

**A STUDY OF STRATEGIES TO ADDRESS
NEEDS AND SERVICE EXPENDITURES IN THE
NON-INSURED HEALTH BENEFITS PROGRAM**

**By
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**A Thesis
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements For the Degree
of
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MASTER OF SCIENCE

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TABLE OF CONTENTS

	Page
Acknowledgments	i
Abstract	ii
Chapter 1: Introduction.	1
1.1 The Nature of the Problem	1
1.2 Dental Disease is Still a Major Public Health Concern	2
1.3 Dental Manpower.	6
1.4 Strategies to Control Dental Service Expenditures	8
1.5 Canadian Publicly-Funded Dental Programs — A Brief Historical Perspective	12
1.6 An Overview of the NIHB Program	13
1.7 Potential Strategies to Accommodate Current and Future Funding Constraints of the NIHB Program	19
1.8 Study Objectives	21
Chapter 2: Materials & Methods	22
2.0 Preamble	22
2.1 Origins of This Study	23
2.2 Overall Study Objectives	31
Chapter 3: Results	34
3.1 Analysis of Manitoba NIHB Dental Service Data: 1996 versus 1995	34
3.2 Analysis of Dental Service Data from the NIHB Regions Excluding Manitoba: 1996 versus 1995	39
3.3 Analysis of Manitoba Dental Service Data With Those From Other NIHB Regions: 1996 versus 1995	41
3.4 Conclusions	45

Chapter 4: Discussion	48
4.0 Introduction	48
4.1 Strategic Overview of the NIHB Dental Program	49
4.2 Short-Term Strategies to Control NIHB Dental Program Expenditures	53
4.3 Strategies to Control NIHB Expenditures Through the Provision of Services by the Providers	55
4.4 Strategies to Control NIHB Expenditures Through Reductions to the First Nations Treaty & Inuit Communities' Disease Burden	58
4.5 Conclusions	63
Chapter 5: Future Research Directions for the NIHB Dental Program. . .	64
Chapter 6: Conclusions.	66
References	67
Appendix	

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ABSTRACT

- **The recent fiscal restraint policies adopted by different levels of government have impacted on Canadian publicly-funded programs, including the Non-Insured Health Benefits (NIHB) program that provides dental services to the First Nations Treaty and Inuit communities.**
- **Considering the previous disparity between increased resource allocations to the above groups, these policies of fiscal restraint are particularly relevant to the dental health of First Nations Treaty and Inuit communities, who have yet to witness the remarkable declines in dental disease prevalence exhibited by most other Canadians.**
- **Recent NIHB dental program audits have emphasized concerns over health delivery to those eligible for benefits since marked regional discrepancies in the fee-for-service component cannot be supported by epidemiological data on the service needs of individual communities or their service outcomes.**
- **These audits and other data have culminated in a growing perception that some of the inflationary NIHB dental program expenditures were partly the result of the providers' service costs rather than the First Nations Treaty and Inuit communities' service needs.**
- **As a short-term strategy to curb the program's inflationary trends, the NIHB imposed restrictions on the provision of dental services to these communities on January 1st 1996, based on an arbitrary set of service frequencies.**
- **In response to opposition to this 'frequency-based' initiative from both service providers and clients, an alternative 'needs-based' system was proposed, whereby services that exceeded a \$500 price threshold required prior approval, in addition**

an appeal mechanism controlled by both professionals and First Nations Treaty and Inuit representatives was proposed.

- **Due to uncertainties for the effectiveness of this "needs-based" strategy, a trial was initiated for one region (Manitoba), based on the premise that its adoption by other regions would follow the acquisition of supportive data .**
- **In this trial study, service data were compared between equivalent nine month periods in 1995 and 1996 (i.e. before and after the implementation of the 'needs-based' [Manitoba] and 'frequency-based' strategies [other regions]). Preliminary analyses of these results indicated that:**
 - **the 'needs-based' strategy was more effective in the constraint of service expenditures than that based on service frequencies;**
 - **no significant reductions in service discrepancies were achieved by either strategy.**
- **More appropriate (long-term) preventive strategies are therefore required to reduce the dental disease burdens of these communities (and their associated service expenditures. Also epidemiological data on their dental needs and service outcomes are crucial to assay the effectiveness of the NIHB dental program.**

NOTE:

In this study, the data are presented in a graphical format within the main body of this text, and in a tabular format in the Appendix. The prime interest is to present in text uninterrupted by tables.

As the data were abstracted from the NIHB data base, only tables presented in a summarized format are listed. The original data are available on request to the author.

1. INTRODUCTION

This Introduction comprises two major inter-related sections. The first primarily provides a brief over-view of the most pertinent determinants affecting both privately and publicly-funded dental markets. Subsequent analysis of recent changes to the program funded by Health Canada is then intended to provide an appreciation of the major strategic issues confronting the dental program for the First Nations Treaty and Inuit communities, and the need for initiatives to modify service expenditures.

1.1 THE NATURE OF THE PROBLEM

The Canadian dental markets are in a state of flux. For instance, the predominant private markets have until recently exhibited remarkable growth, whereas their future is now uncertain due to the various parameters. These include the following:-

- declines in dental disease prevalence witnessed by the majority of Canadians;**
- reductions in those eligible for insurance benefits associated with declining full-time employment opportunities;**
- continued growth in professional manpower.**

As a result, publicly-funded markets have now assumed greater importance as potential sources of income for many generalist and specialist dental providers.

From a professional viewpoint, the importance of publicly-funded dental markets has always been relatively minor, compared with those from the private sector. Clients eligible for publicly-funded benefits however, exhibit higher dental disease burdens than most other Canadians. This dichotomy has also been broadened by the recent adoption of fiscal restraint policies by most levels of government. These changes are particularly relevant to the First Nations Treaty and Inuit communities: most of their dental services are funded by Health Canada's Non-Insured Health Benefits (NIHB) program. Therefore, those at high-risk for dental diseases have more limited service access, than other Canadians. They also exhibit lower service utilization rates. The First Nations Treaty

and Inuit communities have therefore to accept some responsibility for their high disease burdens and their lack of dental services.

1.2 DENTAL DISEASE IS STILL A MAJOR PUBLIC HEALTH CONCERN

The relevance of dental diseases to the healthcare system continues to baffle most policy analysts. Yet the direct service expenditures for oral disease (i.e. excluding those associated with drugs, hospitalization and transportation) are surpassed only by those for cardiovascular (heart and stroke) diseases and mental disorders, and exceed those related to respiratory and digestive diseases, injuries and cancer (Leake et al 1993). This conundrum is partly due to the absence of systematic epidemiological data for Canadians' dental service needs and their service outcomes.

In the absence of national epidemiological data, estimates of Canadians' dental service needs primarily depend on data from the United States (US). For instance, national epidemiological surveys on US children aged 5 and 17 years indicate that the decayed missing and filled surfaces (DMFS) have declined from a mean of 18 to that of 8 between the 1970s and 1980s (US Dept. of Health 1972, 1981, 1989). These data imply that almost 50% of US children are free from dental caries. Similar trends have been reported from other countries (Burton et al 1984, Picton 1986), although they have yet to be exhibited by the First Nations Treaty and Inuit communities. Dental caries remains a serious public health issue and a significant financial burden to the Federal Government. Therefore changes in the prevalence of this disease warrant further consideration.

1.2(a) The Prevalence of Dental Caries

Closer examination of US data indicates that the typical bell-shaped dental disease pattern of previous generations has been replaced by a more dichotomous distribution. In the case of children, some have little or no decay, whereas others require significant expenditures to service their high caries rates. Also, the declines in dental

disease prevalence for most children have not been matched by analogous expenditure reductions, due to increased demands for other services (e.g. orthodontics).

The declines in dental disease prevalence appear to correlate more closely with the benefits of water fluoridation and dietary education, rather than the professional services supplied by dentists (Lewis 1992). Yet in Canada, water fluoridation benefits are only available to 43% of the population (Lewis 1992). This dilemma is further compounded by significant regional discrepancies in the water fluoridation benefits. For instance 75% of the population benefit in Alberta compared with 8% in Newfoundland, although the impact on caries is mollified by other sources of fluoride (Haugejorden 1996). Variations in preventive resources and caries susceptibilities are therefore characteristics of Canada. These variables are particularly relevant to the future dental service expenditures for children from the First Nations Treaty and Inuit communities, since they may escalate without the implementation of more aggressive preventive strategies (Bowen 1991). The higher birth rates in these communities, relative to those of other Canadians may also further compound this issue in the future.

Major changes in dental disease status have also affected adult populations, although the relevant epidemiological information for Canada must again be abstracted from other countries. For instance, comparisons of the National (US) Adult Survey data, collected in the mid 1980s, with those from earlier US studies (US Dept. of Health 1987), indicate a 38.1% to 15.6% reduction in the prevalence of edentulous people in the 55-64 year old age group in a period less than 30 years. Less dramatic but similar changes have also been noted in the 65+ age group. As a consequence, providers' income is increasingly dependent on the service needs of adults due to declines in caries prevalence in children.

Increased demands for natural tooth retention has therefore been encouraged as a potential source of income to the providers (Leake et al 1993). For instance, concomitantly increased numbers of teeth at dental caries risk have resulted in much

higher levels of decayed and filled coronal tooth surfaces. These changes are clearly illustrated by the mean number of 30 decayed and filled coronal surfaces in 50 year olds in the 1985 survey, relative to 15 in 1971 (US Dept. of Health 1987). Changes in attitude for natural tooth retention have therefore contributed to the burgeoning costs of dental services.

Conventional conceptions that caries is primarily a young persons' disease are therefore no longer valid. Indeed, the aggregate caries increment (new and secondary caries on coronal surfaces together with root caries) may now be higher in the over 55 group than in children (Pappas et al 1992). But although caries and its sequelae may be the predominant cause of tooth loss in aging populations (Chauncey et al 1989), prevention is the only long-term strategy to reduce their service expenditures for both child and adult populations.

1.2(b) Dental Service Expenditures

Despite preventive dentistry's major accomplishments in reducing the prevalence of dental caries, the \$3.1 billion spent on dental services (approximately 5.5% of all public and private healthcare expenditures) in the late 1980s underscores the significance of this public health concern (Canada Yearbook 1994). Also, the 136% inflationary rate for dental service expenditures for the 1980-89 period far exceeded the trends for population growth (9%) and the general goods and services index [CPI = 69 - 70%] (Leake et al 1993). But whether these trends primarily reflect the marketing capabilities of dentists, or changes in patients' attitudes towards natural tooth retentions, remain controversial.

The mean 117% inflation rate for per capita dental service expenditures during this (1980-1989) period also exhibited marked regional discrepancies. These are illustrated by the data for 1989, when per capita discrepancies ranged from \$145.54 (British Columbia) to \$33.01 (NWT) (Leake et al 1993). As they cannot be supported by differential provincial fee-guides or epidemiological data, regional expenditure

discrepancies are increasingly perceived to reflect the providers' differential service costs, rather than the service needs of their clients. Controlling the nature of dental services provided to individuals is therefore fundamental to modifications in their associated expenditures.

Analysis of US data suggests that changes in dental disease patterns have induced a "flattening" out of per capita dental service expenditures over the 1979-1989 period (Brown et al 1994). This contrasts with the previous significant annual increments prior to 1979. Although other US service data indicate that private insurance utilization increased from 60% (1980) to 70% (1995), there have been significant reductions in many services. For instance, restorative service expenditures have decreased from \$233 million (1979) to \$202 million (1990) (Nash et al 1991, Ekland et al 1997) although the contributions provided by water and other sources of fluoridation remain enigmatic. Due to slower growth in US dental service expenditures since 1979, relative to the 1950 - 1978 period (Ekland et al 1997), the projections by Douglass & Furino (1990) of a substantial increase in restorative, prosthodontic and endodontic services by the year 2000 are unlikely to materialize for the privately insured population.

Such interpretations are, however, constrained by variations in the practice patterns between different providers. For instance, analysis of 23 procedure groups from 11 major metropolitan markets in the US indicated eight-fold differences in treatment plan costs (Gotowka et al 1988). Many other studies have also demonstrated significant inconsistencies in dental service costs for approximately homologous population groups (Hazelkorn 1985; Shugars et al 1992; Shugars et al 1993). Some control over the specific services provided by individual providers is therefore mandatory to modify expenditures, although strategies to achieve this objective remain controversial due to progressive increases in professional manpower.

1.3 DENTAL MANPOWER

The general consensus, that sufficient professional providers are available to cope with the evolving changes in dental disease patterns (House et al 1983; Dussault 1984; Lewis 1986, House 1987; Stangel 1992), lacks substance without supportive epidemiological data relative to Canadians' dental service needs (Douglass & Gammon 1985; Graves & Stamm 1985; Stangel 1992). Moreover, efforts to control the supply of professional dentists in Canada (Beagrie 1988) have been frustrated by the Federal Government's immigration policies. Canadians training in US dental schools have further exacerbated this problem (Lewis 1992). Future expansion of the professional provider workforce must therefore be anticipated, and will also likely be augmented by continued material and technical developments. With the resultant increased competition within the private dental markets, providers have become increasingly dependent on the publicly-funded markets to support their practices. Even in these markets, professional manpower has been augmented by denturists and dental therapists.

1.3(a) Local Dental Markets

As most (approximately 90%) professional dentists provide services from private practices, their associated overheads [e.g. 88% employ receptionists, 83% chairside assistants and 56% dental hygienists] (Lewis 1992) contribute to their 'high' service charges. There is also fierce competition within specialist markets and this has been further exacerbated by their urban aggregation to attract wider referral bases. The impact of increased competition within urban areas on the provision of services to the public, however, remains largely conjectural.

By contrast, broad provincial and regional variations are apparent in the distribution of generalists (Douglass and Gammon 1985; Graves and Stamm 1985; McDermott 1986; Leake et al 1993). Four of the five most populous provinces have the best population/dentist ratios, whereas such market supplies are relatively deficient in

Newfoundland and New Brunswick (Lewis 1992). Unfortunately, the relative effectiveness of rural versus urban dental or inter-regional providers has yet to be examined, despite their potential impact on service quality provided to all Canadians, including the First Nations Treaty and Inuit communities.

Professional manpower supplies are also augmented by the workforce derived from approximately 120 dental therapists (mainly employed by the Federal and Saskatchewan provincial governments) and approximately 2000 denturists (licensed for independent practice in 10 of the 12 provinces and territories (Lewis 1992). Although the differential economic impact of these providers on both private and publicly-funded markets remains obscure, their dilution of the previously professionally controlled market has potentially serious implications in fee-schedule negotiations (Heloe 1991), especially for publicly-funded programs.

The vast majority of Canadians receive services from private practitioners on a fee-for-service basis, and increased market competition has not been associated with service expenditure reductions. For instance, whereas the introduction of dental insurance plans in the 1960s largely contributed to the remarkable growth of the private market, many companies have since implemented strategies to control service expenditures. These include alternative delivery systems (e.g. capitation and preferred provider systems), routine provider practice profile reviews (Rocky 1988) and changes in service benefit eligibilities and copayments. The resultant increasingly competitive market therefore primarily supplies dental services to the young, affluent and highly educated population sectors, i.e. the populations primarily eligible for private insurance benefits (O'Keefe et al 1994). By contrast, a significant proportion of the working poor (those who are non-unionized or work for minimum wages) are deprived of such benefits or social assistance. The adoption of fiscal restraint policies by most levels of government has further aggravated reductions in the growth of potential resources available for

public insurance programs. These mainly impact on those that are socio-economically disadvantaged, including the First Nations Treaty and Inuit communities.

1.3(b) Public Dental Markets

There is therefore no equitable dental service access in Canada. This also applies to a certain extent to other healthcare services, although some discrepancies for dental services have been accommodated by the allocation of public resources for some (13-15%) expenditures. Unfortunately, these also have historically exhibited significant regional discrepancies. This is illustrated by data from the 1980s, which indicate that public funding accounted for 2% of dental service expenditures in Ontario but 56% in NWT (Waldman 1995). Moreover, whereas publicly-funded services increased from 56 to 75% in NWT, they decreased from 12 to 5% in British Columbia over the same 1980-87 period (Waldman 1995). Due to funding withdrawals from many provincial programs (e.g. British Columbia, Manitoba and Newfoundland) (Niedermayer 1993; Farrel 1993), in addition to progressive benefit restrictions from social assistance programs (Main 1996), improvements to the effectiveness of the NIHB dental program financed by the Federal Government are crucial to ensure their continued funding relative to other priorities (e.g. housing, education etc.).

1.4 STRATEGIES TO CONTROL DENTAL SERVICE EXPENDITURES

Strategies to control the burgeoning Canadian dental market expenditures have proved challenging, although 1992 data indicate that US public service dental programs, including Medicaid, account for less than 4% of dental service expenditures (Oral Health Coordinating Committee 1993). The control of dental insurance benefits is important, since they largely determine most clients' willingness to pay service fees (Cordes & Doherty 1991), i.e. insurance benefits largely control the private markets. Moreover, recent declines in full-time employment, combined with reductions in discretionary funds, have constrained this trend. In addition, recent modifications to insurance benefits

[including reduced annual limits, increased deductibles and routine dental examination and hygiene visit restrictions (Manji 1997)] have further exacerbated competition for discretionary funds (Gronroos 1982). The resultant lack of 'busyness' for some providers (House 1987), however, has been compensated by the adeptness of others at initiating service demands (e.g. esthetics) from clients (Sheiham 1977; Dowell et al 1983; Yule & Parkin 1985; Birch 1988; Grytten 1991). Since these changes have also made the providers more dependent on publicly-funded dental (e.g. NIHB) programs, further expenditure constraints might be anticipated to exacerbate competition within this market, i.e. provider opposition must therefore be anticipated for any strategic change that restricts the public markets.

1.4(a) Strategic Options to Control Service Expenditures

The need to contain expenditures is not unique to the NIHB dental program (Ham 1990; OECD 1992; NERA 1993; Maxwell 1974). Reports in the literature indicate that a needs-based approach is the most logical strategic option, provided accepted guidelines can control the prioritization of services (Dunning 1992, Kitzhaber 1993, Health Care and Medical Priorities Commission 1993, World Bank 1993). Such guidelines to control the provision of services essentially involve five linked principles:-

- i. clinical and other health care decisions should be based on the best patient- and population-based, as well as laboratory-based evidence;
- ii. the nature and source of evidence should be determined by the problem, rather than traditional habits or protocols;
- iii. identification of the best evidence requires the integration of epidemiological and biostatistical assays, meta-analyses of randomized trials, economic and decision analyses, in addition to the integration of odds ratios into judgments on iatrogenic disease;

- iv. **conclusions from such critical evidence appraisals must be translated into service actions that affect patients;**
- v. **systems must be implemented to ensure that providers continuously evaluate their performance in the application of these strategies (Dunning 1992, Kitzhaber 1993).**

Such strategies are unfortunately difficult to devise for the Canadian dental market, due to the lack of common currencies to compare the relative effectiveness of different (e.g. orthodontic versus periodontal) dental services.

Pragmatic short-term solutions to this problem must be directed towards the greater control of the predominant fee-for-service payment systems. Moreover, provincial dental organizations favor this payment system, despite the lack of scientific evidence that it is more cost-effective than salaried alternatives. This is supported by data that indicate that providers with inadequate case-loads tend to increase the service numbers and complexities provided to existing clients (Falk et al 1961; Moore 1970; Bunker 1970; Gabel & Redisch 1979; Wennberg & Gittlesohn 1982; Relman 1983; Chassin et al 1987).

Since the alternative option of imposing fee restrictions risks the provision of additional (unnecessary) services, constraints to the frequency of some (i.e. expensive) services eligible for insurance benefits are the strategic options adopted by most private insurance companies. These strategic options are difficult to rationalize, however, since they ignore the unique service needs of individual clients. For example, restrictions appropriate for clients with low dental disease risks may not necessarily accommodate the service needs of others at high-risk. A more logical option involves the implementation of a predetermination (prior-approval, pretreatment, preauthorization) system. This common administrative procedure for most indemnity insurance programs (Rocky 1988) primarily checks the following:-

- **service or client eligibility;**

- consistency of request with prior services;
- whether services fall within prior-established frequencies (Cooney et al 1986; Dental Prepayment Advisory 1989).

US evidence also indicates that the implementation of prior approval systems may lead to 6-8% expenditure savings, due to subsequent routine treatment plan assessments (Friedman 1975; Carr 1977). This has also been confirmed by a Canadian study, where such systems resulted in 8.5% expenditure savings for a publicly-funded Social Allowance Health Service Program (Cooney et al 1995). Moreover, the service needs of individual clients can be equitably accommodated by prior approval systems, provided there is an associated appeal mechanism based on balanced assessments from experts (i.e. specialists) and representatives from the general public (See Appendix). A further advantage stems from the potential of prior approval mechanisms to ensure quality assurance, i.e. payments for repeated services (e.g. crown or bridge replacements) within a limited period may be denied without rational supportive data (e.g. radiographs).

1.4(b) Strategic Options for Publicly-Funded Programs

Prior approval systems have yet to comprise universal components of publically funded (e.g. NIHB) programs. Whereas in the past, lax constraints of such programs provided convenient economic cushions that could be exploited by some providers, these strategies are incompatible with the recent adoption of fiscal restraint policies by most levels of government (Iglehart 1990). Although publicly-funded markets generally encompass those dependent on social allowance (public assistance), the police force, the military and other essential services, the component that provides dental services for Canada's First Nations Treaty and Inuit communities is by far the most important (Jock 1993; Main 1995; Waldman 1995). Expenditure discrepancies between dental services provided by this (NIHB) program in Manitoba relative to those from the other publicly-funded Manitoba program [the Social Allowances Health Services (SAHS) dental

program] (Cooney et al 1995) undoubtedly heralded the need for significant strategic changes. As program resources can no longer be expected to increase exponentially, the need for both significant short- and long-term strategic changes to reduce the disease burden of the First Nations Treaty and Inuit communities cannot be overstated.

This study is therefore intended:-

- *to chronicle the introduction of a predetermination system into the NIHB dental program for the Manitoba Region as a short-term strategy to contain the associated expenditures*
- *to evaluate initial data to determine the efficacy of this system prior to the implementation to other regions*
- *to evaluate two short-term strategies and their potential national application and to indicate the more appropriate long-term strategies to reduce the disease burden of the First Nations Treaty and Inuit communities.*

An appreciation of the challenges associated with such strategic changes for the NIHB dental program requires further discussion.

1.5 CANADIAN PUBLICLY-FUNDED DENTAL PROGRAMS - A BRIEF HISTORICAL PERSPECTIVE

At the turn of the century, individual dentists or local dental societies sponsored Canada's public service programs (Gullett 1971; Nutrition Canada 1977; Stamm et al 1986). Limited programs were subsequently funded by Canadian city health departments and other local health units, with means tests to determine potential clients' eligibility for benefits. Dental divisions were later established within provincial health departments, although their programs have generally been both temporary and restrictive. For instance, fluoride, fixed prosthodontic and orthodontic services have been eliminated from the Alberta Health Care Dental Benefits program, whereas Winnipeg's

municipal program now restricts emergency care to \$75 per annum per eligible client (Main 1995). Both the Federal and provincial governments, therefore, have narrowed their support of dental services for specific population sectors (e.g. medically handicapped clients). All Canadian publicly-funded healthcare programs have therefore entered a retrenchment period in relation to the recent past.

Some noted exceptions apply to those that provide dental services for the military, police etc., in addition to the NIHB dental program that currently serves approximately 622,000 clients from the First Nations Treaty and Inuit communities (NIHB Health Benefits 1995-96 Annual Report). Further analysis of this NIHB dental program is therefore warranted, as this most important (expensive) program is funded by Health Canada.

1.6 AN OVERVIEW OF THE NIHB PROGRAM

The 1950s witnessed the establishment of a significant commitment by the Department of National Health and Welfare (now termed Health Canada) to provide dental services for the First Nations Treaty and Inuit communities. Initially provided by salaried dentists in fixed and mobile dental facilities for the more remote northern populations, the provision of services was subsequently augmented by:-

- dental therapists (salaried);
- contractual denturists (per diem);
- private practice dentists (fee-for-service).

Although the differential cost-efficiencies of these three payment systems have yet to be investigated, the fee for service component consumes approximately 80% of the NIHB dental program's expenditures.

Established in 1962, the NIHB dental program funded by Health Canada is administered by the Medical Services Branch. Administration for the northern Quebec

communities was transferred to the Quebec Government in 1981 and the Federal Government is committed to provide all communities with autonomous control of their health programs and resources in the future. The negotiation timeframe will, however, depend on many political and socio-economic determinants.

When initially established, the primary short-term objective for the NIHB dental program was to provide effective and economic preventive and treatment services to the First Nations Treaty and Inuit communities, i.e. to obtain the same oral health levels as those enjoyed by other Canadians living in similar locations. Long-term program objectives also designated dental health improvements through intensive public health efforts, including educational and preventive programs. As no epidemiological data have been systematically collected to assay progress towards these objectives, the effectiveness of this publicly-funded program remains controversial.

The NIHB dental program is one of many designed to provide supplementary health benefits to these communities, when they cannot be met by provincial services or other health plans. Dental services must therefore compete for scarce resource allocations with other component services, including the following:-

- *Pharmacy (including prescription and over-the-counter drugs);*
- *Vision care aids and services (including eye-glasses);*
- *Transportation to access medically (dentally) required services;*
- *Healthcare premiums (Alberta and British Columbia only);*
- *Other healthcare services (e.g. mental health counseling).*

In addition, all NIHB programs are characterized by the following:-

- *No eligibility limit on the basis of age, income or residence;*
- *Benefits delivered by private providers (e.g. dentists, pharmacists) can be billed directly to the NIHB;*
- *Clients directed to access benefits from other programs first.*

1.6(a) Eligible Clients for NIHB Benefits

Based on 1987-96 data, the First Nations Treaty and Inuit communities comprise Canada's fastest growing population sector. At approximately 622,000, these populations have increased 56% in size from 1987 to 1996, due partly to Bill C-31, i.e. changes in the Indian Act resulted in over 100,000 additional eligible clients in the 1985-95 period. There was therefore a dramatic 23% increase in the eligible client population from 1988 to 1989, but only 6% from 1989 to 1990. Subsequent annual increases have remained at 3% level, primarily due to their high birth rates. The First Nations Treaty and Inuit communities therefore comprise the fastest growing sector of the Canadian population.

Based on data from the Status Verification System, the 622,000 eligible clients comprised 95% Indian and 5% Inuit by 1996. These have been associated with marked regional variations. For instance, current data indicate a 6% growth in Inuit clients in the past year (mainly restricted to NWT), as opposed to a 3% increase in Indian clients. Whereas one of every four Indian clients were registered to the Ontario region, over three of every four Inuit clients were from NWT. Unfortunately, little epidemiological data are available to define the differential service needs of these communities.

Current (1996) data indicate that 41% of the eligible clients for the NIHB dental program are under 20 years of age, whereas only 5% are 65 years of age or older. In addition, 48% of the Saskatchewan registered clients are under 20 years of age, as opposed to 33% for the Ontario and Quebec regions. The 1996 SVS data also indicate that 61% of these clients resided on reserves, although significant regional discrepancies were apparent. For instance, all Inuit clients in NWT or Labrador were primarily resident in localized communities, as opposed to 91.6% (NWT) and 50.9% (Ontario) of Indian clients were on reserves. Again, no epidemiological data are available to define the impact of reserve migration on the dental service needs of these communities.

1.6(b) NIHB Expenditures

The NIHB program operates within the fiscal environment, defined by the Indian and Inuit Health-Envelope. This latter defines the total healthcare resources available to these communities. Approximately 50% is allocated to NIHB expenditures, whereas other allocations include the following:-

- **Community Health Contributions for direct First Nations and Inuit health service management (e.g. community nursing, alcohol/drug counseling);**
- **Salary, Operating and Capital expenditures (primarily for hospitals, community health centers and nursing stations).**

The 1995 Federal budget set 6%, 3% and 3% growth limits for this envelope over the subsequent three consecutive years, whereas a 1% limit for 1998/99 was set by the 1996 Budget. These expenditure restrictions necessitate strategic changes, although the distinction between transportation expenditures and those for specific health (e.g. dental) services unnecessarily hampers their specific economic appraisal. For instance, travel to urban specialists greatly adds to service costs, although these are not associated with the NIHB dental program budget.

The NIHB program expenditures increased approximately 133% over the 1988/89 to 1995/96 period, primarily due to the following:-

- rising benefit expenditures;
- population growth;
- increase in clients eligible for benefits;
- provincial health care reform and de-insurance.

The annual inflationary trends actually declined from 23% (1990/91) to 6% (1995/96) due to a variety of management initiatives, including:-

- the establishment of regional program budgetary envelopes;
- improved fiscal and management practices.

The economic benefits of these initiatives were, however, compromised by significant discrepancies between the NIHB regions and their component providers.

1.6(c) Regional Variations Within The NIHB Program

The significant regional and service discrepancies within the total NIHB envelope have proved difficult to rationalize and therefore control. These discrepancies are illustrated by the following:-

- a 167% inflation rate for dental services over the 1988/89 to 1995/96 period, relative to 156% (pharmacy), 142% (transportation) and 48% (vision care services);
- a 100% inflation rate for total NIHB expenditures in Manitoba for the 1990/91 to 1995/96 period, as opposed to 52% for Alberta;
- a 102% inflation rate in dental service expenditures in Alberta relative to 81% for Quebec in the 1990/91 to 1995/96 period.
- a 110% inflation rate for transportation services in Manitoba as opposed to 37% for the Yukon in the 1990/91 to 1995/96 period.

Regional discrepancies were further emphasized by 1995/96 data, which indicated that the \$192 national average per capita eligible dental service expenditures ranged from \$147 (Saskatchewan) to \$258 (Alberta). These discrepancies were, however, difficult to rationalize relative to the differential service needs of these communities or differences in their respective professional fee guides. Yet the need for their control cannot be overstated.

1.6(d) Concerns for the NIHB Dental Program

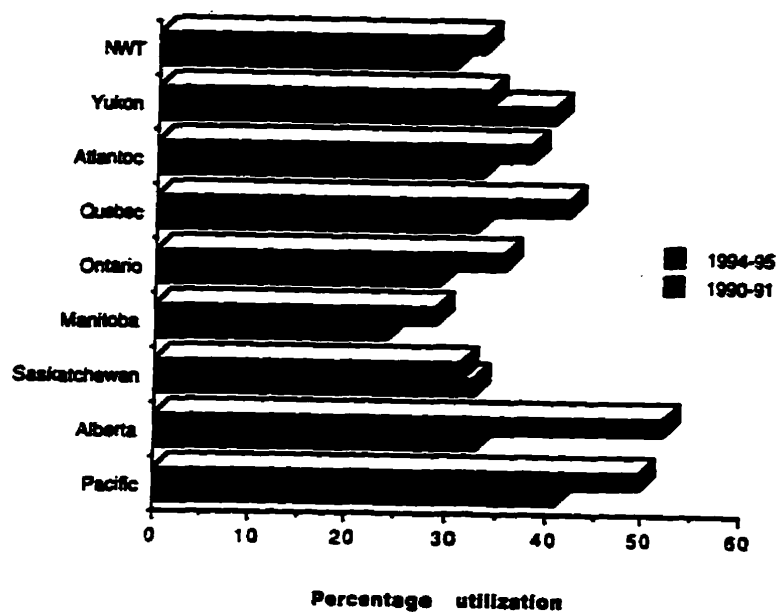
There are many political and economic concerns relative to the accountability of the NIHB dental program. For instance, the numerous small epidemiological studies on

the First Nations Treaty and Inuit communities (Davey 1971; Hann et al 1984; Quee 1985; Graves & Stamm 1985; Titley, Bedard 1986; Lewis 1986; Shah et al 1987; Albert et al. 1988; Messer 1988; Klooz 1988; Hoover et al 1990; Houde et al 1991; Zammit 1991; McKinnon et al 1991; Bedford et al 1993; Leake et al 1993; Harrison et al 1993; Main 1995) do not provide an overall evaluation of the service needs between component NIHB regions or their service outcomes. The program's initial design also preferentially rewarded treatment rather than prevention. More detailed concerns are presented below:-

- i. An approximate 30% utilization rate for dental services was assumed at the start (1962) of the NIHB program, although no epidemiological data were collated to support this assumption. There has also been no systematic study of the marked regional variations in NIHB dental program utilization. For instance, whereas NIHB service utilization in Manitoba has remained below the national average for the past 5 years (Figure 1.1, Table 1.1 Appendix), these discrepancies have yet to be rationalized. Nevertheless, program expenditures would be undoubtedly escalated with marked improvements in program utilization.
- ii. There is a perceived lack of program accountability, due to regional variations in per capita dental services (Figures 1.2, 1.3, Table 1.2 Appendix). Whereas the number of services provided per capita have marginally improved during the 1990-95 period, the respective 94% and 72% increases in periodontal (Ontario) and endodontic (Manitoba) services are difficult to explain.
- iii. Data for the past 5 years indicate that overall NIHB dental program expenditures have increased 67% (Figure 1.4, Table 1.3, 1.4 Appendix). There has been little discussion between clients and providers on strategies to reduce expenditure growth in this program.

Figure 1.1

Regional Variations in NIHB Dental Program Utilization: 1990/91 - 1994/95



Note: The increases in NIHB program utilization were inconsistent between the various regions in both 1990-91 and 1994-95 fiscal periods.

Figure 1.2

Regional Changes in Total Service Numbers Provided by the NIHB Dental Program: 1990-1995

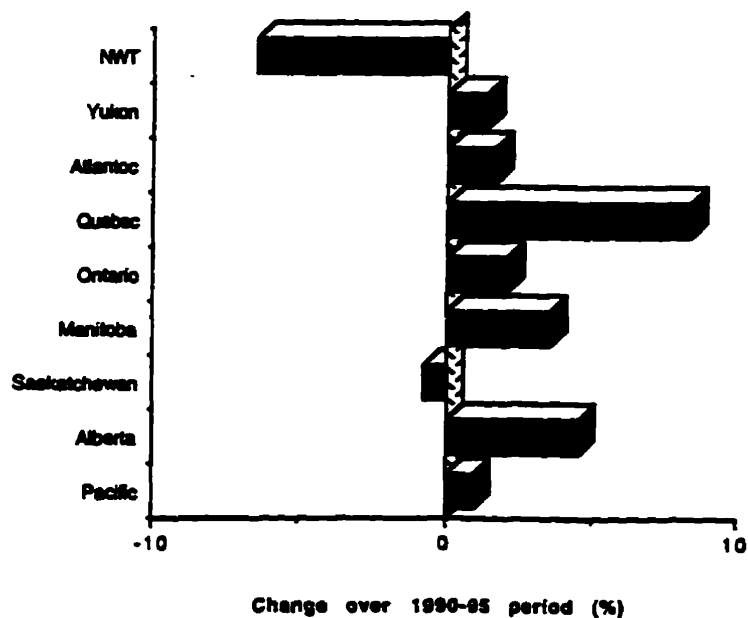


Figure 1.3

Changes in Selected Service Numbers Provided by the NIHB Dental Program: 1990 vs 1995

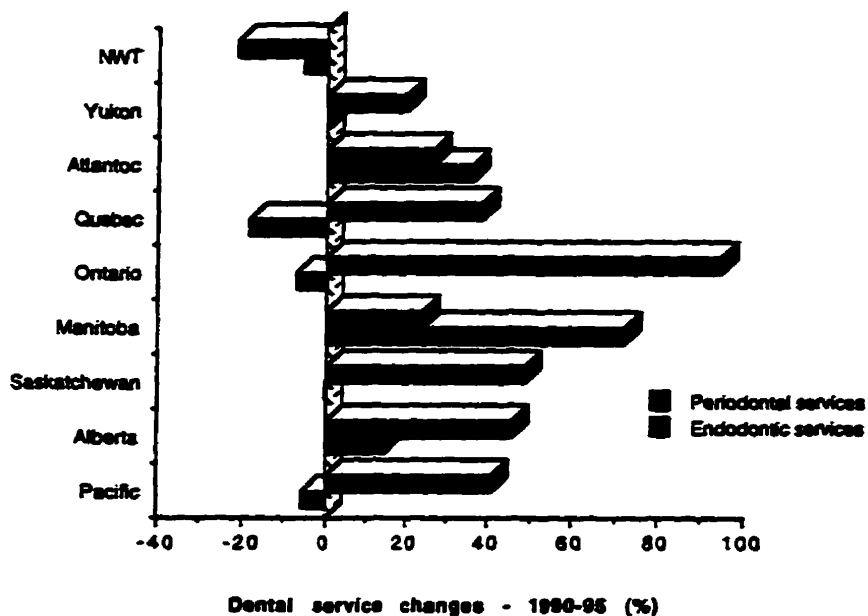
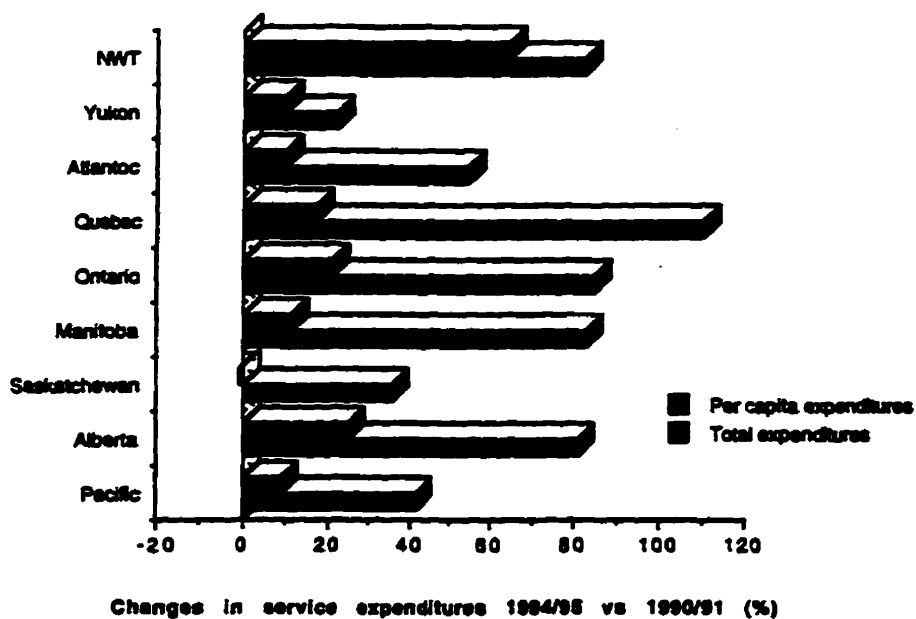


Figure 1.4

Regional Changes in Total and Per Capita Service Expenditures: 1994/95 vs 1990/91



There are also significant anomalies in dental service expenditures. For instance, a 67% increase in dental service expenditures during the 1990-95 period contrasts with a 17% increase in per capita service expenditures. Whereas these data translate to a significant increase in clients serviced by the NIHB dental program, the communities continue to exhibit high disease burdens, i.e. the services provided by this program have proved inadequate to reduce their service needs.

- iv. Per capita service expenditures show marked regional variations (Figures 1.5, 1.6). The 133% increase in per capita periodontal service expenditures in Ontario is difficult to rationalize relative to the 16% change in the Yukon region during the 1990-95 period. There were also concerns for the Manitoba region, where the 134% increase in per capita service expenditures conflict with a 204% increase in dental program expenditures for the 1990-95 period.

1.7 POTENTIAL STRATEGIES TO ACCOMMODATE CURRENT AND FUTURE FUNDING CONSTRAINTS OF THE NIHB DENTAL PROGRAM

Concerns for increasing health (including dental) service expenditures are not new (Evans 1992; Caplan and Weintraub 1993; Leake et al. 1993; Clark 1994; Weil 1994; Capilouto 1995) and have proved difficult to rationalize on the basis of scientific or technical principles (Klein 1993). For instance, the 686% expenditure inflation rate for the NIHB Manitoba region's dental fee-for-service program over the 1985 (\$1.4M) - 1994 (\$11.0M) period, which translated to an average 76% annual inflation rate, was difficult to interpret, due to the lack of concomitant improvements in the First Nations Treaty and Inuit communities' dental disease burden. When transportation expenditures were added to dental service expenditures on a national basis, they exceeded \$160.7M (\$110.0M plus 40% of \$128.0M), i.e. 36% of total NIHB expenditures. Such data conflict with accepted standards for accountability and inevitably indicate that they could primarily reflect the treatment costs of the providers which may not relate to the service needs of their clients.

Figure 1.5

Regional Changes in Per Capita Total Service Expenditures: 1995 vs 1990 (%)

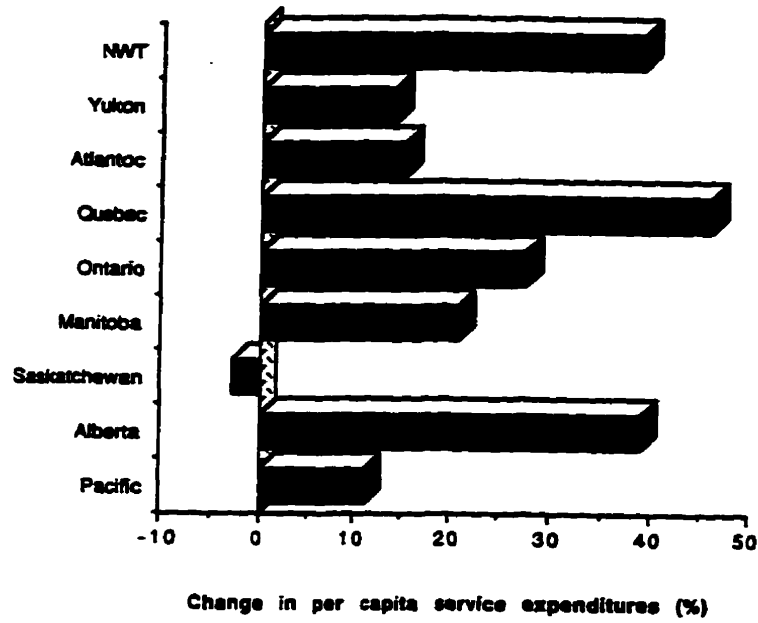
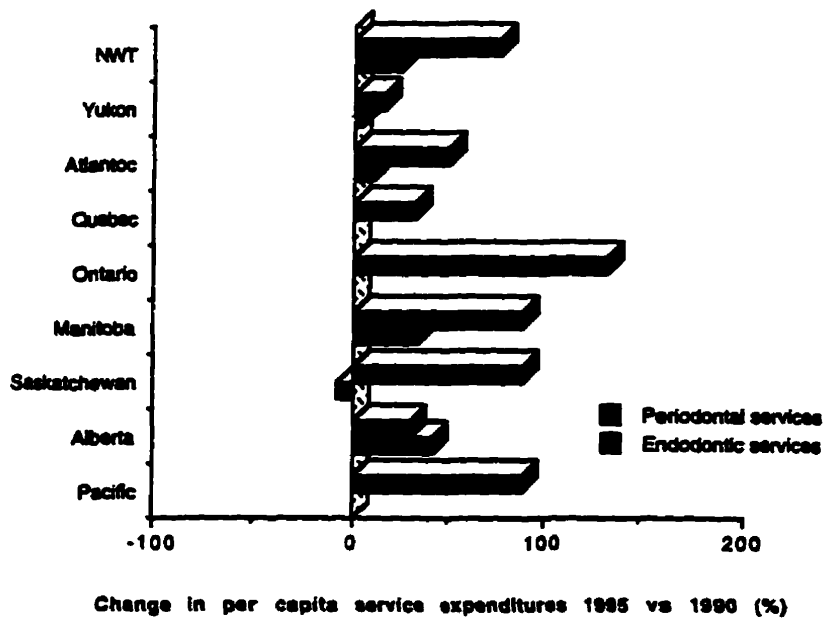


Figure 1.6

Regional Changes in Selected Per Capita Service Expenditures: 1995 vs 1990



There are numerous potential strategies to reduce the burgeoning expenditures for dental services (Table 1.1).

Table 1.1

Strategic Options To Control The NIHB Dental Program Expenditures

STRATEGIC OPTION	POTENTIAL OUTCOME
Per diem and competitive contractual service	Uncertain: difficulties in monitoring different forms of service in practice settings.
Capitation or managed care plans	Uncertain: inadequate epidemiological data on the service needs of these communities.
"Capping" service expenditures by service or region	Uncertain: inadequate epidemiological data on the service needs of these communities. Unacceptable to client group.
Limitations to service frequencies	Uncertain: inadequate consideration of the unique needs of the individual client.
Differential fee-discounts to discourage the provision of specific services	Unacceptable: fee-guides traditionally established by professional organizations not third parties.
Prior approval for services that exceed specific "price" thresholds	Previously established for privately-funded dental programs. Flexible: readily changed depending on funding availability.
Ongoing provider "claim" reviews	Previously established for privately-funded dental programs. Inobtrusive identification of outlier costing providers for further education or peer-review.

Restrictions in service frequencies were unilaterally proposed (October 1995) by NIHB management with minimal provider consultation. Opposition from the profession is summarized in Table 1.2. The new Schedule of Dental Services was however implemented on January 1st 1996, despite an initial review that indicated the anticipated savings were likely to be achieved at the expense of the clients' service needs.

An alternative more equitable needs-based system was therefore devised. This proposal comprised a prior approval (predetermination, preauthorization, pretreatment review) strategy, which is a common administrative procedure in indemnity-type insurance programs that involves treatment plan approval prior to service

Summarized Criticisms to the Imposition of a Frequency-Based Approach to Accommodate Funding Restrictions to the NIH Dental Program

Table 1.2

SERVICE	TYPE	BEFORE CHANGES	AFTER FREQUENCY CHANGES	POTENTIAL IMPACT OF CHANGES
Examination	Complete annual examinations Maximum number of	1 per 36 months	1 per 60 months	Reduced opportunities to assess high-risk clients
		4 per 12 months 16 years of age or younger; 3 per 12 months if 17 years of age or older		Reduced opportunities to assess high-risk clients
	Specific emergency	1 per problem	1 per year	Reduced opportunity to accommodate to assess high-risk clients
	Major specialist	Some required prior approval	All require prior approval	No obvious client benefit
Radiography	Panorex	1 panorex per 60 months	1 panorex per 120 months, 2 per lifetime	Reduced opportunity to assess high-risk clients
Preventive	Scaling and polishing	1 unit of scaling plus polishing twice in 12 month period	1/2 scaling unit if 17 years or older; 1 scaling unit if 16 years or younger	Frequency inadequate for high-risk clients
	Topical fluoride	2 per year if aged under 18 years	2 per year if aged under 17 years	Frequency inadequate for high-risk clients
	Root planning	As desired	4 units per 12 months	Frequency inadequate for high-risk clients
Restorative	Restorations	No restrictions	1 per 60 months for same surfaces on same teeth	Frequency inadequate for high-risk clients
Prosthodontic	Crowns (cast gold or porcelain) Core/posts Bridge repairs Complete or partial dentures	2 on permanent teeth per 60 months 2 on permanent teeth per 60 months 1 per bridge per 60 months 1 arch per 60 months	1 on permanent tooth per 36 months 1 per bridge per lifetime 1 per arch per 36 months	Frequency inadequate for high-risk clients Frequency inadequate for high-risk clients Frequency inadequate for high-risk clients Frequency inadequate for high-risk clients
Endodontic	Root canal treatments Apicoectomy Retfills	2 on permanent teeth per 60 months 2 on permanent teeth per 60 months 2 on permanent teeth per 60 months	1 per permanent tooth per 36 months 1 per permanent tooth per 36 months 1 per permanent tooth per 36 months	Frequency inadequate for high-risk clients Frequency inadequate for high-risk clients Frequency inadequate for high-risk clients
Periodontic	Periodontal surgery Bruxism appliances	No prior approval No prior approval	Requires prior approval 1 per 36 months	Loss of professional autonomy Frequency inadequate for high-risk clients
Orthodontic	Fixed space maintainers	1 per quadrant	1 per arch	Change may not accommodate high-risk clients needs
Other	General anesthesia and facility fees	No prior approval	Prior approval and medical certification if 12 years of age or older	Higher costs for clients from remote areas

commencement. In Canada, these procedures involve checks for client and service eligibility, in addition to consistency with prior services. These are usually performed by administrative personnel (Cooney et al 1986), whereas dental consultants are generally involved with services that exceed a specific price threshold (e.g. fixed prosthodontics). Moreover, 6-8% savings have followed the routine introduction of these procedures in the United States (Friedman 1975, Carr 1977) whereas a recent Canadian study has shown savings of 8.5% (Cooney et al 1995). In order to avoid some of the criticisms applied to the new Schedule of Dental Services, this alternative needs-based system was first introduced to the Manitoba region. There was also a potential option for the national implementation of this alternative need-based strategy, provided the relative efficacy could be documented.

This study is therefore intended to document the rationale for this need-based strategy (summarized in **Figure 1.7**). The prime interest was to evaluate the supportive evidence prior to considering its national implementation.

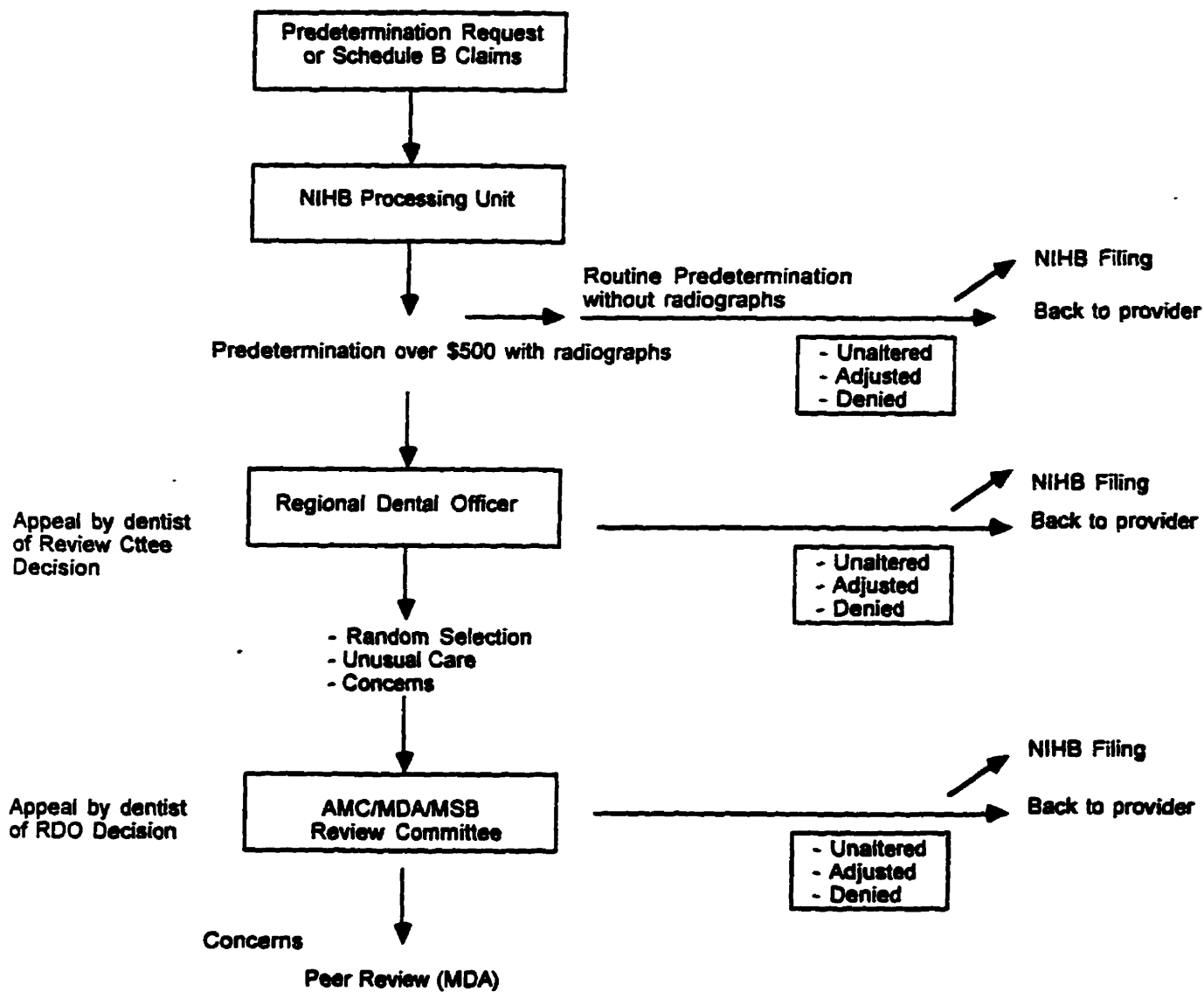
1.8 STUDY OBJECTIVES

In view of the concerns for the NIHB dental program, this study is primarily intended:

- ***to chronicle the introduction of a predetermination system into the NIHB dental program for the Manitoba Region as a short-term strategy to contain the associated expenditures***
- ***to evaluate initial data to determine the efficacy of this system prior to the implementation to other regions***
- ***to evaluate two short-term strategies and their potential national application and to indicate the more appropriate long-term strategies to reduce the disease burden of the First Nations Treaty and Inuit communities.***

Figure 1.7

Predetermination Routing In The Restructured NIHB Dental Program - Manitoba Region



2. MATERIALS & METHODS

2. PREAMBLE

The principal concerns for the NIHB dental program noted in the **Introduction** may be summarized:-

- **inflationary trends in dental service expenditures, without concomitant reductions in the disease burdens of the First Nations Treaty and Inuit communities.**

As this concern indicates an apparent lack of transparent accountability for the NIHB dental program resources, their political and economic implications cannot be overstated. Additional concerns include the potential for recent fiscal restraints imposed on the NIHB dental program by Health Canada to exacerbate the disease burdens of the First Nations Treaty and Inuit communities, especially if they culminated in restricted service access. The onus on the NIHB dental program may therefore be summarized as follows:-

- to formulate appropriate short-term strategies to provide a more equitable distribution of current resource allocations;
- to devise long-term preventive strategies to reduce the First Nations Treaty and Inuit communities' dental disease burden (and their associated expenditures).

These concerns for the NIHB dental program particularly relate to the fee-for-service component, which compromises approximately 80% of the resources. These supply services to both rural and urban communities in the providers' private practices. By contrast, contractual salaried payments principally provide services to the more remote northern communities. They are therefore not so amenable to strategic change, due to potential additional expenditures associated with increased client transportation to rural and urban providers. A comparative cost-effective analysis between fee-for-service and contract salaried payment systems was, however, outside the scope of this study. Such analyses would also require correlations between epidemiological data relative to the

service needs of the communities and the outcomes of services provided by these two payment systems, both of which are unavailable.

The fee-for-service component of the NIHB dental program was therefore the principal focus of this study. This focus centered on the relative economic merits of two different short-term strategies to accommodate the NIHB dental program's immediate fiscal concerns. Consideration of the potentially more appropriate long-term preventive strategies to reduce the disease prevalence in these communities is, therefore, deferred to the **Discussion**.

2.1 ORIGINS OF THIS STUDY

This study was primarily initiated as a response to reservations for the frequency-based initiative implemented in all NIHB regions (January 1st 1996) to reduce the inflationary program expenditures. Unfortunately, no opportunity was provided for a controlled study on the relative effectiveness of strategic alternatives implemented simultaneously in other regional programs. Other important concerns centered on the implementation of strategic changes with minimal provider consultation, in addition to the 'top-down' approach of the NIHB dental program administration and communication.

In view of such reservations (see introduction), a pilot study was undertaken to define an alternative option based on analysis of the NIHB dental program data for the 1990-95 period. This was facilitated by access to the relevant NIHB dental program data provided to Dr. C. Lavelle, on the proviso that confidentiality of the providers and clients would be maintained.

Access to these data proved fortuitous. Dentists (generalists and specialists) and denturists, providing services to the First Nations Treaty and Inuit communities on a fee-for-service basis, have their claims first verified by the appropriate regional NIHB program administrator for provider/client eligibility, prior to encoding and payment.

Subsequent submission to a centralized (Liberty Health) computer databank ensures regional payment rationalization, i.e. databank analyses facilitate national and regional fee for service data overviews.

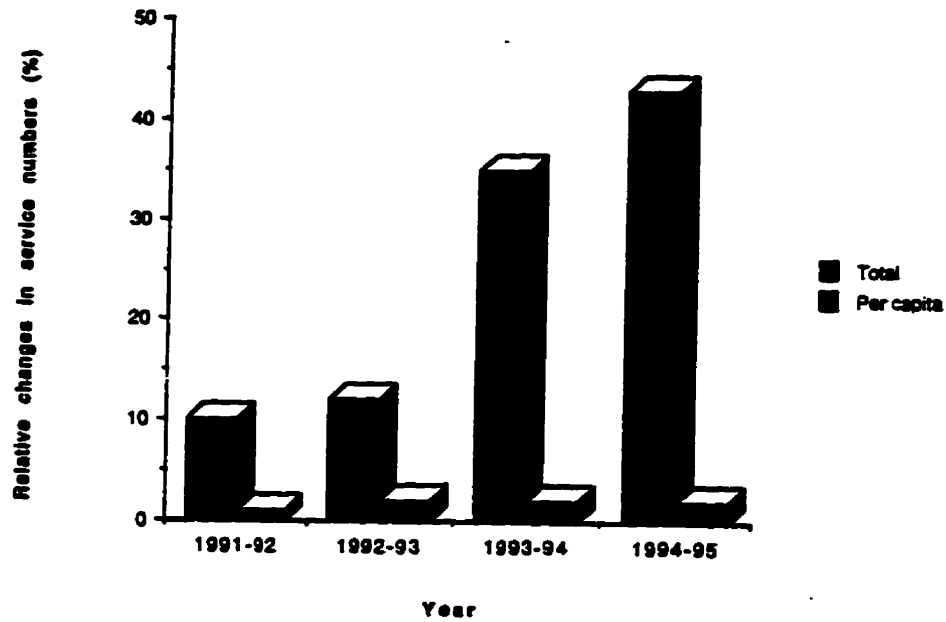
2.2(a) Analysis of NIHB Dental Program Data

Provisional analysis of the NIHB dental program data over the 1990-95 period, incorporated only the fee-for-service component. This precluded evaluations of the relative fee for service and per diem component contributions to the program's inflationary program trends. By contrast, an increase from \$61 million (1990-91) to \$102 million (1994-95) was noted for the fee-for-service component over the same period. This 67% inflation rate in service expenditures, however, contrasted with only a 43% increase in service numbers (Figures 2.1, 2.2, Tables 2.1, 2.2 Appendix). As such, the inflationary trends in program expenditures were functions more of increased service numbers than the provision of expensive services. Strategies are therefore required to control both components. The formulation of potential strategies were, however, complicated by progressive changes that varied with the service categories included in the analyses (Figures 2.3, 2.4). For instance, the demands for orthodontic services increased dramatically from 1991-92 to 1994-95, but strategies to control their association expenditures are not a simple challenge.

There were also marked regional discrepancies in the five-year inflationary trends for total service expenditures. As these ranged from 22% (Yukon region) to 110% (Quebec region), they were difficult to interpret. For instance, each five-year inflationary trend appeared to be a function of the specific service categories included with the analysis, as illustrated by the 10% range for removable prosthodontic and the 140% and 325% ranges for periodontal and orthodontic services respectively. In addition, the five year inflationary trends for surgical services ranged from 57% (Atlantic and Yukon) to 124% (Manitoba). The regional trends for periodontic (52% to 240%), preventive (6 to 109%),

Figure 2.1

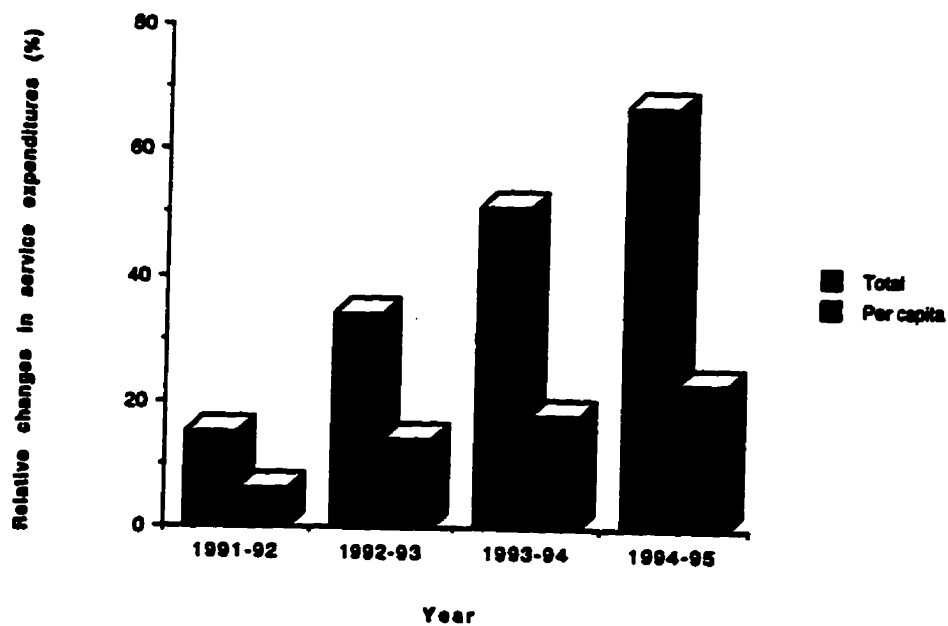
Changes in Service Numbers Relative to the 1990-91 Fiscal Year



Note: The increases in total service numbers greatly exceeded those for individual clients.

Figure 2.2

Changes in Service Expenditures Relative to the 1990-91 Fiscal Year



Note: The increases in total service expenditures paralleled those for individual clients.

Figure 2.3
Changes in Service Numbers Relative to 1990-91

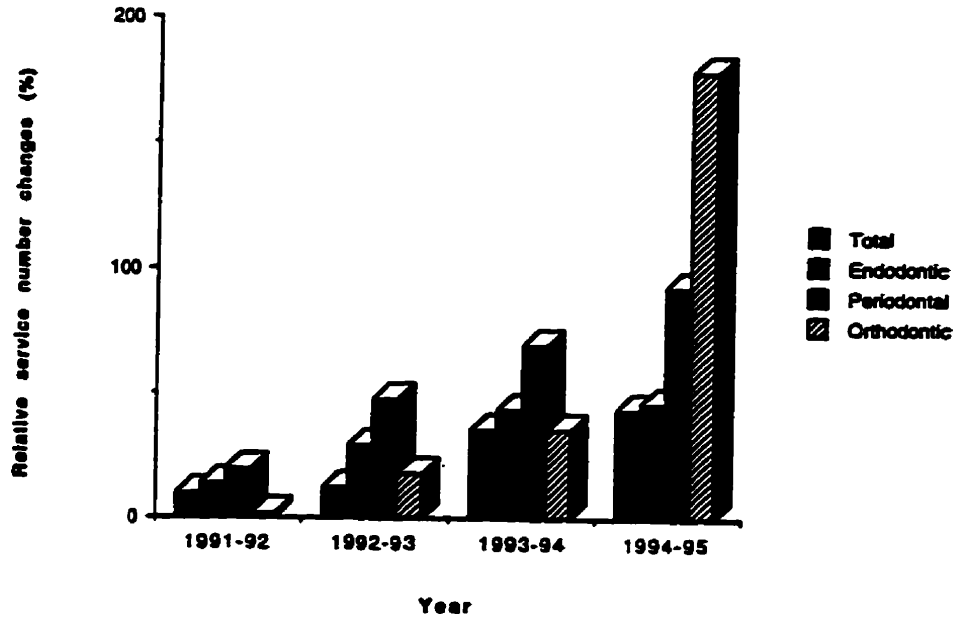
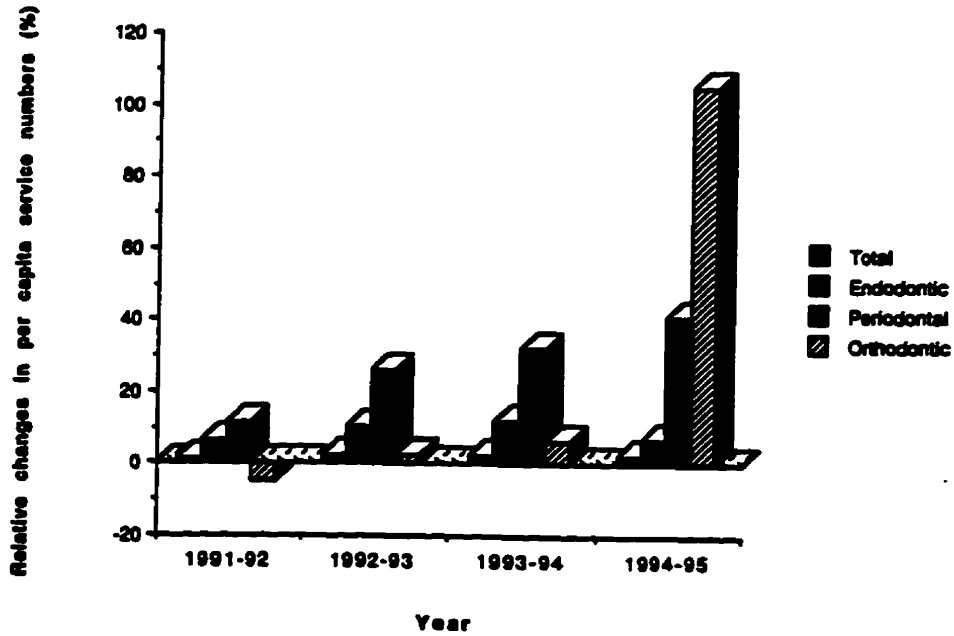


Figure 2.4
Changes in Selected Per Capita Service Numbers Relative to 1990-91



endodontic (12% to 104%) and restorative (28 to 110%) services further emphasized their complexities. As no epidemiological data are available to support such regional disparities, their association with the differential provision of excessive service numbers and/or expensive services was possible. Therefore an equitable system to control both service numbers and expensive services should be inherent to any initiative designed to reduce the NIHB dental program expenditures.

Further data analysis on the fee-for-service component of the NIHB dental program expenditures confirmed this perception. For instance, the 23% five-year inflationary trend for per capita service expenditures conflicted with the 67% increase in total service expenditures (**Figures 2.5, 2.6**). But whereas these data indicated that increased service numbers contributed more to these inflationary trends than the provision of expensive services, marked regional discrepancies compounded their interpretation. For instance, a 3% reduction in per capita total service expenditures over the 1990-95 period (Saskatchewan) conflicted with their 11-46% increases for other (e.g. Pacific and Quebec) regions. Similarly, the inflationary trends in per capita examination expenditures ranged from 4% (Pacific) to 35% (Quebec), whereas those for preventive services ranged from 0% (Yukon) to 55% (Alberta). Regional variations in per capita expenditures were most apparent for removable prosthodontic services, where their five year inflationary trends ranged from 50% increases (NorthWest Territories) to 44% reductions (Manitoba).

These regional discrepancies clearly illustrated the complex challenge in formulating cost-control strategies for the NIHB dental program. They also underscored the need to safeguard potential aggravation of the dental disease burdens of the First Nations Treaty and Inuit communities (i.e. reducing expenditures through service access restrictions could exacerbate their disease burden and associated expenditures). This was the main deficiency of the frequency-based cost-control strategy to reduce program

Figure 2.5

Changes in Selected Service Expenditures Relative to the 1990-91 Fiscal Year

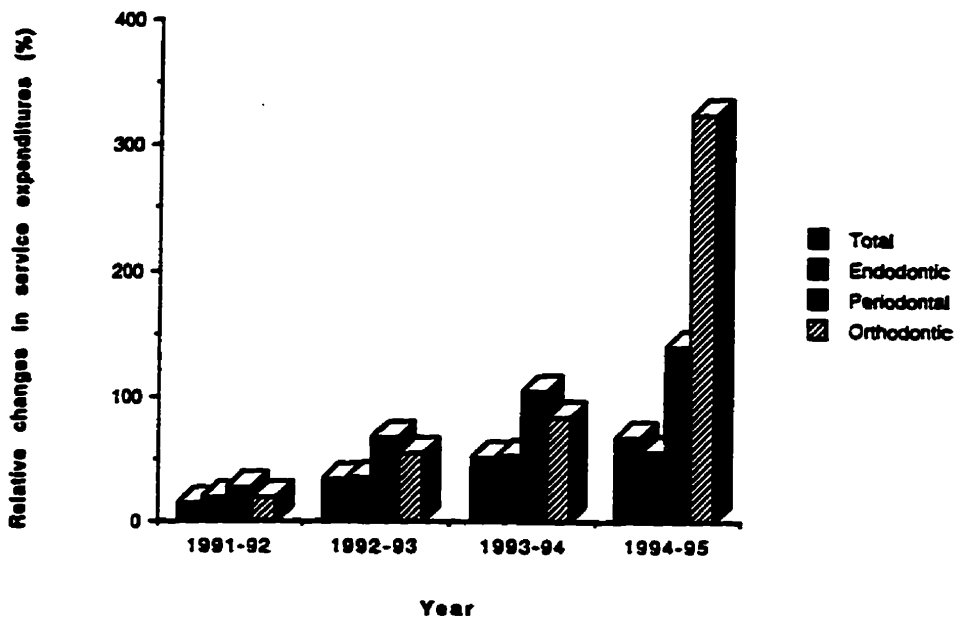
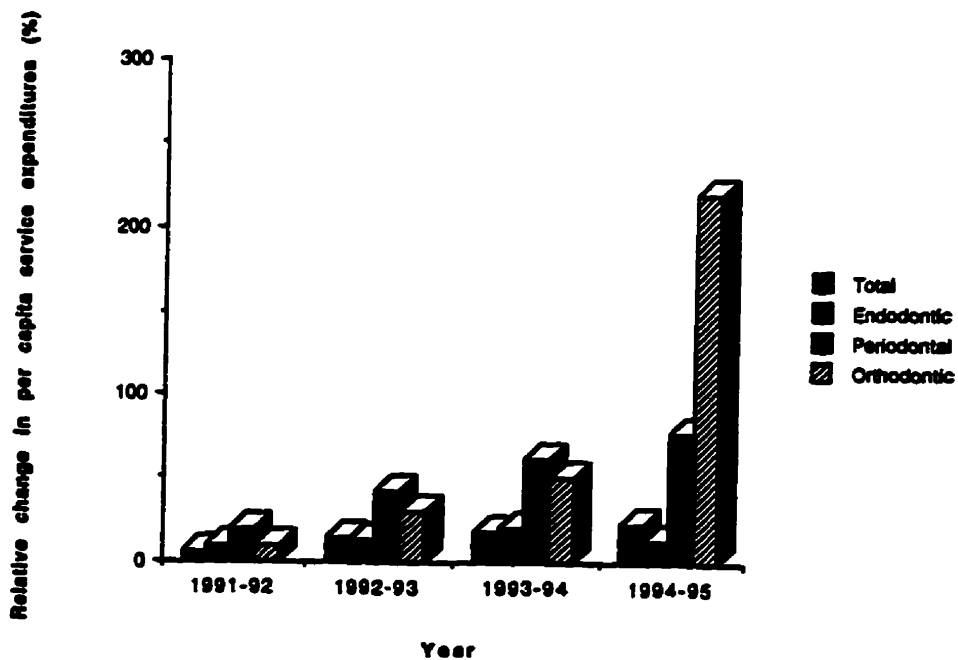


Figure 2.6

Changes in Selected Per Capita Service Expenditures Relative to the 1990-91 Fiscal Year



expenditures, implemented on the NIHB (January 1996), i.e. there were no mechanisms to accommodate the service needs of particular clients.

In conclusion, whereas preliminary analyses indicated the provision of increased and more expensive services contributed to the inflationary trends in the NIHB dental program, marked regional discrepancies constrained their precise interpretations. More detailed evaluations of data from the Manitoba region were therefore warranted to augment the accuracy of these evaluations.

2.2(b) Profile Reviews of Providers from the Manitoba Region

Most private insurance programs monitor the provision of services through routine examination of the providers' practice profiles (Friedman 1983; Brand et al 1995). These audits generally center on the providers' aggregated service rates or expenditures. They are also primarily designed to identify outliers that deviate from regional 'norms' for subsequent more detailed audits. For instance, such analyses have identified providers who routinely extract unerupted third molars, whereas there is evidence that they may remain asymptomatic during the lifetime of an individual (Friedman 1983). In this study, the unique application of this technique was to identify the practice patterns of outliers (i.e. providers who generated maximum expenditures or service numbers) in order to aid the formulation of strategies to control NIHB program expenditures.

This practice profile analysis was facilitated by the development of custom-made computer software, that identified the annual service trends (numbers and expenditures) of the 'top' 30 providers (outliers) from the Manitoba region for a four year period. The primary intent was to determine potential strategic initiatives to curb the inflationary trends in NIHB dental program expenditures from examination of these annual profiles. There were, however, a number of inherent reservations for these analyses. For instance, the fine details that distinguish different providers (i.e. differential clinical or communication skills) cannot be extrapolated from overall or per capita service rates or

expenditures. Also, the 'true' service values may have been masked by dental service rates or expenditures (i.e. differential preventive and endodontic service fees are not necessarily correlated with their respective client 'values').

Cognizant of these inherent data deficiencies, the initial objective was to scan the annual 1992-95 NIHB dental program databank for the Manitoba region to define the overall practice profiles of those providers at the upper end of the specimen, i.e. "top" 30 outliers. This arbitrary cutoff identified providers who collectively generated approximately 50% of Manitoba's program expenditures.

This pragmatic approach centered on the evaluation of service numbers and expenditures provided by two inter-related provider groups over a five year period (1992-1995):-

- the 'top' 30 providers (both generalist and specialist dentists) who generated maximum expenditures during this period (Table 2.3 Appendix);
- the 'top' 20 generalist providers over the same period, i.e. a more homogeneous provider sample (Table 2.4 Appendix).

Examination of these data from both 'top' provider groups (Table 2.5 Appendix) showed the following overall consistencies:-

- a progressive increase in the aggregated service numbers and expenditures from both provider groups over the 1992-95 period (Figures 2.7-2.10);
- a progressive increase in service numbers and expenditures provided by the 'top' outlier within each group;
- poor correlation between service numbers and expenditures from each provider and the average per capita service costs to their clients (Figures 2.11 and 2.12);
- the inclusion of specialist providers resulted in data distortion for the top 30 provider group, i.e. orthodontists generated higher service costs than most other providers;

Figure 2.7

Service Numbers Provided by 'Top' 30 Outliers in 1992 vs 1995

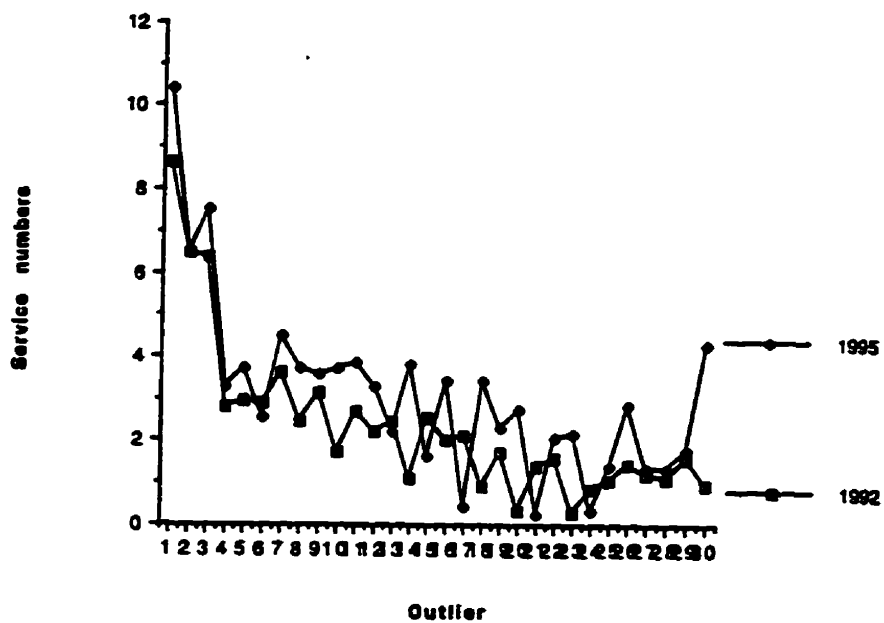


Figure 2.8

Changes in Service Numbers Provided by the 'Top' 20 Outliers 1992 vs 1995

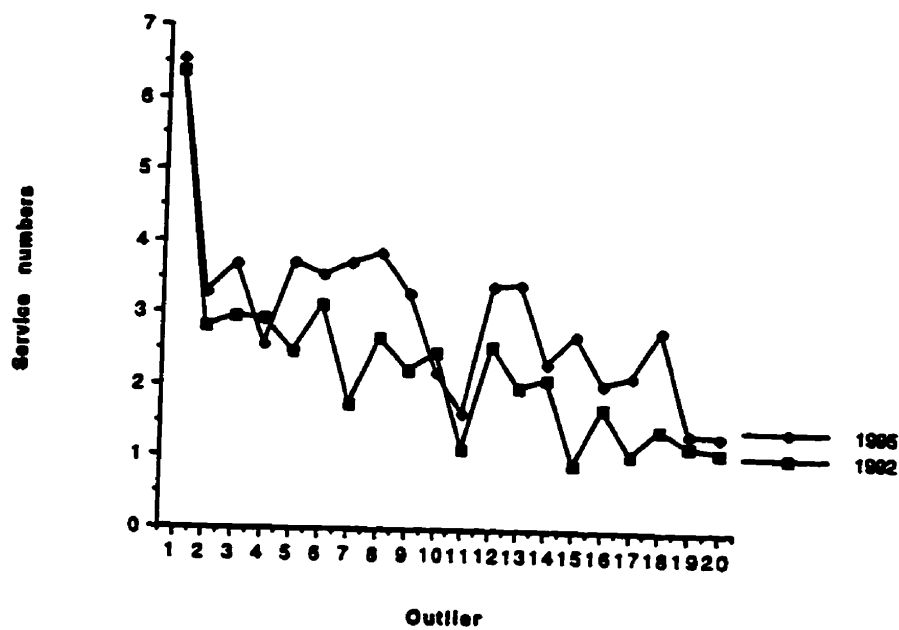


Figure 2.9

Service Expenditures Generated by 'Top' 20 Outliers 1992 vs 1995

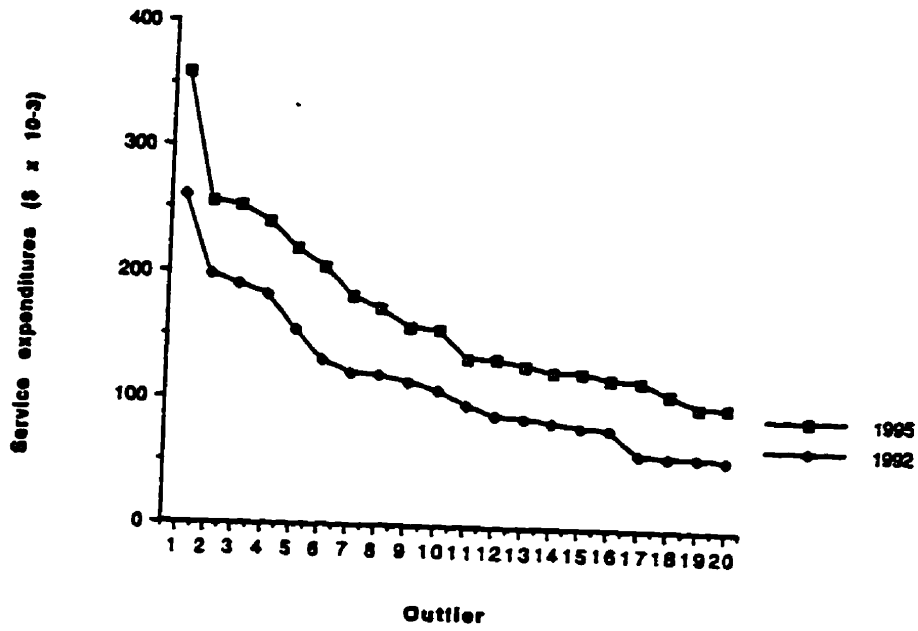


Figure 2.10

Service Expenditures Generated by 'Top' 30 Outliers 1992 vs 1995

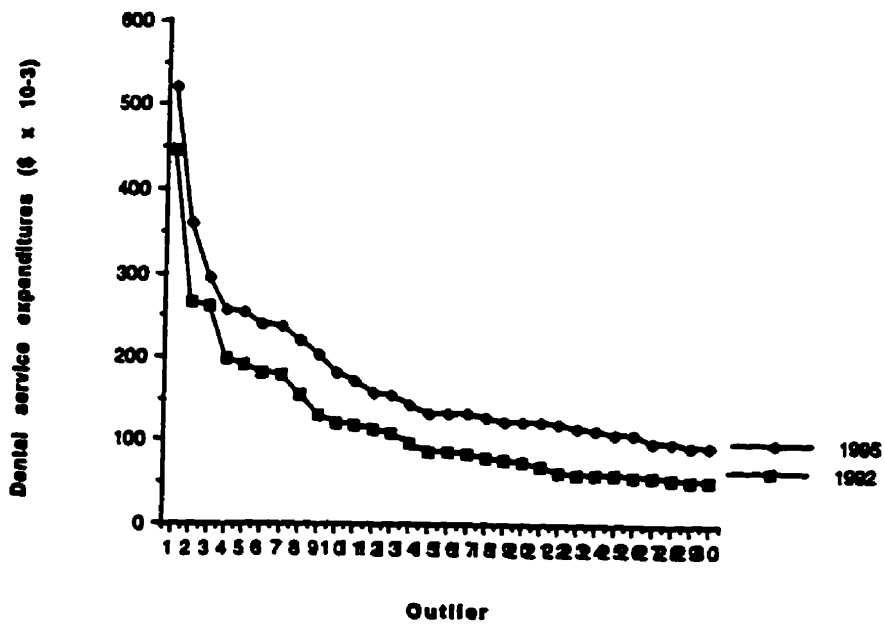


Figure 2.11

Average Service Costs Provided by 'Top' 30 Outliers 1992 vs 1995

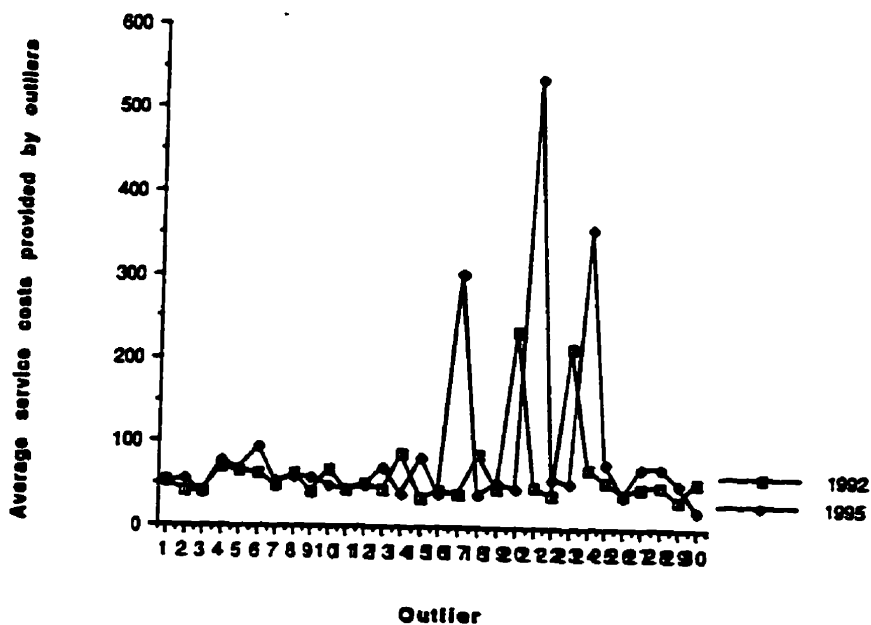
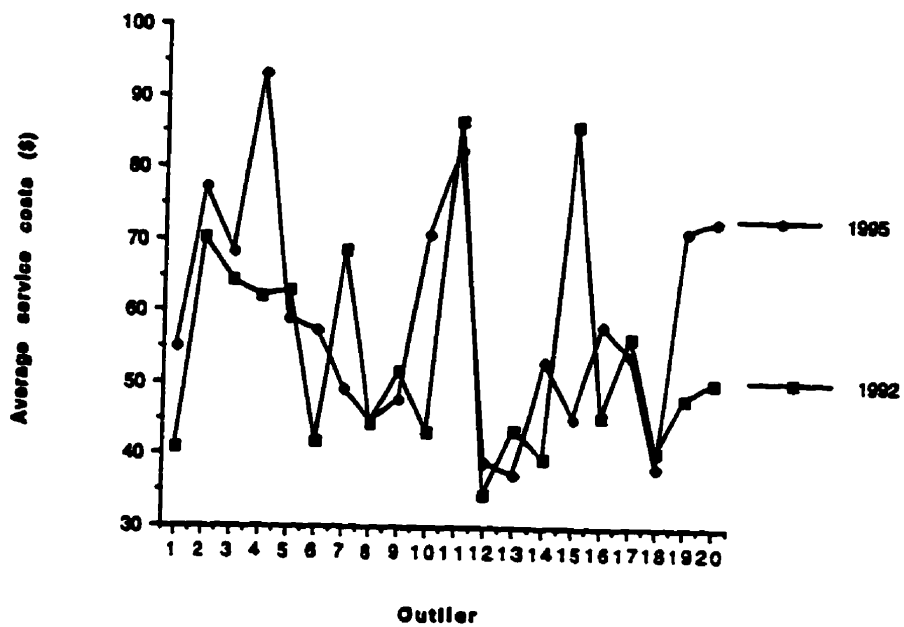


Figure 2.12

Average Service Costs from the 'Top' 20 Outliers 1992 vs 1995



- the top provider from the top 30 group was the same pedodontist in the 1992-95 period;
- profile reviews were insufficient to pin-point specific trends, which required more detailed audits (Figure 2.13).

More detailed practice profile audits from the 'top' providers from each group over the 1992-95 period were illustrated by two examples.

2.2(b) i An Urban General Provider

Detailed audits of one urban general provider showed that significantly higher per capita expenditures were generated relative to others during each fiscal quarter from January 1992 to September 1995. For instance, whereas the 'top' 20 providers generated expenditures that ranged from \$307 to \$518 per capita per fiscal quarter over the 15 quarter periods, the total NIHB dental program expenditures derived from this one provider were \$827,400 (i.e. \$18,386.67 per month) over the same period. Unfortunately these expenditures must be considered in total, since no data were available to distinguish rural from urban providers or specialists from generalists.

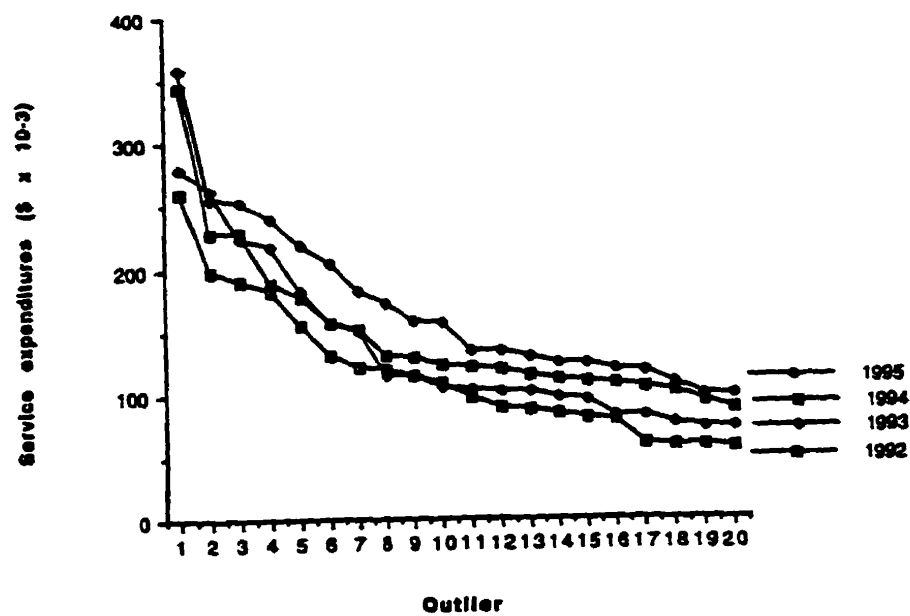
A random sample of this provider's service claims illustrated analogous patterns of practice discrepancies, as illustrated by the expenditures generated during on one client visit (Table 2.1):

Table 2.1 Dental Services Provided by a Single Dentist During One Visit

CODE	TOOTH	SERVICE	FEE
21221	47 OCC	Amalgam	46.17
21212	45 DO	Amalgam	54.45
41301	1 Unit	Desensitizing	30.06
27301	38	Full Cast Crown	342.36
42331	38	Ging Fibre Incision	32.76
43312	2 Units	Occ Adjust	67.48
43801		M.P.D. Appliance	403.38
99111	38	Lab	158.12
92312	2 Units	N ₂ O ₂	34.29
		TOTAL	\$1,171.07

Figure 2.13

Service Expenditures Generated by 'Top' 20 Outliers 1992 vs 1995



Note: Although the expenditures generated by top 'outliers' were higher than the remainder in the years 1992-95, their identity was not consistent, i.e., the same outlier was not the 'top' in each year.

These services for \$1,012.95 (excluding the laboratory bill) appear to have been performed within the thirty minute timeframe, i.e. the time allowed for nitrous oxide sedation. Other audits showed that this provider also tended to 'unbundle' his service claims. This was underscored by the inclusion of most crowns (procedure codes 27201, 27211, 27301, 27311) with separate codes of 42331 or 42339 (gingival fiber incision) and 43311, 43312, 43313, 43314, 43317, 43319 (occlusal adjustment) for crown placement. These three code combinations were apparent in 314 (71%) of 444 claims for crowns (\$51,363.36), as opposed to 130 (29%) of the claims from other providers over the same period. Since these anomalous practice patterns were not unique to this provider, they underscored the need to monitor service claims (e.g. by prior approval) for tighter control of the NIHB dental program expenditures.

2.2 (b) ii A Specialist Provider

This pedodontic specialist had consistently higher remuneration rates over the 1992-1995 period than those derived from similar specialists, as illustrated by the generation of \$2,401,500 from NIHB fee-for-service billings during this period. These data yielded a \$53,367 monthly average, although the practice also served the private dental market.

A random audit of this practice showed that nine of the twelve clients who were booked on an operating room slate to receive service, actually received this service while the three that were not treated received specific examinations. The operation room slate also showed that 7.5 hours were spent under treatment for a total daily billing of \$12,194.17, i.e. \$11,217.53 with the exclusion of general anesthetic and facility charges. The claim for one of these cases showed services for \$1,570.85 were provided in 45 minutes. Moreover, an initial examination (8-01101 and 1-01102), a prophylaxis (11101) and fluoride services (12101) were claimed for each of the nine cases seen that day. Based

on the Relative Time Units derived from the Manitoba Dental Association fee guide, the time required for these three services for the nine children was 6 hours 28.8 minutes:-

9 Initial Exams	27.90 x 9
9 Prophylaxes	11.40 x 9
9 Fluoride Treatments	<u>3.90 x 9</u>
Total	43.20 x 9 minutes, i.e. 6 hours 28.8 minutes

Subtraction of 6.5 hours from the 7.5 hour total operating time, then indicated that dental services for \$10,419.28 (\$11,217.53 - \$798.25) were provided in one hour. Other questions also emanated from this audit. For instance, if the initial exams were performed under GA, were they performed in full? (i.e. can vitality tests, assessments of periodontal pocket depths and occlusion of teeth, in addition to case presentation, be reliable for patients under general anesthesia).

By contrast, claims for another client showed that \$2,168.50 of dental services were provided in one hour and fifteen minutes. These were subsequently withdrawn, however, on questioning the provider about the \$960.31 worth of services performed for the same client one and a half years previously. There were also many other cases of this provider, where considerable levels of additional services had been previously provided by the same provider. These examples clearly underscored the need to monitor services based on the clients' as opposed to providers' needs. This assertion was also confirmed by unusual billing practices for conscious sedation and general anesthesia, including double billing for medications, in addition to the provision of excessive specific services, e.g. (85%) of complete examinations (code 01101) for \$24,042.88 were performed by this provider in 1995 relative to 15% by all the other Manitoba providers over the same period.

Such anomalous practice patterns must therefore be controlled to reduce the inflationary NIHB dental program expenditures. Comparative analysis of the 1992-95

data therefore indicated that the service patterns provided by Manitoba's 'top' outliers partially accounted for the inflationary trends in NIHB dental program expenditures.

Such trends can be controlled by the implementation of a prior-approval (needs-based) strategy, although these constraints will only apply to service claims in excess of \$500. This \$500 threshold was set arbitrarily. The basic premise was that thresholds below \$500 would potentiate administrative delays from increased service claim assessment, although the potential control of more dental service claims has the potential to improve quality assurance for the program as a whole. By contrast, higher thresholds might not achieve the objectives of expenditure control, although would improve the speed of their approval. Review the impact of this \$500 threshold after a trial period was therefore a pragmatic strategy.

2.3 OVERALL STUDY OBJECTIVES

The principal focus of this study centered on the evaluation of two short-term strategies to control the burgeoning inflationary trends in the NIHB dental program expenditures as identified in Section 1.8 (Introduction). More specifically, this thesis is directed to an analysis of the following:-

- **a need-based prior-approval initiative** (date of implementation-1st April 1996; Region- Manitoba);
- **a frequency-based initiative** (date of implementation- 1st January 1996; Region- all NIHB regions, but subsequently substituted by the needs-based strategy in Manitoba region on 1st April 1996).

The overall trends in dental service numbers and expenditures for the Manitoba region relative to the national data were subsequently examined over two nine month (April-December) periods in 1995 and 1996. The NIHB fee-for-service dental data were therefore compared before and after the implementation of different control strategies for

Manitoba versus the remainder of Canada. The more specific primary objective may therefore be defined as follows:-

- **To determine whether there was sufficient evidence to justify the implementation of the need-based strategy (Manitoba) in other regions of the NIHB dental program, i.e. whether cost-control for the NIHB dental program should center on the needs- as opposed to frequency-based strategy in the short-term prior to the institution of more appropriate long-term preventive strategies.**

A nine-month (April-December) time period was selected for study, due to the urgent need to resolve the clients' and providers' concerns for the frequency-based strategy; an analogous period was then selected as the control to ensure a symmetrical study design. This study was therefore based on the premise that these study periods would provide sufficient information to determine whether the needs-based (or some modification) strategy should be implemented in the other NIHB dental program regions. The primary intent was to provide data to devise the most appropriate short-term strategy to curtail the burgeoning expenditures for the NIHB dental program, without potentially exacerbating the First Nations Treaty and Inuit communities' disease burden.

The study design was therefore dictated by two parameters:-

- the volume of claims to the NIHB dental program;
- the urgency of the concerns to control the NIHB dental program expenditures.

The analyses were therefore expedited by aggregating both the service numbers and their expenditures:-

- for each region on a month-to-month basis for the two nine month periods in 1995 and 1996;
- for the total nine month periods in 1995 and 1996.

Detailed service claim data from the individual providers were not examined at this time. Their subsequent analyses will, however, form part of more comprehensive future studies on the providers' reactions to rapid changes in policy initiatives.

Service data from all providers (specialist or generalist dentist) were aggregated together to maintain provider-confidentiality, even though this may have masked some of the important data discrepancies that might have included increased service expenditures.

3. RESULTS

This study was designed as follows:-

- service data for April-December 1995 served as control data;
- service data for April-December 1996 served as experimental data.

The impact of changes induced by the needs- or frequency-based strategies were assayed from comparative analyses of data for analogous 1995 (control) and 1996 (experimental) periods. The derived analyses are then presented in three discrete sections to facilitate their subsequent interpretation:-

- data analyses from the Manitoba NIHB dental program to evaluate the impact of the needs-based strategy;
- data analyses from other NIHB regions to evaluate the impact of the frequency-based strategy;
- data analyses from the Manitoba versus other NIHB dental program regions to provide differential evaluations of these two strategies.

3.1 ANALYSIS OF MANITOBA NIHB DENTAL SERVICE DATA: 1996 versus 1995

The changes induced by the needs-based strategy on the Manitoba NIHB region were evaluated from two perspectives:

- practice profile data from the Manitoba 'top' outliers during the 1996 and 1995 periods (i.e. providers who generated the highest aggregate fee-for-service dental expenditures from this region);
- aggregated dental fee-for-service data for the Manitoba NIHB region during the 1996 and 1995 periods.

3.1(a) Analyses of Data from the 'Top' Outlier Providers in the Manitoba Region: 1996 versus 1995

In this part of the study, the profiles of the Manitoba NIHB fee-for-service outliers were evaluated over comparable nine month periods in 1996 and 1995. This was initiated from previous investigations over the 1992-1995 periods delineated in the Materials and

Methods section. These indicated that this small proportion of outliers (i.e. approximately 6% of the licensed Manitoba providers) contributed more to the inflationary NIHB expenditure trends than the others. The impact of the needs-based strategy on the expenditures generated by this provider group in 1996 relative to 1995 was, therefore, considered the 'acid-test' and evaluated from two perspectives:-

- a heterogeneous 'top' 30 provider group, comprised of both specialists and generalists;
- a homogeneous 'top' 20 provider group, comprised only of generalists.

These data were inherently difficult to interpret. For instance, generalists were components of both outlier groups, i.e. there was data duplication between the outlier groups. There were also variations in the outlier rank orders between the 1995 and 1996 periods. Despite such concerns, the contrasts were considered sufficiently definitive to delineate changes in the service trends of these outliers induced by the needs-based strategy (i.e. pre versus post implementation of the strategy).

As summarized in **Table 3.1 (Appendix)**, the 17% reduction in total aggregated services provided by the 'top' 30 outliers in 1996 relative to 1995 was considered significant, i.e. there was a 26% decline in service expenditures in 1996 compared to 1995. This trend was confirmed by the highest provider within this 'top' 30 outlier group, who provided 21% fewer services in 1996 than 1995. As this translated to a 37% reduction in the associated expenditures (**Figure 3.1**), these data indicated that the needs-based strategy effectively controlled the services provided by this outlier group.

Analogous trends were also apparent from the service data derived from the more homogeneous 'top' 20 outlier group in 1996 versus 1995 (**Table 3.1 Appendix**). For instance, this outlier group generated 16% fewer aggregated services in 1996 than 1995, resulting in a 36% reduction in associated expenditures (**Figure 3.2**). Similar trends were also apparent in the service expenditures generated by the highest provider within this

Figure 3.1

Changes in Manitoban Outliers' Expenditures: 1995 vs 1996, Top 30 Outliers

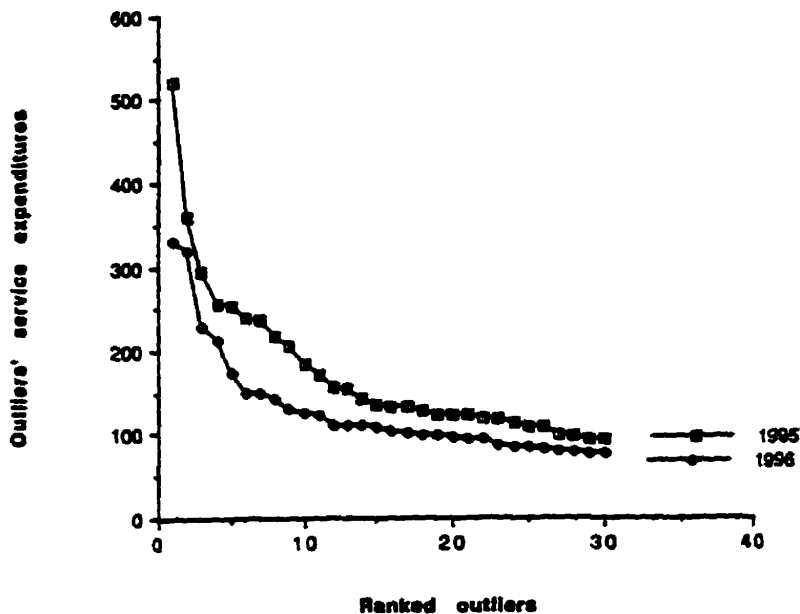
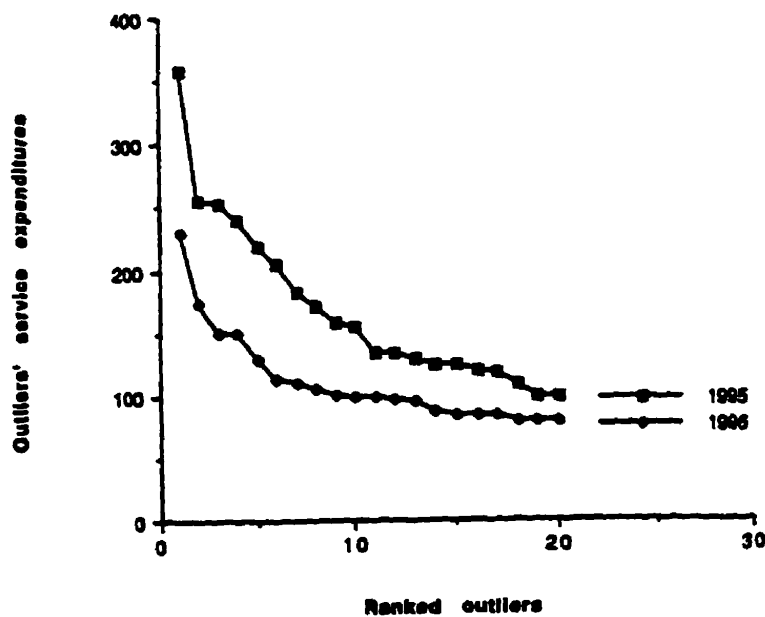


Figure 3.2

Changes in Manitoban Outliers' Expenditures: 1995 vs 1996, Top 20 Generalist Outliers



'top' 20 group (i.e. a 16% reduction in services for 34% lower expenditures). As the 1996-1995 expenditure reductions for both outlier groups exceeded those for services, they therefore indicated that the needs-based strategy more effectively controlled service expenditures than the number of services in the Manitoba region. This interpretation was also confirmed by the 20% and 34% reductions in average dental service costs in 1996 relative to 1995 respectively provided by the highest providers of the 'top' 30 and 20 outlier groups.

These trends were also illustrated in the apparent changes in relationships between the service numbers and expenditures derived from the 'top' 20 homogeneous group in 1996 relative to 1995 (Figure 3.3). For instance, whereas the outliers generating the maximum expenditures also tended to provide the greatest service numbers, these trends were markedly reduced in 1996. Unfortunately, the lack of specific service information constrained more detailed analyses of these trends.

Preliminary service data comparisons from these two outlier groups for the 1992-1995 period (Figures 3.4, 3.5) further underscored the benefits of the needs-based initiative. More detailed interpretation was however constrained by marked variations in the services provided by individual outliers.

Individualized audits of both outlier groups confirmed the benefits of the needs-based strategy to control the NIHB dental program expenditures. For instance, requests to justify 'expensive' service claims prior to approval were not infrequently followed by their subsequent revision (i.e. their down-grading and/or withdrawal). This supported the premise that the needs-based strategy effectively controlled anomalous service claims, provided an appeal mechanism safeguarded potential for errors or bias in the claim assessments. In addition, previous concerns that the prior approval system might delay emergency treatments (e.g. toothaches) was countered by implementation of retrospective payment policies, provided the claims are subsequently substantiated by data (e.g. the

Figure 3.3

Relationships Between Service Numbers and Expenditures for the 'Top' 20 Manitoban Outliers: 1995 vs 1996

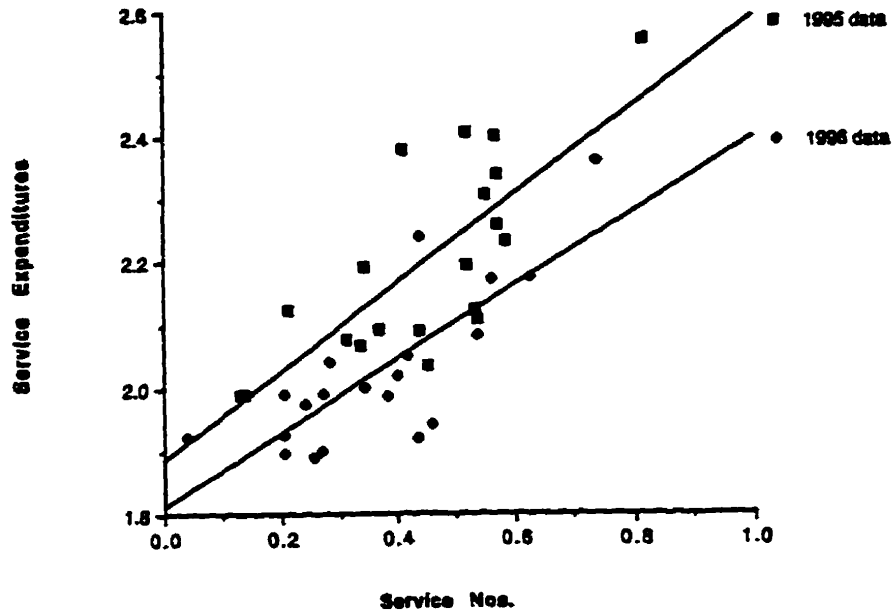


Figure 3.4

Changes in Service Expenditures for 'Top' 30 Manitoban Outliers: 1992-1996

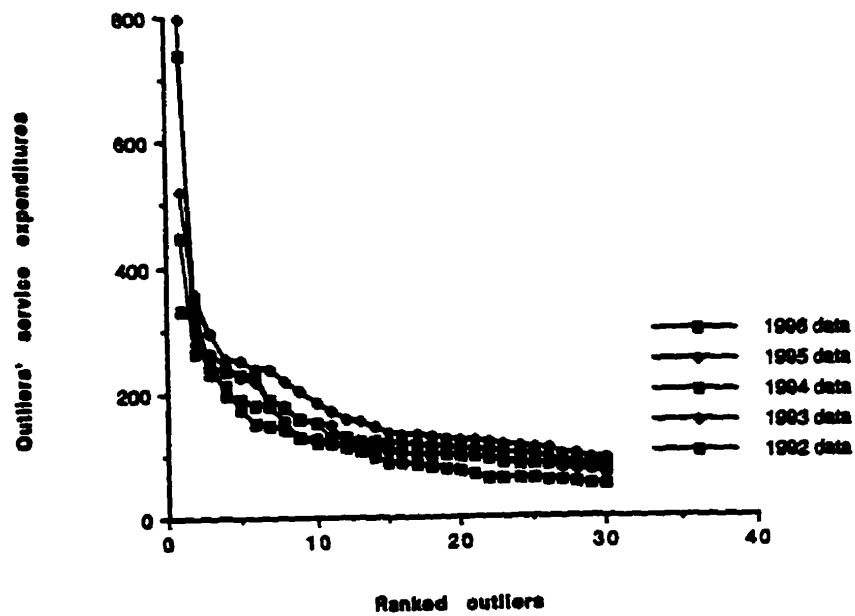


Figure 3.5

Changes in Service Expenditures for 'Top' 20 Manitoban Outliers: 1992-1996

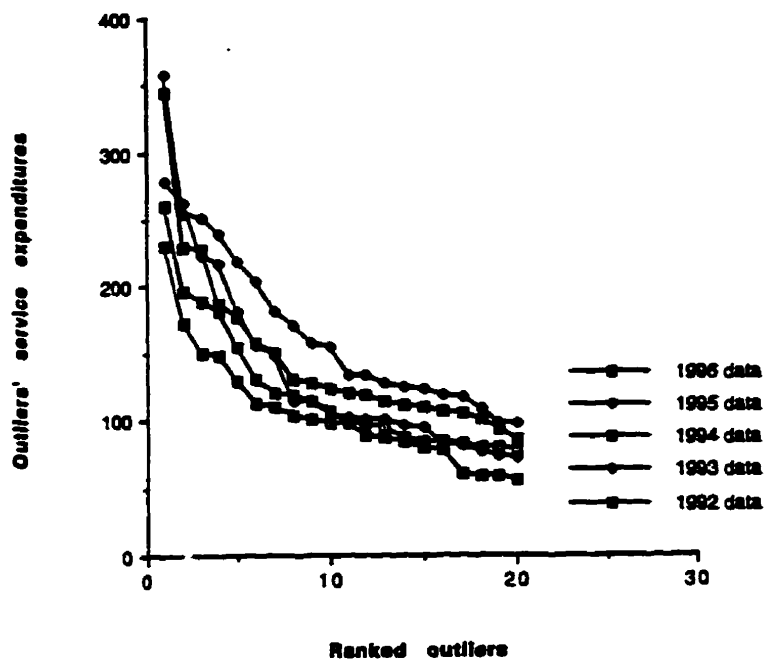
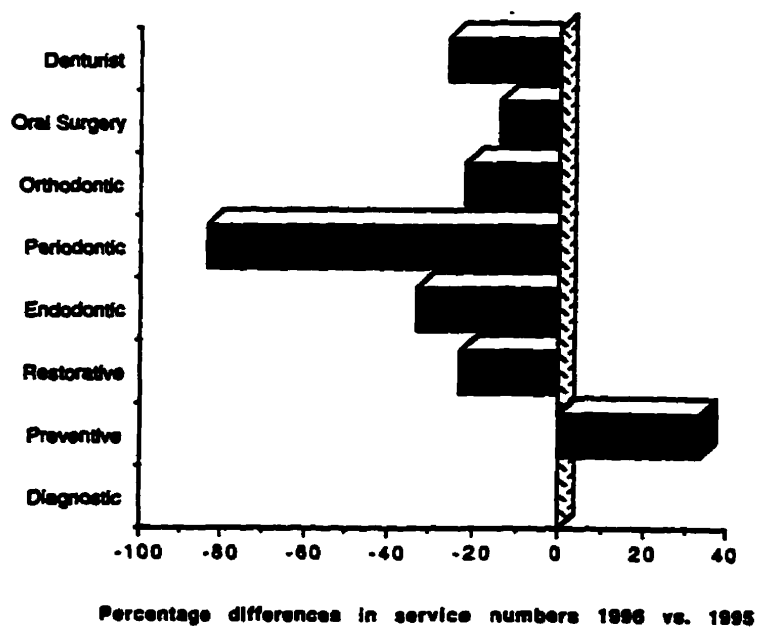


Figure 3.6

Differential Changes in Selected Dental Services Provided by the Manitoba NIHB Program: 1996 vs 1995



provision of radiographic evidence). Other criticisms that the prior-approval mechanism would lead to unacceptable delays (i.e. longer than 14 days) were more difficult to rectify, although these deficiencies tended to improve with the assessor's experience.

Concerns that this strategy was an effective short-term solution to the economic changes in the Manitoba NIHB dental program proved difficult to evaluate, however, since no associated epidemiological data were available to assay the impact on the First Nations Treaty and Inuit communities' service needs. In addition, there were still concerns for the service claims from a small proportion of these outlier groups, although such issues were generally resolved by their referral to the licensing body.

3.1(b) Analyses of Service Data from the Manitoba NIHB Region: 1996 versus 1995

Comparisons of aggregated service data from the Manitoba NIHB dental program over analogous nine month periods in 1996 versus 1995 provided further evidence for the short-term effectiveness of the needs-based strategy in the control of expenditures (**Table 3.2 Appendix; Figures 3.6, 3.7, 3.8**). For instance, these analyses showed a 33% expenditure reduction for only a 16% decline in services to the First Nations Treaty and Inuit communities. In addition, these data indicated the preferential effectiveness of the needs-based initiative in controlling expenditures (i.e. expensive services) as opposed to service access. Unfortunately, reductions in aggregated fee-for-service expenditures were functions of the service category included in the analyses. Therefore expenditure reductions that ranged from 7% for orthodontic to 81% for periodontal services cannot withstand simplistic interpretations. For instance, orthodontic services have always been subject to a predetermination process based on orthodontic specialist consultation, whereas previously unaudited periodontal services are now being funded on the basis of actual service needs rather than service frequency. Intermediate expenditure reductions that ranged from 16% for oral surgery, 18% for diagnostic, 33% for restorative, 45% for removable prosthodontic, 53% for endodontic and 54% for denturist services, to no

Figure 3.7

Differential Changes in Selected Dental Services Expenditures Provided by the Manitoba NIHB Program: 1996 vs 1995

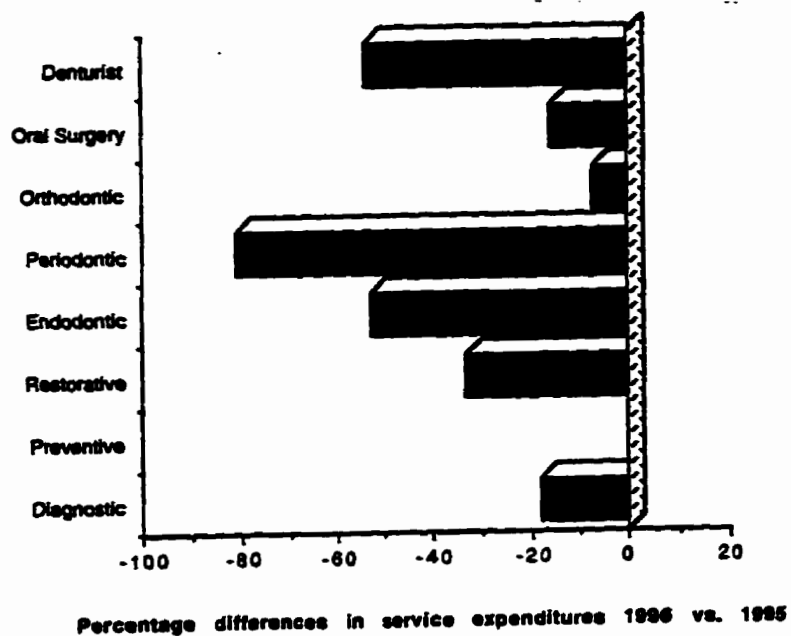
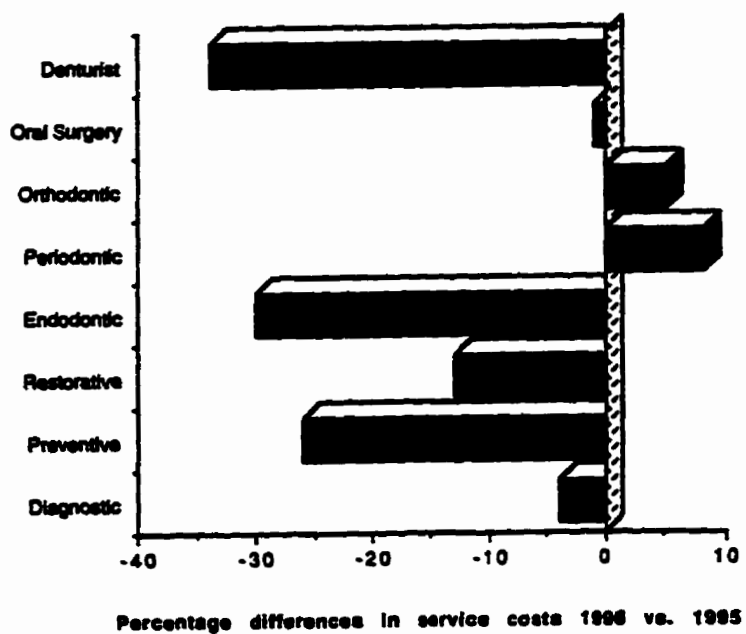


Figure 3.8

Differential Changes in Selected Dental Services Costs Provided by the Manitoba NIHB Program: 1996 vs 1995



changes for preventive service expenditures in 1996 versus 1995, however, further complicated the relative assessments on the effectiveness of the needs-based strategy to control the providers.

In addition to changes over the total nine month periods in 1996 versus 1995, there were also progressive trends within these periods (**Table 3.3 Appendix**). These were illustrated by the progressive expenditure reductions in restorative services, which ranged from 21% (month 1) to 49% (month 9). Similarly, the reductions in periodontal service expenditures increased from 59% to 94% over the same period (**Figures 3.9, 3.10**). Interpretations of these changes were, however, constrained by assessments of the full-impact of a new cost-control initiative over only a nine month period. The urgent concerns for the frequency-based initiative, however, necessarily curtailed a more appropriate two year evaluative period. Moreover, these progressive changes tended to be functions of the specific service category (e.g. endodontic or periodontal services) included in the analysis. This further complicated their interpretation, especially without supportive epidemiological data to define the service needs of the First Nations Treaty and Inuit communities.

Although the reductions in service numbers exhibited similar patterns in 1996 relative to 1995 (**Tables 3.2, 3.3 Appendix**), they tended to be lower than those based on expenditures. For instance, the reductions ranged from 15% (diagnostic services) to 34% (preventive services), although the 83% decline in periodontal services greatly exceeded those for other services. In addition, the data anomalies in the miscellaneous service category undoubtedly reflected variations in the component service proportions included within this category.

The aggregated data from the Manitoba region (**Tables 3.2, 3.3 Appendix**), therefore, underscored the progressive reductions induced by the needs-based strategy, i.e. progressive reductions in service numbers and expenditures were apparent for each

Figure 3.9

Relative Changes in Restorative Services Provided by the Manitoba NIHB Program:
1996 vs 1995

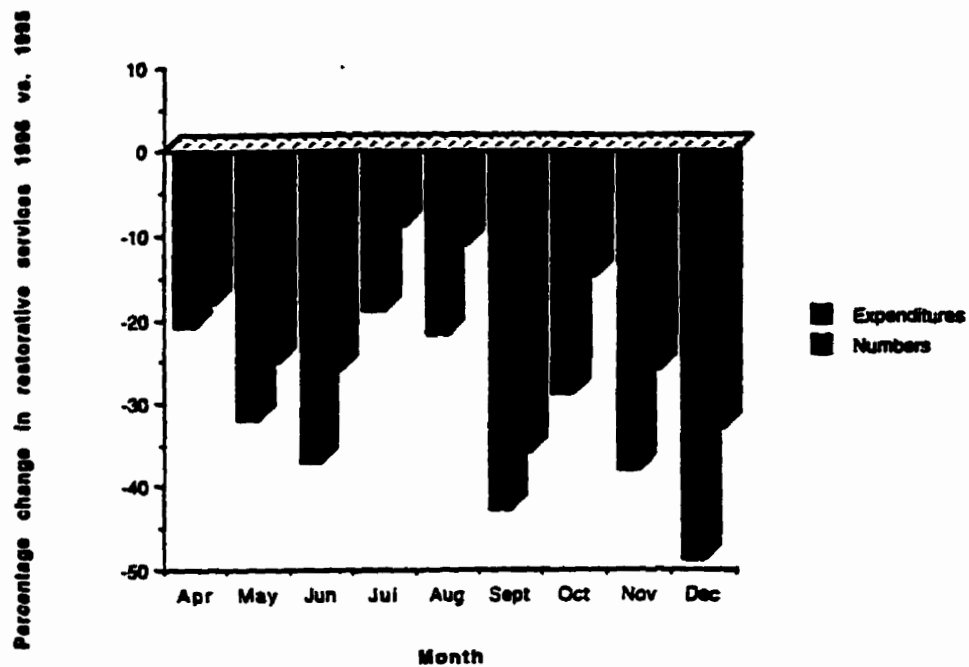
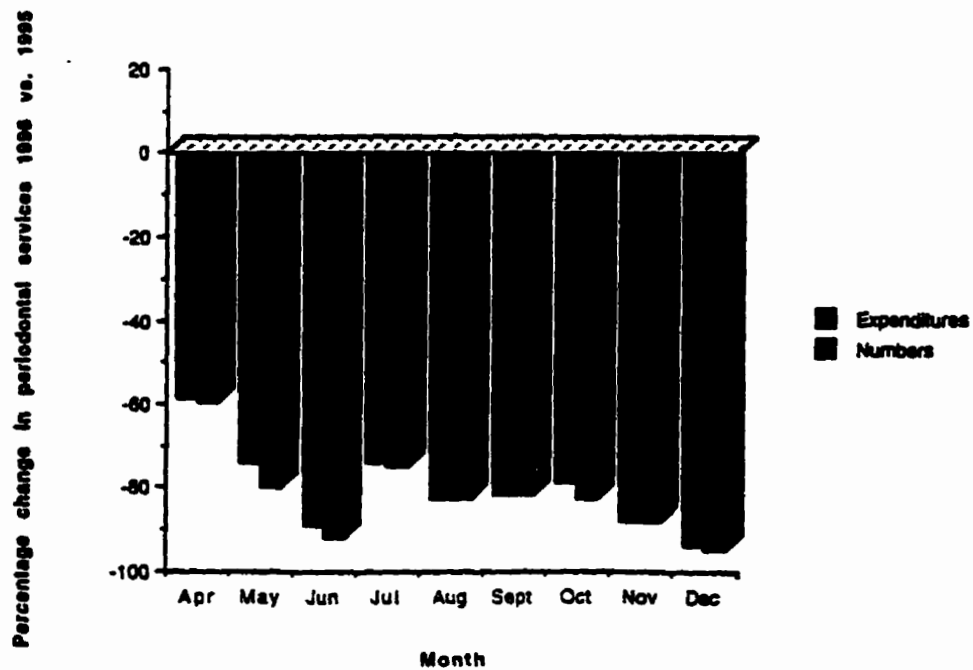


Figure 3.10

Relative Changes in Periodontal Services Provided by the Manitoba NIHB Program:
1996 vs 1995



service category over the nine month period in 1996 relative to 1995, with the exception of preventive services. Reductions in the aggregated costs for each service category were also evident, except for the respective per capita increases of 8%, 5% and 11% in periodontal, orthodontic and miscellaneous services. These data, therefore, indicated that the needs-based strategy had a progressive impact on the expenditures for the Manitoba NIHB dental program, although the effectiveness tended to be a function of the specific service category analyzed. Assessments of the strategic impact on the First Nations Treaty and Inuit communities' dental disease burdens were, however, precluded by the absence of epidemiological data.

3.2 ANALYSIS OF DENTAL SERVICE DATA FROM THE NIHB REGIONS EXCLUDING MANITOBA: 1996 versus 1995

The frequency-based strategy was initially implemented on all NIHB regions on 1st January 1996, but was replaced by the needs-based strategy for the Manitoba region on 1st April 1996. In order to derive comparable data with those from the Manitoba region, therefore, the service data for the regions excluding Manitoba were evaluated over nine month periods (April-December) in 1995 and 1996 (Figure 3.11). As summarized in Tables 3.4 -3.9 (Appendix), the marked regional discrepancies were apparent functions of the specific service category included in the analysis (Figures 3.12, 3.13). Regional discrepancies were illustrated by the declines in total aggregated service expenditures, which ranged from 6% (NWT) to 22% (Yukon). By contrast, the reductions in total aggregated service numbers ranged from 2% (Atlantic) to 19% (Yukon) with a 6% increase for the Ontario region (possibly derived from unbundling of preventive services). Whereas such regional discrepancies complicated their interpretation, they generally indicated that overall service expenditure reductions could be achieved by the frequency-based initiative.

Figure 3.11

Regional Differences in Total Dental Services Provided by the NIHB Program, Excluding the Manitoba Region: 1996 vs 1995

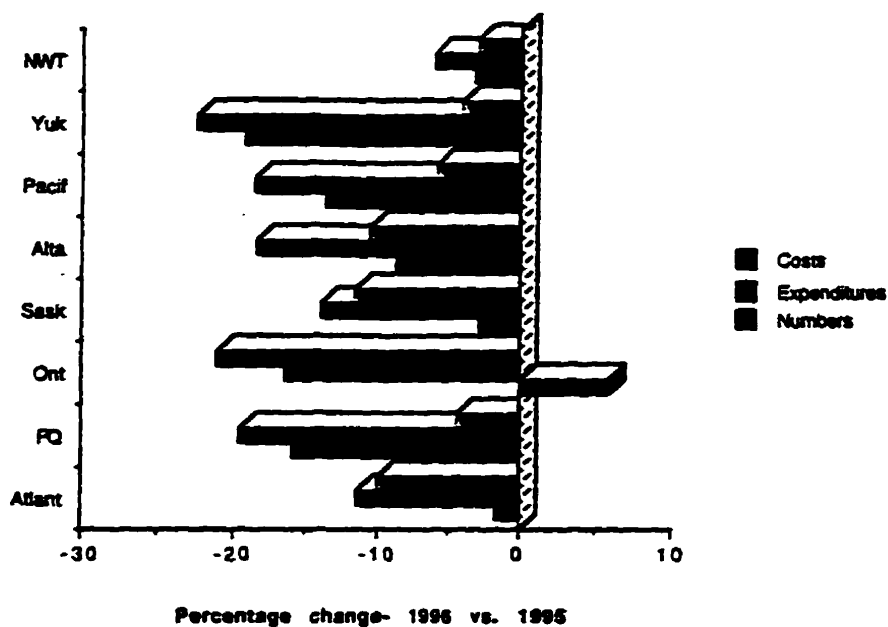
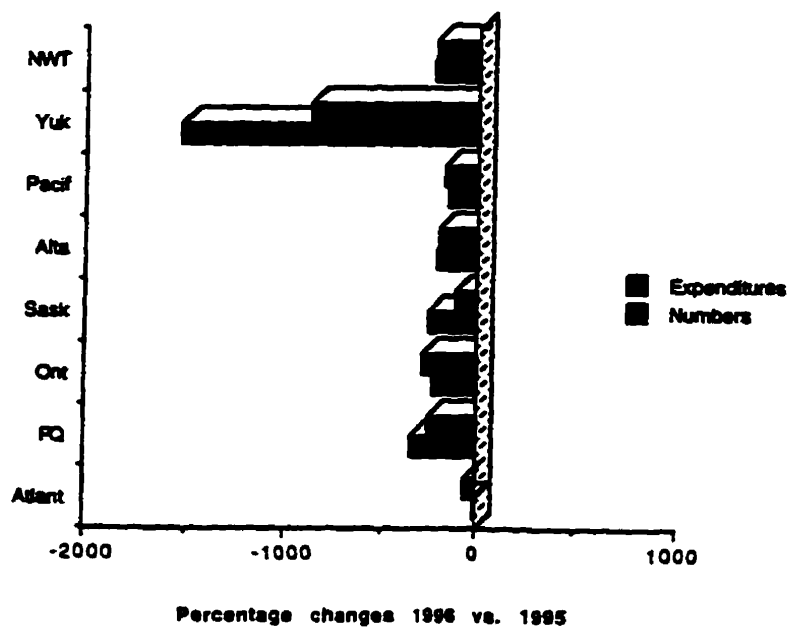


Figure 3.12

Regional Differences in Periodontal Services Provided by the NIHB Program, Excluding the Manitoba Region: 1996 vs 1995



Marked regional discrepancies in the data for specific service categories, however, complicated their interpretation especially without information on their outcomes. These were illustrated by the 608% increase in 1996 for preventive service expenditures relative to those for 1995 for Ontario (likely associated with the "unbundling" of preventive services), as opposed to the respective 5%, 11% and 12% reductions for the Atlantic, NWT and Pacific regions. Similarly, the aggregated periodontal service expenditure reductions ranged from 885% (Yukon) to 62% (Atlantic), whereas the aggregated denturist expenditure declines ranged from 7% (Yukon) to 107% (Quebec) as opposed to a 98% increase for the NWT. These data complexities, however, hampered their interpretation relative to the efficacy of the frequency-based cost-control initiative.

Interpretations of trends in service numbers elicited similar concerns, as the regional discrepancies were also a reflection of the specific service category analyzed. These discrepancies were particularly marked for periodontal services, where their 1996 reductions relative to 1995 ranged from 14% (Atlantic) to a remarkable change of 1534% for the Yukon region. Such contrasts were difficult to rationalize, however, without supportive epidemiological data on the regional discrepancies of the First Nations Treaty and Inuit communities dental service needs. The declines in denturist services that ranged from 1%(Pacific) to 43% (Quebec) elicited similar concerns, since they conflicted with the respective 8% and 96% increases for the Atlantic and NWT regions.

The reductions in total aggregated service numbers and expenditures for all NIHB dental program regions in 1996 relative to 1995 were therefore difficult to rationalize without epidemiological data on the First Nations Treaty and Inuit communities' dental service needs. These concerns were underscored by the range in 1996 versus 1995 aggregated periodontal service costs, that extended from a 44% increase (Ontario) to a 43% decrease (Atlantic) and reductions in aggregated diagnostic service costs of 44% (NWT) and 11% (Ontario). Such regional discrepancies complicated their overall

assessment relative to the effectiveness of the frequency-based initiative for the control of the NIHB program expenditures.

3.3 ANALYSIS OF MANITOBA DENTAL SERVICE DATA WITH THOSE FROM OTHER NIHB REGIONS: 1996 versus 1995

These comparisons were then viewed from two perspectives to facilitate their interpretation:

- data from Manitoba relative to the aggregated data for all other NIHB regions;
- data from Manitoba relative to each other NIHB region.

3.3(a) Service Data Comparisons for Manitoba versus Those Aggregated from the other NIHB Regions

Initially, the 1996-1995 NIHB service data for the Manitoba region were compared with the aggregated data from all the other regions. These comparisons were undertaken to evaluate the relative differences between the needs- (Manitoba) and frequency-based (all other regions) cost-control strategies. As summarized in **Table 3.5 (Appendix)**, they indicated that total aggregated service expenditure reductions were greater in Manitoba (33%) than the other regions (16%), i.e. the needs-based strategy (Manitoba) was more effective for cost-control than the frequency-based initiative (other Canadian regions). As illustrated in **Figures 3.14 and 3.15**, these trends were confirmed by respective reductions in total aggregated service numbers (i.e. 16% reduction for Manitoba versus 7% for the other regions) and costs (i.e. 20% reduction for Manitoba versus 11% for the other regions).

Unfortunately, these interpretations were again complicated by the varying contrasts between the specific service categories. For instance, the reductions in aggregated diagnostic service expenditures were lower for Manitoba (18%) than the other Canadian regions (26%). By contrast the aggregated preventive service expenditure did not change for the Manitoba region, whereas they increased by 50% for the other NIHB regions. In addition, these latter statistics may also have reflected the 63% increase in

Figure 3.13

Regional Differences in Preventive Services Provided by the NIHB Program, Excluding the Manitoba Region: 1996 vs 1995

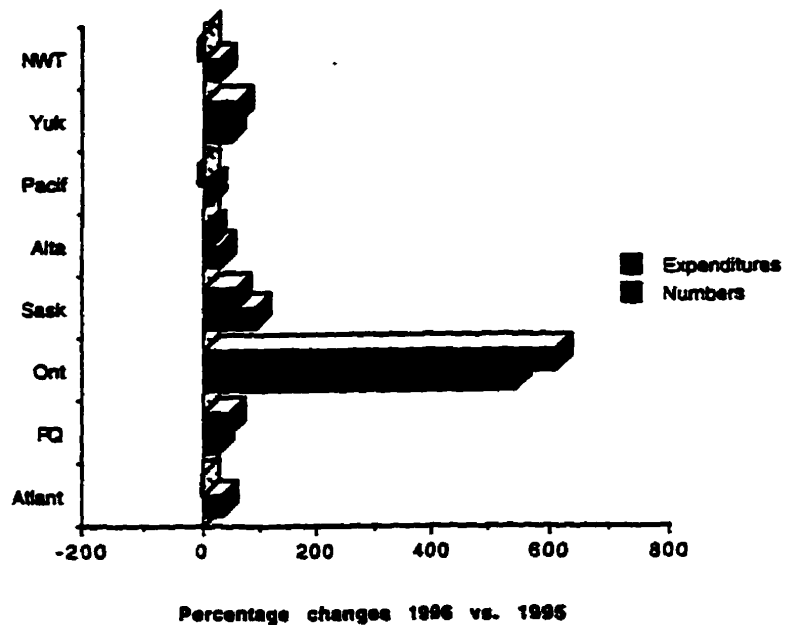
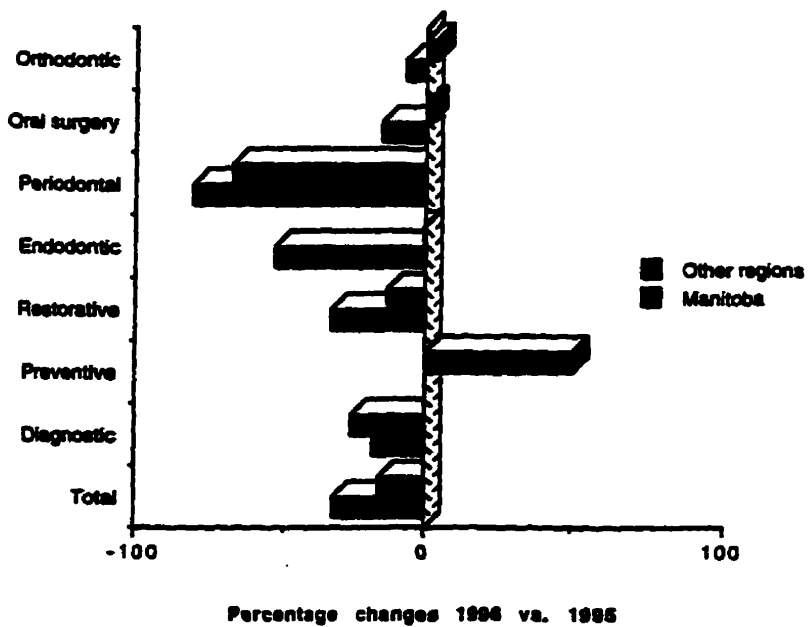


Figure 3.14

Changes in Dental Service Expenditures Provided by the NIHB Program — Manitoba vs Other Regions: 1996 vs 1995



preventive services for other Canadian regions as opposed to a 34% increase in Manitoba (likely due to the moving of "scaling" codes from perio to preventive). Thus, although there were exceptions, the overall trends in these service data suggested that implementation of the need-based strategy for Manitoba was more effective in controlling expenditures than the frequency-based initiative implemented to the other regions.

More consistent trends in NIHB service data were apparent from their examination on a monthly as opposed to a nine-monthly basis (Tables 3.4-3.10 Appendix). Generally, the reductions in total aggregated service expenditures for 1996 relative to 1995 tended to be progressively greater in Manitoba than the other NIHB regions (Table 3.9 Appendix), although the trends were more consistent for the aggregated other regions. The more recent implementation of the needs-based strategy in Manitoba as opposed to the prior implementation of the frequency-based initiative on the other regions undoubtedly contributed to these differences. Moreover, the aggregated expenditure reductions applied to all services in Manitoba, except for preventive services which exhibited no change (likely due to encouragement of preventive services under the needs-based approach). Noted differences were, however, apparent in the aggregated data from the other regions. For instance, aggregated expenditure reductions for diagnostic (26%), and periodontal services (68%) from the other Canadian regions conflicted with increases for other services, i.e. 13% (restorative), 19% (oral surgery), 35% (orthodontic) and 50% (preventive) services. Differences in these NIHB service trends for Manitoba relative to other regions were clearly apparent in Figures 3.16-3.18, although the lack of more detailed information constrained their interpretation.

3.3(b) Service Data Comparisons for Manitoba versus Those for Each Other NIHB Region

Although both cost-control initiatives were implemented in 1996 to induce expenditure reductions relative to those for 1995, further data were crucial to the question whether the needs (Manitoba) or frequency-based strategies (other regions) were

Figure 3.15

Changes in Dental Service Numbers Provided by the NIHB Program — Manitoba vs Other Regions: 1996 vs 1995

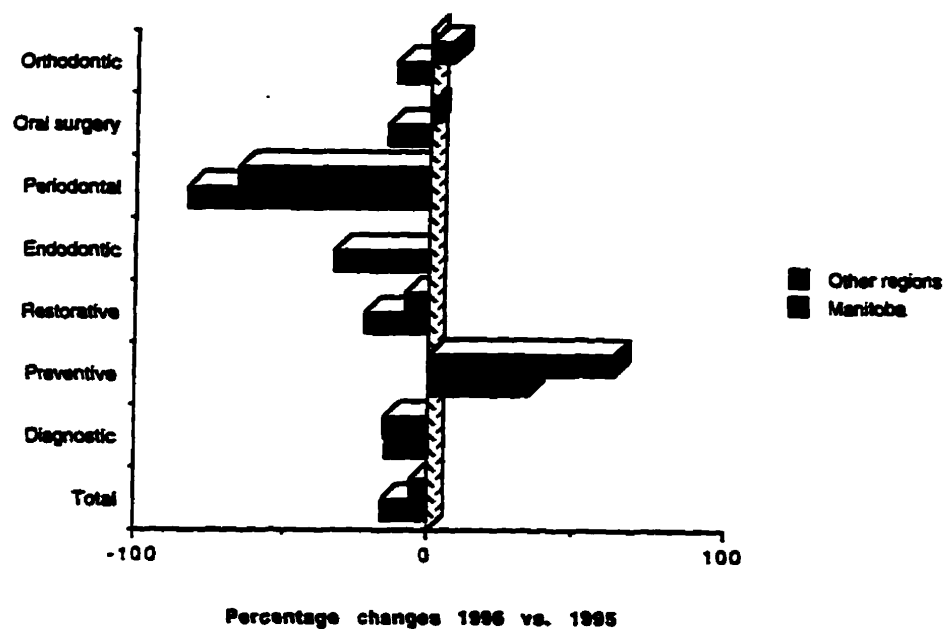


Figure 3.16

Changes in Dental Service Costs Provided by the NIHB Program — Manitoba vs Other Regions: 1996 vs 1995

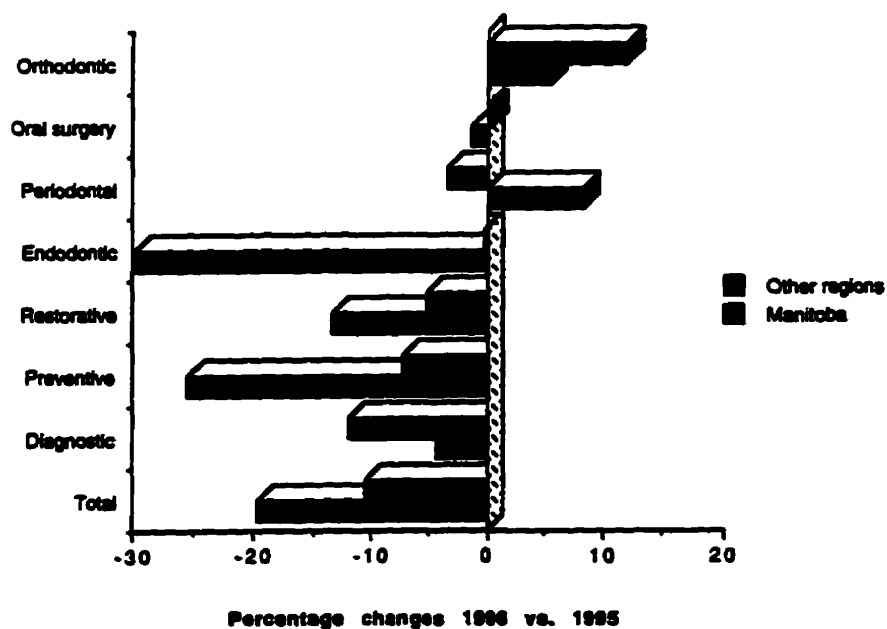


Figure 3.17

Changes in Total Dental Service Expenditures Provided by the NIHB Program —
Manitoba vs Other Regions: 1996 vs 1995

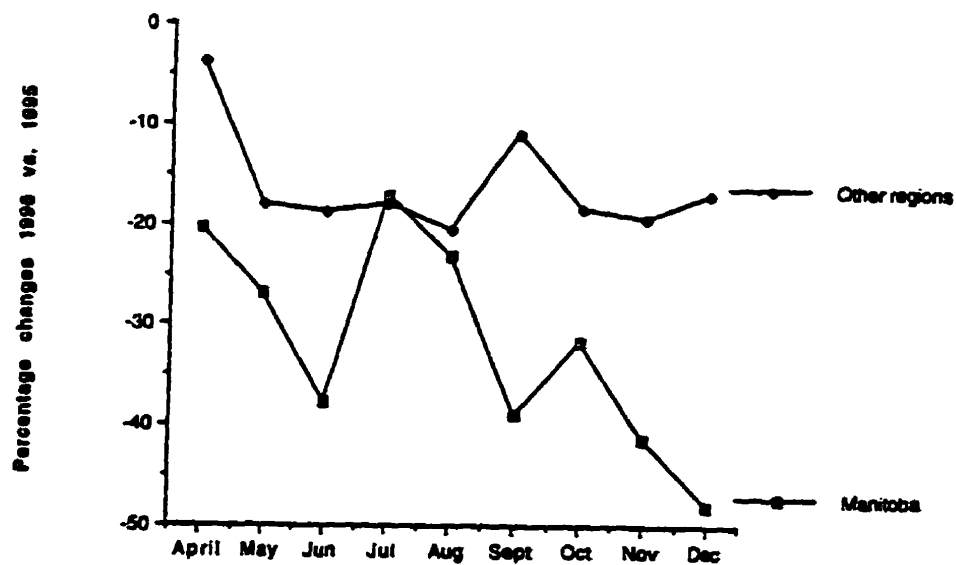
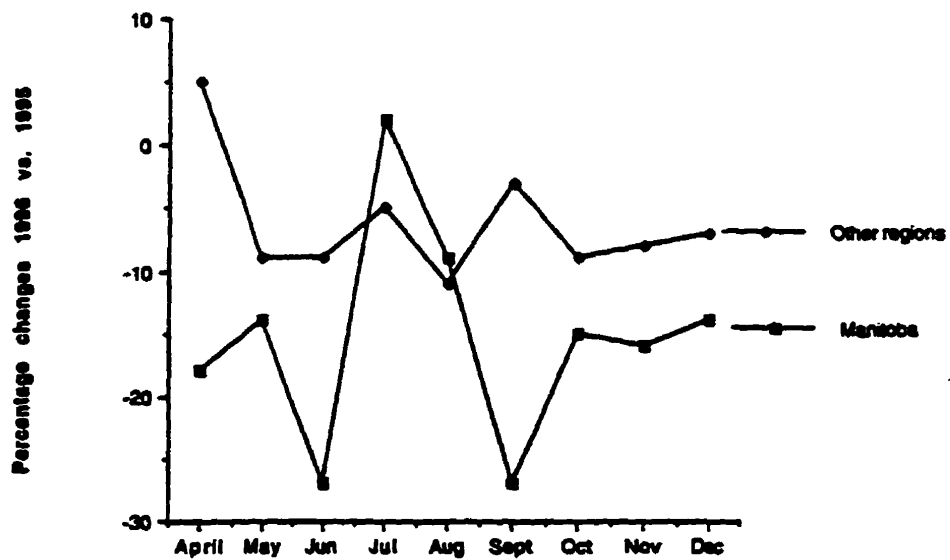


Figure 3.18

Changes in Total Dental Service Numbers Provided by the NIHB Program —
Manitoba vs Other Regions: 1996 vs 1995



more appropriate for the NIHB dental program. Such additional information, summarized in **Table 3.7 Appendix**, indicated that the 16% aggregated service number reduction in Manitoba exceeded that for all other regions except the Yukon (19%) **Figure 3.19**. By contrast, the 33% reduction in aggregated service expenditures for Manitoba exceed those for all other regions (**Figure 3.20**), which confirmed the preferential short-term efficacy of the needs- relative to the frequency-based cost control initiative (**Figures 3.21, 3.22**). This was also supported by the greater reduction in aggregated service costs for Manitoba (20%) than all other regions except Ontario (21%).

These data were, however, difficult to interpret, due to the marked regional discrepancies that appeared to be functions of the specific service category included in the analyses. In addition, no information was available relative to regional differences in the component services included within each category. For instance, reductions in diagnostic services were greater in Quebec (26%), Ontario (25%), Yukon (19%) and Saskatchewan (18%) than Manitoba (17%), whereas restorative service reductions were greater in Manitoba (23%) than all other regions. Similarly, Manitoba exhibited the greatest reduction in orthodontic (13%), oral surgery (17%) and removable prosthodontic services (34%) than the other regions of the NIHB program, although the interpretation of significant anomalies for other services predicted their interpretation.

There were similar concerns for the varied patterns of regional discrepancies in service expenditures for 1996 relative to 1995. For instance, the 18% decline in diagnostic expenditures for Manitoba was exceeded by the reductions for Ontario (49%), Quebec (26%) and Yukon (21%): these trends also conflicted with the 16% expenditure increase noted for the Atlantic region. The changes in preventive service expenditures elicited similar concerns, since whereas no changes were apparent for Manitoba, the other changes ranged from a 12% reduction in the Pacific to a 608% increase in the Ontario regions. Nevertheless, the expenditure reductions were greater in Manitoba than the other regions for restorative (33%), endodontic (53%) and denturist (117%) services.

Figure 3.19

Changes in Total Dental Service Costs Provided by the NIHB Program — Manitoba vs Other Regions: 1996 vs 1995

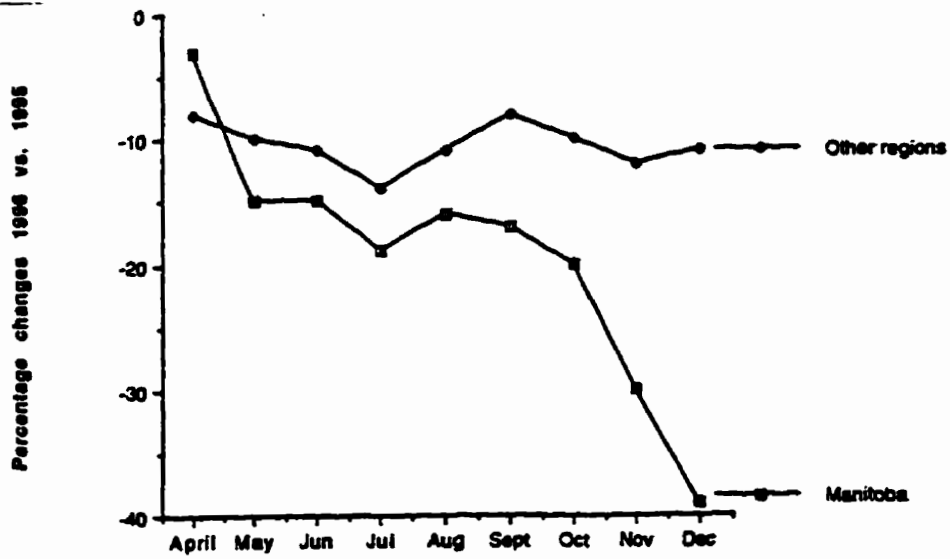


Figure 3.20

Regional Changes in Dental Service Numbers Provided by the NIHB Program — 1996 vs 1995

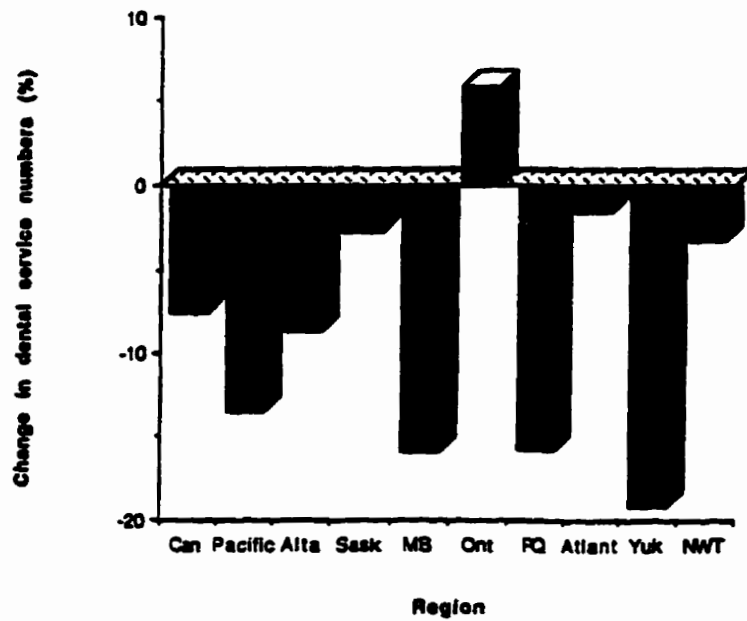


Figure 3.21

Regional Changes in Dental Service Expenditures Provided by the NIHB Program — 1996 vs 1995

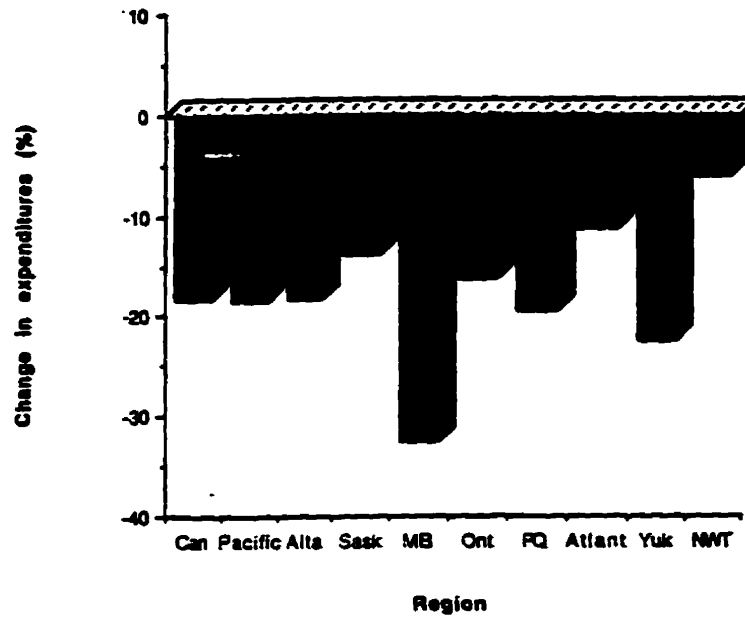
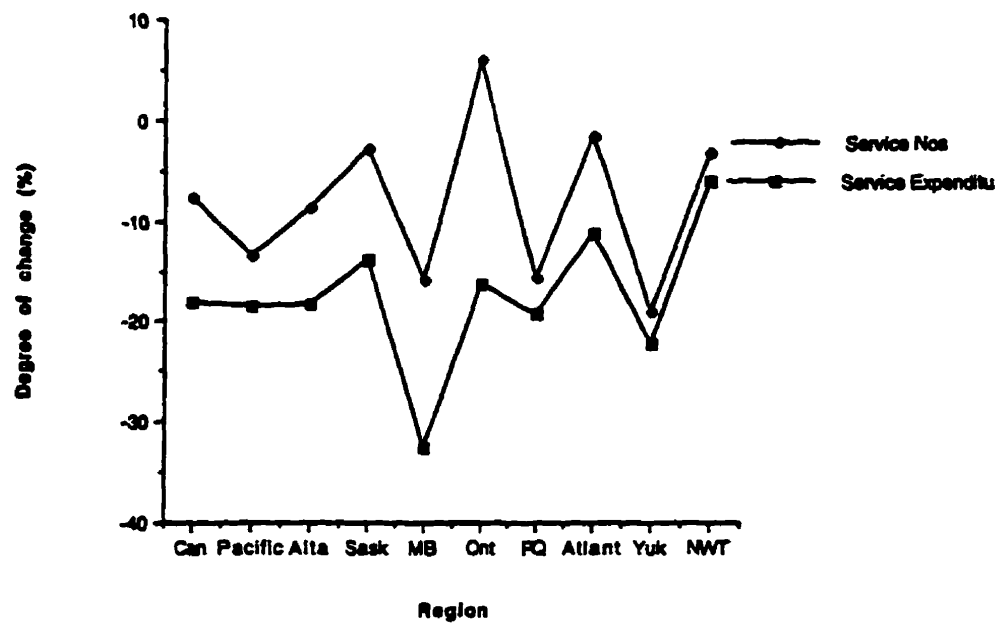


Figure 3.22

Regional Changes in Dental Service Expenditures Provided by the NIHB Program — 1996 vs 1995



The changes in service costs also showed complex regional discrepancies, although the absence of information on the variations in composition within each category hampered their interpretation. For instance, diagnostic service costs increased 34% in Manitoba, as opposed to 44% reductions in NWT. But since the relative proportions of examinations to radiographic services in the two regions remain obscure, the significance of these data was difficult to interpret.

Interpretation of these regional discrepancies in NIHB service data were further complicated by variations in their proportions relative to the Canadian totals. For instance, the 1995 data indicated that 59% of the NIHB-funded services provided to the First Nations Treaty and Inuit communities occurred in three regions (Pacific, Alberta and Ontario), compared to only 1% in the Yukon (Table 3.8 Appendix). Similar relationships also applied to other service data. For instance, 64% of the diagnostic services were provided to the same three regions, as opposed to 56% of preventive and 60% of diagnostic services. But whereas the total aggregated services provided to the Manitoba region ranged from 12% (1995) to 11% (1996), the proportion of endodontic services decreased from 18% (1995) to 14% (1996). Similarly, the relative number of oral surgery services provided in Manitoba declined from 17%(1995) to 15%(1996), whereas periodontal services were reduced from 10%(1995) to 6%(1996). By contrast, the relative proportion of orthodontic services in the Manitoba region remained unchanged at 4% during both periods.

Generally, the relative proportions of service expenditures in the NIHB-program regions exhibited similar patterns of contrast (Table 3.9 Appendix). For instance, the total aggregated service expenditures for the Pacific, Alberta and Ontario regions comprised 60% of the Canadian total in 1995 and 1996. More significantly the relative proportions of these total aggregated expenditures of the Manitoba region decreased from 11% (1995) to 9% (1996). Moreover, declines in the relative proportions characterized all

service expenditures in Manitoba for 1996 relative to 1995, with the exception of diagnostic (8% in 1995 but 9% in 1996) and miscellaneous services (7% and 8% respectively). Generally, the more consistent reductions in the proportions of service expenditures derived in Manitoba relative to other regions provided further evidence that the needs-based initiative was more effective than that dependent on service frequencies.

Relative changes in service costs between the NIHB regions also confirmed the preferential effectiveness of the needs- relative to the frequency-based initiative. (Figure 3.8). For instance, the aggregated total service costs were not only greater in the Yukon relative to the other regions in 1995, but this discrepancy increased in the 1996 period. By contrast, total aggregated service costs were least in the Saskatchewan region in both periods. The costs of other services were also characterized by marked regional discrepancies. For instance, the aggregated diagnostic, preventive and endodontic service costs were significantly higher in the NWT region for both 1995 and 1996, as opposed to the Yukon for restorative and denturist, Ontario for periodontal, Manitoba for orthodontic and Quebec for removable prosthodontic service costs. Since the costs of diagnostic and miscellaneous services were the only two categories to increase in the Manitoba region for 1996 relative to 1995, as opposed to reductions in all other service categories, these data provided further evidence for the effectiveness of the needs-based control strategy. By contrast, regional discrepancies in relative service cost changes were not so consistent in the other regions, which indicated some concerns for the effectiveness of the frequency-based strategy. Again, these interpretations were constrained by the lack of information on the relative composition of the services contained within each category.

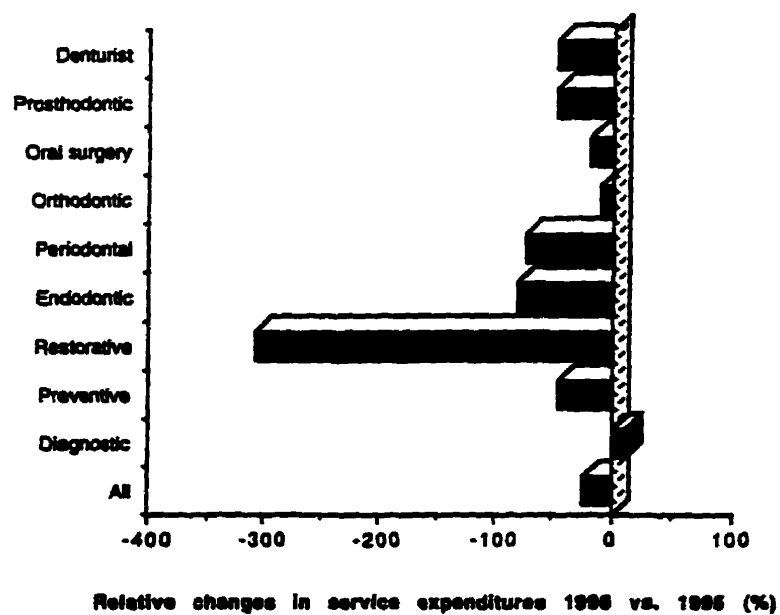
3.4 CONCLUSIONS

When reviewed from a national perspective, the 8% decline in total service numbers in 1996 relative to 1995, for an 18% reduction in associated expenditures,

indicated that both frequency- and needs-based strategies were effective in controlling the inflationary trends of the NIHB dental program. For instance, if the resultant budgetary reduction of \$15.2 million over a nine month period in 1996 versus 1995 were allowed to remain within the dental budgetary envelope, then the First Nations Treaty and Inuit communities would benefit from improvements in service access.

Objective assessments of the relative benefits of the needs- relative to frequency-based cost control strategies, however, proved more difficult to evaluate, due to marked regional discrepancies that had no supportive epidemiological data relative to the differential service needs of the First Nations Treaty and Inuit communities or the impact of the strategies to control NIHB program expenditures. Nevertheless, as summarized in **Table 3.11 (Appendix)**, this study provided evidence that indicated the needs-based control strategy was effective in reducing the inflationary trends in the Manitoba NIHB region, i.e. with the exception of diagnostic and miscellaneous services, there were significant expenditure reductions in 1996 relative to 1995 (**Figure 3.23**). Also there were no indications that service access was impaired by the associated service reductions. Unfortunately, this statement cannot be made for the frequency-based approach, which clearly limits clients to specific numbers of services over specific timeframes. The overall trends in the NIHB dental program were, however, constrained by the marked regional discrepancies that varied with the service category included in the analysis. But whereas the service needs of individual clients can be preferentially accommodated by a needs-based rather than a frequency-based initiative, the general consensus that the former has more constraining expenditures were difficult to refute.

The data from the current study underscored the urgency for supportive epidemiological data on the service needs of the First Nations Treaty and Inuit communities and the outcomes of services provided by the NIHB dental program. Without such information, there are difficulties in refuting the perception that the previous inflationary trends in program expenditures and the marked regional

Figure 3.23**Changes in Selected Dental Service Expenditures Provided by the NIHB Program in Manitoba vs Other Regions: 1996 vs 1995**

discrepancies that varied with the service category included in the analysis were partly induced by the providers' service costs. Although prior approval for services that exceed a specific price threshold would appear the most appropriate strategy for their control, there were concerns for the persistence of such discrepancies in the Manitoba region. These data therefore indicated that the needs-based strategy was not a short-term panacea to control the services provided by the NIHB dental program. Rather this was an approach to the immediate fiscal concerns for the program, but the need for its replacement by more appropriate preventive strategies is a more logical method to control expenditures.

4. DISCUSSION

4. INTRODUCTION

The basic question is **whether the balance of services funded by the NIHB program is appropriate to reduce the disease burden of those eligible for benefits.** This cannot be addressed without epidemiological data defining the total dental disease burden of the First Nations Treaty and Inuit communities. Epidemiological information is also required to evaluate the relative cost-effectiveness of services provided by the NIHB program. The most logical answer is to equate the communities' dental needs assessments with the expenditures required to provide their services. Unfortunately, this basic question cannot be addressed without precise data for both sides of the equation. There is also a more fundamental issue. Why have the inflationary NIHB dental program expenditures over the past two decades (Leake et al 1993) not contributed to the remarkable reductions in dental disease prevalence exhibited by most other Canadians? As both issues have evoked serious economic concerns for the future of the NIHB dental program, the current study was undertaken to investigate the most urgent aspect, i.e. short-term strategies to address the inflationary program expenditures.

The economic concerns for the national NIHB dental program were primarily evoked by the increased expenditures from \$46 million (1988-1989) to \$123 million (1995-96). These concerns were further underscored by the component fee-for-service expenditures for the Manitoba NIHB region, where the \$1.4 to \$11.0M increase over the 1985-1994 period translated to a 686% nine-year trend (i.e. an average 76.2% annual inflation rate). These trends transcend accepted standards of public-funding accountability, since they cannot be supported by concomitant improvements to the First Nations Treaty and Inuit communities' disease burden (Graves & Stamm 1985).

Comparisons of two short-term strategies to resolve the inflationary issues were the primary objectives of the current study, although potential preventive initiatives are

also briefly described as they comprise the most logical cost-reduction strategies for the NIHB dental program in the long-term.

4.1 STRATEGIC OVERVIEW OF THE NIHB DENTAL PROGRAM

Devising new strategies to reduce both the burgeoning inflationary NIHB dental program expenditure trends and the First Nations Treaty and Inuit communities' disease burden have proved complex challenges without the relevant epidemiological data. Whereas evidence from this study indicated that a needs-based strategy (where services exceeding \$500 price thresholds require prior approval) was more equitable in the short-term than alternatives based on service frequencies, the optimal resources for an effective NIHB dental program remain enigmatic. Moreover, this is a problem not solely confined to the NIHB program, since other publicly and privately funded programs continue to grapple with similar inflationary trends, i.e. no common strategy has yet been devised to resolve this problem.

4.1.a The Uniqueness of the NIHB Dental Program

Some of the unique political-economic concerns of the NIHB dental program center on the First Nations Treaty and Inuit communities' legal status and the Federal Government's commitment to future transfer of program control. Such jurisdictional transfers offer potential opportunities for locally unique and responsive dental programs, provided they are supported by adequate resources. By contrast, inadequate resources may lead to fragmented expensive programs that require additional tribal or band council resources, especially if exacerbated by neighboring band-council rivalries and continued urban migration. Epidemiological data on these communities' service needs and service outcomes are therefore fundamental for future strategies of the NIHB dental program, since they offer the potential to delineate the most appropriate volume of required resources.

The marked regional discrepancies in service expenditures defined in this study further underscored the fundamental need for precise dental epidemiological data on the First Nations Treaty and Inuit communities and the effectiveness of the NIHB dental program (e.g. the proportion of endodontic services that comprise previous service retreats, or the number of orthodontic services terminated due to inadequate oral hygiene or attendance). Without such information, regional service expenditure discrepancies will inevitably lead to further concerns for their potential association with unexplained variations in costing by the providers (Rice et al 1989; Labelle et al 1994; Rizzo et al 1996). Subjective assessments of existing service effectiveness are therefore unacceptable for the resource allocations within the NIHB program (e.g. objective data are required to allocate resources to 'expensive' orthodontic and basic services for dental caries prevention).

Epidemiological data are therefore crucial to resolve traditional conflicts between infinite health service demands and the finite availability of resources (Maxwell 1974), especially when exacerbated by demographic, educational and social awareness changes (Van Campeu Sixma et al 1995; Kravitz 1996). Such information is important to assess the association of the providers' economic aspirations when faced with progressively competitive private markets (Rice et al 1989; Labelle et al 1994; Rizzo et al 1996) and the strategic co-development to safeguard their potential clients.

4.1.b The Need For Practice Guidelines

Control of the NIHB program may be improved by strategies that strengthen management (i.e. peer reviews, clinical audits and the development of service quality initiatives), although the lack of guidelines or standards for clinical decision-making constrains their potential benefits. Ontario has addressed this concern by legislation that requires provincial licensing authorities to . . . "develop, establish and maintain programs and standards of practice of the profession . . ." (Leake et al 1996). The Royal College of

Dental Surgeons of Ontario (RCDS) quality assurance committee has responded by the announcement of plans to develop evidence-based dental practice standards (Royal College of Dental Surgeons of Ontario 1995), and the Ontario Dental Association has endorsed this open consultative approach (Shosenberg 1995). Unfortunately, these concerns have yet to be addressed for the NIHB dental program. The prior-approval component of the needs-based initiative may partly resolve the 'expensive service' issue, provided guidelines have been developed to assess the relevant clinical data (e.g. radiographs).

Dental evidence-based guideline or standard development lags behind many initiatives devised for medicine (Hayward et al 1995). Although criteria have been developed to assay the technical quality of dental services (Friedman 1972), their testing has been limited (Bailit et al 1974). Some direct service programs have also developed manuals that outline services to ensure effective care (Dental Services Branch, Indian Health Service 1974; North York Public Health Department 1982), yet compliance requires a monitoring system. In addition, early attempts to develop standards for the United States proved either unsuccessful (Helfrick 1991) or too impractical to impact on the delivery of services (Bader & Shugars 1995; ADA 1995). Similar criticisms may also be applied to the guidelines/standards developed by the Advisory Board in General Dental Practice in England (1991) and the College of Dental Surgeons of British Columbia (1993). The lack of initial local provider input conceivably was their primary deficiency (Stephens et al 1996). This proved a deficiency of the frequency-based initiative devised by the NIHB administrators. These were also inherent difficulties in regulating the service needs for individual clients.

4.1.c The Need to Rationalize the Provision of Services

Dental services provided by the NIHB program are no exception to the general truism: not every one can receive all the healthcare services they demand. In the private

sector, copayments and managed care plans are the principal techniques to control service expenditures. These strategies are difficult to apply to the NIHB dental program. They might however be applied to the cosmetic needs for orthodontic and other 'expensive' services.

No public funding has been withdrawn from the NIHB programs, despite contrary government rhetoric. Cuts have, however, been applied to constrain their inflationary rates, in common with many other international, national or provincial programs (OECD 1992). Since resources will never be sufficient for Canadians to have full access to expensive dental (e.g. orthodontic and fixed prosthodontic) or other healthcare services, prioritization is inevitable for the First Nations Treaty and Inuit communities. This applies to most other health care services for Canadians.

This realization has initiated international interest in defining the service range to be funded from public resources (National Advisory Committee 1992; Health Care and Medical Priorities Commission 1993, Kitzhaber 1993). Complex tradeoffs are therefore required to equate freedom of choice with equity, and comprehensiveness with cost-containment, for the First Nations Treaty and Inuit communities and other Canadians. Political and economic demands for publicly-funded resource restraint and accountability have undoubtedly sharpened these concerns for the NIHB dental program.

Strategic planning to address these concerns involve two main levels:-

- resource allocations by various government agencies (e.g. healthcare, housing etc.),
- resource allocations to the dental relative to other NIHB programs.

Since there can be no objective criteria to allocate additional or reduced resources to the NIHB dental or other programs without supportive epidemiological data, comparisons of the relative effectiveness of two short-term cost-control strategies will also be largely subjective, i.e. no objective information was available to define their relative impact on the First Nations Treaty and Inuit communities' dental disease burden.

4.2 SHORT-TERM STRATEGIES TO CONTROL NIHB DENTAL PROGRAM EXPENDITURES

Devising short-term strategies to control the inflationary NIHB dental program expenditure trends essentially involved initiatives to control:-

- the provision of services, and
- the service demands.

Faced with 3%, 3% and 1% expenditure growth limitations for the next three consecutive years, the NIHB dental program administrators devised and implemented a cost-control initiative based on service frequency limitations (January 1996). Comparisons of data from analogous nine month periods in 1995 and 1996 data from all NIHB regions (except Manitoba) indicated that this initiative reduced program expenditures, although numerous inherent strategic deficiencies were apparent:-

- **inflexibility:** the service demands (needs) of individual clients could not be accommodated by frequency limitations or supported by scientific data. For instance, generally six monthly examinations are unnecessary for caries diagnoses (Sheiham 1977), except under extraordinary circumstances e.g. radiotherapy for malignancies (Woodward et al. 1993), although no information is available for the number of examinations required for high-risk First Nations Treaty and Inuit communities.
- **improprietary:** opposition must be anticipated for any new initiative implemented with minimal local provider / client consultations;
- **imperfect:** the frequency-based initiative has not eliminated marked regional discrepancies in service numbers and expenditures;

- **inadequate:** epidemiological data on the First Nations Treaty and Inuit communities' dental needs are crucial for strategies based on service frequency restrictions.

Data from the current study indicated that the alternative, needs-based, initiative was associated with double the expenditure reductions than derived from restricted service frequencies. The needs-based strategy was also considered more appropriate for the First Nations Treaty and Inuit communities, since services exceeding a \$500 threshold for individual clients could still be approved, provided they were rationalized by sufficient data (e.g. radiographs, overall treatment plans etc.).

The needs-based approach was not a panacea for the control of NIHB dental program expenditures, however, due to numerous inherent deficiencies:-

- **imperfect:** regional discrepancies in service numbers and expenditures were still apparent in the Manitoba region, even nine months after implementation of the initiative;
- **imperfect:** increased administrative costs (approximately 5%) associated with service claim approval, although they were compensated by significant expenditure reductions for some services;
- **imperfect:** both providers and clients were irritated with delays in service claim approval;
- **imperfect:** the intransigence of a regional dental officer may potentially compromise prior-approval mechanisms, although all decisions may be over-ruled by the appeal mechanism;
- **imperfect:** epidemiological data on the First Nations Treaty and Inuit communities' service needs are crucial for long-term strategies to reduce NIHB dental program expenditures.

Nevertheless, the needs-based initiative has been shown to be effective in controlling 'outlier' providers' expenditures, without restricting service access for the First Nations Treaty and Inuit communities. Yet the relative effectiveness of this short-term initiative must not be allowed to subvert the development of more appropriate long-term strategies to curb the inflationary NIHB dental program expenditures.

4.3 STRATEGIES TO CONTROL NIHB EXPENDITURES THROUGH THE PROVISION OF SERVICES BY THE PROVIDERS

Significant strategic shifts in NIHB program policies are required to reduce the marked regional discrepancies in service expenditures. Such discrepancies are not unique to the NIHB dental program (Lewis 1969; Wennberg et al 1977; Paul-Shaheen et al 1987; Conrad et al 1987; Birch 1988; Bailit et al 1983) and appear primarily related to the "providers' practice styles" (Wennberg 1991; Chassin et al 1986). Due to the insignificant cost implications (Wennberg 1985), the assumption that reimbursement for only effective services would reduce program expenditures has stimulated the growing interest in practice guideline development (Roper et al 1988; Field et al 1990). In practice, such developments have been constrained by their undue reliance on expert opinions, rather than published scientific data (Audet et al 1990). They may also offer more potential benefits if developed locally, rather than imposed by a centralized authority.

Certainly, the US Agency for Health Care Policy and Research has supported scientific studies on guidelines to reduce service variations (Medical Treatment Effectiveness Research 1990), although the NIHB dental program has yet to adopt this approach. Moreover, other dental programs serving relatively similar client populations have yet to control such service variations (Bailit et al 1983; Grembowski et al 1990, 1991). The inherent complexity of the problem, therefore, cannot be overstated.

Small area analyses indicate that service variations appear to be initiated at three distinct points in the decision-making process:-

- clinical condition detection and diagnosis, e.g. proximal enamel caries;
- service provision for the condition(s), e.g. to restore a proximal lesion now or to await 6-12 months for potential remineralization;
- service selection from alternative options, e.g. to crown a tooth with/without prior root canal therapy (Shugars & Bader 1992).

But whereas differences in examination thoroughness, application of diagnostic criteria, risk assessments, nonclinical client factor interpretations and interpersonal client/provider interactions may lead to decision variations (Maryniuk 1990; Noar et al 1990), these parameters are inherently difficult to control. For instance, scientific data relative to the effectiveness of alternative services may not reduce regional discrepancies, since the average dental service benefits provided by average providers in average communities may vary between the First Nations Treaty and Inuit and other Canadian communities. The same reservations apply to their differential impacts on life quality (Gordon et al 1988) or client satisfaction (Davies et al 1981). As discussed later, dental sealants are exceptions to this dilemma (Weintraub et al 1987), since their cost-effectiveness is well substantiated.

There are further concerns for this alternative. For instance, whereas assays for service effectiveness are generally based on randomized clinical trials (RCTs) (Brook et al 1985), expense and ethical constraints hamper their applications to the First Nations Treaty and Inuit communities. Alternative assays through longitudinal observational studies offer potentially valid clinical data (Greenfield 1989), although these hinge on precise assessment criteria. Analyses of the NIHB dental program data may resolve this issue, although they have been subjected to only limited investigation to date. The frequency-based control strategy was not based on systematic data analyses, and therefore was inherently compromised.

Payments restricted to only basic services comprise an alternative strategic option, although precise data on the relative cost-effectiveness of low- and high-cost service alternatives are not available for either the First Nations Treaty and Inuit communities or other Canadians. Data from the current study also indicated that provider inconsistencies may compromise any cost-containment strategy, i.e. some providers tend to claim for more specific services (e.g. night-guards) than others, even with a monitoring system. Routine provider profile analyses will soon be introduced into the NIHB program, to identify anomalous provider service patterns.

Furthermore, whereas strategic analysis for the NIHB program analysis has been confined to the fee-for-service component, salaried (including per diem) options to reduce regional expenditure discrepancies are complicated by the premise that provider-inducement was primarily responsible for service discrepancies (Bailit 1988), i.e. highly competitive private markets may overwhelm providers' ethical standards (Morris et al 1987; Beazoglou et al 1988), unless clients' interests are safeguarded by some quality assurance (prior approval) mechanism (Atchison et al 1990). Moreover, further consideration of salaried options were excluded from the current study, although they are worthy of further investigation.

In the absence of epidemiological data on the First Nations Treaty and Inuit communities, the information derived from the current study was inadequate to define long-term cost-effective strategies to control the providers' services, although the establishment of ongoing provider profile analyses will undoubtedly identify outliers for subsequent detailed scrutiny. A rational approach would appear to encourage the local development of service guidelines for the First Nations Treaty and Inuit communities, in anticipation that a subsequent regional and national consensus could be achieved. Regional discrepancies in the service demands of potential clients also require further investigation.

4.4 STRATEGIES TO CONTROL NIHB EXPENDITURES THROUGH REDUCTIONS TO THE FIRST NATIONS TREATY AND INUIT COMMUNITIES' DISEASE BURDEN

Without concomitant reductions in the First Nations Treaty and Inuit communities' disease burden, the long-term NIHB dental service expenditures cannot be reduced (Hunt 1990). This also applies to 20% of the general population at high dental caries risk (Mandel 1996), since analogous socioeconomic and cultural factors are responsible for the significant prevalence for nursing-bottle caries in both types of populations (Ripa 1988; Albert et al 1988). The particular concern of nursing-bottle caries cannot be underestimated, since this virulent form of dental caries develops rapidly in the presence of improper feeding habits associated with inappropriate bottle/breast feeding (Milnes 1996). Moreover, such lesions tend to develop on enamel surfaces normally considered at low risk, i.e. the maxillary primary incisors and first molars. This disease is prevalent in the First Nations Treaty and Inuit communities, as illustrated by the 37% of children aged 3-5 years who were noted to be affected in a study of the Keewatin District of the NWT region (Albert et al 1988). The significance of this disease relates primarily to the high service costs (Cook et al 1994, Milnes et al 1993), although the reduction will necessitate social and cultural changes. Moreover, there are effective preventive strategies, as illustrated by the 75-85% caries incidence reductions achieved in Sweden (Axelsson et al 1993). There are, therefore, scientifically-based preventive strategies, whose aggressive implementation would offer potential benefits to the First Nations Treaty and Inuit communities and other high-risk populations. There is, however, a worrying trend for the prevalence of caries to increase, after a period characterized by their significant reduction. This has been noted in the United Kingdom (Downer 1994, 1995) and other parts of Europe (Von der Fehr 1994), although the primary etiology remains obscure. Nevertheless, these trends illustrate that conventional preventive strategies may not be entirely successful in reducing the prevalence of dental caries in the long term.

Dental diseases are not primarily confined to the young (Chauncey et al 1989), although the untreated sequelae for the First Nations Treaty and Inuit communities' children tend to be more severe than adults (e.g. tooth drifting following premature deciduous or permanent tooth loss potentiate subsequent expensive [e.g. orthodontic] service demands). This implies that the preservation of natural teeth is the most logical cost-control strategy, despite the higher disease increments in older adults than children for most other Canadian populations (Glass et al 1987). These trends conflict with those for the First Nations Treaty and Inuit communities, where high birth rates have ensured that more than 50% are under 20 years of age. As they therefore require more aggressive preventive strategies than most other Canadians, their further analysis is indicated.

4.4.a Preventive Measures

The potential preventive dental strategies for the First Nations Treaty and Inuit communities essentially hinge on those originally promulgated by the National Institute of Dental Research's National Caries Program (Harris 1989).

4.4.a(i) Reducing the impact of caries-inducing microorganisms

Personal oral hygiene techniques (mechanical non-calcified tooth deposit removal) remain the principal focus of most preventive strategies, since the results from new pharmaceutical agents and potential caries vaccines have so far proved disappointing (Harris 1989). Strategies to encourage plaque control through instructed brushing and flossing, improved toothbrush design and more effective dentifrices appear most appropriate for these communities. Unfortunately, the potential NIHB dental therapists' educational role in this regard has yet to be fully exploited.

These strategies alone are unlikely to be adequate, since most early supervised brushing and flossing studies reported insignificant dental caries benefits, due to

brushing (occlusal) and flossing (interproximal) inadequacies (Suomi et al 1980). Subsequent reports indicated that these benefits were only sustained by frequent office visits (Axelsson et al 1991). Strategies to improve the First Nations Treaty and Inuit communities' oral hygiene must therefore be anticipated to be labor intensive (i.e., expensive), although they must be implemented prior to the cost-effective provision of 'expensive' (e.g. orthodontic) services.

Dental caries has been defined as an infectious disease (Anusavice 1995), although not in the sense of tuberculosis or measles, yet the bisguanide antiseptic chlorhexidine is the only recommended antimicrobial agent (other than fluoride) (Mandel 1994; Emilson 1994). A 0.12% rinse is an acceptable chlorhexidine vehicle for high risk patients in the United States (Anusavice 1995), although professionally applied chlorhexidine varnish (up to 40% concentration) may be more appropriate (Emilson 1994). Unfortunately, this conflicts with other reports that this agent's 46% overall caries-inhibiting effect is independent of the application method or frequency (Van Rijkom et al 1996). This conflict may be due to the asynchronomous reduction in dental caries prevalence with the reduction or elimination of mutans streptococci. There are, however, several studies that clearly show that treatment with chlorhexidine, particularly chlorhexidine and fluoride, can be effective in reducing caries (Emilson 1994). The more effective treatment to date has involved chlorhexidine gels applied by flossing or in trays (Bowden 1996), although chlorhexidine varnishes may effectively reduce the numbers of mutans streptococci, sometimes for long (months) periods (Schaeken et al 1989, 1994, Sandham et al 1992). Treatment of mothers with chlorhexidine-fluoride gels has also been shown to be effective in reducing the colonization by mutans streptococci and caries prevalence in children (Tenovaro et al 1992) although the associated taste changes and tooth staining is a concern (Greenstein et al 1986). Strategies involving this agent's use in the NIHB dental program must also await FDA approval.

4.4.a(ii) Dietary Modifications

Strategies for dietary modification through sugar (especially sucrose) intake restrictions (e.g. in drinks) have been replaced by the more pragmatic approach of sugar substitution by hypoacidogenic and nonacidogenic sweeteners (Tanzer 1993). Initiatives have yet to be devised to improve their availability to the First Nations Treaty and Inuit communities. Also two reports indicate that a low dental caries incidence in children may still be compatible with their high sugar consumption (Rugg-Gunn et al 1984; Burt et al 1988), i.e. sucrose substitution is no panacea for high-risk populations.

The use of the nonacidogenic sweetener xylitol, primarily in chewing gum is a most promising dietary approach to caries prevention, enamel remineralization and dentin caries arrest (Makinen 1992; Trahan 1995, Makinen et al 1995; Sintes et al 1995). Yet there are concerns for the effectiveness of dietary counseling in changing overt behaviors (Weinstein et al 1989), even when chewing gum is the incentive.

4.4.a(iii) Fluorides as a Means to Increase Tooth Resistance

Marked reductions in dental caries prevalence mainly reflect the widespread availability of fluoride (Newbrun 1989). Unfortunately, water fluoridation for isolated communities is not cost-effective where these populations are small (Newbrun 1989; Ringelberg et al 1992). Since poorer socioeconomic groups benefit more from water fluoridation than other groups (du-Plessis et al 1995), dietary supplements and/or school water fluoridation are alternatives if community fluoridation is impractical (Horowitz 1990; Bergmann & Bergmann 1995). As inappropriate discretionary fluoride intake is a potential concern (Levy et al 1995; Lewis & Limeback 1996), the Canadian Dental Association has recommended that fluoride supplementation be limited to children 3 years of age or older in areas with less than 0.3 ppm of fluoride in the water supply (Clark 1993; Lewis et al 1995). Unfortunately this recommendation has yet to be promulgated to the First Nations Treaty and Inuit communities.

Dentifrice is the most common form of fluoride application (Stookey 1990, Mandel 1994, Seppa et al 1995), although comparable benefits can be achieved from fluoride rinses, topical applications and systemic fluorides (Newbrun 1989; Marthaler 1990; McGuire 1993; Shern 1995). Yet strategies to encourage the use of such agents by the First Nations Treaty and Inuit communities are constrained by the lack of placebo controls in randomized controlled trials (RCTs) (Ripa 1991) and the ineffectiveness of prior tooth prophylaxis (Ripa 1991; Johnson et al 1995). In addition, there is little information on the acceptance of dentrifices by these communities.

Regardless of the primary source, therefore, fluoride's preventive measures must be aggressively pursued for the First Nations Treaty and Inuit communities, although strategies to achieve this objective are beyond the scope of this thesis.

4.4.a(iv) Sealants

As occlusal pits and fissures can be cost-effectively sealed with adhesive resins (Romeke et al 1990; Ripa 1993; Weintraub et al 1993; Lewis et al 1994; NIH 1994; Foreman 1994; Handelman et al 1995), the primary objective of the United States Public Health Service for 50% of 8 and 14 year children to have pit and fissure sealants in one or more permanent molar teeth by the year 2000 (US Department of Health 1990; ADA News 1989) will be achieved, provided there are improvements to the public's awareness and knowledge of sealants (Gift 1994; Foreman 1994). The case for an analogous strategy for the First Nations Treaty and Inuit communities is not difficult to rationalize (NIH 1984; Burt 1985; Ripa 1985; Gift 1988; Swift 1988; Pitts 1991; Ripa et al 1992; Bader & Brown 1993; Leverett et al 1993; Soderholm 1995) and should therefore be aggressively pursued by the NIHB dental program.

4.5 CONCLUSIONS

The data from the current study therefore indicated the following strategies should either be maintained or implemented for the NIHB dental program:-

- the needs-based initiative was a more effective cost control strategy than that based on service frequencies: consideration should therefore be given to the implementation of this short-term strategy to the other NIHB regions;
- the implementation of long-term preventive measures to the First Nations Treaty and Inuit communities is the most logical strategy to achieve significant reductions in the NIHB dental program expenditures;
- the acquisition and analysis of epidemiological data is crucial to assay the impact of these cost-reduction strategies and improve the accountability of the resources allocated to the NIHB dental program.

5. FUTURE RESEARCH DIRECTIONS

5. FUTURE RESEARCH DIRECTIONS FOR THE NIHB DENTAL PROGRAM

As acquisition and evaluation of epidemiological data and the aggressive application of preventive strategies are crucial to the control of the NIHB dental program expenditures, they must comprise the central focus of future research.

1. The need for epidemiological data on the First Nations Treaty and Inuit communities cannot be overstated:-

- **To assay the current service needs and estimate the expenditures required to achieve and maintain their dental health status to analogous levels of most other Canadians. Although such information is crucial to determine the appropriate resources required for the NIHB program, little epidemiological data are available for comparisons with other Canadians.**
- **To retrospectively evaluate the cost-effectiveness of the current service range provided by the NIHB dental program, with special emphasis on the 'expensive' (e.g. orthodontic, endodontic and prosthodontic) services.**
- **To determine the impact of reserve migration on the dental service needs of the First Nations Treaty and Inuit communities.**
- **To determine the impact of dental program transfers to tribal/band control on the First Nations Treaty and Inuit communities.**

2. Reductions to the dental disease burden of the First Nations Treaty and Inuit communities will require the development of the following strategies:-

- **To ensure that clients in isolated northern communities have adequate access to fluoride and evaluate the impact from epidemiological data;**
- **To encourage the First Nations Treaty and Inuit communities to increase their demands for sealants and evaluate the impact from epidemiological data;**

- **To improve the demands for non-sugar sweeteners in foods, snacks and drinks and evaluate the impact from epidemiological data;**
 - **To expand the role of dental therapists in the aggressive application of preventive services to the First Nations Treaty and Inuit communities and assay their cost-effectiveness from ongoing epidemiological assays.**
- 3. Evaluation of the relative potential benefits of expended salaried to fee-for-service provider payments is required in the quest for strategies to improve the accountability of the NIHB dental program.**

6. CONCLUSION

CONCLUSIONS

- **The fee-for-service component of the NIHB dental program served as a significant income source for some providers in the past, although no epidemiological data can support analogous improvements to the dental disease burdens of the First Nations Treaty and Inuit communities.**
- **As growth in the resources allocated to the NIHB dental program has been limited to 3%, 3% and 1% over the next three consecutive years, the more equitable provision of services to the First Nations Treaty and Inuit communities and reductions to their disease burden reductions therefore required a new strategic approach.**
- **The strategy implemented (January 1st 1996) by the NIHB program was to control dental expenditures by limitations in client eligibility based on a schedule of service frequencies.**
- **Due to providers/client opposition, an alternative more flexible option was implemented for the Manitoba region (April 1st 1996). This was based on the premise that this needs-based strategy might be adopted nationally, provided sufficient (6-9 months) data were obtained to support the effectiveness in controlling expenditures.**
- **Comparisons of the needs-based (Manitoba) and frequency-based (remainder of Canada) strategies, showed the former was more effective in controlling dental service expenditures, although neither reduced the regional discrepancies that varied between specific service categories.**
- **The implementation of preventive strategies is crucial to reduce long-term service expenditures provided by the NIHB dental program, although on-going epidemiological data are crucial to assay their effectiveness.**

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APPENDIX

1. Tables for Introduction

Appendix Table 1.1

Regional Variations in NIHB Dental Program Utilization (1990-95)

REGION	1990-91	1991-92	1992-93	1993-94	1994-95
Pacific	41.0	43.7	45.5	66.1	49.7
Alberta	32.7	44.0	47.8	50.1	52.0
Saskatchewan	32.5	25.7	25.8	30.8	31.3
Manitoba	24.0	24.3	26.1	27.8	28.8
Ontario	28.9	30.9	32.7	33.5	35.5
Quebec	32.6	32.5	38.8	40.3	41.9
Atlantic	32.9	34.4	35.0	35.9	38.0
Yukon	40.3	34.6	34.2	33.3	33.5
NWT	30.0	29.3	27.3	28.8	32.9
CANADA	32.1	33.3	35.0	37.2	38.6

Source: NIHB data base

All values listed as relative percentages of those eligible for program benefits

Appendix Table 1.2

Regional Variations in Per Capita Dental Service Numbers 1990-1995

REGION	TOTAL	EXAMINATION	PREVENTIVE	RESTORATIVE	ENDODONTIC	PERIODONTIC	PROSTHO-DONTIC	SURGICAL
Pacific	0.9	0.6	0.1	-5.9	-5.7	40.7	-46.9	10.0
Alberta	4.5	4.0	11.2	10.5	14.5	45.7	-10.1	-8.3
Saskatchewan	-0.8	10.4	30.4	-2.3	-5.4	48.7	-27.6	-4.0
Manitoba	3.5	5.8	9.8	7.7	72.0	24.0	-67.5	5.0
Ontario	2.0	5.8	-0.2	-8.2	-7.1	94.4	-28.8	-13.0
Quebec	8.3	-0.7	33.3	14.5	-18.5	38.4	-3.6	-4.0
Atlantic	1.6	25.9	9.5	5.7	35.6	26.6	2.9	-5.1
Yukon	1.3	4.4	-3.8	5.7	0.5	20.3	-24.9	4.8
NW T	-6.4	16.3	-30.2	5.7	-6.1	-21.4	-31.1	-6.0
CANADA	1.8	2.5	5.9	5.7	6.7	40.5	-45.7	-2.7

Source: NIHB database

All 1995 service numbers expressed as percentage increases (decreases) relative to the 1990 data

Appendix Table 1.3

**Regional Variations In Total And Per Capita Dental Service Expenditures
For The NIHB Dental Program (1990-95)**

	1991/92	1992/93	1993/94	1994/95
TOTAL EXPENDITURES				
Pacific	11.7	25.3	32.4	41.4
Alberta	18.7	48.6	68.7	80.7
Saskatchewan	0.0	7.0	28.6	35.6
Manitoba	22.6	50.0	70.5	82.5
Ontario	23.6	40.2	58.6	84.8
Quebec	13.2	44.7	71.4	110.3
Atlantic	19.8	31.0	35.1	54.4
Yukon	-0.7	4.6	13.6	21.8
NWT	3.1	23.6	53.6	82.1
CANADA	14.8	33.9	50.8	67.2
Per Capita Expenditures				
Pacific	-0.4	2.5	4.2	8.8
Alberta	8.3	17.0	23.3	25.2
Saskatchewan	-0.7	1.0	-1.6	-0.9
Manitoba	4.5	9.9	10.4	11.1
Ontario	6.4	9.2	14.9	21.0
Quebec	1.0	-1.8	4.6	17.2
Atlantic	3.3	6.3	7.6	10.0
Yukon	4.0	-3.5	0.6	9.9
NWT	19.1	30.4	46.6	64.2
CANADA	4.5	8.5	12.1	17.1

Values expressed as percentage changes relative to 1990-91 data

Source: NIHB database

Appendix Table 1.4

Regional Variation Changes in Selected Per Capita Dental Service Expenditures (1990-95)

REGION	ALL	EXAMINATION	PREVENTIVE	RESTORATIVE	ENDODONTIC	PERIODONTIC	PROSTHO-DONTIC	SURGICAL
Pacific	11.1	4.3	13.3	4.1	0.0	88.9	124.4	47.1
Alberta	38.8	26.6	54.5	33.1	41.7	30.0	65.2	30.8
Saskatchewan	-3.0	11.8	23.8	-0.8	-8.0	88.9	84.9	30.0
Manitoba	20.8	14.7	4.3	32.5	33.3	88.9	56.7	52.4
Ontario	27.4	13.3	23.4	6.1	0.0	133.3	56.6	11.5
Quebec	45.9	34.5	46.4	45.4	0.0	32.7	85.1	28.6
Atlantic	15.2	15.2	23.3	27.1	9.8	50.0	18.8	18.8
Yukon	14.0	24.3	0.0	19.6	4.6	15.6	-34.2	42.3
NWT	38.9	32.1	16.7	47.9	24.0	76.9	25.0	42.9
CANADA	22.5	15.6	28.1	15.9	13.3	76.9	-35.6	33.3

Source: NIHB database

All 1995 expenditures expressed as percentage increases (decreases) relative to 1990

2. Tables for Materials & Methods

Appendix Table 2.1

**Annual Changes in Selected Dental Services Provided by the NIBH
Program Relative to 1990-91 Data**

DENTAL SERVICE		1991-92	1992-93	1993-94	1994-95
All	Total service Nos.	10	23	35	43
	Per capita service Nos.	1	2	2	2
Examination	Total service Nos	10	23	35	43
	Per capita service Nos.	2	4	5	3
Preventive	Total service Nos	11	24	37	45
	Per capita service Nos.	3	6	7	6
Restorative	Total service Nos	9	21	31	36
	Per capita service Nos.	8	9	-2	6
Endodontic	Total service Nos	14	29	43	46
	Per capita service Nos.	6	10	12	7
Periodontic	Total service Nos	19	47	69	92
	Per capita service Nos.	11	26	32	41
Prosthetic- remove	Total service Nos	(7)	(10)	(19)	(25)
	Per capita service Nos.	(14)	(24)	(36)	(45)
Prosthetic- fixed	Total service Nos	(9)	(2)	(15)	(26)
	Per capita service Nos.	(15)	(15)	(35)	(46)
Surgical	Total service Nos	9	17	29	33
	Per capita service Nos.	1	0	1	(3)
Orthodontic	Total service Nos	2	18	35	178
	Per capita service Nos.	-5	2	6	105

Service data listed as percentage change increases (or decreases) relative to 1990-91 data.

Source: NIHB database

Appendix Table 2.2

**Annual Change in Selected Dental Service (Expenditures) Costs
Relative to 1990-91 Data**

DENTAL SERVICE		1991-92	1992-93	1993-94	1994-95
All	Total costs	15	34	51	67
	Per capita costs	6	14	18	23
Examination	Total costs	13	34	50	59
	Per capita costs	4	13	18	16
Preventive	Total costs	17	40	59	72
	Per capita costs	9	22	25	28
Restorative	Total costs	16	34	50	59
	Per capita costs	8	14	17	16
Endodontic	Total costs	19	35	53	56
	Per capita costs	10	13	20	13
Periodontic	Total costs	28	68	105	140
	Per capita costs	19	42	62	77
Prosthetic- remove	Total costs	0	2	8	10
	Per capita costs	(8)	(14)	(17)	(21)
Prosthetic- fixed	Total costs	(13)	5	4	(17)
	Per capita costs	(25)	(25)	(25)	(50)
Surgical	Total costs	23	44	69	81
	Per capita costs	14	24	33	33
Orthodontic	Total costs	20	54	83	325
	Per capita costs	10	30	50	220

Service expenditures listed as percentage increases (decreases) relative to 1990-91 data.

Source: NIHB database

Appendix Table 2.3

Changes in the practice profiles of the 'top' thirty Manitoba providers: 1992-1995

Year	1992				1993				1994				1995			
Provider	Service No.	Expenditures	Cost/service	Provider	Service No.	Expenditures	Cost/service	Provider	Service No.	Expenditures	Cost/service	Provider	Service No.	Expenditures	Cost/service	
1*	8.61	446.3	51.84	1*	15.10	797.4	52.82	1*	14.58	738.4	50.63	1*	10.40	521.2	50.13	
2*	6.47	265.4	41.05	2	5.21	278.9	53.49	2	6.34	343.8	54.22	2	8.51	358.3	55.05	
3	6.35	259.8	40.91	3	3.49	282.4	75.21	3*	4.75	241.4	50.83	3*	7.53	294.3	39.09	
4	2.80	197.1	70.33	4*	5.88	243.3	41.39	4*	5.66	235.1	41.56	4	3.30	255.0	77.36	
5	2.95	189.5	64.27	5	4.07	223.5	54.86	5	3.46	228.7	66.08	5	3.89	251.9	68.35	
6	2.91	180.8	62.11	6	2.61	216.5	82.86	6	3.02	228.0	75.55	6	2.57	238.6	93.01	
7*	3.63	178.7	49.23	7*	3.80	186.3	49.08	7	3.03	188.2	62.15	7*	4.50	236.6	52.60	
8	2.48	154.9	62.97	8	2.77	180.7	65.20	8	3.49	177.0	50.74	8	3.70	218.4	59.00	
9	3.12	130.1	41.73	9	3.57	156.1	43.80	9	2.55	156.6	61.30	9	3.55	203.5	57.35	
10	1.75	119.9	68.85	10*	3.48	152.2	44.04	10	3.56	150.0	42.12	10	3.70	181.5	49.02	
11	2.89	118.4	44.24	11	3.78	149.2	39.47	11	1.78	129.9	73.64	11	3.66	171.3	44.53	
12	2.21	113.9	51.60	12*	2.82	118.4	42.00	12	1.92	128.0	66.82	12	3.30	157.2	47.70	
13	2.48	107.3	43.23	13	2.52	114.0	45.19	13	1.92	122.5	63.85	13	2.20	155.3	70.74	
14	1.12	97.1	88.48	14	3.17	113.5	35.85	14*	0.32	121.1	393.28	14*	3.83	143.3	37.47	
15	2.55	87.7	34.40	15	1.27	104.2	82.29	15	3.04	119.7	39.44	15	1.62	133.5	82.31	
16	2.00	87.0	43.43	16	2.40	102.4	42.65	16	1.97	118.7	60.20	16	3.41	132.8	38.94	
17	2.12	83.5	39.50	17	2.32	100.9	43.55	17*	2.85	115.9	40.69	17*	0.44	131.9	301.84	
18	0.93	79.6	86.00	18	1.67	100.7	60.23	18	2.58	114.4	44.64	18	3.42	128.0	37.43	
19	1.72	78.3	45.49	19*	0.41	97.8	237.35	19	2.96	111.3	37.55	19	2.33	123.9	53.07	
20*	0.32	74.3	232.91	20	2.11	98.2	45.62	20	2.39	108.7	45.44	20	2.73	123.2	45.22	
21*	1.41	68.7	48.82	21*	1.35	94.9	70.40	21*	2.47	107.0	43.42	21*	0.23	122.6	537.79	
22*	1.58	61.6	39.22	22	2.13	94.2	44.31	22	2.09	105.1	50.18	22	2.05	119.3	58.20	
23*	0.29	60.9	213.84	23*	0.34	88.5	261.03	23*	0.40	101.6	252.62	23	2.18	116.8	54.00	
24*	0.85	60.2	70.54	24*	0.48	88.8	187.48	24	2.46	100.8	40.85	24*	0.32	113.8	356.63	
25	1.06	59.6	56.29	25	1.20	81.9	68.56	25*	1.59	97.8	61.42	25*	1.42	108.9	78.91	
26	1.43	57.9	40.58	26	2.17	81.5	37.58	26	1.67	93.0	55.75	26	2.82	108.4	38.42	
27	1.20	57.6	47.98	27	0.98	78.2	78.50	27*	0.17	87.7	531.23	27	1.37	97.9	71.25	
28	1.12	56.2	50.28	28*	0.25	75.3	302.29	28	1.78	86.0	48.98	28	1.35	97.8	72.73	
29	1.57	53.4	33.96	29	1.23	72.7	58.94	29	2.13	85.2	40.06	29	1.77	93.8	53.17	
30*	0.94	52.5	55.75	30*	0.17	67.6	390.68	30*	0.27	84.5	315.43	30	4.30	93.3	21.71	

Appendix Table 2.4

Changes in the practice profiles of the 'top' twenty Manitoba generalist provider: 1992-1995

Year	1992				1993				1994				1995			
Provider	Service No	Expenditures	Cost/service	Provider	Service No	Expenditures	Cost/service	Provider	Service No	Expenditures	Cost/service	Provider	Service No	Expenditures	Cost/service	
1	6.35	259.80	40.91	1	5.21	278.86	53.49	1	6.34	343.84	54.22	1	6.51	358.29	55.05	
2	2.80	197.13	70.33	2	3.49	262.39	75.21	2	3.46	228.69	66.08	2	3.30	254.97	77.36	
3	2.95	189.47	64.27	3	4.07	223.49	54.86	3	3.02	228.01	75.55	3	3.69	251.92	68.35	
4	2.91	180.80	62.11	4	2.61	216.52	82.86	4	3.03	188.19	62.15	4	2.57	238.56	93.01	
5	2.46	154.91	62.97	5	2.77	180.74	65.20	5	3.49	177.00	50.74	5	3.70	218.41	59.00	
6	3.12	130.06	41.73	6	3.57	158.14	43.80	6	2.55	156.56	61.30	6	3.55	203.52	57.35	
7	1.75	119.93	68.65	7	3.78	149.24	39.47	7	3.56	150.04	42.12	7	3.70	181.54	49.02	
8	2.68	118.43	44.24	8	2.52	114.01	45.19	8	1.76	129.90	73.64	8	3.65	171.30	44.53	
9	2.21	113.89	51.60	9	3.17	113.55	35.85	9	1.92	128.03	66.82	9	3.30	157.18	47.70	
10	2.48	107.35	43.23	10	1.27	104.18	82.29	10	1.92	122.52	63.85	10	2.20	155.28	70.74	
11	1.12	97.10	86.46	11	2.40	102.37	42.65	11	3.04	119.71	39.44	11	1.62	133.51	82.31	
12	2.55	87.68	34.40	12	2.32	100.91	43.55	12	1.97	118.72	60.20	12	3.41	132.78	38.94	
13	2.00	86.98	43.43	13	1.87	100.65	60.23	13	2.56	114.37	44.64	13	3.42	128.00	37.43	
14	2.12	83.53	39.50	14	2.11	96.18	45.52	14	2.96	111.27	37.55	14	2.33	123.87	53.07	
15	0.93	79.83	86.00	15	2.13	94.20	44.31	15	2.39	108.68	45.44	15	2.73	123.22	45.22	
16	1.72	78.29	45.49	16	1.20	81.93	68.58	16	2.47	107.04	43.42	16	2.05	119.31	58.20	
17	1.06	59.56	56.29	17	2.17	81.47	37.58	17	2.09	105.09	50.18	17	2.18	116.85	54.00	
18	1.43	57.91	40.58	18	0.96	76.16	79.50	18	2.46	100.85	40.85	18	2.82	108.37	36.42	
19	1.20	57.82	47.98	19	1.23	72.74	58.94	19	1.87	93.04	55.75	19	1.37	97.90	71.25	
20	1.12	56.22	50.26	20	1.16	71.67	46.44	20	1.76	85.97	48.98	20	1.35	97.82	72.73	

Appendix Table 2.5

**Changes in Services for the 'Top' Manitoba Providers
in the NIHB Program: 1992-1995**

(a) **Service Numbers**

Year	TOP 30 Total No.	TOP 20 Total No.	TOP 30 Top Provider's	TOP 20 Top Provider's	TOP 30 Mean No./ Provider	TOP 20 Mean No./ Provider
1992	70.60	44.94	8.61	6.35	2.35±1.86	2.25±1.20
1993	82.67	49.83	15.10	5.21	2.76±2.74	2.49±1.13
1994	87.13	54.42	14.58	6.34	2.90±2.62	2.72±1.05
1995	94.32	59.61	10.40	6.51	3.14±2.12	2.98±1.16

Service numbers abbreviated $\times 10^{-3}$ (b) **Total Dental Service Expenditures**

Year	TOP 30 Total	TOP 20 Total	TOP 30 Top Provider's	TOP 20 Top Provider's	TOP 30 Mean	TOP 20 Mean
1992	3638.4	2316.3	446.3	259.8	121.3±85.8	115.8±55.3
1993	4614.1	2677.4	797.4	278.9	153.8±135.7	133.9±64.7
1994	4825.9	2917.3	738.4	343.8	160.9±124.8	145.9±62.2
1995	5232.5	3372.6	521.2	358.3	174.4±93.2	168.6±67.5

Service expenditures abbreviated to \$ $\times 10^{-3}$ (c) **Per Capita Dental Service Expenditures Generated by the 'top' Dentists in the Manitoba Region of the NIHB Program**

Year	TOP 30 Mean per capita	TOP 20 Mean per capita	TOP 30 Per capita expenditures from 'top' provider	TOP 20 Per capita expenditures from 'top' provider
1992	63.9±45.5	54.0±15.2	51.8	40.9
1993	91.3±89.6	55.3±15.5	52.8	53.5
1994	95.0±117.0	54.2±11.6	50.6	54.2
1995	90.0±110.7	58.7±15.6	50.1	55.1

Per capita expenditures listed as mean \$ per dental service

Source: NIHB data base

3. Tables for Results

Appendix Table 3.1

Changes to the practice profiles: 1996 versus 1995

(a) The 'top' 30 Manitoba providers

Ranked providers	Service numbers			Expenditures			Cost/service		
	1995	1996	% difference 1996/95	1995	1996	% Difference 1996/95	1995	1996	% Difference 1996/95
1	10.40	8.19	-21	521.22	330.28	-37	50.13	48.34	-20
2	8.51	7.62	17	358.29	317.53	-11	55.05	41.89	-24
3	7.53	5.48	-27	294.28	229.83	-22	38.08	41.94	7
4	3.30	3.99	21	254.97	210.68	-17	77.36	52.78	-32
5	3.69	2.73	-26	251.92	173.27	-31	68.35	63.58	-7
6	2.57	4.24	65	238.56	149.89	-37	93.01	35.32	-62
7	4.50	3.62	-19	236.76	149.01	-37	52.50	41.12	-22
8	3.70	4.01	3	218.41	141.31	-35	58.00	35.23	-40
9	3.55	3.44	-3	203.52	129.12	-37	57.35	37.51	-35
10	3.70	0.22	-94	181.54	124.48	-31	49.02	573.64*	1070
11	3.85	0.20	-95	171.30	121.46	-29	44.53	607.28	1264
12	3.30	2.50	-24	157.18	112.39	-28	47.70	43.31	-9
13	2.20	2.57	17	155.28	110.50	-29	70.74	42.95	-39
14	3.83	1.91	-50	143.33	109.93	-23	37.47	57.52	54
15	1.62	0.14	-91	133.51	108.59	-19	82.31	786.88*	856
16	3.41	2.50	-27	132.76	104.35	-21	38.94	41.81	7
17	0.44	2.20	402	131.90	99.92	-24	301.84*	45.52	-85
18	3.42	1.86	-46	128.00	97.97	-24	37.43	52.55	41
19	2.33	1.80	-23	123.87	97.56	-21	53.07	68.82	15
20	2.73	2.40	-12	123.22	96.97	-21	45.22	46.35	11
21	0.23	0.15	-33	122.82	94.86	-23	537.79*	624.06*	16
22	2.05	1.73	-16	119.31	93.76	-21	58.20	54.32	-7
23	2.16	2.86	32	116.85	87.07	-25	54.00	38.45	-29
24	0.32	1.60	400	113.77	83.96	-26	356.83*	52.50	-85
25	1.42	1.09	-23	108.90	83.77	-23	78.91	78.64	0
26	2.82	2.71	-4	108.37	83.16	-23	38.42	38.72	20
27	1.37	1.85	34	97.90	79.20	-19	71.25	42.96	-40
28	1.35	1.59	16	97.82	78.96	-19	72.73	48.82	-32
29	1.77	1.79	2	93.84	77.77	-17	53.17	43.35	-18
30	4.30	1.37	-68	93.30	77.67	-17	21.71	58.86	162

(b) The 'top' 20 Manitoba generalist providers

Ranked providers	Service numbers			Expenditures			Cost/service		
	1995	1996	% Difference	1995	1996	% Difference	1995	1996	% Difference
1	8.51	5.48	-36	358.29	229.83	-36	55.05	41.94	-24
2	3.30	2.73	-17	254.97	173.27	-32	77.36	63.58	-18
3	3.69	4.24	15	251.92	149.89	-41	68.35	35.32	-48
4	2.57	3.62	41	238.56	149.01	-38	93.01	41.12	-56
5	3.70	3.44	-7	218.41	129.12	-41	58.00	37.51	-36
6	3.55	2.60	-27	203.52	112.39	-45	57.35	43.31	-24
7	3.70	1.91	-48	181.54	109.93	-39	49.02	57.52	17
8	3.85	2.50	-35	171.30	104.35	-39	44.53	41.81	-6
9	3.30	2.20	-33	157.18	99.92	-36	47.70	45.52	-5
10	2.20	1.86	-15	155.28	97.87	-37	70.74	52.85	-26
11	1.62	1.60	-1	133.51	97.56	-27	82.31	68.82	-16
12	3.41	2.40	-30	132.76	96.97	-27	38.94	46.35	4
13	3.42	1.73	-50	128.00	83.76	-34	37.43	54.32	45
14	2.33	2.86	22	123.87	87.07	-30	53.07	38.45	-27
15	2.73	1.60	-41	123.22	83.96	-32	45.22	52.60	16
16	2.05	1.09	-47	119.31	83.77	-30	58.20	78.64	32
17	2.16	2.71	25	116.85	83.16	-29	54.00	38.72	-29
18	2.82	1.85	-34	108.37	79.20	-27	38.42	42.86	12
19	1.37	1.59	15	97.90	78.96	-19	71.25	48.82	-30
20	1.35	1.79	33	97.82	77.77	-20	72.73	43.35	-40

Source: NIHB data base
 Service numbers and expenditures listed x 10³

Appendix Table 3.2

Changes in dental service data for analogous nine month periods in 1995 and 1996

Service type	Period	Numbers	% difference	Expenditures	% difference	Cost per service	% difference
All	1995	152223		9016544		59.23	
	1996	127951	-15.9	6089554	-32.5	47.59	-19.7
Diagnostic	1995	42118		824866		19.58	
	1996	35975	-14.6	673550	-18.3	18.72	-4.4
Preventive	1995	23643		512238		21.67	
	1996	31759	34.3	512249	0.0	16.13	-25.6
Restorative	1995	42699		3314865		77.63	
	1996	33022	-22.7	2218869	-33.1	67.19	-13.4
Endodontic	1995	4862		617186		126.94	
	1996	3249	-33.2	289058	-53.2	88.97	-29.9
Periodontic	1995	12695		602614		47.47	
	1996	2176	-82.9	111841	-81.4	51.40	8.3
Orthodontic	1995	1488		895215		601.62	
	1996	1312	-21.8	831803	-7.1	634.00	5.4
Oral Surgery	1995	15047		696662		46.30	
	1996	12880	-14.4	587835	-15.6	45.64	-1.4
Prosthetic-R	1995	2548		888356		348.65	
	1996	1904	-25.3	490541	-44.8	257.64	-26.1
Denturists	1995	1117		302187		270.53	
	1996	828	-25.9	139063	-54.0	167.95	-33.9
Miscellaneous	1995	5760		324173		444.07	
	1996	4689	-18.6	213911	-34.0	491.70	10.7

Expenditures and costs per service listed in \$;
 % Differences listed as 1996 data as percentages of that for 1995
 Source: NIHB database

Appendix Table 3.3

Differential changes in dental service data for the Manitoba region between analogous nine month periods for 1996 vs 1995

(a) Service expenditures

Month	Diagnostic	Preventive	Restorative	Endodontic	Periodontic	Orthodontic-1	Oral Surgery	Orthodontic	Denturist	Miscellaneous
April	-14.2	14.1	-20.8	-46.1	-58.9	-12.3	-26.2	29.6	-76.3	-61.4
May	-10.1	1.8	-32.2	-59.3	-74.7	-37.1	-13.8	23.2	-57.4	15.3
June	-30.0	-17.9	-36.7	-62.6	-88.9	-49.0	-16.9	-3.3	-46.4	126.5
July	2.8	19.2	-19.2	-42.8	-73.8	-40.3	16.3	-13.4	-12.4	-17.8
August	-16.1	-7.8	-21.5	-32.1	-63.4	-17.7	-2.2	-15.3	-20.9	9.0
September	-27.8	-12.6	-42.9	-63.3	-81.5	-54.3	-26.9	30.6	-58.6	78.7
October	-21.6	-2.7	-28.5	-48.6	-78.8	-46.3	-23.6	-2.0	-40.5	-6.3
November	-19.2	9.2	-38.2	-51.1	-88.4	-61.7	-18.1	49.9	-77.2	-105.2
December	-23.1	5.3	-48.9	-61.7	-93.7	-61.3	-22.9	-47.1	-68.4	-222.2
Total	-18.3	0.0	-33.1	-53.2	-81.4	-44.8	-15.6	-7.1	-54.0	-6.9
SD	10.0	12.4	10.5	10.7	10.4	17.6	14.0	30.0	23.1	102.0

(b) Service numbers

Month	Diagnostic	Preventive	Restorative	Endodontic	Periodontic	Orthodontic-1	Oral Surgery	Orthodontic	Denturist	Miscellaneous
April	-9.8	20.5	-17.6	-40.9	-59.6	-13.5	-29.5	66.1	-57.7	-36.8
May	-10.0	39.9	-24.8	-43.1	-80.2	-7.3	-12.8	72.5	-29.8	-8.7
June	-30.5	14.0	-26.0	-32.3	-91.7	-40.7	-17.1	2.0	-20.6	13.3
July	6.8	67.2	-9.2	-23.9	-75.0	-11.5	8.3	-12.8	13.5	-28.2
August	-13.2	34.4	-10.7	0.7	-83.4	3.2	9.3	2.3	22.4	4.2
September	-24.7	23.1	-35.9	-53.0	-82.2	-33.4	-32.1	-1.3	-30.1	-3.8
October	-13.1	41.3	-14.8	-23.1	-82.5	-27.2	-14.7	-48.0	-17.7	-58.3
November	-14.4	40.4	-25.8	-26.1	-88.3	-46.9	-12.8	-42.6	-50.8	49.7
December	-15.2	35.0	-32.5	-44.8	-94.5	-37.0	19.0	-60.6	-49.5	811.6
Total	-14.6	34.3	-22.7	-33.2	-82.9	-25.3	-14.4	-11.8	-25.9	-5.7
SD	10.3	15.5	9.4	16.0	10.3	17.2	17.7	46.8	27.8	275.2

Source: NIHB data base
All values listed as percentage increases (decreases) of 1996 relative to 1995 data

Appendix Table 3.4

Regional changes in dental service data for analogous nine month periods in 1996 relative to 1995

		Atlantic	Quebec	Ontario	Saskatchewan	Alberta	Pacific	Yukon	NWT
All Services	Service Nos	-1.6	-15.3	5.9	-2.3	-8.7	-13.5	-19.1	-3.2
	Expenditures	-11.3	-19.4	-16.3	-13.3	-18.3	-18.5	-22.4	-8.0
	Costs	-9.9	-4.3	-21.0	-11.4	-10.5	-5.8	-4.1	-2.9
Diagnostic	Service Nos	-12.4	-26.1	-25.2	17.6	-13.9	-17.3	-19.1	-14.7
	Expenditures	16.4	-25.6	-49.3	12.7	-15.3	-15.6	-20.9	-18.0
	Costs	-15.3	9.0	10.5	-22.4	-17.3	-23.8	10.1	-43.3
Preventive	Service Nos	30.3	25.3	541.0	91.2	29.2	3.1	45.3	28.5
	Expenditures	-4.6	45.3	608.3	56.2	10.4	-11.3	60.0	-10.7
	Costs	-13.3	16.0	10.5	-18.3	-14.6	-19.2	10.1	-30.5
Restorative	Service Nos	-8.7	-14.7	-13.7	14.6	-11.7	-9.3	-19.3	-1.1
	Expenditures	-10.5	-17.7	-14.2	6.4	-17.1	-14.9	-26.0	0.3
	Costs	-2.0	-3.6	-0.6	-7.1	-6.1	-5.7	-6.2	1.4
Endodontics	Service Nos	-21.2	-23.5	-12.7	16.7	-10.2	-7.3	-39.5	-2.9
	Expenditures	-19.6	-23.8	-14.1	1.6	-15.8	-13.4	-43.4	-29.9
	Costs	2.0	0.0	-1.6	-12.9	-6.2	-8.5	-6.3	-27.8
Periodontics	Service Nos	-13.7	-351.5	-245.7	-255.8	-220.3	-158.8	-1533.7	-243.1
	Expenditures	-62.3	-257.1	-293.2	-113.8	-214.1	-177.1	-684.7	-232.7
	Costs	-42.7	20.9	43.8	39.9	1.9	-7.1	39.7	3.0
Orthodontics	Service Nos	-6.4	-4.3	-1.3	13.5	19.6	-5.8	21.4	54.3
	Expenditures	-6.5	-2.3	-1.5	12.6	9.3	-2.3	26.6	63.0
	Costs	-2.0	2.0	-0.2	-182.7	-12.8	-263.8	6.6	19.1
Oral Surg	Service Nos	-10.7	8.0	-4.9	16.6	-7.8	3.2	-3.8	1.9
	Expenditures	-3.2	17.7	-3.9	18.9	-8.5	1.3	-18.0	5.2
	Costs	6.7	10.6	1.0	2.7	-0.7	-1.9	-13.7	3.3
Prosth-R	Service Nos	5.4	-10.7	-21.1	-8.6	-24.4	-10.9	-12.8	2.4
	Expenditures	-4.9	33.8	24.5	15.0	43.8	30.5	4.7	3.8
	Costs	-1.0	-20.9	-2.8	-5.9	-15.7	-17.7	7.2	-6.4
Denturists	Service Nos	7.9	-43.2	-14.7	-22.3	-17.6	-1.1	0.0	95.5
	Expenditures	-11.4	-106.9	-59.6	-62.0	-41.4	-35.6	-6.7	96.0
	Costs	-21.0	-44.5	-39.2	-32.4	-20.2	-34.4	-6.7	54.4
Miscellaneous	Service Nos	97.3	5.8	-24.3	-154.4	-8.4	-7.8	-59.8	28.8
	Expenditures	-21.9	-246.3	-67.5	-161.3	-41.6	-30.2	56.5	18.9
	Costs	-23.7	-113.6	-3.5	-13.2	-19.5	-11.8	53.8	-152.3

Source: NIHB data base

All values listed as percentage increases (decreases) of 1996 relative to 1995 data

Appendix Table 3.5

Differences in selected NIHB dental program data for analogous nine month periods in 1995 and 1996.

(a) Service expenditures \$

Service	Manitoba			All other Canadian regions		
	1995	1996	% Difference	1995	1996	% Difference
Total	9016544	6089554	-32.3	74704669	62429710	-16.4
Diagnostic	824866	673550	-18.3	9599669	7132356	-25.7
Preventive	512238	512249	0.0	4622597	6929762	49.9
Restorative	3314865	2218869	-33.1	24273629	21010642	-13.4
Endodontic	617186	289058	-53.2	2949725	2938573	-0.4
Periodontal	602514	111841	-81.4	6815593	2200385	-67.7
Oral surgery	696662	587835	-15.6	4236994	4288996	1.2
Orthodontic	895215	831803	-7.1	7224931	7468747	3.4

(b) Service numbers

Total	152223	127951	-15.9	1116688	1044256	-6.5
Diagnostic	42118	35975	-14.6	329726	278849	-15.4
Preventive	23643	31759	34.3	142583	232539	63.0
Restorative	42699	33022	-22.7	286523	261644	-8.7
Endodontic	4862	3249	-33.2	16949	16932	-0.1
Periodontal	12695	2176	-82.9	110418	37580	-66.0
Oral surgery	15047	12880	-14.4	71695	72299	0.8
Orthodontic	1488	1312	-11.8	32480	35022	7.8

(c) Service costs \$

Total	59.23	47.59	-19.7	66.90	59.78	-10.6
Diagnostic	19.58	18.73	-4.4	29.11	25.58	-12.1
Preventive	21.67	16.13	-25.8	34.53	31.96	-7.4
Restorative	77.63	67.19	-13.4	84.72	80.30	-5.2
Endodontic	126.94	88.97	-29.9	174.04	173.55	-0.3
Periodontal	47.47	51.40	8.3	60.26	58.16	-3.5
Oral surgery	46.30	45.64	-1.4	59.10	59.32	0.4
Orthodontic	601.62	634.00	5.4	-362.57	-405.54	11.9

Source: NIHB data base

% Difference listed as increases (decreases) of 1996 relative to 1995 data.

Appendix Table 3.6

Differences in NIHB dental program data for analogous nine month periods in 1995 and 1996

(a) Total service expenditures \$				All other Canadian regions		
Manitoba						
Month	1995	1996	% Difference	1995	1996	% Difference
April	880513	701059	-20.4	7539383	7244505	-3.9
May	1123069	821162	-25.9	9152954	7491653	-18.1
Jun	1084578	675960	-37.7	8961478	7272150	-18.9
Jul	804843	665859	-17.3	8013357	6561221	-18.1
Aug	831060	637845	-23.2	7263019	5758315	-20.7
Sept	1082757	661102	-38.9	7312071	6506324	-11.0
Oct	1130890	771377	-31.3	9290368	7579650	-18.4
Nov	1111885	651166	-41.4	9601591	7738289	-19.4
Dec	966939	504024	-47.9	7570558	6277603	-17.1
Total	9016544	6089554	-32.5	74704669	62429710	-16.4
(b) Total service numbers				All other Canadian regions		
Manitoba						
Month	1995	1996	% Difference	1995	1996	% Difference
April	16106	13207	-18.0	114076	119339	4.6
May	19152	16413	-14.3	137849	125336	-9.1
Jun	18207	13347	-26.7	130087	118767	-8.7
Jul	13728	14029	2.2	114735	109164	-4.9
Aug	14266	13027	-8.7	108069	95757	-11.4
Sept	18487	13516	-26.9	113088	109491	-3.2
Oct	19135	16289	-14.9	142224	129256	-9.1
Nov	17926	15024	-16.2	144304	132528	-8.2
Dec	15216	13099	-13.9	112256	104628	-6.8
Total	152223	127951	-15.9	1116688	1044266	-6.5
(c) Total per capita service costs \$				All other Canadian regions		
Manitoba						
Month	1995	1996	% Difference	1995	1996	% Difference
April	54.67	53.08	-2.9	66.09	60.71	-8.1
May	58.64	50.03	-14.7	66.40	59.77	-10.0
Jun	59.57	50.65	-15.0	68.89	61.23	-11.1
Jul	58.63	47.46	-19.0	69.84	60.10	-13.9
Aug	58.25	48.96	-15.9	67.21	60.13	-10.5
Sept	58.57	48.91	-16.5	64.66	59.42	-8.1
Oct	59.10	47.36	-19.9	65.32	58.64	-10.2
Nov	62.03	43.34	-30.1	66.54	58.39	-12.2
Dec	63.55	38.48	-39.4	67.44	60.00	-11.0
Total	59.23	47.59	-19.7	66.90	59.78	-10.6

Source: NIHB data bank

% Difference listed as increases (decreases) of 1996 relative to 1995 data.

Appendix Table 3.7

Changes in dental service numbers and expenditures for analogous nine month periods in the 1996 relative to the 1995 fiscal years.

Service		Atlantic	Quebec	Ont	Man	Sask	Alberta	Pacific	Yukon	NWT
All	Service Nos	-1.6	-15.3	5.9	-15.3	-2.3	-3.7	-13.5	-19.1	-3.2
	Expenditures	-11.3	-19.4	-16.3	-32.5	-13.9	-18.3	-18.5	-22.4	-6.0
	Costs	-9.9	-4.3	-21.0	-19.7	-11.4	-10.5	-5.3	-4.1	-2.9
Diagnostic	Service Nos	-12.4	-26.1	-25.2	-17.1	17.8	-13.3	-17.3	-19.1	-14.7
	Expenditures	16.4	-25.3	-49.3	-18.3	12.7	-15.3	-15.5	-20.9	-18.0
	Costs	-15.3	9.0	10.5	34.3	-22.4	-17.0	-23.3	10.1	-43.3
Preventive	Service Nos	30.3	25.3	541.0	34.3	91.2	29.2	9.1	45.3	28.5
	Expenditures	-4.6	45.3	608.3	0.9	58.2	10.4	-11.3	50.0	-10.7
	Costs	-13.3	16.0	10.5	-25.6	-18.3	-14.5	-19.2	10.1	-30.5
Restorative	Service Nos	-8.7	-14.7	-13.7	-22.7	14.6	-11.7	-9.3	-19.3	-1.1
	Expenditures	-10.5	-17.7	-14.2	-33.1	8.4	-17.1	-14.9	-26.0	0.3
	Costs	-2.0	-3.6	-0.6	-13.4	-7.1	-8.1	-5.7	-8.2	1.4
Endodontic	Service Nos	-21.2	-23.8	-12.7	-33.2	16.7	-10.2	-7.3	-39.5	-2.9
	Expenditures	-19.5	-23.8	-14.1	-53.2	1.6	-15.3	-13.4	-43.4	-29.9
	Costs	2.0	0.0	-1.6	-29.9	-12.9	-6.2	-6.5	-6.3	-27.3
Periodontal	Service Nos	-13.7	-351.3	-245.7	-483.4	-255.3	-220.3	-158.3	-1533.7	-243.1
	Expenditures	-62.3	-257.1	-293.2	-438.8	-113.8	-214.1	-177.1	-884.7	-232.7
	Costs	-42.7	20.9	43.3	7.6	39.9	1.9	-7.1	39.7	3.0
Orthodontic	Service Nos	-6.4	-4.3	-1.3	-13.4	13.5	19.3	-5.3	21.4	54.3
	Expenditures	-8.5	-2.3	-1.5	-7.5	12.6	9.3	-2.3	26.6	63.0
	Costs	-2.0	2.0	-0.2	5.1	-182.7	-12.3	-263.3	6.6	19.1
Oral Surgery	Service Nos	-10.7	8.0	-4.9	-16.8	16.6	-7.8	3.2	-3.8	1.9
	Expenditures	-3.2	17.7	-3.9	-16.5	18.9	-8.5	1.3	-18.0	5.2
	Costs	6.7	10.6	1.0	-1.4	2.7	-0.7	-1.9	-13.7	3.3
Prosth-R	Service Nos	5.4	-10.7	-21.1	-33.8	-8.6	-24.4	-10.9	-12.8	2.4
	Expenditures	-4.9	33.8	24.5	81.1	15.0	43.8	30.5	4.7	3.8
	Costs	-1.0	-20.9	-2.8	-36.3	-5.9	-15.7	-17.7	7.2	-6.4
Denturist	Service Nos	7.9	-43.2	-14.7	-34.9	-22.3	-17.6	-1.1	0.0	95.5
	Expenditures	-11.4	-106.9	-59.6	-117.3	-62.0	-41.4	-35.8	-6.7	98.0
	Costs	-21.0	-44.5	-39.2	-61.1	-32.4	-20.2	-34.4	-6.7	54.4
Miscellaneous	Service Nos	97.3	5.8	-24.3	-22.8	-154.4	-8.4	-7.8	-59.6	26.9
	Expenditures	-21.9	-246.3	-67.5	-81.5	-161.3	-41.6	-30.2	56.5	18.9
	Costs	-23.7	-113.6	-3.5	9.7	-13.2	-19.5	-11.8	53.8	-152.3

Source: NIHB data bank

Ont = Ontario; Man = Manitoba; Sask = Saskatchewan

All values listed as percentage changes in 1996 data relative to those for the analogous nine month period in 1995.

Appendix Table 3.8

Regional differences in selected service numbers expressed as regional percentages of Canadian totals for 1996 and 1995

Service type	Period	Atlantic	Quebec	Ont	Man	Sask	Alberta	Pacific	Yukon	NWT
All	1995	4.4	7.5	16.3	12.0	11.5	19.5	22.7	0.9	5.3
	1996	4.7	8.3	18.7	10.9	12.1	19.3	21.3	0.3	5.3
Diagnostic	1995	4.4	4.3	21.3	11.3	8.5	20.4	22.0	0.9	5.7
	1996	4.3	4.3	20.5	11.4	11.9	21.2	22.1	0.9	5.9
Preventive	1995	5.3	11.3	5.1	12.4	8.7	20.3	29.3	0.7	5.3
	1996	4.7	3.5	21.3	10.7	10.3	17.3	20.7	0.5	4.4
Restorative	1995	4.0	8.3	17.3	13.0	8.3	19.3	23.0	0.9	5.4
	1996	4.1	7.3	16.7	11.2	10.3	19.5	23.2	0.3	5.3
Endodontic	1995	2.3	4.3	12.2	18.2	10.3	23.1	22.3	1.3	4.3
	1996	2.5	4.2	12.1	13.9	14.5	23.3	23.5	0.9	4.3
Periodontic	1995	3.9	12.5	16.2	10.3	4.0	16.3	30.9	1.1	4.1
	1996	10.7	8.3	14.5	5.5	3.5	16.4	37.0	0.2	3.7
Orthodontic	1995	9.5	9.1	28.3	4.4	10.5	23.0	12.3	0.2	1.3
	1996	8.5	8.2	25.7	3.8	11.5	25.7	10.9	0.2	3.7
Oral Surgery	1995	4.5	4.4	16.2	17.3	11.2	19.5	16.3	1.2	9.0
	1996	4.1	4.3	15.7	15.1	13.7	18.5	17.5	1.2	9.4
Prosthodontic-R	1995	4.7	4.7	15.1	12.8	12.7	19.4	19.7	1.3	9.5
	1996	5.5	4.9	14.3	11.0	13.4	17.3	20.3	1.3	11.2
Denturist	1995	2.7	14.2	12.2	14.8	6.9	23.8	24.2	1.3	0.1
	1996	3.4	11.2	12.1	12.3	6.4	23.0	27.2	1.5	3.0
Miscellaneous	1995	1.9	0.7	9.9	7.4	59.3	11.9	7.0	0.3	1.5
	1996	12.1	1.3	13.3	10.1	38.9	18.3	10.8	0.3	3.5

All values expressed as percentages of Canadian totals

Source: NIHB database

Appendix Table 3.9

Selected regional service expenditures for analogous nine month periods in 1995 and 1996 expressed as percentages of Canadian totals

Region	Period	Atlantic	Quebec	Ont	Man	Sask	Alberta	Pacific	Yukon	NWT
All Services	1995	4.3	8.7	18.3	10.3	9.3	20.3	20.5	1.2	6.1
	1996	4.8	8.3	19.3	8.9	9.8	20.2	20.5	1.1	7.0
Diagnostic	1995	3.3	5.8	30.2	7.9	5.5	22.9	15.1	0.3	8.3
	1996-	5.1	5.6	20.5	8.6	8.2	25.9	17.0	0.9	9.4
Preventive	1995	6.0	10.3	5.4	9.1	7.1	27.9	22.8	0.3	10.2
	1996	4.1	11.2	25.9	6.4	7.8	21.3	14.2	1.0	6.5
Restorative	1995	3.7	7.3	16.9	12.0	7.3	19.3	25.5	1.4	5.5
	1996	1.3	2.6	5.3	3.2	3.4	5.4	8.8	0.4	2.2
Endodontic	1995	3.7	5.7	13.4	12.9	8.1	25.0	20.7	1.7	7.8
	1996	3.7	3.5	14.5	7.6	10.3	25.5	22.5	1.2	5.3
Periodontic	1995	4.6	10.9	24.2	8.1	3.2	21.8	21.2	1.2	4.3
	1996	9.0	3.8	19.3	4.8	4.8	22.2	24.8	0.4	4.5
Orthodontic	1995	7.1	16.0	24.8	11.0	4.3	16.4	18.4	0.2	1.3
	1996	6.4	15.3	23.7	10.0	5.5	17.7	17.6	0.3	3.4
Oral Surgery	1995-	4.4	5.1	18.8	14.1	8.3	21.2	18.2	1.3	8.4
	1996-	4.3	3.2	18.1	12.1	10.7	19.7	18.3	1.4	8.9
Prosthetic-R	1995-	4.8	7.4	15.0	12.1	10.5	18.5	19.2	1.3	11.1
	1996	6.5	7.1	15.4	8.5	11.7	16.4	18.3	1.5	13.7
Denturist	1995	2.3	27.0	12.9	13.6	6.3	15.8	19.1	2.9	0.1
	1996	3.2	20.0	12.3	9.6	5.9	17.2	21.6	4.2	6.0
Miscellaneous	1995-	3.1	0.9	17.8	6.8	47.1	15.4	7.7	0.1	1.3
	1996-	4.7	0.5	19.3	8.2	33.1	20.0	10.9	0.3	3.0

All values expressed as percentages of Canadian totals

Source: NIHB data base

Appendix Table 3.10

Service costs for selected services expressed as percentages of those for Canada in analogous nine month periods of 1995 and 1996

Service type	Period	Atlantic	Quebec	Ont	Man	Sask	Alberta	Pacific	Yukon	NWT
All	1995-96	98.1	116.6	115.6	88.8	80.8	103.9	90.4	131.4	116.2
	1996-97	99.8	126.0	103.3	81.4	80.8	105.0	96.2	142.2	127.3
Diagnostic	1995-96	75.5	113.9	136.8	89.9	84.0	112.3	68.7	90.2	150.2
	1996-97	104.9	113.5	93.7	71.0	65.3	114.9	72.3	90.3	134.9
Preventive	1995-96	107.3	92.5	102.0	72.9	81.6	134.2	76.7	128.2	192.6
	1996-97	103.0	118.7	124.7	68.0	73.8	126.8	68.6	156.2	148.2
Restorative	1995-96	93.0	93.6	97.8	92.8	95.1	97.3	110.9	150.5	102.0
	1996-97	98.1	95.2	102.5	84.5	93.1	96.3	110.3	145.6	109.0
Endodontic	1995-96	132.3	139.2	110.0	79.5	74.1	108.0	92.6	134.0	180.7
	1996-97	149.6	154.3	119.9	54.8	71.5	112.3	96.1	139.1	144.6
Periodontic	1995-96	106.2	79.1	137.0	71.9	73.1	117.5	62.6	103.2	108.7
	1996-97	84.4	113.5	278.4	88.4	138.0	135.0	66.3	194.2	124.8
Orthodontic	1995-96	73.4	176.1	85.2	251.7	45.9	71.3	148.9	152.7	71.7
	1996-97	75.4	180.0	88.9	277.5	17.0	88.2	42.8	171.1	3.2
Oral Surgery	1995-96	98.0	116.2	114.9	81.4	76.3	108.3	109.1	136.2	92.6
	1996-97	104.4	127.9	115.3	79.7	78.0	106.9	106.3	119.0	95.1
Prosthetic-denture-R	1995-96	103.8	156.2	99.0	94.2	62.7	95.0	97.7	104.0	117.1
	1996-97	114.6	144.5	107.6	77.8	87.4	91.8	92.8	125.3	123.1
Denturist	1995-96	85.5	190.7	105.0	82.7	91.4	66.6	79.1	222.7	68.1
	1996-97	95.3	178.1	101.8	77.6	93.1	74.7	79.4	281.6	201.6
Miscellaneous	1995-96	95.3	104.5	151.0	146.2	65.1	125.5	71.4	32.8	114.2
	1996-97	75.8	48.2	143.7	159.4	56.7	103.4	62.9	70.0	44.6

All values expressed as percentages of Canadian totals

Source: NIHB data base

Appendix Table 3.11

Percentage changes in Manitoba service data relative to aggregated national data, excluding the Manitoba region: 1995 vs 1996

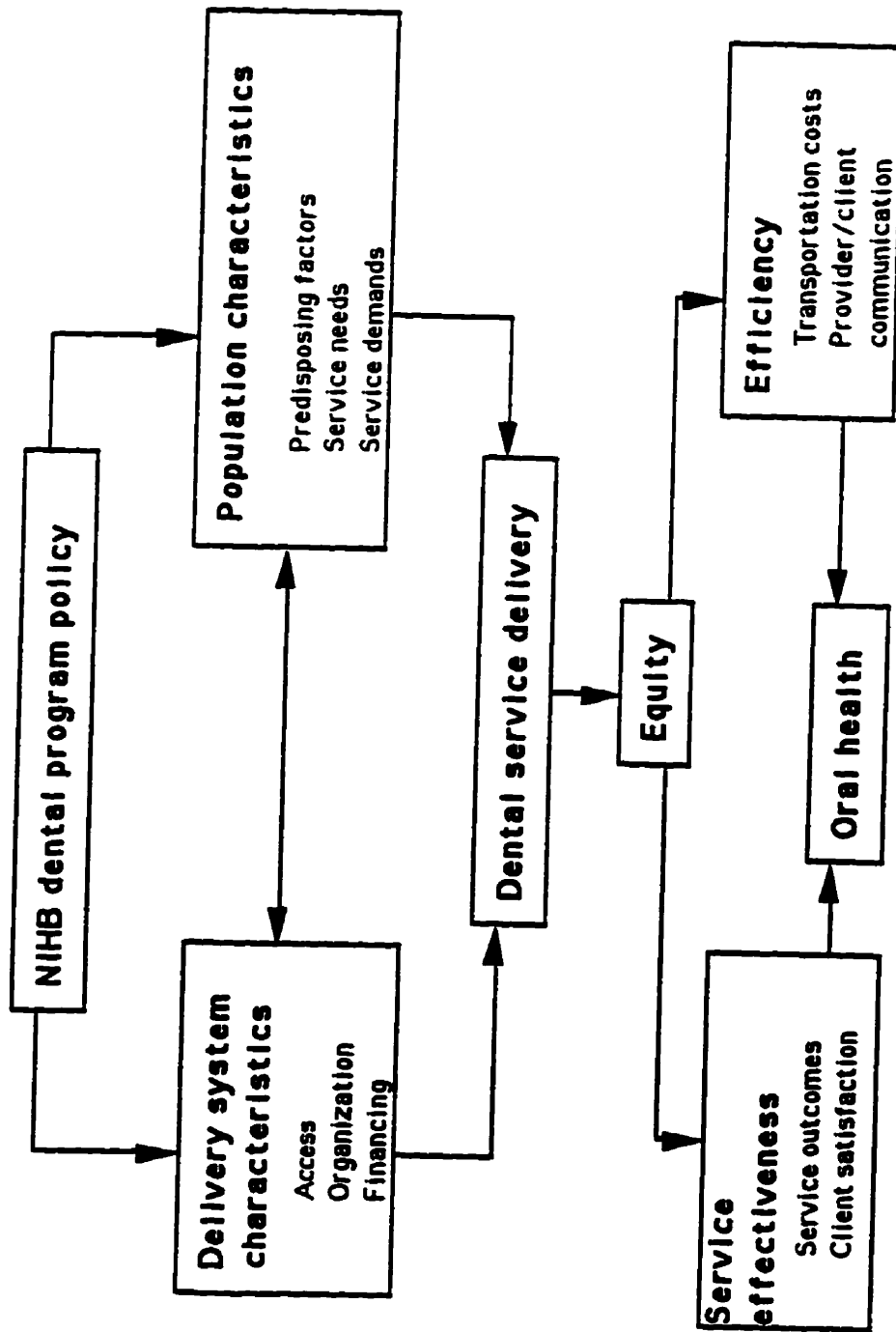
Service type	Period	Numbers	Expenditures	Costs
All	1995	13.63	12.11	97.14
	1996	12.25 (-11)	9.78 (-24)	89.04 (-9)
Diagnostic	1995	12.77	8.62	85.02
	1996	12.25 (-4)	9.47 (+10)	89.04 (+5)
Preventive	1995	14.21	10.01	87.62
	1996	12.02 (-10)	6.90 (-45)	73.78 (-19)
Restorative	1995	14.80	13.70	98.52
	1996	12.62 (-18)	3.38 (-308)	90.21 (-9)
Endodontic	1995	22.29	14.80	72.54
	1996	16.10 (-38)	8.24 (-80)	58.51 (-28)
Periodontic	1995	11.50	8.87	77.64
	1996	5.79 (-89)	5.10 (-74)	88.68 (+24)
Orthodontic	1995	4.58	12.43	257.05
	1996	3.75 (-22)	11.17 (-11)	283.73 (+10)
Oral Surgery	1995	20.89	18.49	89.25
	1996	17.81 (-18)	13.75 (-20)	87.34 (-2)
Prosthetic-R	1995	14.72	13.79	95.48
	1996	12.35 (-19)	9.38 (-47)	78.99 (-21)
Denturist	1995	17.12	15.72	94.34
	1996	14.03 (-22)	10.59 (-48)	79.48 (-18)
Miscellaneous	1995	8.03	7.29	148.63
	1996	11.24 (+40)	8.98 (+23)	182.08 (+9)

Values listed as percentage differences of data from the Manitoba region relative to national NIHD program totals excluding data for the Manitoba region
 Period of study: Analogous nine periods in 1995 and 1996
 Values in parentheses indicate increases (+) or decreases (-) in 1996 relative to 1995

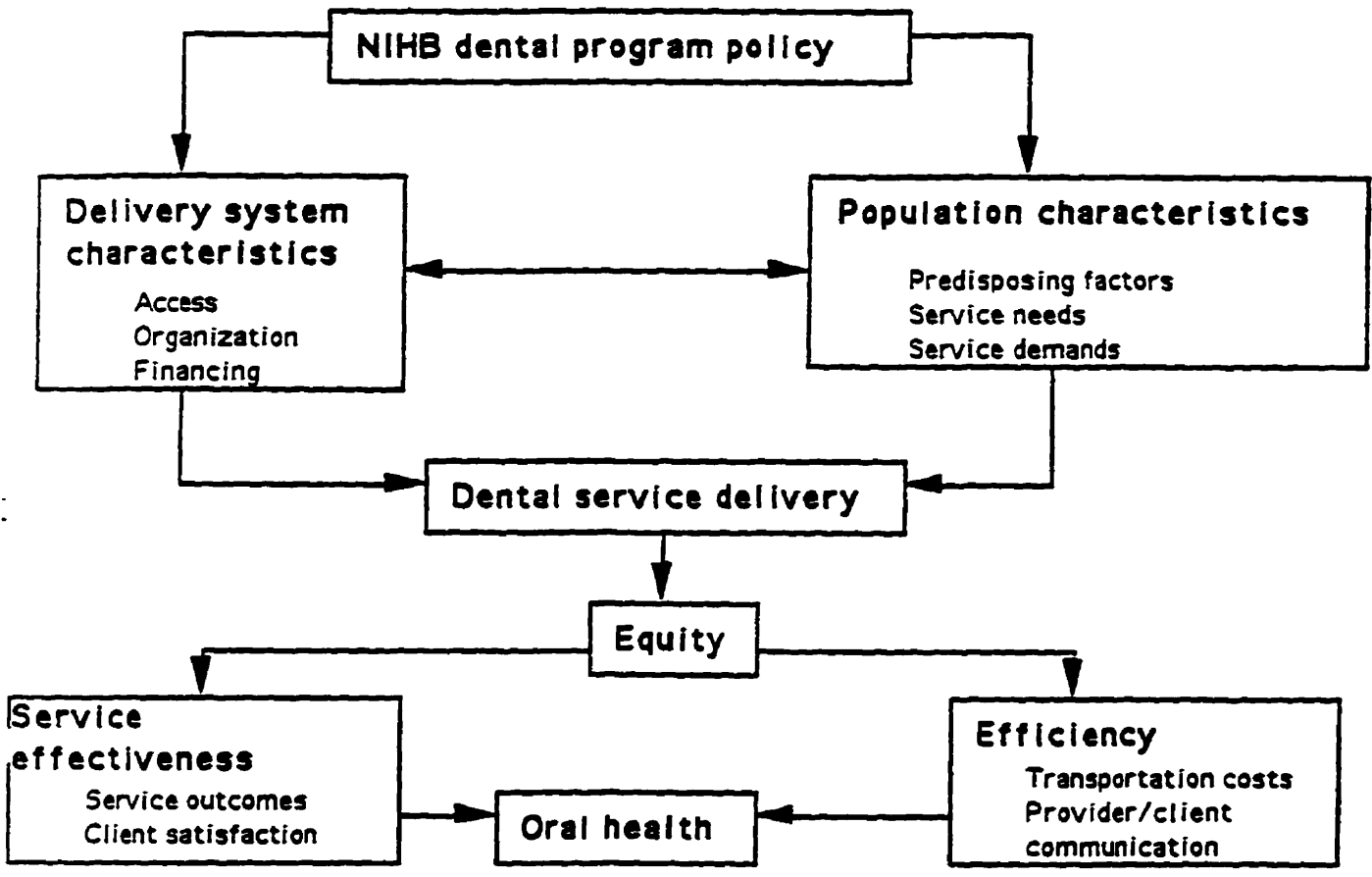
Source: NIHD data base

Operation of the NIHB Dental Program

The NIHIB dental program framework



The NIHB dental program framework



Criticisms of the Frequency-Based Strategy

**SPECIFIC CRITICISMS OF THE FREQUENCY-BASED STRATEGY
INTRODUCED JANUARY 1ST 1996**

The main specific criticisms of the frequency-based strategy are most appropriately listed in point form:-

1. Examinations:

Once/twelve month coverage for recall examinations on clients over the age of 17, as opposed to the previous twice/twelve month coverage. Specific examinations limited to one in any twelve month period.

As the specific examination fee is 19.93 (Code 01204) and that for a recall examination is \$19.47 (Code 01201), the savings gained when clients may be recalled after six months and examined for a specific concern or complaint remain obscure.

2. Preventive Services:

The changes introduced for preventive services include the potential six fold increase in scaling units provided per annum, although these changes were not based on scientific data. Moreover, as NIHB expenditures in Manitoba during the 1993/94 fiscal year included \$407,000 for 1-4 units of scaling and only \$10,600 for 5+ units, inflationary trends in the latter must be anticipated under the frequency-based initiative.

Approximately 582 bruxism appliances (Code 43611/43612) were constructed in Manitoba over the 1992-95 period. As a limit of 1 per client per 36 months is set by the frequency-based initiative, then the potential number could increase under the frequency-based initiative from 582 to 25,481 should all providers use the maximum allowable limit.

3. Restorative Services:

There were serious reservations for restorative services included within the frequency-based initiative:

- **“Restorations, Amalgam - Limited to one per tooth in any sixty month period (same surfaces) in combination with prefabricated and tooth coloured restorations.**
- **Restorations, Tooth Coloured - Limited to one per tooth in any sixty month period (same surfaces) in combination with amalgams and prefabricated restorations”.**

For instance, if a client returns to a private provider after four years with a cracked anterior filling, the potential options include:

- i) Replace the restoration for no fee;**
- ii) Replace the restoration and extend it by at least one surface for a higher fee than originally charged;**
- iii) Provide a crown, with or without a root canal treatment on the tooth if a frequency violation does not occur;**
- iv) Extract the tooth and add to it a removable partial denture.**

As no provider is likely to replace a restoration after four years for no fee and no First Nations Treaty and Inuit community client will wish pay privately for the restoration due to socio-economic and political reasons.

The four options are therefore associated with the following potential billing situations:

Option (i)	23113 - MIL on #21 (Replacement)	\$75.36
Option (ii)	23114 - MILB on #21	\$89.24
Option (iii)(a)	27211 + Lab - Crown on #21	\$450.00
Option (iii)(b)	27211 + 3311- Crown + Endo + 25731 Post & Core	800.00
Option (iv)	53201 + Lab - Removable Partial Denture + 71101 - Extraction	\$590.00

All these options are more costly than replacement of the existing restoration, i.e. the original Option (i). Even if there was an upper partial denture, the costs to extract the tooth and add it to an existing prosthesis far outweigh the MIL restoration costs.

4. Endodontic Services and Crowns:

In the frequency-based initiative implemented on January 1, 1996 the frequency for endodontic services and crowns was changed from 2/5 years to 1/3 years. In many instances, additional expenditures will be associated with these changes. For example, a client with two endodontic services and crowns provided in December 1992, would have been eligible for another crown or endodontic service in December 1997 under the previous system. Under the frequency-based initiative, however, they would be eligible for a crown and endodontic service in January 1996 (i.e. three years after the last crown or endodontic service). The intent of this change was clearly to lessen the provision of endodontic services and crowns, i.e. the expenditure savings (if any) have been deferred to a much later point in the three/five year cycle. A situation could therefore be anticipated where an increase in expenditures will be noted as a type of "hump cost". This situation has been worsened by a systems problem which counts the three year timeframe from the placing of the first crown within the last five years rather than the second crown.

5. Adjunctive Services:

The new parameters for general anesthesia approval elicit similar potential expenditure escalations.

The Schedule of Dental Services, in the frequency-based initiative implemented on January 1, 1996 included the following statements:

"General Anaesthesia/Conscious Sedation - Limited to children under the age of 12 years. Others will require prior approval. Applications must indicate the systemic condition making a general anaesthetic necessary".

However, Schedule "D", Part I, Division I, Section 47 and Part I, Division II, Section 3 of Manitoba Regulation 506/882 states that:

“Surgical removal of any tooth and/or other dental surgical procedure in hospital where such treatment is an integral part of the management or treatment of a specific systemic condition or trauma, and such oral/dental surgical procedure has been requested by the patient’s attending medical practitioner . . .” is an insured service when performed by a certified oral and maxillofacial surgeon or licensed dentist. These surgical procedures and hospital costs are insured services.

The interpretation of these statements implies that:-

General anaesthesia is no longer a covered service for clients over the age of 12 years unless medically compromised (although these services are already covered as Provincially insured services)

General anaesthesia for adults in need of oral surgery is therefore no longer covered by the NIHB dental program.

This intended cost saving measure has very limited benefits upon closer examination. For instance, the Manitoba NIHB dental program previously funded an oral surgeon to travel with a registered anaesthesiologist to Norway House Hospital and provide Operating Room (OR) services each month.

As general anaesthesia is no longer covered by the NIHB program under the frequency-based initiative, the OR service has been canceled. As a consequence of these changes, this operating room slate (approximately 20 patients with 5 escorts per month) will now have to be flown from this remote community for oral surgical services under local anaesthesia, i.e. \$15,000 on travel and accommodation expenditures to save \$2,034 general anaesthesia charges or a 500% increase in adjunctive service/transportation expenditures.

6. Quality of Care

There is no scientific literature to support the following:-

- an 8-years lifetime for complete upper or lower dentures
- one endodontic service and crown to eligible clients on a three year timeframe.

As the provision of more services to some clients than others is such a fundamental attribute of quality assurance, frequency-based initiatives can no longer be justified.

NEEDS-BASED STRATEGY

The needs-based strategy is based on the complete dental service needs of individual clients, rather than limiting dental benefits to allowable frequencies of individual services. This allows providers to provide better services to clients with high service needs and reduce administrative delays associated with awaiting the frequency of specific services.

With the implementation of the prior approval aspect, the provider completes an annual treatment plan outlining all the client's service needs. Any treatment plan that exceeds \$500 per year, or includes specific services that necessitate prior approval, must first be submitted to the NIHB program for pre-determination review.

The implementation of this strategy is intended to manage dental benefits more like other public and private dental plans, where pre-authorization is required for major restorative work.

Prior approval is therefore required for:-

- **All services where prior approval is indicated by "P" or "IC" in the fee-schedule;**
- **Treatment exceeds \$500 per patient per year;**
- **Post-treatment approval will not be considered;**
- **Prior approval may be given by telephone by the Regional Dental Officer for emergency cases.**

DRAFT: NIHB DENTAL REVIEW/APPEAL COMMITTEE — MANITOBA**1. Role:**

To review predeterminations, claims, appeals and profiles of work provided under the NIHB Dental Program, Manitoba Region and recommend disposition of same.

2. Structure:

- (a) Two First Nations representatives from the Assembly of Manitoba Chiefs.
- (b) Two dentist representatives from the Manitoba Dental Association.
- (c) Ex-Officio non-voting members:-
 - One Regional Dental Officer from Medical Services Branch
 - Dental Office Staff Person, Medical Services Branch (Secretary to the Committee)

Appointments to the committee shall be made for a two-year term renewable once by:

- The Assembly of Manitoba Chiefs concerning (a) above.
- The Manitoba Dental Association Board of Governors concerning (b) above.
- Regional Director, Manitoba Region, Medical Services Branch concerning (c) above.

NOTE: A denturist will be available for the Committee on an "as needed" basis.

Meeting Frequency:

- (a) A minimum of one and maximum of two meetings will be held per month.
- (b) Remuneration to non-Federal employees on the Committee will be in accordance with standard Medical Services Branch agreements.

Duties and Responsibilities of Committee:

- To elect a chairperson at the outset of each two year term.
- To review and dispose of specific predeterminations/claims brought to the committee.
- To review and dispose of predeterminations/claims containing services which have previously been rejected by claims administration/regional dental officer and appealed by patients/dentists/denturists.
- To seek the opinion of a specialist when the committee requires additional information.
- To study and analyze patterns of professional practice in the provision of dental services by individual providers in order to ascertain and report to the Manitoba Dental Association in qualitative and quantitative norms consistent with approved dentistry.
- To report to the M.D.A. Complaints Committee predeterminations/claims which require review due to a concern about the appropriateness of treatment provided.
- To provide information to the AMC/MSB about the existing Schedule in order to update and clarify the terms as necessary.
- To report on the activities of the committee on an annual basis to the AMC/MDA and MSB.