



REGIONALIZING HEALTH CARE BUDGETS IN BC

A report prepared by the
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This paper was commissioned by the British Columbia Medical Association Council on Health Economics and Policy to examine the implications of regionalized budgets. This paper serves as a summary of the project group's work. The terms of reference established the group's mandate as follows:

The mandate of the Regionalized Budgets Project Group is to assess the implications of implementation of the proposed Population Needs Based Funding model, as it pertains to physicians, patients and the BCMA.

The intent of the report is twofold: (a) to serve as a basis for discussion with government and (b) to provide members with a summary of implications and issues.

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EXECUTIVE SUMMARY

In 1993, the government of British Columbia announced a health reform initiative labelled “New Directions for a Healthy BC,” thus signalling the birth of regionalization. During the winter of 2001, the number of regions was reduced to six in total. In addition, new administrations were put in place and the Liberal government signalled that performance criteria would be established for the regions and that the regional authorities would be held accountable for their actions. With a new governance structure in place, the Ministry has introduced a Population Needs-Based Funding (PNBF) model that allocates funding to health regions based on the characteristics and utilization patterns of the residents of the region. The fund allocation model will evolve to include all health care services, except the Medical Services Plan, Pharmacare, and the BC Ambulance Service.

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

Including the term “needs-based” in the model title is a misnomer. The model under consideration does not attempt to derive any objective assessment of actual need and is not determinative in nature. Rather, it is simply a tool to allocate a fixed budget amount across a defined number of regions. To the extent that the level of the fixed budget is inadequate, so too will be the regional allocations.

The proposed model has several limitations and its application could result in large, and potentially inappropriate, shifts in funding between regions. In addition to the model, the combined regionalization initiatives create other implications. Regional health authorities may well be faced with the incentive to discontinue or reduce service levels and funding for programs and diagnostic equipment, resulting from the combined application of tight budgets and new performance criteria. Patients may be forced to receive care outside of their region of residence, where travel time to the nearest facility will increase. This may be further complicated if regions are reluctant to receive patients who do not reside within their regional boundary.

As the regional authorities struggle with their new authority, responsibility and accountability mechanisms, there will inevitably be variable criteria applied in deciding which programs will survive and which will be cut. Without effective coordinating mechanisms, which have yet to be demonstrated, serious variations may occur, to the point where the resulting system is no longer providing universal coverage to all BC residents.

As regional health boards begin to exercise greater control in determining those health care services that are provided within a region, medical input into that decision-making structure will be critically important. The inter- and intra-regional allocation of funds may impact physicians’ ability to provide quality care to their patients, due to regional variations in the availability of

resources. Physicians will need to work with the regions to ensure that required programs and equipment are available for patients.

Regional Medical Advisory Committees (RMAC) will play an integral role. They must retain responsibility for effectively communicating the views and concerns of physicians throughout large geographic regions. Coordinated communication structures will need to be established where not currently in existence. This may be amplified by the recent amalgamation of regions, where physicians now have less direct contact at the aggregated regional level than previously at the disaggregated Community Health Council level. This loss of contact deprives the regional authorities of a valued resource and so must be reconstructed in an effective fashion.

To date, no province employing a population-based funding formula has included physician services. Although there are no immediate plans to decentralize the Medical Services Plan budget in BC, incorporation has been proposed for further model developments by government. If this were to happen, the existing mechanisms of a centrally negotiated and managed fee schedule and a uniform claims payment system would almost certainly be extinguished. There is no government interest or management advantage in simply maintaining the status quo with several additional administrative bodies duplicating effort. Alternate payment mechanisms would be pursued.

Regionalizing the MSP budget would be of grave concern to the physician community, raising questions of equity and access, professional autonomy and administrative interaction.

Regionalization initiatives are creating a new dynamic in health care and as change unfolds, new risks and challenges to ensuring appropriate access to care will be encountered. One of those significant challenges involves restoring the morale, involvement and support of the physician community. On the basis of polling data, physicians are frustrated with the current regional funding system, and consistent in their lack of support for increased regional health board influence over health care fund allocations and/or physician payments. This 'cooperation gap' must be closed. Within this difficult and sensitive environment, the physicians of British Columbia offer the following conclusions and observations:

- 1) Of perhaps greatest concern is the effect that further regionalization initiatives may have on the province's health care system. There is a significant risk that devolving increasing amounts of authority and funding to regions will create a balkanized health care system in BC. This risk would be exacerbated by devolving taxing authority to the regions.

The sense of risk will heighten in the absence of solid implementation, accountability and sustainability plans, and explicitly defined performance measures that are effectively communicated to the public and health care providers.

- 2) Physicians remain unconvinced of the theory that health care delivery decisions, or funding allocations, are most effectively made at the regional level. They require reassurance that regional decision-makers will balance the needs and interests of the entire BC patient population when responding to internal pressures to meet financial and delivery targets. Reassurance can only come in the form of a more inclusive and transparent decision process.

- 3) Consequently, BC physicians assert that further regionalization initiatives, including regional funding models, must be designed to reflect and support an overall provincial service plan. That plan must be created on a collaborative basis, with input from physicians, other health care providers and the public at large. This should be a first priority for the government.
- 4) The proposed Population Needs-Based Funding model has several shortcomings that limit its applicability for health system funding, including:
 - The model fails to capture an objective measurement of need;
 - Inadequate adjusters – adjustments for remoteness and complexity are arbitrary and may not reflect real practice;
 - Questionable data quality - population counts and address validity are suspect;
 - Non-current information - a lag of one to two years in data availability exists;
 - Lack of definition - no definition of core services is provided;
 - Uncertainty - annual inter-regional migration and aboriginal population undercounts can affect regional funding allocations by almost 0.5%;
 - Lack of a monitoring process - no model evaluation processes are identified.

Therefore, if the PNBFB model is to be used, improvement efforts must continue, including processes for improving the timeliness of the underlying data. Applying the ACG adjustment mechanisms should be carefully evaluated.

- 5) In the interests of transparency and accountability, further development of the PNBFB model should include input from a broader array of stakeholders, particularly physician groups.
- 6) Of significant concern are the access to care implications related to the issue of patient transfers between regions. These include the adequacy of the funding model to respond to required transfers in a way that will ensure no financial impediments are created, as well as in promoting practical care support, such as the effective use of information technology and air and road ambulance services. These latter initiatives are costly to implement and maintain and will need to be developed and adequately funded by the Ministry if they are to be successful.
- 7) Fair and appropriate mechanisms for paying physicians must be maintained. Physicians are not prepared to enter into contractual or employee relationships that would permit the regional administration to come between them and their patients on clinical matters. Therefore, a plurality of voluntary payment mechanisms that respect the principle of physician autonomy must be available.
- 8) Regardless of the delivery or payment model, patients must be free to choose their health care provider, without interference from any governing authority.

INTRODUCTION

In 1993, the government of British Columbia announced a health reform initiative labelled “New Directions for a Healthy BC,” thus signalling the birth of regionalization. The initiative was to decentralize the health care system in a manner that would address specific local health care, while promoting community-based alternatives to traditional institutional-based care.

A subsequent report in late 1996, “Better Teamwork, Better Care”, redefined the number of established regions, and established a single layer of governance for each geographic area. Control over funding allocation for health care services, except provincially-funded tertiary care programs, Medical Services Plan, Pharmacare, and the BC Ambulance Service, was granted to the new regional authorities.

However, in actual fact, regional funding levels continued to be based on historical budgetary patterns and reflected a degree of built-in rigidity, hampering the authorities’ true ability to internally re-allocate. Specific funds continued to be centrally allocated for specific purposes. The regional governing bodies still had only minimal control over the distribution of health care funding to the residents within their district and remained of the opinion that funds could be allocated among the regions in a more equitable and consistent manner.¹ Consequently, a population based funding model was pursued, with an expressed purpose to make “more effective use of the extensive resources...dedicated to health care” (Prov. of BC, 1996, p. ii).

The initial model was released in 1995, with a final report completed in November 1996. 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 model was not designed to address the adequacy of aggregate funding, but rather to equitably distribute the total of the Ministry’s operating funds to the regions, through a proportional application of age and gender related utilization data, with an adjustment for health status based upon the use of Standard Mortality Ratios to relate socio-economic conditions to health. Interregional flows related to acute care services and adjustments for cost differentials in providing services across regions were also attempted.

This particular model, however, was never implemented, as some key groups, such as the Health Association of British Columbia expressed concerns. Consequently, in May 2000, the Ministry of Health was instructed to refine the approach for consideration for the 2001/2002 fiscal year. In fact, a version of the model was applied to allocate funds to the governing health authorities for the 2002/2003 fiscal year. The new Liberal government has stated the following as 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.

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

This paper provides a description and detailed assessment of the known details of the revised BC funding model, an examination of the potential implications for including the physician funding component under the regional structure and an overall assessment of practicing physician opinion concerning regionalization and regional funding processes.

THE POPULATION NEEDS-BASED FUNDING MODEL

POPULATION NEEDS-BASED FUNDING APPROACH

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

It should be made clear at the outset, however, that including the term “needs-based” in the model title is a misnomer. The model under consideration in BC does not attempt to derive any objective assessment of actual need and is not determinative in nature. Rather, it is simply a tool to allocate a fixed budget amount across a defined number of regions. Allocations amongst regions are based on the relative (not absolute) needs of their residents. To the extent that the level of the fixed budget is inadequate, so too will be the regional allocations.

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).

CURRENT MODEL DEVELOPMENT

Objectives of the Model

The model has been developed with the intention of meeting five guiding principles:

1. **Fair** – there is no penalty for factors beyond the region’s 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** – allocates 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, who are responsible for the health status of their residents, are better equipped than the Ministry of Health to determine the most effective way to deliver those health care services that meet the needs of their residents.

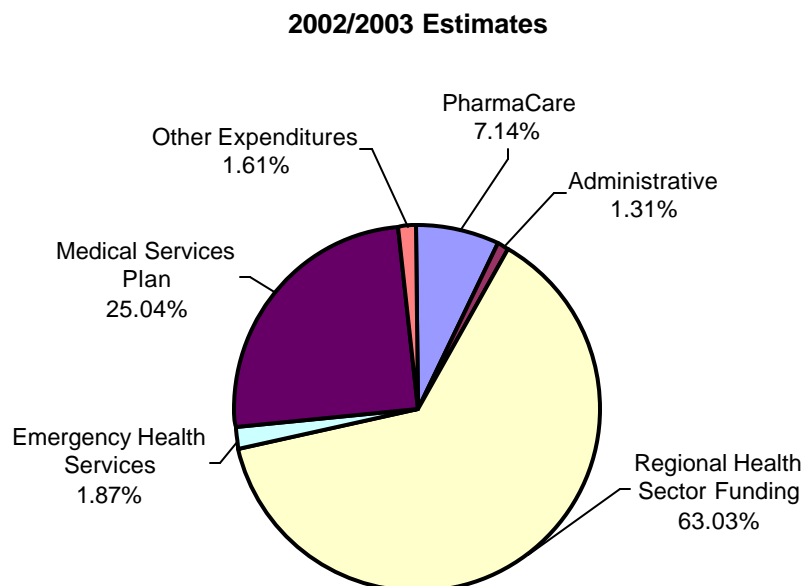
Scope

The BC PNBf model was developed while 18 regions were in existence, comprised of the eleven regions (RHB) and seven Community Health Services Societies (CHSS) (see Appendix B). However, in December 2001, the regional governance structures were amended. The RHB and CHSS designations were collapsed to form five mutually exclusive regional governing health authorities, plus one Provincial Health Services Authority (PHSA) responsible for provincial programs and specialized services, such as cardiac care and transplants. Within the 5 regional authorities, there are 15 Health Service Delivery Areas.

There is no reason to believe that the model would be affected by this change, however, and it is assumed that funds would be distributed to the five new regional governance structures using the same PNBf model format. It is not clear how funds would be subsequently distributed to the Health Service Delivery Areas, but presumably that distribution would be at the discretion of the regions. The Ministry will fund the PHSA directly, which will then be responsible for allocation amongst the various programs under their jurisdiction.

The BC PNBf model is not intended to function as an allocation tool for **all** health care funds provided by the Ministry of Health. 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, 2002, Estimates, p.142).

Figure 1: 2002/2003 Estimated Distribution of Aggregate Health Care Budget in BC



The BC PNB 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. Acute care and continuing care represent a significant portion of Regional Health Sector Funding in Figure 1. In the 2000/2001 model, the acute and continuing care sectors represented 55.27% (or \$4.49 Billion) of the health budget (Prov. of BC, 2000, Estimates, p. 158). Future initiatives include incorporating 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 equipment) are not included in the model. These funds will reportedly continue to be centrally allocated by the Ministry of Health.

DESCRIPTION OF MODEL

Service Sector Fund Allocation

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. Under the PNB model, 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 age (based on nineteen, 5-year age groups, ranging from <1, 1-4, 5-9...80-84, >85), gender and socio-economic status (SES) of residents. The SES categories applied (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.

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.

This segmentation results in the creation of 152 mutually exclusive population groups.

Population Estimates

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 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.

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 formulae) can be found in Appendix A.

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 experience 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.

Population growth rates applied in the model are based on the region's population growth rate from the year(s) prior to the funding year. For example, in preparing 2001/2002 budget figures, population growth rates from 1999/2000 – 2000/2001 or 1999/2000 – 2001/2002 would be applied (Prov. of BC, 2001, PNBf model, p.15).

Interregional Flow

This adjustment is designed to account for the flow of patients receiving health care services in regions other than their home region.

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. Not surprisingly, Vancouver experiences the largest inflow of patients.

According to model documentation, approximately 90,000 EWLs of acute care services are obtained outside of the resident's home region. This represents over 15% of the EWLs province-wide, or over \$31 Million of the aggregate funds allocated to acute care.³

The interregional flow adjustment uses data that is one-year old, and does not reflect any planned program changes or the addition of new institutions which may provide more services to residents and non-residents of the region. The Ministry is attempting to develop a strategy to account for these expected changes in interregional flow as they occur, to ensure funding is adequately and properly allocated in a timely manner.

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

³ $486,714 \div 577,109 = 0.84 = 84\%$ of EWL received in resident's home region. (Prov. of BC, 2001, PNBf Model)

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 non-tertiary 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 climatic conditions. This is a commonly held opinion, but no cost data is 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 complexity factor adjusts 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 as to how best to calculate it. 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. The previous health regions of Capital, Vancouver, and Simon Fraser provide primary and secondary care services at a higher average cost compared to other facilities and regions, due to extra overhead costs caused by maintaining larger facilities and teaching commitments. 4% of the total acute care funding pool has been 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.

MODEL RESULTS

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

The Ministry has 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 and Table 1 illustrate the difference between actual funding and model-allocated funding for the 2000/2001 fiscal year based on the previous regional structure (Prov. of BC, 2001, PNB model supplementary materials)

Figure 2: Acute Care Actual vs. Model Aggregate Funding Allocations 2000/2001

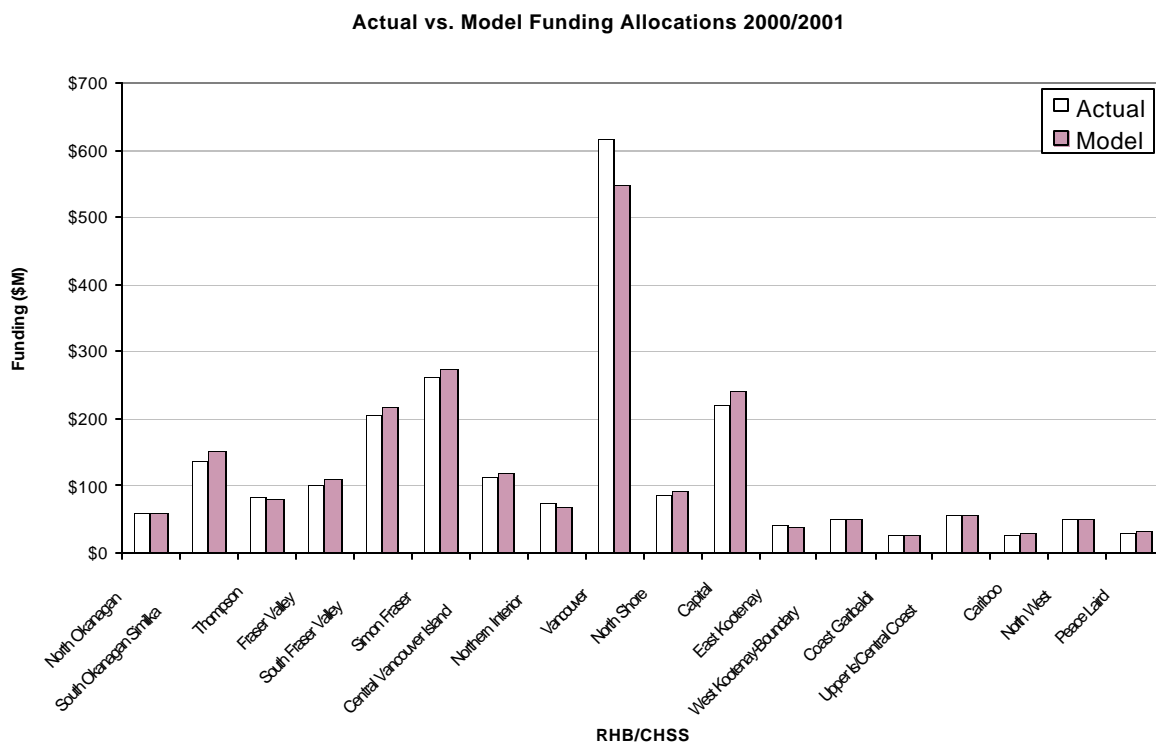


Table 1: Actual vs. Model Aggregate Funding Allocations 2000/2001

Region	Actual (\$M)	Model (\$M)	Difference (\$M)	% Difference
North Okanagan	\$58.59	\$60.87	\$2.28	3.89%
South Okanagan Similkameen	\$137.79	\$152.39	\$14.60	10.60%
Thompson	\$84.37	\$81.67	-\$2.70	-3.20%
Fraser Valley	\$101.99	\$109.21	\$7.22	7.08%
South Fraser Valley	\$205.15	\$215.98	\$10.83	5.28%
Simon Fraser	\$263.24	\$273.46	\$10.22	3.88%
Central Vancouver Island	\$114.32	\$119.22	\$4.90	4.29%
Northern Interior	\$73.64	\$67.42	-\$6.22	-8.45%
Vancouver	\$617.24	\$549.24	-\$68.00	-11.02%
North Shore	\$86.56	\$90.74	\$4.18	4.83%
Capital	\$221.45	\$242.50	\$21.05	9.51%
East Kootenay	\$40.54	\$39.43	-\$1.11	-2.74%
West Kootenay-Boundary	\$50.76	\$49.66	-\$1.10	-2.17%
Coast Garibaldi	\$27.46	\$26.01	-\$1.45	-5.28%
Upper Is/Central Coast	\$56.73	\$57.75	\$1.02	1.80%
Cariboo	\$28.24	\$28.90	\$0.66	2.34%
North West	\$50.63	\$50.80	\$0.17	0.34%
Peace Laird	\$28.67	\$32.14	\$3.47	12.10%

As illustrated in the figure and table above, implementation of the model based on the previous regions would have resulted in substantial shifts in funding – some regions gaining or losing as much as 12% of their annual funding.

Since the new regional governing health authorities are simply groupings of the previous regions, the acute care allocations are aggregated correspondingly to produce the following results:

Figure 3: Actual vs. Model Aggregate Funding Allocations 2000/2001 – New Health Authorities

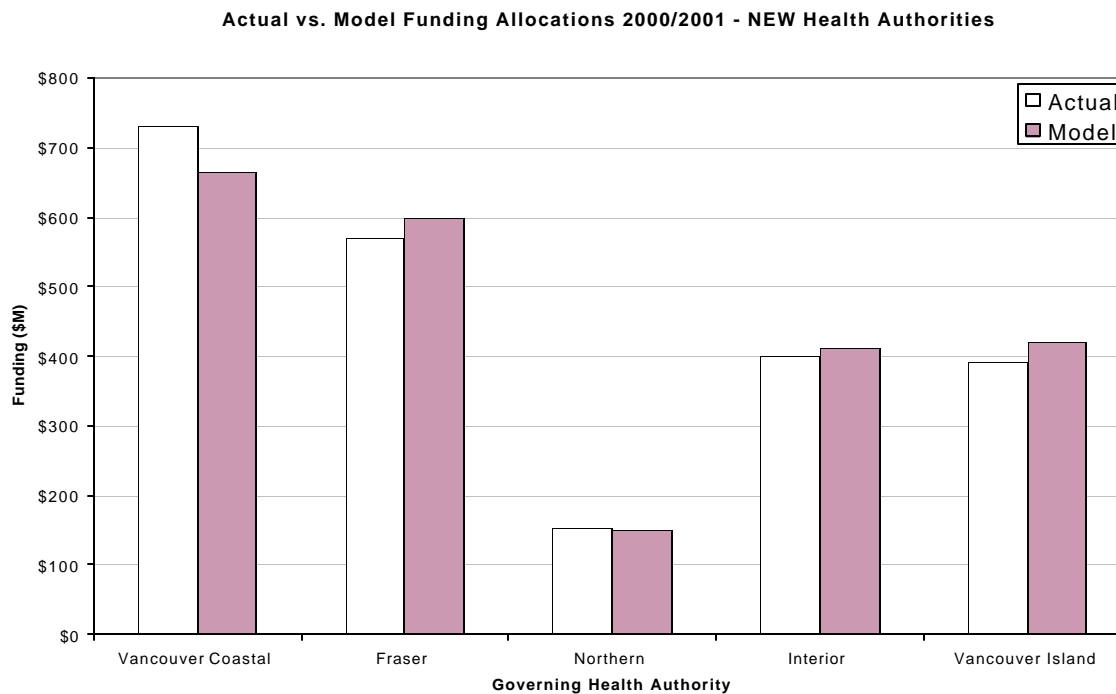


Table 2: Actual vs. Model Aggregate Funding Allocations 2000/2001 – New Health Authorities

Health Authority	Actual (\$M)	Model (\$M)	Difference (\$M)	% Difference
Vancouver Coastal	\$731.26	\$665.99	-\$65.27	-8.93%
Fraser	\$570.38	\$598.65	\$28.27	4.96%
Northern	\$152.94	\$150.36	-\$2.58	-1.69%
Interior	\$400.29	\$412.92	\$12.63	3.16%
Vancouver Island	\$392.50	\$419.47	\$26.97	6.87%

Again, considerable funding shifts occur even with the aggregation of regions as shown in Figure 3 and Table 2.

MODEL STRENGTHS

If health regions truly become more autonomous and accountable, a regional funding model for hospital and community programs could be a useful tool, subject to the ability to effectively track and accommodate interregional patient flow.

Strength #1: Attempt at fairness and equity

From a philosophical point of view, a population needs-based funding model that can provide a more equitable means of allocating funds would be an improvement over the existing method

based on previous funding patterns. All regions would be provided funding using the same consistent approach.

Strength #2: Consideration of special factors

The model recognizes the *need* for special adjustments, such as accommodating for interregional flow, regional remoteness and complexity of providing care in certain regions. The cost of providing care differs from region to region. The model recognizes that these disparities exist.

Strength #3: Responsive to changing population characteristics

A population based funding model endeavours to be more responsive to changes in the characteristics of the population over time, with the incorporation of age, gender and socio-economic status in determining fund allocations. However, this is subject to the model's ability to adjust real-time for interregional flow and migration.

Strength #4: Local input into decision-making

The use of a PNBFB model would facilitate regional health authority decision-making. The intent of this change is to target resources to the local population with the greatest need.

MODEL WEAKNESSES

In the BC PNBFB 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, and the general concept of funding a regional health authority using a population-based model. Others are more technical in nature, related to the actual workings of the BC PNBFB 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. 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.

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 region's expected workload relative to the expected workload 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, only that regions will receive funding proportionally to other regions.

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 ineffective 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. Geographic boundaries should be defined to reflect established patterns of travel, movement and service, 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.

It is recognized that health authority boundaries are established by legislation, external to the PNBFB model development process. Nonetheless, further research into the appropriateness of the boundaries should have been considered prior to implementation. The reduction in the number of regions from 18 to 5 will minimize the effect of the boundaries on interregional flow to some degree. However, the change of the regional boundaries did not occur with respect to the model and did not directly address the suitability of the regional boundaries for model implementation. For example, one of the dividing lines between the new Vancouver Coastal Health Authority (Vancouver/Richmond, North Shore, Coast Garibaldi) and the new Fraser Health Authority (Simon Fraser, South Fraser, Fraser Valley) exists along Boundary Road, also the border between the cities of Vancouver and Burnaby. This regional boundary is extremely artificial, since numerous Lower Mainland residents live on one side of Boundary Road, and cross to the other side everyday for work, school or recreation.

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. This is due to the model's focus on relative need, not actual. 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 process remains based on historical allocation patterns.

The aggregate funds allocated to each service sector will obviously affect the funds distributed to a region to deliver health care services. The method of determining sector allocations must be transparent, and allocations should be consistent with the model methodology. For example, if the percentage of BC residents who were over 65 years old were to increase, this would directly affect the level of funding required by the Long-Term care sector.

Weakness #5: Funds non-transferable between service sectors

One of the major potential advantages of a PNBFB model is the flexibility that it permits a decentralized body to reallocate resources when required. However, the BC PNBFB model prohibits fund transfers **into** the acute care sector. This restriction may limit patients' ability to access the health care services they require most.

Weakness #6: Core services not defined

“Core services” may be mandated by the Ministry of Health, or may be independently defined by each of the regional health authorities. In the latter case, the regional health authorities would be under no obligation to provide the same scope of services to its residents as compared to services offered in other regions. Regions operating as mutually exclusive units may be inclined to exclude services, reckoning it would be less expensive to send patients to another region than to provide resource-intensive services themselves. If several regions assume this position and do not look beyond their regional boundaries, the availability of certain 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.

Weakness #7: No performance measures defined

The underlying rationale for developing and implementing a population-based model is the perception that things are not working. The implementation of this model would initiate change, granting regions additional responsibilities.

However, exactly what needs to be improved is not clear. Without that knowledge, it is impossible to know what to measure, or how to gauge improvements. There can be no a priori reason to believe that a PNB model will fix or remove the problem, if there is no explicit definition of the problem. The Ministry is currently trying to address this issue by specifying performance targets in the 2002/2003 health authority performance contracts.

Weakness #8: Inability to measure impact on patients

Ultimately, the 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. However, if regions choose to not provide certain services, this will affect patient accessibility to services. Regions may determine it is more efficient to send patients to other regions for care than provide the services within the region. There has been no work to determine how to measure the patient impact of such a reallocation.

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 funds will actually be allocated in an effective and efficient manner. Measuring the model’s effectiveness without understanding whether the weakness lies in the allocation or in the spending will make evaluation difficult.

Technical Flaws

Weakness #10: Accuracy of residential addresses

Population statistics are the backbone of this model. Without accurate information on the addresses of residents, the model will misallocate funds.

Numerous address discrepancies exist between the Medical Services Plan (MSP) and the Ministry of Social Development and Employment Security (MSDES) databases, for Welfare & Disabled 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 (Prov. of BC, 2001, PNB Model supplementary materials).

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 an 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 premiums) 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. Pharmacists have access to update resident addresses; 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.

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 especially 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 very conservative estimate that addresses for 1% (or 1 in 100) NPA residents are incorrect, the result is a wrongful allocation of approximately 29,431 residents.⁴ The misallocation of NPA individuals, if not consistent across all regions, could have considerable financial consequences.

⁴ 1% * 2,943,135 (NPA estimated population) = 29,431

Weakness #11: Migration

Inter-regional migration should be accounted for in the BC PNBFB model. The impact of its exclusion is to under-finance those regions receiving an influx of residents, such as the Vancouver Coastal Health Authority, and to over-finance those regions with departing residents, such as the Northern Health Authority.

Weakness #12: Segmentation by non-premium assistance

Currently 73%, or almost 3 in 4, of British Columbians are categorized as NPA in the BC PNBFB model. However, residents are denoted as NPA by default – by calculating the difference between a region's total population 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 (National Council on 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/hour⁵, while the minimum wage in BC is \$8.00/hour, effective November 1, 2001. As a result, individuals earning barely over the LICO are calculated to have the same health care needs as individuals with substantially higher annual incomes. This contradicts an underlying assumption in the model that income or poverty is an indicator of health care need. The Ministry has recognized this as a major issue, and is currently investigating alternate methodologies to address this weakness.

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 division 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 poorer living conditions. However, the model assumes that the 153,000 aboriginals counted by the census (Status and Non-Status) have the same utilization rate as the 105,000 aboriginals for whom there are MSP utilization records (Status only). 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 their spouse or employer's MSP coverage may not be identified as Status Indian, further affecting the accuracy of the MSP utilization database (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

⁵ Assume 40 hours/week * 50 weeks = 2,000 hours. \$18,371/2,000 hours = \$9.19/hour

accounting for age and gender” (Verhulst et al, 2001, p. 330). Age and gender explain only a small amount of the variation in resources used by patients (Verhulst et al, 2001, p.330).

Weakness #15: Use of resource intensity weights (RIW) to calculate utilization

It is logical to assume that the average RIW for a given population segment is consistent across regions in the province – given no evidence to indicate otherwise.

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 RIWs assigned to BC cases.

Also, the RIWs are vulnerable to manipulation on a provincial scale. Although utilization rates are calculated at the provincial level, 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.

Weakness #16: 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%, or \$90 Million in the 00/01 model, was determined to be reasonable and fair by the subjective analysis of the Joint Advisory Committee and the Health Association of BC. No work has been completed to validate the magnitude of this allocation.

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.

As well, the very need for a complexity adjustment is uncertain, due to the model’s use of Resource Intensity Weights to drive fund allocations. RIWs are theoretically designed to capture the complexity of patient care.

Weakness #17: 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 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 into the community from nearby regions. The Ministry recognizes that additional funds will be required external to the PNB model to initially accommodate major program re-adjustments.

Weakness #18: 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 a rate of 2.2% (Indian and Northern Affairs, 1997).

SENSITIVITY ANALYSIS

Since the BC PNB model is highly dependent upon the quality of population-related data, a sensitivity analysis was undertaken to determine the effect of small, known fluctuations in the data. This required the reconstruction of the BC PNB model, followed by a study of the effects of known aboriginal population undercounts and intra-provincial migration, which are the two areas that lend themselves most readily to analysis.

Unfortunately, all of the data elements necessary to reproduce the model could not be obtained from the Ministry. Consequently, the reproduction herein was based partially on estimates and subsequently aggregated up to the five new regional areas. Although not an ideal estimation approach, no alternative was available.

ABORIGINAL POPULATION

The explicit number of aboriginals living in the province of BC is 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 population figure chosen for use in the model was the census estimate of aboriginals living in BC, stated as 153,224. However, Statistics Canada admits that due to inaccessibility issues, approximately 44,000 aboriginals are missing from their national count (Stats Canada, 1998, para. 58). This translates to about 7,700 individuals in BC. These people may be missing from the model counts entirely, but at best would be incorrectly categorized by socio-economic status. Even assuming this best case, since the aboriginal population tends to have higher utilization rates, some misallocation of funds would result.

MIGRATION

Migration can be defined as intra-provincial (population flow among the regions of BC) or inter-provincial (to and from the province). In 1998/99, 91,200 people migrated within BC.

Migration data for the funding year are not included in the BC PNB model. The model is based on population estimates (along with all other related data) from the previous year. Therefore, funding for migrating individuals during the year of funding will not be correctly allocated. Individuals will migrate during the year, and subsequently, their "new" regions will in turn be expected to provide them with care. However, the model will not allocate funds to their "new" regions. The funding for these individuals will be in the hands of their region of origin, since the

model is based on their previous address of residence. The funding model will eventually adjust for these differences, but only a year later.

Migration projections by BC Stats for the next several years show annual variations in the thousands in net intra-provincial flow across regions (BC Stats, 2001). By introducing historical migration patterns to the model, assessments of the single year funding misappropriations were derived.

THE IMPACT

The combined effect of these two factors on the regional allocations is outlined in Table 3. The impact is most significant for the Northern governing health authority, representing approximately 0.5% of their annual budget.

While the effects may appear relatively small in magnitude, they must be considered in the context of the regions' budget directive of 0%, 0% and 0% for the next three years (on top of their current deficit positions) and the associated responsibility of the regional authorities to ensure their budgets are not overspent.

Table 3: Combined Effect of Undercounted Aboriginals and Migration on Acute Care Fund Allocations

<i>Governing Health Authority</i>	<i>\$ Difference (Aboriginal)</i>	<i>\$ Difference (Migration)</i>	<i>Net Effect</i>	<i>Base model allocation</i>	<i>% Difference</i>
Vancouver Coastal	(\$459,271)	\$1,779,603	\$1,320,332	\$665,990,000	0.198%
Fraser	(\$582,172)	(\$153,761)	(\$735,933)	\$598,650,000	-0.123%
Northern	\$752,831	(\$1,405,481)	(\$652,650)	\$150,360,000	-0.434%
Interior	\$172,035	\$444,084	\$616,119	\$412,920,000	0.149%
Vancouver Island	\$116,578	(\$664,444)	(\$547,866)	\$419,470,000	-0.131%

Health region administrators will be required to manage their regions under these very strict budgetary constraints. Anywhere from 80%-95% of the costs of 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 these funding allocations is far more substantial than it initially appears.

Regardless of what methodology is used, the model is sensitive to the population figures, and inaccuracies can have significant implications.

ANTICIPATED MODEL MODIFICATIONS

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

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 is the backbone of registered patient information
- Exploration into the use of Adjusted Clinical Groups (ACGs) rather than Age/Gender/SES segments to determine a population’s relative need for health care.

Adjusted Clinical Groups (ACGs) were developed by Johns Hopkins University to describe the morbidity of a population. ACGs do not group across similar illnesses; instead, they group across unrelated illnesses requiring similar resource intensities. Based on past diagnostic data, patients are classified into an ACG, which relates to their relative need for health care. There is preliminary evidence to support the relationship between ACG and utilization of health care services, using BC specific data, although more investigation is warranted. Using ACGs may allow for better recognition of the needs of a population, categorizing by actual morbidity rather than by age/gender/SES, assuming that the diagnostic information is reasonably accurate.

- Revision of the complexity factor adjustment – both the method and the amount allocated
- Use of target interregional referral patterns rather than historical records

In addition, data quality, especially population estimates, must continue to be assessed given that it is critical to the model’s ability to accurately allocate funds to the regions. Although the Ministry believes the data is adequate to facilitate immediate implementation, there should be several information system improvements undertaken. Specific initiatives and explicit plans must be prepared and targeted on improving the data collection and monitoring processes, in order to minimize and control future data quality concerns.

IMPLEMENTATION

The Ministry’s implementation plan has not been explicitly defined. To ensure the successful implementation of such an expansive model, it is critical that an effective plan is developed considering:

- Timing of implementation of each funding component
- Defining reporting/auditing responsibilities and accountability
- Proposed evaluation of the impact of model
- A strategy for improvements and enhancements to the model

Of these various factors, accountability will be key, 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, which should measure, at least in part, the impact of the implementation on the delivery of health care in BC.

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.

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 objectives and provincial service standards.

On a final note, implementation and administration at the provincial and regional levels will introduce additional costs. The provincial government will assume new costs, since determining fund allocations with the model will require more effort 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 and data sources used (Hutchison et al, 1999, p.30).

Moreover, while more flexible, 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 incurred additional costs by assisting the regions with their annual planning, budgeting and monitoring process.

REFLECTIONS ON MODEL EXPANSION: THE MEDICAL SERVICES PLAN BUDGET

INTRODUCTION

To date, no province employing a population-based funding formula has included physician services. The tradition of provincially negotiated physician remuneration has been maintained throughout Canada. Although there are no immediate plans to decentralize the Medical Services Plan budget in BC, incorporation has been proposed for further model developments by government.

The Ministry holds that the current fee-for-service compensation system presents a management challenge for government, since it is impossible to exactly predict and contain physician expenditures. The government solution has been to pro-rate physician payments, thereby straining 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 Health Association of BC has explicitly 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).

This view is also demonstrated in the reports of the Alberta Premier's Advisory Council and the Saskatchewan Commission on Medicare. The Alberta report makes an explicit recommendation that funds be allocated to the regional health authorities to directly contract with physicians for certain services. The report authors suggest that initially 25% of the Medical Services Budget be allocated for this purpose, with increased allocations based on measured successes and acceptance from stakeholders (Province of Alberta, 2001, p.67). The Saskatchewan report states that health districts have the mandate to organize and manage providers through contracting provisions (Fyke, 2001, p. 1).

In a practical sense, what would regionalizing the MSP budget actually mean? The answer to that question has many facets, depending upon the precise funding and remuneration structure that would be employed. There are many options here and the implications for providers and the public vary considerably. One thing is certain, however; the existing mechanisms of a centrally negotiated and managed fee schedule and a uniform claims payment system would be extinguished. There is no interest or management advantage in simply maintaining the status quo with several additional administrative bodies duplicating effort. Alternate payment mechanisms would be pursued, thus first necessitating a mechanism for fund transfer to the regional authorities.

FUNDING THE REGIONS

There would appear to be three logical approaches to fund transfer; 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 an ACG based methodology. However, the PNBf model approach would appear to be the most likely as the ACG method is insufficiently tested for use and the historical pattern approach runs contrary to the very essence of the 'population based' philosophy. This approach is further examined below.

Using the PNBf approach, 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 strictly on the regional population-based formula.

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

The PNBf model allocates funds according to the region's *relative* need and the same methodology could be applied to the MSP budget. Since expected workloads are calculated based on resource intensity weights (RIW), which supposedly represent resource requirements, including physicians, the assumption is that the EWL will also reflect the proportional cost of providing physician services to the region's residents.

A comparative study was undertaken to determine the difference between the actual 2000/2001 distribution of physician fee-for-service payments by patient LHA and the EWL distribution of physician funds according to the model. 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.

Figure 4 illustrates the percentage of actual FFS payments distributed compared to the EWL estimates per region, and demonstrates the existence of large gaps. The percentage differences are substantial in some regions. For example, in the Capital Health Region the actual expenditures are 1.27% higher than the EWL would have allocated in the 2000/2001 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.⁶

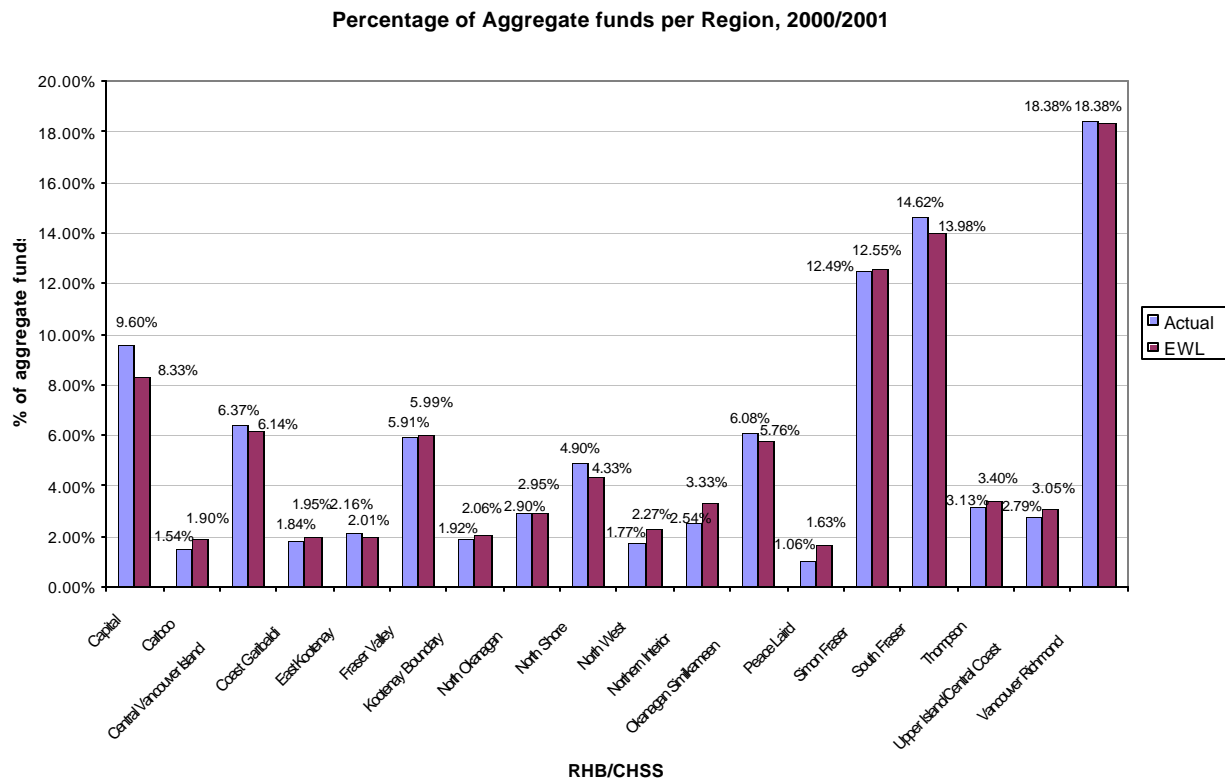
2) Allocation based on Population Characteristics

A second alternative for determining allocations to the regions could be based on the same methodology as the proposed PNBf model, i.e., based on the 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. Due to unanticipated delays within the Ministry of Health, the required data was not received prior to completion of this report.

⁶ 1.27% of \$1,548,957,341.89 = \$19,738,576.45

Figure 4: Actual vs. Expected Workload FFS Allocations per Region, 2000/2001



Regardless of the choice of allocative model, it is apparent that the majority of weaknesses identified for the PNB model itself would continue to apply to the physician component. In particular, a further interregional adjustment would be required to account for the increased tendency for ambulatory patients to receive medical treatment outside the borders of their region.

It is not suggested that the results of this re-allocative analysis reflect the precise nature of what may transpire under a regionalized model. However, it is indicative that massive funding re-allocations would be expected. The effect that these would have on service availability, patient accessibility and physician supply distribution can only be imagined.

PAYING PRIMARY CARE PHYSICIANS

The subsequent distribution of funds by the regional health authorities to individual primary care physicians could take a variety of forms, including fee-for-service (FFS), contract, capitation, and partial capitation (blend of FFS and capitation) and it is anticipated that there would be elements of each found throughout the region. These are briefly reviewed below.

Fee-For-Service (Region-Specific Fee Schedules)

This option is based on the continued use of fee schedules to determine physician payments; however, these fee schedules would be determined on a region-to-region basis. Fee-for-service (FFS) allows physicians to maintain their professional autonomy and remains as the favoured means of remuneration for physicians. FFS offers the greatest level of assurance that services will be available, particularly where physician supply shortages exist.

The administrative costs of establishing and maintaining separate regional fee schedules would be significant.

Contracts

There is a small, but continuing, interest in contracts amongst the physician community as their preferred means of remuneration. Contracts provide physicians with a secure and predictable income. As well, salary/contract compensation systems provide administrators with fixed expenses for a fiscal year. Contracts tend to restrict the level of service provided due to quotas or hourly limitations and thereby patients may be more limited in their ability to access physician services.

Administrative costs may be less than with other alternatives.

Capitation

Capitation, a population-based compensation system where each primary care physician is paid per individual patient registered (rostered) with their practice for continuing care, has been used in numerous countries, including the United Kingdom and the United States. Capitation limits the total financial exposure of the regions for medical care, but the associated financial risk is transferred to the capitated physician group. Capitation provides an incentive to under service patients and increases the potential to engage in risk selection (i.e. “cream-skim”, or turn away those patients with greater health care needs). Also, there is greater incentive for primary care physicians to offload care to non-capitated physicians (i.e. Specialists).

The use of a capitated system for primary care physician remuneration in Canada is considered by some policy advisors to be the best alternative to controlling costs, while encouraging physicians to promote good health among their patients. However, very few BC physicians are interested in capitation and public interest is not seen to be high.

Again, administrative costs could be expected to be high, particularly due to maintaining patient rosters.

Partial or Blended Capitation

Capitation is seldom used as the sole source of remuneration and is frequently accompanied by FFS payments in some form. In fact, a small number of BC primary care practices are operating under a blended capitation type payment structure. These approaches result in a greater degree of

risk sharing between the physician and payment authority, but at a resulting increase in administrative cost and inefficiency.

The impact on access to care varies with the specific blend arrangement and the associated incentives that the diverse payment modalities provide.

While each of these payment modalities are an option, it is clear that if regional administrators are to be held accountable for balancing budgets and achieving specified service delivery goals, then some of these payment options hold greater management potential than others. Advocates of regionalizing the MSP budget do so for two main reasons; flexibility and control. Managers are looking to gain the flexibility to respond to their perceptions of community needs by offering specific physician services in particular locations. They seek control to assist in co-opting physicians to share accountability for achieving the established regional goals. In each case, professional autonomy would be at risk and the potential increased for the administration to come between patient and physician on clinical matters.

IMPLICATIONS OF REGIONAL BUDGETING

Implementation of the PNB model will result in changes in the delivery and management of health care services. No one will be unaffected. Patients, physicians, regional health authorities and the Ministry of Health will all be impacted. A brief assessment of the various implications follows. In each case, the implications with respect to the proposed general funding model are discussed first, with subsequent commentary on any additional ramifications of expanding the model to include the MSP budget.

PATIENTS

The most serious implication for patients would be the resulting changes in access to health care services.

Regional health authorities may well be faced with the incentive to discontinue or reduce service levels and funding for programs and diagnostic equipment, resulting from the combined application of tight budgets and new performance criteria. Patients may be forced to receive care outside of their region of residence, where travel time to the nearest facility will increase. This may be further complicated if regions are reluctant to receive patients who do not reside within their regional boundary. Since regions will plan to care for the population they are funded for, accepting patients from other regions may strain their limited resources and cause accessibility problems for their own residents. Inadequate fund transfer mechanisms between regions will discourage regions from accepting transferred patients.

Refusal to admit patients from other regions is already a reality in BC. A BC Ministry of Health initiative, BCBedline, was established in the Summer of 2001 to assist health care providers in transferring patients needing a higher level of care than is available in their own community. However, within the first few months of implementation, BCBedline encountered authorities that

refused to accept patients from outside their region (Prov. of BC, 2001, bcbeline). Similar instances will be encountered under the PNB model.

Of equal importance is the increased possibility for balkanization of BC's health care system. As the regional authorities struggle with their new authority, responsibility and accountability mechanisms, there will inevitably be variable criteria applied in deciding which programs will survive and which will be cut. Without effective coordinating mechanisms, and these have yet to be demonstrated, serious variations may occur, to the point where the resulting system is no longer providing universal coverage to all patients. This situation could be exacerbated if, as recommended by the Alberta Premier's report, regional health authorities were granted the authority to raise additional revenues to augment the regional health funding allocations (Province of Alberta, 2001, p. 62). The uneven geographical distribution of wealth in the province would impact directly on the availability of care.

Regionalizing the MSP budget would further affect patients' access to required care as regional health authorities choose to contract with physicians of varying specialties and establish, or de-establish, programs and, potentially, standards of care. Where physician services are concerned, inter-regional transfer of care issues are even more problematic. For example, one of the dividing lines between the Vancouver Coastal Governing Health Authority and the Fraser Health Authority lies on Boundary Road, concurrently the dividing line between the cities of Vancouver and Burnaby. Numerous residents of neighbouring cities cross these regional boundaries daily to live, work and play. However, if the MSP budget were realized, ease in accessing physician resources could well be affected by crossing that road. Funds for physician services will not "follow the patient" due to the time lag in the availability of utilization data. As a result, regions may not be adequately funded in a fiscal year to provide the physician resources required by their residents.

Regionalization of the MSP budget could also have an impact on patients' ability to choose amongst physicians. Depending on the types of contractual arrangements that are sought and implemented between the authority and physicians, patients may be coerced to exclusively receive care from physicians funded by their region of residence, rather than from the physician of patient choice. Patients would view this as an intrusion and barrier to the normal relationship with their physician and the doctor's consequent ability to advocate on behalf of their patients' interests.

PHYSICIANS

As regional health boards begin to exercise greater control in determining those health care services that are provided within a region, medical input into that decision-making structure will be critically important. The inter- and intra-regional allocation of funds may impact physicians' ability to provide quality care to their patients, due to regional variations in the availability of resources. Physicians will need to work with the regions to ensure that required programs and equipment are available for patients.

Regional Medical Advisory Committees (RMAC) will play an integral role. They must retain responsibility for effectively communicating the views and concerns of physicians throughout large geographic regions. Coordinated communication structures will need to be established where not currently in existence. This may be amplified by the recent amalgamation of regions, where physicians now have less direct contact at the aggregated regional level than previously at the disaggregated Community Health Council level. This loss of contact deprives the regional authorities of a valued resource and so must be reconstructed in an effective fashion.

Regionalizing the MSP budget would be of grave concern to the physician community, raising questions of equity and access, professional autonomy and administrative interaction:

a) Equity and access

- Physicians must receive equal fee for equal work, regardless of patient or physician location, while recognizing the additional cost of practice in NIA designated areas,
- The relative value of services may change, both within and between regions. Physicians providing identical services may be remunerated differently dependent on their region of practice,
- Physicians treating patients from other regions may be remunerated inconsistently, as pay may be based on the fee schedule in patient's region of residence,
- Regional health authorities could limit physician access to hospital facilities arbitrarily, affecting a physician's ability to provide care to patients.

b) Professional autonomy

- A physician's ability to practice in the community or region of their choice may be affected, since the regions will have the authority to determine which medical services and practices are funded within their region,
- Physicians are at risk of losing significant investments in infrastructure and equipment based on arbitrary decisions regarding regional physician funding,
- Physicians may be under increased pressure from regional health authorities to be compensated under alternate payment plans. The ability to choose one's method of remuneration may be compromised, as it may be conditional of employment,
- Contractual obligations may require physicians to be more actively involved in budget management, creating a potential conflict between patient and administrative accountability related to clinical decisions.

c) Administrative interaction

- Regional health authorities may have the power to reallocate physician funds within the “global” regional budget, shifting physician funds to fund other sectors based upon local priorities,
- Overhead costs associated with negotiations would increase over the current system, as physicians would be required to conduct individual or small cell negotiations within each region. The costs of these negotiations would be shared across a smaller number of physicians than currently exists.

REGIONAL HEALTH AUTHORITIES AND THE MINISTRY OF HEALTH

The expanded regional health authorities’ role in the delivery of health care services will require additional administrative personnel, resources and costs. Regional administrators will have additional responsibilities and accountabilities given the increased magnitude and importance of their decision-making. However, the administrative responsibilities will also depend on the degree to which fund allocations by health care sector are pre-prescribed by the Ministry of Health.

It is not clear from the PNBf model documentation if discrete funds will be allocated to regions to assist with the added administrative costs associated with model implementation. Rather, regions may be required to apply funds allocated for acute and continuing care to administrative purposes, place an additional strain on financial resources.

As noted earlier, the model allocations are based on poor quality population data. As a result, regions may not be allocated sufficient funds to properly meet the service requirements of its residents. Moreover, regional flexibility over fund allocations will result in competition between programs within each health care sector. Without the collection of relevant and supporting data, fair and informed choices amongst programs will be problematic.

At the provincial level, the Ministry of Health will experience challenges in balancing power and accountability. Although regional authorities will technically be granted power and responsibility over the provision of health care within their region, the Minister of Health will ultimately be accountable to the public for the state of health in the province. It will be essential that the Ministry of Health monitor and evaluate regional health authority resource allocation decisions to ensure that patient needs are consistently met for all residents of the province.

However, the current information systems in place may not support the evaluation of the effectiveness of regional decision-making. Without consistent, current data, it will be extremely difficult for the Ministry of Health to accurately determine the effect of the shift of power and responsibilities to the regions. As a minimum, it is essential that the Ministry of Health maintain control over all data collection systems, to ensure consistency in data collection and information system maintenance and support.

With respect to the physician sector, administering the MSP budget at a regional level will require additional resources and incur further expense. Regional health authorities will likely require additional expertise in negotiations, economic analysis, policy and communication to properly manage regional fee schedules, contracts and the allocation of funds. Depending on a region's effectiveness in negotiations, it may be very difficult for a region to acquire and retain needed physicians. As with other health services, the Ministry will be required to monitor the regional authorities, to ensure that medical funds are fairly and consistently allocated to practitioners in the region.

A NOTE ON THE LEGAL RAMIFICATIONS OF REGIONALIZING THE MSP BUDGET

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.

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").

The clauses relevant to the regionalization of the MSP budget are as follows:

1. The sole function of the Commission is to facilitate reasonable access to health care in a manner that is provided under the Act (Section 3, Item 3)
2. The duties the Commission is authorized to carry out are outlined in Section 5 of the Act - the Commission can do no more or less than stated. They include administering the Act on a non-profit basis, 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, entering into arrangements and making payments for the costs of rendering benefits that will be provided on a fee for service or other basis, and exercising other powers or functions that are authorized by the regulations or the minister. The Commission is permitted to enter into payment arrangements with regions, rather than physicians, including 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 (Section 13, Item 3).

As well, the practitioner must submit the service particulars to the Commission in order to receive payment (Section 27, Item 1). As a result 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 (Section 27, Item 4). However, the powers of the Commission also include the ability to set up fee schedules that differ by category of practitioner (Section 26, Item 1). Those categories may be based on a specified geographic area, category of practitioners, category of practitioners within a specified geographical area, or a specified benefit or class of benefits within a specified geographic area (Section 26, Item 4).

Further powers over the fee schedule include the commission's ability to modify, or even remove, payment schedules (Section 26, Item 3). As a result, 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.

Second Master Agreement (SMA)

The Second Master Agreement is the principal agreement that outlines the relationship between the Government of BC and the BC Medical Association. It is a binding, legal agreement between the BCMA, Medical Services Commission 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 mitigates the Government's power to do so, so long as physicians do not withdraw services.

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.

PHYSICIAN OPINION ON REGIONAL STRUCTURES AND BUDGETING

Given the potential implications and possible upcoming implementation of the Population Needs-Based Funding model, the BC Medical Association canvassed its members with respect to their understanding and possible acceptance of the proposed model. In the Fall of 2001, a survey was distributed. The survey was also designed to gather physician opinion on the potential inclusion of the Medical Services Plan budget in the funding model.

SURVEY PROCESS

Physicians were stratified based on their type (GP or Specialist) and location of practice (Urban, Non-Urban or Rural), using pre-established definitions:

- Rural: Physicians practising in the Northern Isolation Allowance (NIA) communities were determined to represent rural physicians. Physicians in NIA communities are in remote areas, such as 100 Mile House, Terrace and Revelstoke (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 and the required sample sizes for the stratified groups are presented in Table 4:

Table 4: Stratified Physician Group Populations and Sample Sizes

Stratified Physician Group	Population	Target ⁷	Sample Size ⁸
Rural – GP	301	169	301 (population of Rural GPs)
Rural – Specialist	90	73	90 (population of Rural Specialists)
Non-urban – GP	359	186	359 (population of Non-urban GPs)
Non-urban – Specialist	155	111	155 (population of Non-urban Specialists)
Urban – GP	2562	334	668
Urban – Specialist	3551	347	694
TOTAL	7018		2267

A total of 898 surveys were returned as of October 17, 2001. Survey responses were weighted as required to reflect the opinions of the membership overall.

OPINION ON THE CURRENT REGIONAL FUNDING MODEL

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

- The majority (58.3%) of physicians do not believe that funding is distributed equitably amongst the regions in BC. 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 inadequately 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.

OPINION ON THE POPULATION NEEDS-BASED FUNDING MODEL

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 physician remuneration methods and administration:

- Approximately 60% of physicians were unaware that this model is currently under consideration.
- Almost 70% of physicians rate their regional health board (pre-reorganization) as incapable, or somewhat incapable, at effectively managing the delivery of health care services. Urban

⁷ Target sample sizes (n') were calculated using the Finite Population Correction Factor formula.

⁸ Sample sizes were calculated assuming a 50% response rate based on past BCMA survey experience. Where the target sample size was more than half the population, the entire stratified population was surveyed.

physicians are more likely to have less confidence in the capabilities of their regional health boards.

- 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 is 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 is 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: GPs are more likely to favour the BCMA, while 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 regions, alternate payment contracts and on-call payments are the most frequently chosen option, 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 three ways, among very interested (32.7%), neutral (36.2%) and not interested (30.7%).
- The majority of physicians (58%) oppose or strongly oppose the idea of region-specific fee schedules.

CONCLUSIONS

Over the course of the past nine years the BC Ministry of Health has pursued, without success, the development of a functional regional model for the management and delivery of health care services. During the winter of 2001, the number of regions was reduced to six in total. In addition, new administrations were put in place and the Liberal government signalled that performance criteria would be established for the regions, and that the regional authorities would be held accountable for their actions. With a new governance structure in place, the Ministry has introduced a Population Needs-Based Funding (PNBF) model that allocates funding to health regions based on the characteristics and utilization patterns of the residents of the region.

These initiatives are creating a new dynamic in health care and as change unfolds, new risks and challenges to ensuring appropriate access to care will be encountered. One of those significant challenges involves restoring the morale, involvement and support of the physician community. Overall, physicians are frustrated with the current funding system, and consistent in their lack of support for increased regional health board influence over health care fund allocations and/or physician payments.

Within this difficult and sensitive environment, the physicians of British Columbia advance the following conclusions and observations:

- 1) Of perhaps greatest concern is the effect that further regionalization initiatives may have on the province's health care system. There is a significant risk that devolving increasing amounts of authority and funding to regions will create a balkanized health care system in BC. This risk would be exacerbated by devolving taxing authority to the regions.

The sense of risk will heighten in the absence of solid implementation, accountability and sustainability plans, and explicitly defined performance measures that are effectively communicated to the public and health care providers.

- 2) Physicians remain unconvinced of the theory that health care delivery decisions, or funding allocations, are most effectively made at the regional level. They require reassurance that regional decision-makers will balance the needs and interests of the entire BC patient population when responding to internal pressures to meet financial and delivery targets. Reassurance can only come in the form of a more inclusive and transparent decision process.
- 3) Consequently, BC physicians assert that further regionalization initiatives, including regional funding models, must be designed to reflect and support an overall provincial service plan. That plan must be created on a collaborative basis, with input from physicians, other health care providers and the public at large. This should be a first priority for the government.
- 4) The proposed Population Needs-Based Funding model has several shortcomings that limit its applicability for health system funding, including:

- The model fails to capture an objective measurement of need;
- Inadequate adjusters – adjustments for remoteness and complexity are arbitrary and may not reflect real practice;
- Questionable data quality - population counts and address validity are suspect;
- Non-current information - a lag of one to two years in data availability exists;
- Lack of definition - no definition of core services is provided;
- Uncertainty – annual inter-regional migration and aboriginal population undercounts can affect regional funding allocations by almost 0.5%;
- Lack of a monitoring process – no model evaluation processes are identified.

Therefore, if the PNBFB model is to be used, improvement efforts must continue, including processes for improving the timeliness of the underlying data. Applying the ACG adjustment mechanisms should be carefully evaluated.

- 5) In the interests of transparency and accountability, further development of the PNBFB model should include input from a broader array of stakeholders, particularly physician groups.
- 6) Of significant concern are the access to care implications related to the issue of patient transfers between regions. These include the adequacy of the funding model to respond to required transfers in a way that will ensure no financial impediments are created, as well as in promoting practical care support, such as the effective use of information technology and air and road ambulance services. These latter initiatives are costly to implement and maintain and will need to be developed and adequately funded by the Ministry if they are to be successful.
- 7) Fair and appropriate mechanisms for paying physicians must be maintained. Physicians are not prepared to enter into contractual or employee relationships that would permit the regional administration to come between them and their patients on clinical matters. Therefore, a plurality of voluntary payment mechanisms that respect the principle of physician autonomy must be available.
- 8) Regardless of the delivery or payment model, patients must be free to choose their health care provider, without interference from any governing authority.

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APPENDIX A: MATHEMATICAL BASE MODEL SUMMARY

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

X_{ijk} = 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} where m = 1 to 18 regions

$$\text{Average Provincial Utilization Rate per population segment} = Y_{ijk} = \frac{\sum RIW_{ijk}}{X_{ijk}}$$

Example: Region A Unadjusted Aggregate Expected Workload EWL_A

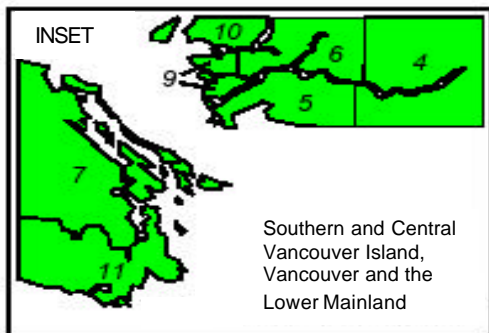
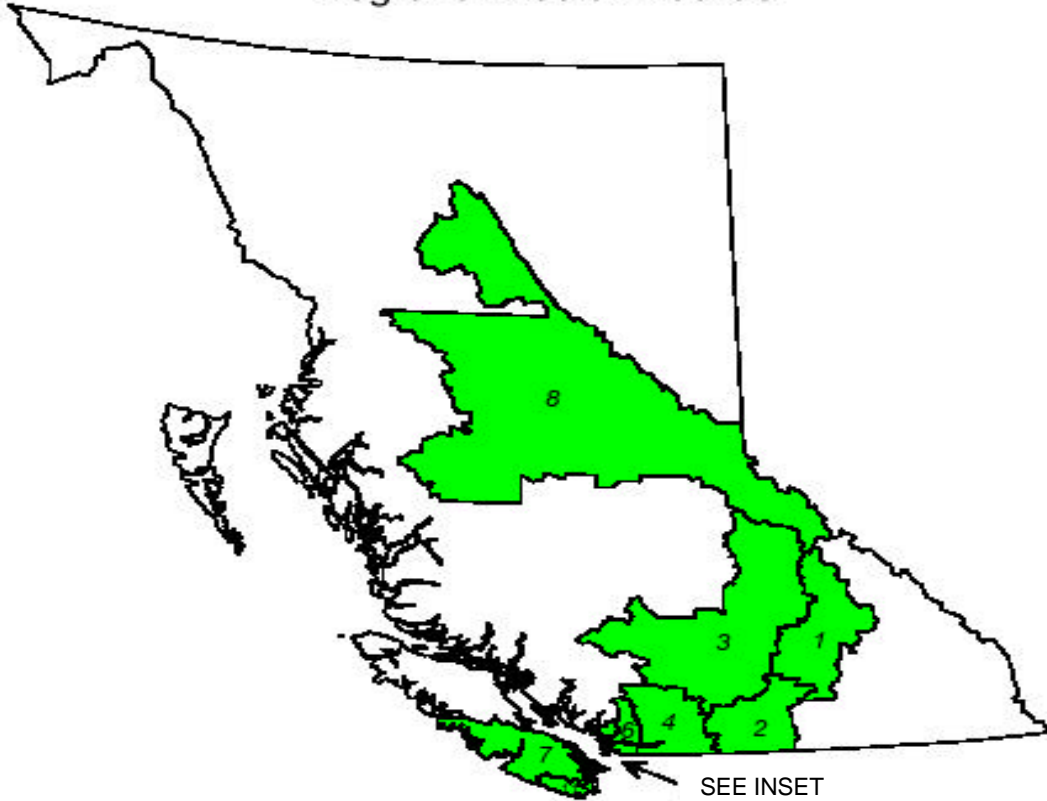
$$\sum_i \sum_j \sum_k (X_{ijkA})(Y_{ijk}) = EWL_A$$

Region A Adjusted Expected Workload $AEWL_A$

$$\frac{EWL_A}{\sum_m EWL_m} = AEWL_A$$

APPENDIX B: RHB and CHSS MAP

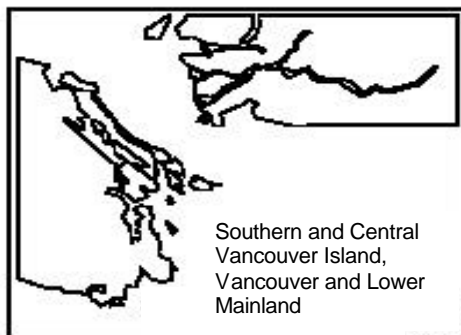
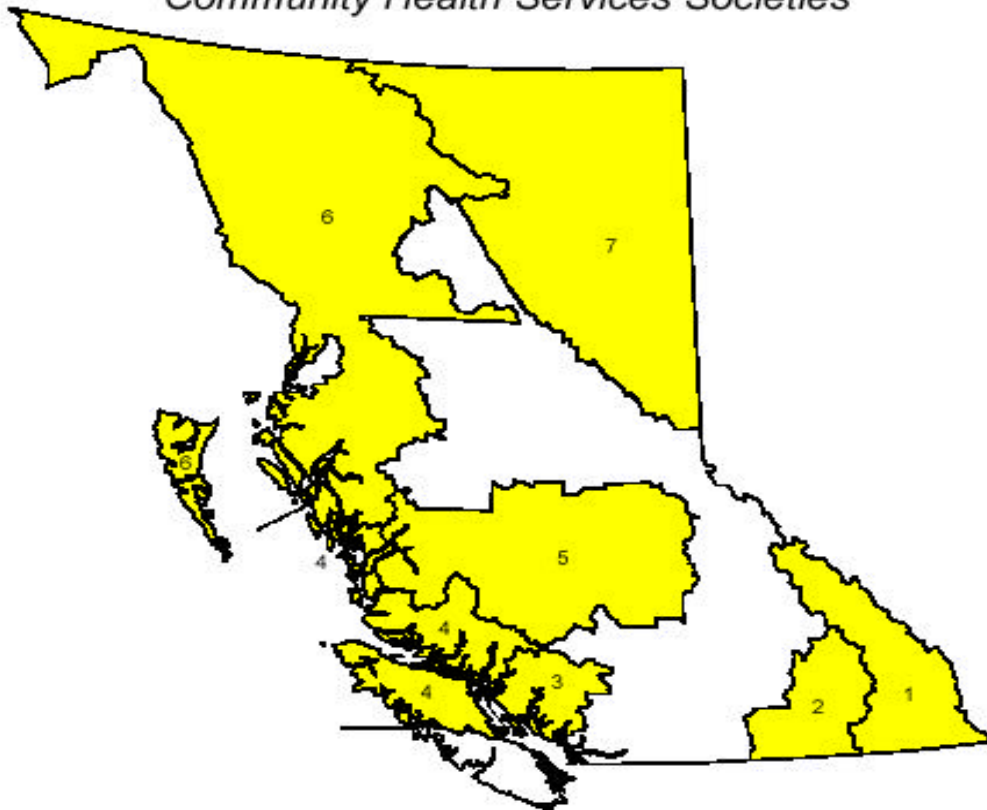
British Columbia Regional Health Boards



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

Source: Medical Services Plan of British Columbia Physician Counts and Full-Time Equivalents, 1999/2000, Health Information Access Centre

British Columbia Community Health Services Societies



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

Source: Medical Services Plan of British Columbia Physician Counts and Full-Time Equivalents, 1999/2000, Health Information Access Centre

British Columbia

Governing Health Authorities, effective December 2001

