difficult survey to answer**
  - Inadequate information provided on topic
  - Guesswork answers
  - Inadequate information on other regions or types of physicians
  - Survey results have little validity

• **Fed up/give up**
  - Seriously considering leaving province and/or practice
  - Frustrated with lack of long term planning efforts by government
  - Feelings of apathy

• **BCMA inadequately supporting the physicians**
  - Rural physicians feel poorly represented and their needs unmet
  - Fee schedule negotiations have not adequately dealt with inter-specialty disparity

• **Privatization is the answer**
  - Introduce patient user fees
  - Will result in more efficient system
  - Give patients the choice
  - Need direct consumer responsibility

### 4.2.5 ARRIVAL DISTRIBUTION

Surveys were mailed in to the BC Medical Association, the first received on September 18, 2001, and day 20 is represented by October 17, 2001. The distribution of arrivals is shown below in Figure 3. The follow-up letter was expected to generate a bimodal distribution of survey arrivals, but did not. The follow-up letter was mailed and e-mailed on October 2 and 3, 2001 (days 11 and 12, indicated by arrow) allowing ample time for response by October 17, 2001. Therefore, the follow-up letter was not as effective as expected, and could likely be excluded in future surveys.
Figure 3: Distribution of Survey Arrivals
5. REGIONALIZATION OF MEDICAL SERVICE PLAN
BUDGET

5.1 INTRODUCTION

Although there are no immediate plans to decentralize the Medical Services Plan budget, it has been proposed for incorporation in further model developments.

The current fee-for-service based compensation system is challenging for the government to manage, since it is impossible to exactly predict and contain physician expenditures for budgeting purposes. The solution in the past has been to pro rate payments, which strains the relationship between the government and physicians.

The Ministry of Health has stated that since physicians largely drive hospital utilization activity, continued central control of the Medical Services Plan budget is likely to constrain the Regional Health Boards' ability to manage resources over the long run. (Prov. of BC, 1996, p. iv) As well, the BC Health Association (or now the HABC) has explicitly and specifically called for the inclusion of MSP in a regional funding model, to ensure the success of a decentralized health service delivery system. (BCHA, 1995, p. 9)

The Ministry of Health and the Regional Health Authorities ultimately would like to include the MSP budget for two main reasons: Flexibility and Control. They would gain the flexibility to ensure physician services in given locations, or even to institute substitute practitioners, such as nurse practitioners. They would also gain control over an independent, yet critical, component in the regional delivery of health care.

However, to date, no other province operating under a population-based funding formula has included physician services. The tradition of provincially negotiated physician remuneration has been maintained throughout Canada.
5.2 Background

The Canadian Medical Association's policy on physician compensation includes (CMA, 2001):

- A physician must maintain the right to choose his or her method of payment.
- Funding for physicians, as per negotiations with the provincial government, should be reserved for physicians, regardless of whether channelled through an agency.
- All physicians have the right to formal representation in negotiations.

As well, the Canada Health Act (section 12.1) states that physicians are to be paid reasonable remuneration, as per the provincial health insurance plan, for providing insured medical services to the public (Government of Canada, 2001).

Although none of the above statements directly prohibit or condemn the regionalization of the MSP budget, it is clear that fairness in compensation for physician services is recognized as an important component of the health care system.

5.3 Scenario Analysis

If the MSP budget were regionalized, this would imply greater regional influence in negotiations. The spectrum of involvement in negotiations varies from the current process, where physicians are not tied to regions at all, to a process where regions negotiate physician contracts and fee schedules, independent of the same negotiations in other regions. A middle ground could involve regional remuneration negotiations, but under the structure of a provincial template. However, for the regions to achieve their objectives of flexibility and control, it is reasonable to assume that their preferred option would be to negotiate at a regional level, without the restrictions of a provincial template. As a result, all further discussion on this topic is based on this assumption.
The first component of the new system would be the allocation of funds to the regions to reimburse their physicians for their services. The second component would be determining the method by which physicians are reimbursed by their regions.

5.3.1 AGGREGATE FUND ALLOCATION TO REGIONS

Allocation could be based on historical spending patterns, the BC PNBF model, either on a proportional or regional population-based formula, or the application of the ACG methodology.

5.3.1.1 HISTORICAL SPENDING PATTERNS

The MSP budget could be allocated based on the historical regional spending patterns of residents on physician services. Various forecasting techniques could be applied, varying in sophistication from moving average to exponential smoothing to ARIMA modeling. It is likely that the regional forecasts would actually serve as proportional allocations, if the disaggregate regional forecasts sum to be greater than the aggregate funds available.

This analysis was not possible due to the late arrival of the required data, and is reserved as future work.

5.3.1.2 MODEL-BASED ALLOCATION

Using the model as a basis for allocation, there are at least two ways in which the MSP budget could be regionalized: 1) based on the proportional needs of the region using the Expected Work Load calculation, or 2) based on the regional population-based formula.

1) Relative need allocation based on Expected Work Load (EWL)

The model allocates funds according to the region’s relative need – the same methodology can be applied to the MSP budget. Since expected workloads are calculated based on RIWs, which supposedly represent resource requirements including physicians, it is reasonable to assume that the RIWs for a region or their EWL will also be proportional to the cost of providing physician services to their residents. EWL is a proxy for physician service needs, and therefore can, in theory, be applied to allocate funds to the regions.
Analysis

A comparative study was undertaken to determine if a difference exists between the current distribution of physician fee-for-service payments by patient LHA and the EWL distribution of physician funds according to the model. Therefore, the analysis was completely based on the residence of the patient, regardless of the location of practice of the physician or the location of service delivery.

Aggregate FFS payments in a given fiscal year were determined for each RHA and CHSS. All data was retrieved from Medical Service Plan claims files. Note that physician fee-for-service monies spent where the patient’s residence was in the Nisga’a Health Authority, out-of-province, or unknown were removed from the analysis.

![Figure 4: Actual vs. Expected Workload FFS Allocations per Region for 2000/2001](image)

As Figure 4 illustrates, the percentage of actual FFS payments distributed is similar to the EWL estimates per region, verifying the existence of a proportional relationship.
However, the percentage differences are substantial enough in some regions to restrain the ability of this methodology to accurately and adequately distribute the Available Amount. For example, in Figure 4, for the Capital Health Region, the actual expenditures are 1.27% higher than the EWL would have allocated in the 200/2001 fiscal year. This represents over $19 Million in additional funding that would be required to the Capital region to meet the physician service requirements of its residents.¹⁴

This may also be a preliminary indication that the model is under-allocating acute care dollars to the Capital Health Region, since the 2000/2001 EWL is lower than the physician fee-for-service requirements during the 98/99, 99/00 and 00/01 fiscal years.

2) Allocation based on Population Characteristics

An alternate method of determining allocations to the regions is based on the same methodology as the model – based on the quantity and characteristics of a region’s residents. Unfortunately, such patient-specific payment data (with age, gender and SES codes) is only available through application to the Ministry of Health for use in research purposes. However, due to unexpected delays in the Ministry of Health, the required data was not received prior to completion of this report. Therefore, this analysis is left as future work.

Analysis

Upon access to the required data, the analysis would follow the same format as the determination of relative need in the model based on utilization data. A provincial average physician payment per each of the 152 segments would be calculated and applied to the residents of each region, based on the previous population distributions. Regions would then be allocated their relative share of physician funding. The distribution of this allocation would be compared to the current actual distribution of physician payments by residents’ region.

¹⁴ 1.27% of $1,548,957,341.89 = $19,738,576.45
5.3.1.3 ACG Based Allocation

Recent studies have verified the validity of applying the Adjusted Clinical Groups methodology in predicting physician expenditures in British Columbia (Reid, MacWilliam et al., 2001). Upon assigning ACGs to individual patient records, a linear regression model was used to determine the ability of the ACGs to explain the variation in individual physician expenditures. The resulting model (using ACGs assigned in the same year as the costs incurred) performed reasonably well, with an Adjusted $R^2$ of 0.467, over all age groups in BC (Ibid, p. 91). The regression model did not perform as well when predicting prospective, or next year, physician costs, with an Adjusted $R^2$ of 0.226 over all age groups in BC (Ibid, p. 91).

Therefore, the application of ACGs to predict physician expenditures by a given population appears to be quite practical, given the success of the past models. The advantage of this methodology over the others discussed is the direct relationship between fund allocation and patient needs.

There are concerns associated with the implementation of any of these allocation methodologies. For example, since the funds are allocated to the region of residence of the patient, how would funds be allocated to compensate physicians treating patients from outside of the region? An interregional adjustment, similar to the concept applied in the BC PNBF model, would be required. As well, inherent to these fund allocation methodologies is the creation of winners and losers among physicians. The approximate per capita funding available per physician will be reflective of the population to physician ratio in the region. Therefore, a physician’s ability to make money is directly related to the number of other physicians, or competition in the area. Such restrictions do not directly exist under the current physician remuneration system.

5.3.2 Regional Distribution to Physicians

The subsequent distribution of funds to physicians could take a variety of forms, each with their advantages and disadvantages. The methods that will be examined include regional fee schedules, contracts (salary based), and capitation, including partial capitation (blend of FFS and capitation).
Regional Fee Schedules

Advantages

- Physicians, as determined by the physician survey analysis, favour the current system. Over 50% prefer fee-for-service as the means of compensation, and over 58% oppose the idea of region-specific fee schedules, implying support for a provincially negotiated fee schedule.
- Financially rewarding to physicians who are hard working and efficient.
- Professional autonomy maintained

Disadvantages

- The current system does not parallel the decentralized thinking of the HABC or Ministry of Health – this may continue to lead to conflict between these parties and the BC Medical Association.
- It is possible for fee-for-service billing to exceed the Available Amount. This reduces the government’s ability to control precise expenditures for a given time frame.
- There is the potential for over-servicing of patients.
- There is no direct incentive to encourage/promote wellness.
- Physicians are not reimbursed for administration time if surgery is cancelled. Similarly, shortages in other areas of the health care system such as nursing shortages reduce billing opportunities.

There are additional administration requirements if a Regional Health Authority was to manage fee-for-service, including:

- Method to determine fees, including negotiations;
- Processing of claims;
- Monitoring physicians for over billing.

Contracts (salary-based)

An alternative way in which the regions could deliver funds to physicians is via contracts.
Advantages

- As noted in the physician survey, there was a noteworthy level of interest in a salary-based system - 14% of respondents chose it as their preferred means of remuneration. The majority of physicians who chose another preferred means of remuneration (34 respondents) expressed their interest in a salary-based system.
- Provides physicians with a secure and predictable income
- Salary/contract compensation systems provide administrators with fixed expenses for a fiscal year, which is important in budget planning.

Disadvantages

- Physicians will have no incentive to work beyond the hours paid by their contract, unless stipulations are made to accommodate overtime hours. As a result, patients may be more limited in their ability to access physician services. Or, physicians may increase their referral levels.
- Contract details are generally negotiated on a contract-by-contract basis. If this were the case for physicians, and each exercised their right to representation, the BCMA would need to substantially increase its Negotiations staff in order to provide this service.

Capitation

The use of a capitated system for physician remuneration in Canada is considered by some to be the best alternative to controlling costs, while encouraging physicians to promote good health among their patients. Capitation, a population-based compensation system where each physician is paid per individual patient registered with their practice for continuing care, has been used in numerous countries, including the United Kingdom and the United States. In fact, a pilot project is currently under way in BC, where several primary care practices are operating under a capitated payment structure.

Capitation is seldom used as the sole source of remuneration – it is generally accompanied by fee-for-service payments in some form. For example, applying capitation to physicians at a regional level could include only primary care physician groups, or only designated services while specialty and/or on-call services remained as fee-for-service.
The physician survey provided some insight into physician opinion on capitation. While less than 1% of responding physicians chose capitation as favoured basis of remuneration, almost 18% selected a blended FFS/Capitation approach.

Some of the advantages and disadvantages of a capitation based remuneration system are outlined below:

Advantages (Hurley et al., 1999)
- Greater incentive to produce and use services efficiently to restore and prevent deterioration of health of participants
- Greater accuracy in predicting spending. As well, conceptually would provide greater cost control over time, since growth in population will control the growth in expenditures

Disadvantages (Ibid)
- Incentive to under provide services
- Potential to engage in risk selection (turn away those patients with greater health care needs)
- Generally requires the rostering of patients, which may be perceived as too restrictive and therefore, unacceptable to Canadians. As well, the freedom of choice of physician is specifically defined in the Canada Health Act.
- Potential competition among physicians for healthy rostered patients.
- Potential damage to physician/patient relationship – patients know that physician will benefit financially by providing fewer services.

In addition, the use of capitation at a regional level would create additional administrative work for the Regional Health Authorities, including:

- Method to determine capitation rates, including a needs-adjustment based on patient characteristics;
- Actual rostering of patients;
- Monitoring to control for under servicing of patients.
Capitation Experience in BC

In 1997, Health Canada established a Health Transition Fund, to support provincial governments in initiating and testing new approaches to the delivery of health care. BC chose to initiate the Primary Care Demonstration Project (PCDP) in 1998 to test alternate ways to deliver primary care (Prov. of BC, 2000, PCDP). Existing physician practices volunteered for the project, which took the form of blended population-based funding with “virtual” patient registration, similar to a capitation-like system (Patients were unaware of rostering). Additional resources such as enhanced computer systems were provided to the participating practices.

The reaction since implementation in the Fall of 1999 has been positive from involved physicians and patients. As well, certain performance metrics were determined to measure the effect of the new system. However, recently the evaluation component of the initiative has been eliminated due to funding cuts. Therefore, the potential for this initiative to serve as a gauge for future changes to funding is reduced dramatically. Without a thorough understanding of the impact of capitation over time in the BC environment, it is not clear whether the system as such would be successful under a larger scale implementation.

Therefore, there is no simple or obvious best method - each has its advantages and disadvantages.

5.4 IMPLICATIONS AND RISKS

Clearly, the regionalization of the MSP budget would represent a major shift from the current traditional process. This section will focus on the legal implications of regionalizing the MSP budget, as well as the implications and potential risks for practising physicians.

5.4.1 LEGAL ANALYSIS

Several legal agreements are in place in the province of BC that directly relate to the remuneration of physicians and the ability of the government to regionalize the Medical Services Plan budget. The Medicare Protection Act, and the Second Master Agreement
provide detailed information regarding the mechanics of payment schedule administration and amendments.

All agreements in place, including the Second Master Agreement and the Medicare Protection Act, are binding agreements. A breach of any clause in these contracts can result in a lawsuit, subject to resolution through arbitration. However, that said, all of the agreements can also be completely overridden by provincial legislation. Yet, it is unlikely that the government would take such rash action, due to the uproar that would result from physicians.

**Medicare Protection Act (MPA)**

The Medicare Protection Act (the “Act”) and its regulations outline the specific roles and responsibilities of the Medical Services Commission (the “Commission”) (Prov. of BC, 2000, MPA).

1. The sole function of the Commission is to facilitate reasonable access to health care in a manner that is provided under the Act. As stated in Section 3, Item 3:

   3 (3) *The Medical Services Plan established under the former Act is continued and the function of the commission is to facilitate, in the manner provided for in this Act, reasonable access, throughout British Columbia, to quality medical care, health care and diagnostic facility services for residents of British Columbia under the Medical Services Plan.*

2. The duties the Commission are authorized to carry out are outlined in Section 5 of the Act - the Commission can do no more or less than stated. Section 5 includes the following items:

   5 a) *Administering the Act on a non-profit basis;*

   ..................

   e) *Determining the information required to be provided by beneficiaries and practitioners for the purpose of assessing or reassessing claims for payment of benefits rendered to beneficiaries;*

   ..................
q) Enter into arrangements and make payments for the costs of rendering benefits that will be provided on a fee for service or other basis;

u) Exercise other powers or functions that are authorized by the regulations or the minister.

Implications: * The Commission is restricted from acting beyond the items noted in Section 5.
* Item (q) allows the Commission to enter into payment arrangements with regions, rather than physicians. This item also permits payments to the regions on a basis other than fee-for-service, allowing for alternate payment options.

3. The Commission is required to pay for a practitioner’s services, so long as they are rendered in accordance with the Act, as stated in Section 13, Item 3:

13 (3) A practitioner who renders benefits to a beneficiary is, if this Act and the regulations made under it are complied with, eligible to be paid for his or her services in accordance with the appropriate payment schedule, less any applicable patient visit charge or reduction made under section 24(2).

As well, Section 27, Item 1 states that the practitioner must submit the service particulars to the Commission in order to receive payment

27 (1) A practitioner who renders a benefit to a beneficiary must, for the purpose of assessing or reasoning the claim for payment, provide particulars of services and accounts to the commission that are required by this Act and the regulations in the manner the commission specifies.

Implications: * Practitioners must submit payment requests to the Commission in order to receive payment – submissions made to any other body, such as a Regional body, are not eligible for reimbursement. The regions could not assume the responsibility of directly administering fee-for-service under the current Act and its regulations.
* The Commission must pay for the rendering of benefits to a beneficiary as long as the practitioner has provided the required information.

* There is nothing in the Act or its regulations specifically stating that the Commission must pay the practitioner directly, only that it must pay for the service. Therefore, it is possible that the Commission could compensate the Region, and subsequently, the Region could compensate the practitioner, without contravening the Act.

4. The Commission must pay for claims for benefits according to the Act, regulations and fee schedules established, as stated in Section 27, Item 4.

27 (4) The commission must, to the extent authorized by the appropriation, pay for claims for benefits that the commission has assessed or reassessed and that comply with this Act, the regulations and the appropriate payment schedule.

The powers of the Commission also include the ability to set up fee schedules that differ by category of practitioner, as stated in Section 26, Items 1 and 4.

26 (1) The commission

a) must establish payment schedules that specify the amounts that may be paid to or on behalf of practitioners for rendering benefits under this Act, less applicable patient visit charges, and

b) may establish different categories of practitioners for the purposes of those payment schedules.

26(4) An amendment referred to in subsection (3)b may apply

a) to a specified geographic area,

b) to a category of practitioners,

c) to a category of practitioners within a specified geographical area,

d) to a specified benefit or class of benefits within a specified geographic area
Further powers over the fee schedule include the commission’s ability to modify, or even remove, payment schedules, as found in Section 26, Item 3

26 (3) The commission may, at any time, amend the payment schedules

   a) in any manner that the commission considers necessary or advisable, and
   b) without limiting paragraph (a), by increasing or decreasing any amount in a payment schedule.

Implications: * The Act empowers the Commission to delete the current fee schedule and create new region-specific or physician type-specific fee schedules (or both)
* The Commission is required to allocate payments based on the schedules established.

Framework Agreement

The Framework Agreement outlines the guidelines by which the Government and physicians of BC will define their relationship.

Specifically, the Framework Agreement:

- States that that a Master Agreement, Working Agreement and Subsidiary Agreements (as required) will exist
- Sets expiry dates for all Agreements
- Dictates how negotiations will proceed

The relationships that exist among all agreements are as follows:
Second Master Agreement (SMA)

The Second Master Agreement is the principal agreement under the Framework Agreement, and outlines the relationship between the Government of BC and the BC Medical Association. It is a binding, legal agreement between the BCMA, MSC and Government of BC.

This agreement was developed to mitigate the effects and narrow the scope of the Medicare Protection Act (the "Act"). For example, the Act allows the Government to prorate physician fees, while the Second Master Agreement removes the Government's power to do so, so long as physicians do not withdraw services.

The clauses in the Second Master Agreement cannot contradict clauses found in the Medicare Protection Act. Also, all other agreements (Working Agreement and all Subsidiary Agreements) must not contradict any term in the Second Master Agreement. Yet, there are no specific clauses preventing regionalization of the MSP budget in the Second Master Agreement.

However, only the BC Medical Association, the Government of BC and the MSC are party to this agreement. Since the Regional Health Authorities are not party to the agreement, they are under no direct obligation to comply with the clauses in the SMA, leaving it as the Government's responsibility to enforce these regulations with them.

The Government must negotiate with the BCMA on all discussions related to physician funding, as stated in Section 2, Item 2.2:
2 (2.2) The Government hereby grants to the BCMA the sole and exclusive right to represent those physicians where the funding for their services is, in whole or in part, provided by the Government either directly or through other public agencies.

*Implications:* * Regions or agencies cannot establish funding arrangements with physicians directly.
   * If regional fee schedules were established, the BCMA would be designated as the official representation of the physicians in all discussions. This would generate a tremendous amount of work for the BCMA.

### 5.4.2 Impact on Physicians

No matter what form regionalization takes, clearly the most affected stakeholders will be the physicians of British Columbia. The implications can be categorized under three headings: Equity and Access, Professional Autonomy and Administration.

1. **Equity and Access**
   - Physicians treating patients from other regions may be remunerated inconsistently – would pay be based on the fee schedule in patient’s region or physician’s region?
   - The independent negotiations could lead to bidding wars among regions.
   - Local manpower issues may be lost in mega-region negotiations.
   - The relative value of services may change, both within and among the regions.
   - The inter- and intra-regional allocation of funds may impact the ability of physicians to provide quality care to their patients, due to regional unavailability of resources.

2. **Professional Autonomy**
   - Physicians may have less flexibility in buying/selling of practices, resulting in reduced flexibility in relocating.
   - The physicians may be under increased pressure from regional health authorities to be compensated under alternate payment plan.
   - Physicians may have less input into decisions at the aggregated regional level that exists at the disaggregated Community Health Council level currently.
• The Regional Health Authorities could limit access to hospital facilities arbitrarily.

3. Administration
• The RHAs lack the expertise locally (in negotiations, economics, policy making and communication) to properly manage the allocation of funds.
• The cost to administer would increase over the current system. This could take the form of increased BCMA membership fees.
6. CONCLUSIONS

It is recognized that it is not realistic to expect every aspect of the health care system to be accounted for in a simple spreadsheet model. The model developers have attempted to construct the best approximation possible, given incomplete, erroneous and time lagged data. However, the BC PNBF model as developed is not suitable for implementation. The inherent fundamental flaws with the model must be formally acknowledged and resolved by the model development and implementation teams. These include the intrinsic inadequacy of the model to address unmet need, the absence of defined core services, and the lack of defined model performance objectives.

The following issues limit the BC PNBF model’s ability for success in the short term. These issues must be addressed and completed before further consideration of implementation:

- Improve address data quality
- Include effect of inter-regional migration
- Validate the accuracy of all data
- Develop solid implementation, accountability and sustainability plans, explicitly defining performance measures.
- Seriously evaluate alternate population segmentation strategies, particularly the ACG methodology.

All further work on the model must be consistent with the stated principle of transparency, which has not been adhered to by the Ministry of Health thus far. Stakeholders must be updated on the progress of model development and their opinions formally solicited.

Overall, physicians are frustrated with the current system, and consistent in their lack of support for increased Regional Health Board influence over health care fund allocations and/or physician payments. Physicians continue to prefer fee-for-service as their means of remuneration, but are open to exploring alternate payment plans. Physicians also value equity in pay, regardless of region of practice. Therefore, any changes to the health care funding formula must address these concerns, and meet with the satisfaction of physicians.
The regionalization of the MSP budget would likely confine fee negotiations to the regional level. This is the only viable alternative under which regional health authorities will achieve their goal of flexibility and control over physician expenditures. Under the assumption of regional control, fund distribution using the expected workload calculations from the BC PNBF model are consistent with current expenditure patterns. Additional analysis is required to determine the accuracy of using historical expenditures or population characteristics to distribute funds regionally. The subsequent distribution of funds to physicians could take the form of fee-for-service, blended capitation/fee-for-service, or salaried contract, each with their advantages and disadvantages. Physicians have stated their preference for a fee-for-service system, yet their willingness to explore alternate payment options. A trial capitation project has produced little information on its long-term feasibility, due to the absence of analysis of its impact on patients and physicians. The implications of such changes on physicians could potentially include changes in their access to resources, their level of professional autonomy, the equity of pay, and the administration of remuneration.

The legal agreements currently in place, the Second Master Agreement and the Medicare Protection Act, do not explicitly restrict the regionalization of the MSP budget. However, regionalization of the MSP budget to its full extent is not feasible without amendments to these agreements.

Therefore, the regionalization of the MSP budget is not likely in the immediate future, due to the complexities of distribution and negotiation. Further consultation between the Ministry of Health and the BCMA is required to ensure the satisfaction of physicians with any changes to funding mechanisms.

It is hoped that the research and observations in this thesis assist the model developers in their future efforts.
REFERENCES


Province of Saskatchewan, Saskatchewan Health, District Management Services Branch.  

Province of Saskatchewan, Saskatchewan Health, District Management Services Branch.  


APPENDIXES
APPENDIX A: BC MEDICAL ASSOCIATION BACKGROUND

The British Columbia Medical Association (BCMA) is a voluntary association of British Columbia's medical doctors. Founded over one hundred years ago, the BCMA's membership has grown to include over 8000 medical practitioners from all regions in the province. It represents about 75% of the doctors currently practising in British Columbia. The role of the BCMA is to advance the practice and science of medicine and the health of British Columbians by working for the improvement of medical education, health care legislation, hospital and other health services (BCMA, 2001).

The BCMA offers recommendations about legislation and regulations affecting health care and the practice of medicine, and is an advocate for the health issues that concern the citizens of British Columbia.

The BCMA represents the collective view of the medical profession of British Columbia, and negotiates for and on behalf of sessional salaried and other alternative payment physicians. It is also responsible for setting medical service fee schedules as well as negotiating the schedule of benefits paid by the Medical Services Plan.

The BCMA is guided by its elected body of physicians from across the province. Each year a President is elected to serve as the primary spokesperson for physicians in BC and is an advocate for doctors' issues with the provincial and federal government and other important stakeholder groups.

The BCMA is a member of the Canadian Medical Association (CMA), which works with the federal government and acts as the national voice of medicine. Despite this close relationship, the BCMA is an autonomous organization with specific responsibilities in the province of British Columbia.

The BCMA is separate and distinct from the College of Physicians and Surgeons of British Columbia. The College is established by the Medical Practitioners Act to oversee the licensing and disciplining of doctors.

Philosophy

The British Columbia Medical Association is committed to the highest standard of health care and to the belief that physicians must be independently free to work for and on behalf of their patients to achieve that standard.

Mission

To promote a social, economic, and political climate in which members can provide the citizens of British Columbia with the highest standard of health care while achieving maximum professional satisfaction and fair economic reward.
Objectives

i. To represent the collective view of the medical profession of British Columbia and communicate that view to the public, elected representatives of the public, members of the British Columbia Medical Association, and other groups.

ii. To influence the evolution and development of public policy concerning health care delivery.

iii. To be advocates for the health issues that concern the citizens of British Columbia.

iv. To achieve appropriate compensation for professional services.

v. To maintain the highest professional standards among physicians.
Introduction

Since 1998, a substantial portion of Alberta's health care funding has been allocated across the province by applying a population based funding model. The model currently allocates $2.68 Billion across 17 Regional Health Authorities. These monies provide funding for the following services:

- Acute In-Patient
- Hospital Based Ambulatory Care (Emergency Services, Scheduled out-patient clinics, Day surgery clinics)
- Continuing Care
- Home Care
- PPP (Protection, Prevention, Promotion)
- Private Clinics

Funding for the following services is not allocated using the population based funding model:

- Community Laboratory Services
- Community Rehabilitation
- Ancillary Operations
- Research
- Education
- Cost of Doing Business (Travel and misc. for rural communities)
- Public Health Services (Info lines, STD/TB Services)
- Assured Access (additional rural allocation per capita)
- Other Services (Alternate Physician Payments, ICU, Emerging Drugs, etc.)
- Physician Payments

(Note: Mental Health is excluded in the Alberta model; BC plans to incorporate Mental Health into their model next year)

Prior to the implementation of the model, Alberta allocated funds across the province in a similar manner to most other Canadian provinces, where prior funding levels dictate fund allocations.

The Model

The population based funding model is similar in many aspects to the funding model as developed by the BC Ministry of Health. However, there are also many key differences between the two models.

The aggregate funds available for health care are allocated into different funding "pools" based on historical expenditure data, as reported by the regions. The historical data provides a basis for relative, percentage-based funding pool size requirement.
Model Base

The model is population based, which means it allocates funds to regions based on the demographic distribution of the regions’ residents. The population data source is a central Population Registry File, with updated information from the Eligibility & Premium System and the Stakeholder Registry. The central registry is called the Alberta Health Care Insurance Plan (AHCIP). It is a count of Albertans who are active and eligible for medical benefits as of March 31 of each fiscal year.

Assigning residents to specific regions was based on the last known Alberta postal code in the AHCIP registry, but complicated by overlap of postal codes between regions. As well, the listed address for a resident may be a mailing address not a residency address, or may not even include a postal code.

a. Age

According to the documentation, age is the most significant determinant of health care costs.

Age is used to stratify the population into 20 groups: <1, 1-4...85-89, 90+. Registrants are assigned to age groups based on age on March 31 of the given fiscal year.

b. Gender

The model documentation claims that the gender of a resident is only important during the childbearing years.

c. SES

The SES groups used in the model included:

1. Aboriginals, under 65 (3.4%)
2. Welfare, under 65 (3.0%)
3. Subsidy, under 65 (11.2%)
4. Others (non-premium subsidy and all residents 65 and older) (82.4%)

According to the documentation, SES is insignificant once a resident is 65 years or older; therefore, all residents over 65 are classified as part of the “Other” segment. This was partly due to the fact that most individuals, regardless of socio-economic status, have an increased need for health care as of 65. Also, it was noted that most individuals apply for premium assistance as of 65, regardless of previous SES status. Therefore, the SES indicator was no long indicative of need for health care. Also, it was noted that not many Aboriginals live past 65; therefore, the SES segmentation would have little effect.

d. Import/Export

The import/export adjustment accounts for the interregional flow of patients from region to region. Select activities in the following service categories were included: hospital
inpatient, hospital ambulatory care, continuing care, home care and private clinics. Any import/export activity was flagged where a difference existed between region of service (based on facility code) and region of residence. As with the BC model, the net flow of patients per region is used to calculate any payment adjustments.

Calculations to value the import/export services are the same as used for capitation payments, as described below. However, for continuing care, payments are adjusted to exclude duplication of payment for the long-term care component of the per capita funding rate.

Data Issues

Many of the data challenges facing BC are similar to those faced by Alberta. Alberta has an aggregate database, the Stakeholder database, with records on all past and present users of health care in Alberta. The Eligibility & Premium System database contains only records of currently insured users of health care in Alberta. Other databases with information on patients are also available – comparison work is done with the 6 databases available, and records with potential errors are flagged and forwarded to the Registration Branch for further investigation.

In 1998, Alberta Health went through the exercise of comparing the population numbers in the Registry and the census (using 1996 census data). Alberta Health knew that the census numbers would differ from the Registry numbers – for example, many Natives will not register in the census but were present in the Registry. This accounted for noticeable discrepancies in areas with known Native populations. However, despite the differences in data collection, the population numbers were within 3% of each other overall. Therefore, the decision was made to rely primarily on AHCIP data in the model, since it is known to be controlled and updated data.

Updating the Eligibility database is accomplished through a number of mechanisms:

- The Registration Branch has numerous people updating the system as update information is submitted from the users. This includes deaths, change of address, marriages, etc.
- Hospitals enter new birth data (Ideally, Alberta Health would like to have hospitals connected and able to update information from patients as they arrive for service.)
- Employers submit information on changes in address or employment on behalf of their employees
- Premium assistance is managed through the Eligibility File (bills sent out to individuals and employers to collect premiums). Therefore, any changes to subsidy status are updated automatically in the Eligibility database. As a result, there was confidence that the subsidy flags were accurate in this database.

Issues with age and address validity were addressed. According to the Ministry of Health, the Registry’s age data was very good, with less than 200 “suspect” or missing date-of-births in the database. With respect to addresses, there were initially close to 4 000 (out of 3,000,000) records with missing addresses. Using previous address records to help in filling in the blanks, now only have about 300-400 without addresses. These are primarily residents of the downtown core, with no fixed address.
One of the criticisms of the BC model is its inability to segment the portion of the population receiving no level of premium assistance (73%). The Alberta model allocates 82.4% of its population in this socio-economic group. There has been no effort to date (or planned for the future) to further stratify this large population group. According to Alberta Heath, there has been no indication that the allocation of 82.4% has restricted the model's ability to appropriately allocate funds. However, there have been no specific efforts to determine if there are utilization differences among the users in this large socio-economic group.

**Funding Pool Allocations**

The initial step in the allocation of funds is to determine the size of the funding pools. The pool sizes are calculated using the most recent historical expenditure data available from the regions. Timeliness in receiving the information is important to ensure accurate distribution of funds as required by the population. Special programming tools are used to assign operating expenditures to funding pools. All province-wide and non-population based expenditures are removed.

**Capitation Allocation**

The process of determining the base capitation fund allocation proceeds as follows:

1) Costing weights are assigned to all activity data available. The importance is the relative weighting of the costing, not the actual number itself.

The costing of services occurred as follows:

a. *Acute Inpatient* (based on the Hospital Specific Relative Value methodology)
   - Group activity records into one of about 430 diagnosis groups (Refinement Group Numbers) using the RDRG (Refined Diagnosis Related Grouping) Methodology
   - An average cost per case is calculated for each RGN for each facility and province-wide. The costs per case have been determined using in-patient care records and data from Alberta and Ontario. Validation of the dollar figures is achieved by reconciliation to the financial records/reports of a facility or clinic and the utilization records
   - A Hospital Specific Relative Value (HSRV) is calculated to illustrate the cost of an RGN relative to other RGNs in the facility
   - Per RGN, a province-wide relative measure of the value of the RGN is calculated (weighted average of HSRVs). This provides the system-wide relative cost of cases in a given RGN relative to all other cases - $<1 = \text{relatively inexpensive}$, while $>1 = \text{relatively expensive}$.
   - A case mix adjustment is introduced to account for differences in cases per facility. This allows for adjustment to the HSRV, incorporating the relative values of cases in the facility, the number of cases in the facility and the province wide case relative value.

b. *Hospital Based Ambulatory Care*

   The Ambulatory Care Classification System (ACCS) facilitates the reporting of ambulatory care visits and corresponding costing information (only currently available from 6 regions). However, ACCS data only accounts for 80% of spending, and FFS
claim files are applied to supplement the data. All activity is classified by the ACCS into 434 groups (similar to ACGs). The cost weights for the ACCS activities were the average costs obtained from the regional data collected.

c.  **Continuing Care**

Long-term care activity data was collected from the Resident Classification System. Patients are classified on an A-G scale, which indicates increasing need for health care resources. Costs are calculated for each classification, increasing from A to G.

d.  **Home Care**

Data on home care expenditures is collected in the Home Care Information System, reported on a per-client and per hour basis. Province-wide costs were determined for 6 general service types by dividing the average hourly provider cost by the number of providers.

e.  **Private Clinics**

The provincial government allocates funding to the RHAs to cover costs of approved procedures occurring outside of the public hospital venue. The allocation is based on client-based utilization data and fees gathered by the private clinics.

2) Once the costs are assigned, the aggregate of the costs will likely be higher or lower than the actual funding available for the given funding pool. Therefore, costing weights are scaled down in a relative fashion so that the aggregate matches that of the total funding available.

3) The activity file and registry file are linked, identifying each patient with demographic information, activity data, as well as relative costing associated with the activity.

4) The aggregate expenditures are divided by the population for each population group, to generate a per capita expenditure for each of the 124 population groups.

5) Knowing the population distribution of each region, the per capita rates are applied to determine the base funding allocation for each region.

**Therefore, the model is heavily dependent on good utilization and relative resource consumption cost data.**

**Minimum % Guarantee**

The model includes a minimum percentage increase in funding annually, set at 3.53%.
Population Growth Adjustment

The model includes an automatic 1.9% allocation to account for expected population growth in the regions in the funding year. Population growth is based on the recent previous years’ data, rather than trends over several years. This is due to the recent steep population increase over the past few years, especially in the urban areas, such as Calgary. Yet, interestingly, the same population growth rate is applied to ALL regions, regardless of that regions’ growth trend in the previous year.

“No Loss” Subsidy

In an attempt to alleviate the turmoil that accompanies drastic funding cuts, the model included a “no loss” subsidy. The subsidy ensures that regions endure “protected” funding cuts. If the model dictates that a region’s funding should be reduced, the subsidy ensures that funding was maintained at the same level as the previous year. However, as of 2000/01, No Loss subsidy payments will only be made if the current year’s no loss calculation exceeds that of the previous year’s no loss payment. As well, the payment made will only be the difference between the current no loss calculation and the previous year’s no loss payment. Basically, this is a mechanism to phase out no loss subsidies, and ease the regions into operating with reduced funding.

Therefore, the model formula for assigning funding to regions can be summarized as:

\[ \text{Funding} = \text{Base} + \text{Minimum \% Guarantee} + \text{Population Growth Adjustment} + \text{No Loss Incremental Payment} \]

Capital Expenditures

The Alberta model includes the allocation of funds for capital equipment requirements, a total of $15 M for 2000/01. However, it is not clear from the documentation how capital fund allocation decisions are reached to facilitate fair distribution among the 17 regions.

Implementation

The model does not specifically outline “core” services, or list which health care services a region is required to provide to its residents. Instead, funding is allocated and the regions are responsible to determine and supply the services required. The decision to not outline “core” services is a political one, due to the difficulty in defining exactly what comprises fair and equitable access.

There have been no specific initiatives to measure the potential impact the model may have had over the past few years. No specific data has been gathered or reports generated. The Alberta government has found it difficult to determine what exactly to measure to show the effectiveness or ineffectiveness of the model. It has been stated that “if you aren’t counting, you’re only practising” – how can you know how the system works without gathering data on its operation? In other words, this model was implemented because the previous model was perceived to not be effective in allocating funds. This implies that using this improved funding
model would lead to improvements and efficiencies in delivering health care. Why would the government go to the effort of implementing such an extensive model (with huge implications and consequences) without trying to determine whether the model was actually better or not?

The Ministry of Health was unable to provide an answer on how performance measure targets and initiatives have been used to explain the effectiveness of the new fund allocation method.

However one indication of the model’s ineffectiveness may be the continuation of targeted funding from the provincial government. The Health Authorities continue to pressure the provincial government for targeted funding, arguing that the reduced funding levels allocated by the model are insufficient. The government’s “knee jerk” reaction to address these unmet health care needs is to announce targeted funding allocations as a political refuge. This has included targeted funding for MRI equipment, and increased resources to reduce wait times for knee and hip replacement surgery. The continued existence of such funding mechanisms attests to the models inability to adequately allocate funds to address these health service needs.

**Physician Payments**

Alberta Health has been pushing for the inclusion of physician payments to the model to complete the spectrum of services covered by the model. However, due to opposition from the Alberta Medical Association, the matter has not been pursued. However, Alberta Health believes that the model will never be truly effective until funding for all health care services in a region are related to the population characteristics of the region.

**Health Authority Business Plan and Annual Report Requirements**

**Business Plan**

Health Authorities are required to define core businesses, goals, how to achieve their goals and how to improve performance. They must address the key challenges – residents must be provided with the care required, preparations must be undertaken for future, accountability must be maintained and the focus must be on long term gains. The Health Authority Business plan must include:

- **Statement of Accountability**
  - Developed in accordance with law and government requirements
  - Commitment to achieve results noted in business plan
- **Vision**
  - Focus on current and future health of Albertans
- **Mission**
  - Why does HA exist
  - How will HA reach its vision
- **Opportunities and Challenges**
  - Link with previous years’ opportunities and challenges
  - How will challenges be managed and opportunities fully exploited
- **Core Businesses**
  - Ensure accountability and continuous improvement in health system
- **Goals**
  - Desired results that are potentially attainable
  - Must include goals as set by Ministry of Health

- **Strategies**
  - Actions to be used to achieve goals
  - How needs, issues and areas for improvement will be addressed

- **Performance Measures, Targets and Key Indicators**
  - Performance measures: Progress in achieving goals; Used to set priorities, adjust strategies, improve performance
  - Targets: Desired level of performance of program or service; set a target for all performance measures and goals
  - Key Indicators: Measures of health activity without an identified numerical target; To be monitored, assessed and reported on
  - Provincial government sets some performance measure, targets and key indicators that must be met by the regions

- **Capital Projects**
  - Includes approved and proposed plans

- **Financial Information**
  - Submit a balanced budget
  - Financial plan must include: Statement of Operations, Statement of Changes in Financial Position, Capital Equipment Plan and Summary of Debt Level

The Ministry of Health in Alberta has developed a business plan template for use by all regions. In addition to this document, a separate “Assumptions and Risks” document is required. “Assumptions” includes listing those areas with the greatest potential effect on financial performance, such as population, service volumes, financial resources, expenditures and sustainability. “Risks” includes an analysis of the sensitivity of the plan to changes in key assumptions.

**Annual Report**

Annual reporting is required on the ability of the region to achieve each of the goals set out in the previous year’s business plan.

Annual reports must include:

- **Letter of Accountability**
  - Developed in accordance with law and government requirements

- **Board Governance**
  - Describes roles and responsibilities of Board
  - Activities and decisions of Board during the year

- **Organizational and Advisory Structure**
  - Any changes to structure

- **Major Initiatives/Accomplishments**

- **Contextual Information for Results Achieved**
Geographic, social and economic environment described

- **Progress in Implementing Strategies**
  - Includes goals and strategies from business plan and progress thus far
  - Level of achievement on performance measures, targets

- **Results Report**
  - Explains any discrepancies between achievements and targets
  - Information on key indicators progress
  - Compares regional and provincial results; explains any differences

- **Challenges and Future Directions**
  - Areas of focus for next planning cycle

- **Report on Capital Projects**
  - Completed or in progress projects

- **Financial Summary**
  - Audited financial statement
  - Budgeted vs. actual expenditures

---

**Best Practices Initiative Article**

The Government of Alberta’s Best Practices Initiative is an attempt to share learnings among regions. The idea is to promote continuous improvement, promoted by exchanges across the HA’s of initiatives, strategies, and services that are working well.

The goal is to reduce duplication, coordinate for an improved health care system, promote learning, develop a process to measure quality, and identify solid practices.

This initiative supports other initiatives such as the core services project to define which health care services must be available or reasonably accessible to every person who needs them.

This initiative has many parallels to Continuous Improvement efforts that occur in business, where there are continuous, systematic processes in place for evaluation.

They were very careful to make sure that it did NOT develop into a perceived Health Authority organizational review, which would result in a “report card” for each region. They were very clear that their objective is only to determine what represents best practices in the Health Authorities. They were simply looking for examples of innovativeness, creativity and pride.

Best practices were identified and defined by exhibition of superior performance in governance, management and administration. Examples were identified among the health authorities.

Some recommendations for communication of these findings (and future findings) among regions include:

- Best Practices Bulletin
- Electronic communication
- Information Forums
- Annual Best Practices conference
In the future, further Best Practices reviews will include other stakeholders in the health system, including Alberta Health.
APPENDIX C: SASKATCHEWAN FUNDING MODEL SUMMARY

Background

Health districts were established in Saskatchewan in 1993, as part of a health care renewal effort to better address the needs of local residents. Twenty-nine districts were created at the time, increasing to 32 a short time later, plus the creation of the Athabasca Health Authority servicing northern Saskatchewan (Prov. of Sask., 2000, History).

The previous funding model provided each institution and agency with a detailed budget to follow for a given year. The funding allocated was based on historical data and approved volumes of service. Many of the agencies and institutions did not receive strict instructions on how or where to allocate the funds within their organization. Therefore, the previous funding system allowed for flexibility in service delivery mechanisms.

However, the key problem identified with this funding methodology was the correlation of use to availability. It was found that residents use the services available to them, regardless of whether there was a need for the services. Therefore, areas providing more services received more funding, based on the populations use (not need) of services.

Funding Model

Saskatchewan Health uses a needs-based funding formula to allocate funds to the health districts based on population characteristics. Saskatchewan was the first province in Canada to implement this type of funding model, although similar models had been implemented around the world. Health care spending accounted for 30.4% of Saskatchewan’s provincial budget in 1994-95 (Prov. of Sask., n.d., p. 6).

The model was developed in conjunction with a Methodology Advisory Board, comprised of academics and others knowledgeable in health care, and a user group, consisting of Health District CEOs. Similar to BC, the purpose of the model is to allow the District Health Boards to direct funds in their district in a manner that was consistent with local need.

The easiest way to allocate funds would have been based on the proportion of the population residing in each district; however, it is known that there is not an equal need for heath care in the population.

A population needs based funding model has been in place since the 1994-95 fiscal year in Saskatchewan. The model allocated funds for non-primary acute care services (in-patient/outpatient), home based services, long-term care and rural health initiatives. This model allocated approximately 60% of the funds distributed to the health districts. The model excluded funding for addictions, community health and mental health, while the inclusion of primary acute care services and emergency services occurred in subsequent years.

Note that the separation of funding for primary and non-primary acute care services required that all acute care services be explicitly defined as one or the other. Primary care services were
defined as acute care services provided in all districts across all hospitals, and generally provided by a GP or other health care practitioner. Non-primary care services were defined as specialized care, provided to residents outside the district boundaries, including such services as surgery.

Funding pools were allocated for each service area, after adjustments for program growth and other policy decisions.

**Age and Gender**

The age and gender distribution of each district is established, and utilization rates calculated for each group in each area of service. Age/gender groupings are weighted differently for each service.

A resource share is calculated for each age-gender group, specific to the resource such as non-primary weighted cases. Then, the population of each age-gender group is adjusted for its resource share. Next, each district’s portion of the adjusted population is calculated.

**Example:**

Total population in province: 988,463  
Total male/45-49 in province: 27,225 (2.75% * 988,463)  
Total male/45-49 in District X: 340

Resource share (non-primary care) for all male/45-49 in province: 1.82%  
Adjusted male/45-49 population in province: 1.82% * 988,463 = 17,990

District X unadjusted male/45-49 population: 340/27,225 = 1.25%  
District X adjusted male/45-49 population: 1.25%*17,990 = 224

Therefore, for non-primary care, the population of males, 45-49 years old in District X changed from the actual 340 count to 224, based on their relative need for these health services.

**Needs Indicators**

Traditional indicators have been based on past utilization – however, it is known that utilization is driven by availability and accessibility. They determined that indicators must be valid (ability of indicator to measure what it is intended to measure), reliable (degree to which the indicator gives the same results over different situations) and responsive (extent to which indicator respond to changes in area studied).

Indicators used for non-primary acute care services include premature death rate and low birth rate. The indicator used for home-based services was whether the resident lived alone or not. The indicators are relative measures among districts, NOT among age/gender groups. Therefore, the same premature death rate would be applied to all population groups in a given District.
**Example continued:**

If the premature death rate is 1.283 in District X, the male/45-49 population will be further adjusted:

\[1.283 \times 224 = 287\] (new relative population value)

**Cost Adjustment**

In order to accommodate the fact that variations exist in the cost of providing a given level of health services, adjustments are made to the needs-adjusted population rate. For example, funds allocated for home-based services will include adjustments for the estimated travel time, given the size and population density of a district. As a result, a home care “unit” may have a value of 1.2 rather than 1, to allocate additional funds to account for additional expenditures.

**Inter-district patient flow**

A district’s population is adjusted to account for services provided to residents of other districts. A weighted percentage of residents are re-allocated to other districts, based on the weighted cases for which care was provided outside of the district. These adjustments were made only based on acute care records.

**Patient flow out of Province**

Adjustments are made to reduce funding to those districts close to provincial borders, where residents seek acute care outside of the province.

**Registered Indians**

Registered Indians were assigned to a district based on the postal code of their residence, as found in service-specific databases. It is known that the utilization rates are higher, relative to the rest of the population. For example, Registered Indians make up 6% of the population, but represent 14% of ambulance calls. As a result, the number of Registered Indians in a district will have an impact on the cost of delivery of health services, resulting in increased allocation of resources to the districts.

The model allocates funding for the population as determined by the Person Registry System, a locally maintained database. Registered Indians are counted separately, external to the Person Registry System.

**Capital Funding**

Capital projects are funded 65% provincially and 35% through health district contributions. Proposals for capital funding are prepared as per guidelines set out by the provincial
government. A team consisting of Saskatchewan Health and external experts review proposals on a regular basis (Prov. of Sask, 2000, Capital).

**Implementation**

In 1994-95, the plan was to implement the model in phases, to permit

- Refinement of methodology;
- Expansion of methodology to other health care expenditures; and
- Allow for reasonable shifts in funding that would avoid jeopardizing the quality of health care provided.

As seen, a district is allocated their funding relative to the other regions. Initial use of the model resulted in large discrepancies between previous district funding and model-allocated funding. The model has been adjusted over time, as items such as accounting for the service flow of Long Term Care residents were debated.

When applying the model, cases were weighted using RIW information and utilization cost curves was created. However, the RIWs were adjusted for some procedures, where districts differed in treatment practices. For example, one district would treat carpal tunnel procedures on an outpatient basis, while another district would treat it as an in-patient service.

Some items are still funded as “line” items, such as tertiary services.

Saskatchewan Health works with the regions to ensure that their planning is consistent with that of provincial objectives for health care. Saskatchewan Health officials also assist with district budget planning, physician resource planning, and monitoring of program outcomes. As well, it is noted that District Health boards are composed of both elected and appointed members.

The CEO of one medium-sized health district in the province noted that the model is no longer applied in its intended fashion. It has shifted from a needs-based methodology to a rules-based methodology, where deficits incurred by regions are covered, but districts are encouraged to prevent future deficits. This CEO believed that Saskatchewan would be immune to such politically motivated actions. He also stated that the model was truly applied to allocate funding in 1995-96, and since then has deteriorated to become a deficit-covering model.
APPENDIX D: RHA AND CHSS MAP

British Columbia
Regional Health Boards &
Community Health Services Societies

Regional Health Board
1. North Okanagan
2. Okanagan Similkameen
3. Thompson
4. Fraser Valley
5. South Fraser
6. Simon Fraser
7. Central Vancouver Island
8. Northern Interior
9. Vancouver/Richmond
10. North Shore
11. Capital

Community Health Services Society
1. East Kootenay
2. Kootenay Boundary
3. Coast Garibaldi
4. Upper Island/Central Coast
5. Cariboo
6. North West (excludes Nisga'a)
7. Peace Liard

Prepared by: Information and Analysis Branch, Ministry of Health and Ministry Responsible for Seniors
Boundary Source: BC STATS, Ministry of Finance and Corporate Relations
JAN2000
APPENDIX E: SURVEY DOCUMENTATION
Section 1: Current Regional Funding

Please check the answer that best reflects your opinion.

1. Do you believe health care funding is currently distributed equitably amongst regions in BC?
   - a) Yes, I think funding is distributed equitably
   - b) No, I do not think funding is distributed equitably
   - c) Not sure/No opinion

2. What is your opinion on the adequacy of funding available to supply the health services under the jurisdiction of your region?
   - 1 ☐ Well Funded
   - 2 ☐ About Right
   - 3 ☐ Poorly Funded

3. From the list below, please check the two (2) least well-funded areas of health care in your region of practice. ALSO, for ONLY those two (2) areas identified, please indicate whether the level of funding in your region is better, about the same, or worse, relative to other health regions.

<table>
<thead>
<tr>
<th>Section</th>
<th>Better</th>
<th>About the Same</th>
<th>Worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Hospital/Acute Care Funding</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b) Long Term Care Funding</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c) Capital Construction Funding</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>d) Capital Diagnostic Equipment Funding</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>e) Community Based Services Funding</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>f) Home Care Funding</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>g) Preventative Services Funding</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Section 2: Population Needs-Based Funding Model

Please check the answer that best reflects your opinion.

4. Prior to receiving this survey, how aware were you that BC is considering implementing a Population Needs-Based Funding model?
   
   1□ Highly Aware 2□ Somewhat Aware 3□ Not aware

5. Which best represents your opinion on your current Regional Board’s ability to effectively manage the delivery of health services?
   
   1□ Extremely Capable 2□ Somewhat Capable 3□ Neutral 4□ Somewhat Incapable 5□ Incapable

6. In your opinion, would the situation, with respect to the following, be better or worse if your Regional Health Authority was granted full decision-making power over fund allocations within your region:
   
   Better □ Worse □ No Difference □
   • Equal pay for equal work
   • Ability to negotiate satisfactory working contracts and conditions
   • Bed Availability
   • Access to OR facilities
   • Physician involvement in decision-making
   • Number of physicians practising in your region

7. In your opinion, which body would be best suited to manage the delivery of health services, and the allocation of health care funds, excluding fee-for-service physician payments?
   
   □ a) Regional Health Authority
   □ b) Ministry of Health
   □ c) Independent “arm’s length” body (somewhat like a Crown Corporation)
   □ d) Other (please describe): ________________________________
   □ e) Not sure/No Opinion
8. In your opinion, which body would you prefer to manage and allocate existing physician payments?

- [ ] a) Regional Health Authority
- [ ] b) Ministry of Health
- [ ] c) Tri-partite Medical Services Commission
- [ ] d) Independent "arm's length" body (somewhat like a Crown Corporation)
- [ ] e) BC Medical Association
- [ ] f) Other (please describe): ____________________________
- [ ] g) Not sure/No Opinion

9. In general, would you agree with including physician fee-for-service payments as part of the direct financial and administrative responsibilities of Regional Health Authorities?

- □ Strongly Agree
- □ Agree
- □ Neutral
- □ Disagree
- □ Strongly Disagree

10. Please indicate which of the following physician payments you think could be included as part of the direct financial and administrative responsibilities of the Regional Health Authorities. (Please check as many as apply)

- [ ] a) All payments, including fee-for-service, alternate* payment contracts and on-call payments
- [ ] b) Only fee-for-service payments
- [ ] c) Only alternate* payment contracts
- [ ] d) Only on-call payments
- [ ] e) Alternate* payment contracts and on-call payments
- [ ] f) None of the above
- [ ] g) Not sure/No opinion

*Note: Alternate payments refer to salary, sessional and contract payments

11. Ideally, what basis of physician payment would you prefer?

- [ ] a) Fee-For-Service
- [ ] b) Capitation ($ allocation per registered patient regardless of services provided)
- [ ] c) Blended fee-for-service/capitation approach
- [ ] d) Contract (fixed payment for specific services)
- [ ] e) Other (please describe): ____________________________
- [ ] f) Not sure/No opinion

12. What is your level of interest in pursuing physician payment mechanisms other than fee-for-service?

- □ Very Interested
- □ Neutral
- □ Not Interested
13. What is your opinion regarding the development of region-specific fee schedules, for fee-for-service payment?

1 □ Strongly Support  2 □ Somewhat Support  3 □ Neutral  4 □ Somewhat Oppose  5 □ Strongly Oppose

Section 3: Demographic Information

14. What is your Gender?

☐ a) Male  
☐ b) Female

15. Please provide the first three digits of your postal code of practice: □ □ □

16. What is the approximate population of the community/municipality in which your practice is located?

☐ a) Under 5,000  
☐ b) 5,001 - 10,000  
☐ c) 10,001 - 25,000  
☐ d) 25,001 - 50,000  
☐ e) 50,001 - 100,000  
☐ f) 100,001 - 250,000  
☐ g) Greater than 250,000

17. Please indicate which best describes you:

☐ a) GP/FP  
☐ b) Medical Specialist  
☐ c) Surgical Specialist  
☐ d) Diagnostic specialist  
☐ e) Other (please describe): ________________________________

18. How many years have you been practising medicine?

☐ a) 0-5 years  
☐ b) 6-10 years  
☐ c) 11-20 years  
☐ d) 21-30 years  
☐ e) Over 30 years

19. How many years have you been practising medicine in BC?

☐ a) 0-5 years  
☐ b) 6-10 years  
☐ c) 11-20 years  
☐ d) 21-30 years  
☐ e) Over 30 years
20. How many clinical hours do you work a week?

- [ ] a) Fewer than 30
- [ ] b) 30-60
- [ ] c) More than 60

Additional Comments:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

If you have any further comments regarding this survey, please attach a separate piece of paper.

Thank you for completing this survey.

A summary of results will be posted to the BCMA website at www.bcma.org.
APPENDIX F: ADJUSTED CLINICAL GROUPS SUMMARY

Background

As health care resources are continually perceived to be inadequate, there is a growing desire to determine better ways to measure the true health care service requirements of a specified population.

The Johns Hopkins School of Hygiene and Public Health in Baltimore, Maryland, has established a methodology to explain variation in the use and cost of ambulatory care. Adjusted Clinical Groups (ACGs; formerly Ambulatory Care Groups) are used to describe the “illness burden”, or need for medical care, of individuals and populations.

ACGs incorporate demographic data (age and gender) and diagnostic data (ICD-9 codes) to measure a population’s health status over time. Thus, ACGs account for the fact that morbidities accumulate to amount to a patient’s total “illness” level, and provide a unique way to quantify an individual’s morbidity experience over time.

As a result, the objective of using ACGs is to determine required services based on the health care needs of a population over time. ACGs, along with expenditures as the response variables, are used to build a regression model, which allows for comparisons between expected funding required and actual funding provided. The ACG model has a proven ability to explain variation in physician payments (Reid, MacWilliam et al., 2001, p.91), ambulatory visits and ambulatory charges (Starfield et al., 1991, p.53).

One of the main advantages of using the ACG model, compared to other case-mix models, is its basis on diagnostic data and not utilization data, thereby discouraging incentives to increase utilization rates to increase funding.

However, ACGs are subject to the same criticism associated with many predictive, case-mix models: they rely on past utilization data, which represent services provided, and not necessarily services needed.

Development, Evaluation and Validation

Historical utilization rates and expenditure data is, of course, one method that can be used to predict future health care expenditures. However, models that incorporate population characteristics have evolved as discussed below:

Phase 1: Age/ Gender

One of the simplest and obvious methods to predict health care expenditures is to use the age and gender of a given population.
Advantages:
• **Data availability:** The objectivity and general availability of this generic data allows for easy use in a model

Disadvantages:
• **Poor predictive capability:** A regression model based only on the age and gender of the patients in a population is able to explain less than 10% of the variation in expenditures among patients, as shown in analysis in the US and Canada (Reid, Verhulst et al., 2001, p.15). This model’s performance is substantially poorer, compared to the following models.

Note: Socio-Economic Status (SES) has also been applied to further segment the population; however, it is often only applicable to approximately 25% of the population, and is subject to change over time, unlike age and gender.

**Phase 2: Age/ Gender/ ADG**

The explanatory power of the model is substantially improved by incorporating patient diagnostic records. Over 14,000 ICD-9 diagnostic codes are categorized into 1 of 32 Adjusted Diagnostic Groups, or ADGs. The assignment of diagnoses to ADGs is based on the following diagnosis characteristics: severity, diagnostic certainty, need for special care, etiology and duration of illness. Subsequently, all patient records with a diagnosis are matched with an ADG. Therefore, it is possible for a single patient to be assigned up to 32 different ADGs, or no ADGs.

However, the risks associated with introducing diagnostic information include:
• Current lack of monitoring for completeness of diagnostic data;
• Only primary diagnostic data is recorded; secondary diagnostic information is lost;
• Use of 3-digit ICD-9 codes lack the diagnostic detail of 4- and 5-digit ICD-9 codes.

Advantages:
• **Data availability:** Diagnostic information is often available in fee-for-service records, or hospital records, on a per patient basis
• **Best Predictive Capability:** Analysis consistently demonstrates that the use of age, gender and ADG to segment the population generates the best predictive model, with an R-squared as high as 0.52 when used to predict physician FFS payments in BC (Reid, Verhulst et al., 2001, p.15).

Disadvantages:
• **Cumbersome model:** This model requires the segmentation of the population into 1,216 groups (2 gender * 19 age * 32 ADG)

**Phase 3: ACGs**

ACGs emerge as the 1,216 Age/Gender/ADG groups are collapsed to form 90 mutually exclusive ACGs. The 90 ACGs are determined by applying an algorithm that reduces the number of categories by identifying the most common combinations of ADGs among patients. The resulting ACGs incorporate combinations of age, gender and ADG; for example, ACG
4000: 2-3 Other ADG Combos, Females, Age 17-34. All patients are classified into a single ACG, based on their patient records over the specified time period.

**Advantages:**
- *Model simplicity:* The model algorithm reduces the number of patient “groups” from 1,216 to 90, adding an element of simplicity, while losing only a small amount of predictability.

**Disadvantages:**
- *Sub-optimal Predictive Capabilities:* Although the ACG model is slightly sub optimal compared to the Age/Gender/ADG model, it is five-times better at predicting ambulatory resource use than the age/gender model (Reid, Verhulst et al., 2001, p.15).

The ACG model has been tested and validated extensively in the US, using patient and cost data from public and private health organizations. Validation of the model is based on the R-squared statistic, or the ability of the model to explain variance in expenditures. As well, observing that ACGs with the highest morbidity correspond to the highest costs has provided further validation (Reid, MacWilliam et al., 2001, p.94). Recently, the ACG model was validated using BC and Manitoba patient data, to predict physician FFS payments. The resulting R-squared values are shown below:

<table>
<thead>
<tr>
<th></th>
<th>BC</th>
<th>Manitoba</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/Gender</td>
<td>0.07</td>
<td>0.08</td>
</tr>
<tr>
<td>Age/Gender/ADG</td>
<td>0.52</td>
<td>0.50</td>
</tr>
<tr>
<td>ACG</td>
<td>0.47</td>
<td>0.43</td>
</tr>
</tbody>
</table>

However, testing has shown that all three models have reduced predictive ability when extended to the future.

**Applications**

ACGs have been used in the following applications:
- Capitation payment adjustments in the primary care demonstration project underway.
- Practitioner profiling, to measure variations among physician billings due to patient characteristics (Salem-Schatz et al., 1994, p.872).

It has been noted that ACGs are particularly applicable in funding initiatives that are population based, which is relevant to the current funding model developments initiated by the BC Ministry of Health (Reid, Verhulst et al., 2000, p.2).
APPENDIX G: SENSITIVITY ANALYSIS DATA TABLES
<table>
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<th>New Patients</th>
<th>New Recruitment</th>
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<tr>
<td>Thompson</td>
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<tr>
<td>North Okanagan</td>
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<td>South Okanagan Similkameen</td>
<td>12</td>
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Reproduction of base model (Master Table)
### Difference in Housing due to Migration

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<th>$ Allocation</th>
<th>% Migration</th>
<th>$ Allocation</th>
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<td>84,900,000</td>
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### Migration Effects

- **North Okanagan**
- **South Okanagan Similkameen**
- **Thompson Okanagan**
- **Shuswap**
- **Central Vancouver Island**
- **Northwestern Interior**
APPENDIX H: JAC AND OFSC DOCUMENTATION

JAC Joint Advisory Committee

The Joint Advisory Committee is a partnership between the Ministry of Health's Associate Deputy Minister of Regional Programs and representatives of the health industry. The Committee provides a forum for the Ministry of Health and health stakeholders to address issues of common interest and enhance and encourage collaborative analyses and development of recommendations.

The mandate of the Joint Advisory Committee is to provide advice to the Associate Deputy Minister on the administration of health services across British Columbia.

JAC Terms of Reference

CONTEXT

The creation of the Joint Advisory Committee provides the opportunity to identify and address issues related to the administration of the regionalized health services across British Columbia. This committee provides a forum for the Ministry of Health and health stakeholders to address issues of common interest and enhance and encourage collaborative analyses and development of recommendations.

MANDATE

The mandate of the Joint Advisory Committee is to provide advice to the Associate Deputy Minister on the administration of health services across British Columbia.

FUNCTIONS

1. To identify and prioritize issues, challenges and barriers to effective health system administration.
2. To promote a coordinated approach to population analysis, service requirements, resource allocation and management of the regionalized health care delivery system.
3. To make recommendations to promote equity and system effectiveness and efficiency across the province.
4. To foster a cooperative environment between the Health Authorities, unions and other associations and the Ministry of Health which will provide value-added decision making to ensure British Columbians receive high quality care.

MEMBERSHIP

The membership is composed of representatives from a cross-section of stakeholders with diverse, yet complementary, interests and includes Senior Health Authority, Senior Ministry of Health, Union and Association representatives.
Members are appointed to the Committee in recognition of their individual knowledge, experience and expertise and substitutions will not normally be permitted. Members will be appointed to the Committee for a period of 24 months.

**PROCESS**

The Associate Deputy Minister, Regional Programs, Ministry of Health and Ministry Responsible for Seniors will chair the committee.

Meetings will be scheduled in advance.

Standing Committees will be established to address specific topics. The Chair of each of the Standing Committee will be expected to present reports or position papers to the Joint Advisory Committee and lead the discussion of the issues their group addressed. Recommendations from the Standing Committees require approval by the Joint Advisory Committee.

**ACCOUNTABILITY**

The Committee is to provide advice and make recommendations to the Associate Deputy Minister of Regional Programs, Ministry of Health and Ministry Responsible for Seniors.

The Standing Committees will provide regular reports to the Joint Advisory Committee and submit any documents and/or products resulting from its work.

Secretariat and administrative support to the Committee and its Standing Committees will be provided.

The Ministry of Health has the ultimate decision making authority and accountability.

**REMUNERATION**

Members of the Committee shall not receive remuneration for the performance of activities and will be responsible for their own travel expenses.

**JAC MEMBERSHIP (AS OF SPRING 2001)**

Includes representatives from the Ministry of Health, the Health Authorities, and the Unions and Associations (excluding the BCMA).
OPERATIONAL FUNDING STANDING COMMITTEE

TERMS OF REFERENCE

The creation of the Operational Funding Standing Committee by the Joint Advisory Committee provides the opportunity to identify and address issues related to funding methodologies and resource allocation processes impacting the administration of the regionalized health services across British Columbia. Under the direction of JAC, this committee provides a forum for the Ministry of Health and health stakeholders to address specific issues of common interest and enhance and encourage collaborative analyses and development of recommendations.

MANDATE

The mandate of the Operational Funding Standing Committee is to recommend resource requirements and allocation methods to the Joint Advisory Committee, which promote accountability and are consistent with provincial health system goals; are equitable, consistently applied, understandable and cost effective to administer.

FUNCTIONS

1. To review and make recommendations on the current and medium term (2-3 years) funding requirements and allocation processes.
2. To develop an effective communication process with HAs where HA input is recognized and incorporated and resource allocation is transparent, explained and understood.
3. To liaise with other provinces to exchange resource allocation methods and experience.
4. To develop a regional funding allocation model.

MEMBERSHIP

The membership is composed of representatives from a cross-section of stakeholders and includes Senior Health Authority, Senior Ministry of Health, Union and Association representatives.

Members are appointed to the Committee in recognition of their individual knowledge, experience and expertise and substitutions will not normally be permitted. Members will be appointed to the Committee for a period of 24 months.

PROCESS

The Operational Funding Standing Committee has been established to address specific topics as identified and assigned by the Joint Advisory Committee.

Meetings will be scheduled in advance.

The Chair of the Standing Committee is expected to present reports or position papers to the Joint Advisory Committee and lead the discussion of the issues their group addressed.

Recommendations from the Standing Committees require approval by the Joint Advisory Committee.
ACCOUNTABILITY

The Committee is to provide advice and make recommendations to the Joint Advisory Committee.

The Standing Committee will provide regular reports to the Joint Advisory Committee and submit any documents and/or products resulting from its work.

Secretariat and administrative support will be provided.

The Ministry of Health has the ultimate decision making authority and accountability.

REMUNERATION

Members of the Committee shall not receive remuneration for the performance of activities and will be responsible for their own travel expenses.
## APPENDIX I: URBAN/NON-URBAN/RURAL COMMUNITIES

### URBAN COMMUNITIES

| Abbotsford | Maple Ridge | Shawnigan |
| Aldergrove | Mission     | Surrey    |
| Anmore     | New Westminster | Nanaimo   |
| Brentwood Bay | North Saanich | Vancouver |
| Burnaby    | North Vancouver | Victoria |
| Chilliwack | Penticton    | Westbank  |
| Cobble Hill | Pitt Meadows | Williams Lake |
| Coquitlam  | Port Coquitlam | White Rock |
| Delta      | Port Moody   | Winfield  |
| Duncan     | Richmond     | Peachland |
| Kamloops   | Prince George| Mill Bay  |
| Kelowna    | Saanichton   | Port Alberni |
| Ladner     | Sidney       |          |
| Langley    | Sardis       |          |
| Lions Bay  |             |          |

### NON-URBAN COMMUNITIES

| Agassiz | Enderby | Powell River |
| Alberni | Gabriola | Qualicum Beach |
| Armstrong | Gibsons | Quesnel |
| Brackendale | Harrison | Salmon Arm |
| Campbell River | Hope | Salt Spring Island |
| Castlegar | Kimberley | Sechelt |
| Chase | Ladysmith | Sicamous |
| Chemainus | Lake | Sooke |
| Comox | Nelson | Spallumcheen |
| Courtenay | Oliver | Squamish |
| Cranbrook | Osoyoos | Summerland |
| Davis Bay | Parksville | Trail |
| Davis Bay | | Whistler |
### Rural Communities

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<th>City</th>
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**APPENDIX J: MATHEMATICAL BASE MODEL SUMMARY**

Mathematically, the PNBF base model (including only population and utilization data without further adjustments) can be summarized as follows:

\[ X_{ijk} = \text{population per each of 152 population segments} \]

Where:
- \( i \): Age (19), <1, 1-5, 6-10, ..., >85
- \( j \): Gender (2), M/F
- \( k \): Socio-economic status (4), Aboriginal, Welfare & Disabled, Premium Assistance, and No Premium Assistance

\[ X_{ijkm} \text{ where } m = 1 \text{ to } 18 \text{ regions} \]

Average Provincial Utilization Rate per population segment = 
\[
Y_{ijk} = \frac{\sum R IW_{ijk}}{X_{ijk}}
\]

**Example:** Region A Unadjusted Aggregate Expected Workload \( EWLA \)

\[
\sum_i \sum_j \sum_k (X_{ijk})(Y_{ijk}) = EWLA
\]

Region A Adjusted Expected Workload \( AEWLA \)

\[
\frac{EWLA}{\sum_m EWLM} = AEWLA
\]