

Establishing a Minimum Data Set to Support the Advancement of NAHO's Aboriginal Health Human Resource Initiative: Next Steps

Version: August 20, 2007

Prepared by

Tomblin-Murphy Consulting Inc.

Authorship

Gail Tomblin Murphy, RN, PhD

Victor Maddalena, PhD

Executive Summary

In 2004, Health Canada, First Nations Inuit Health Branch committed funds to support the development of an Aboriginal Health Human Resource Initiative (AHHRI). The principal objectives of this initiative are to:

- a. develop a health human resources plan specific to First Nations Inuit & Métis communities;
- b. address the acute shortages of FN/I&M health care providers;
- c. identify ways to make the health care system more responsive to the needs of FN/I&M Peoples;
- d. improve the health status of FN/I&M communities by improving access to culturally appropriate health services.

Environmental scans were conducted to determine available information sources and document the current status of health human resources serving First Nations Inuit & Métis communities across Canada. In 2007 Phillip Bird was contracted to conduct a national level environmental scan of relevant First Nations Inuit & Métis HHR data sources entitled, “*A Comprehensive Survey of the Aboriginal Health Human Resource Landscape*”.

In the summer of 2007 the National Aboriginal Health Organization (NAHO) contracted Tomblin Murphy Consulting Inc. to conduct a review of its national environmental scan entitled, “*A Comprehensive Survey of the Aboriginal Health Human Resource Landscape*” (July 2007) and also consider the findings of the four regional scans (Atlantic, Northern, Saskatchewan and Alberta) to assess the data collected and provide advice on the development of a Minimum Data Set (MDS) to be used to facilitate needs-based health human resources planning for First Nations, Inuit and Métis communities.

The purpose of this report is to:

1. Conduct a critical review of NAHO's national and regional HHR scans to assess the quality of the data collected and the relevance and utility of the scans in supporting the development of a Minimum Data Set (MDS) to be used to conduct needs-based health human resources planning for First Nations, Inuit and Métis communities.
2. Examine the strengths and weakness of the environmental scans and challenges associated with accessing data sources, comparability of data, data quality and privacy concerns.
3. Provide recommendations to ameliorate identified concerns and propose a process to advance the development of the Minimum Data Set.

While the national and regional environmental scans provide valuable insight into the issues surrounding health human resources in First Nations Inuit & Métis communities and potential sources of data to support a Minimum Data Set, the environmental scans do not provide sufficient information to support the development of an MDS to support needs-based HHR planning for First Nations Inuit & Métis communities.

In the first instance, there is a need to first, clearly articulate the parameters of the MDS, including all indicators and measures of health needs, supply, productivity, health status and determinants of health and other issues relevant to FNI&M culture and communities.

Information that has been collected in the form of databases and ad hoc studies shed important light on the circumstances and context for HHR planning issues opportunities in First Nations Inuit & Métis communities. The information contained in the Environmental Scans can inform the development of an MDS for First Nations Inuit & Métis communities, but in their current form they do not provide sufficient information to form the basis for the MDS without further development.

Recommendations:

1. A consensus conference (or similar forum) with participation from appropriate stakeholders should be convened to identify a definitive list of indicators and measures that will form the basis for a Minimum Data Set to facilitate HHR planning in First Nations Inuit & Métis communities.
2. Following the identification of indicators that will comprise the Aboriginal MDS to support needs-based HHR planning data, sources should be identified and evaluated for quality, compatibility and comprehensiveness.
3. Once data sources have been evaluated for quality, compatibility and comprehensiveness NAHO should then negotiate with the institutional owners of the data to access data while respecting the organization's privacy policy.
4. Following the identification of appropriate data sources and following negotiated agreements on protection of privacy and data access issues, software and hardware compatibility, NAHO should establish an MDS database to support HHR planning in First Nations Inuit & Métis communities.
5. NAHO should establish appropriate policies regarding data access and database management policies based on industry practices should be developed.

Table of Contents

	Page
<i>Executive Summary</i>	2
1.0 Background.....	6
2.0 Purpose.....	7
3.0 Pan-Canadian Framework for Needs-Based Health Human Resources Planning	7
4.0 Creation of a Minimum Data Set to Support Needs-Based HHR Planning for FNI&M Communities	12
4.1 Phase One: Identification of specific indicators and measures that will comprise the AMDS.....	12
4.2 Phase Two: Securing Data Sources	15
4.3 Phase Three: Data Storage and Management.....	16
5.0 NAHO Regional and National Environmental Scans	17
6.0 Summary.....	19
7.0 Recommendations.....	24

Appendix One: Minimum Data Sets: Priority Information Needs, Indicators and the Data Elements

Endnotes

1.0 Background

In 2004, Health Canada, First Nations Inuit Health Branch committed funds to support the development of an Aboriginal Health Human Resource Initiative (AHHRI). The AHHRI is being developed in partnership with a broad range of stakeholders including First Nations, Inuit and Métis (FN/I&M) groups, governmental organizations, professional associations and educational institutions. The principal objectives of this initiative are to:

- e. develop a health human resources plan specific to First Nations Inuit & Métis communities;
- f. address the acute shortages of FN/I&M health care providers;
- g. identify ways to make the health care system more responsive to the needs of FN/I&M Peoples;
- h. improve the health status of FN/I&M communities by improving access to culturally appropriate health services.

The preliminary stages of the AHHRI consisted of conducting environmental scans (at both national and regional levels).^{1 2 3 4 5} The purpose of conducting the environmental scans was to determine available information sources and document the current status of health human resources serving First Nations Inuit & Métis communities across Canada. This, in turn would support the development of a Minimum Data Set (MDS) that will form the foundation upon which needs-based HHR planning for FN/I&M planning can occur. The environmental scans were conducted in concert with provincial and territorial jurisdictions and with First Nations, Inuit and Métis organizations and a wide range of stakeholders.

In 2007 Phillip Bird was contracted to conduct a national level environmental scan of relevant First Nations Inuit & Métis HHR data sources. Two surveys were conducted. A preliminary survey was distributed to about 40 participating organizations in November 2006. Responses were returned to NAHO by mail and fax until January 2007. This first survey served as a pilot to identify organizations that collect data on FN/I&M people and assist in formulating the questions that would comprise the more comprehensive scan to be conducted in 2007. The second, more comprehensive survey consisted of 31 questions that focused on collecting data in six general areas including: Data Collection; Education Institutes; Privacy Policies and Procedures; Relationships and Data Sharing; Data Storage and Contact Information.

In the summer of 2007 the National Aboriginal Health Organization (NAHO) contracted Tomblin Murphy Consulting Inc. to conduct a review of its national environmental scan entitled, "*A Comprehensive Survey of the Aboriginal Health Human Resource Landscape*" (July 2007) and also consider the findings of the four regional scans (Atlantic, Northern, Saskatchewan and Alberta) to assess the data collected and provide advice on the development of a Minimum Data Set (MDS) to be used to facilitate needs-based health human resources planning for First Nations, Inuit and Métis communities.

2.0 Purpose

The purpose of this report is to:

4. Conduct a critical review of NAHO's national and regional HHR scans to assess the quality of the data collected and the relevance and utility of the scans in supporting the development of a Minimum Data Set (MDS) to be used to conduct needs-based health human resources planning for First Nations, Inuit and Métis communities.
5. Examine the strengths and weakness of the environmental scans and challenges associated with accessing data sources, comparability of data, data quality and privacy concerns.
6. Provide recommendations to ameliorate identified concerns and propose a process to advance the development of the Minimum Data Set.

3.0 Pan-Canadian Framework for Needs-Based Health Human Resources Planning⁶

The AHHRI Research Plan ⁷ has adopted the “*Pan-Canadian Framework for Health Human Resources Planning*” (2007) as the guiding model for its HHR planning. Establishing a comprehensive Minimum Data Set that is culturally appropriate to the unique interests and characteristics of the First Nations, Inuit and Métis communities will serve as the cornerstone for needs-based health human resources planning.

The Pan-Canadian Framework promotes a systems-based, collaborative, population needs-based approach to health human resources planning. The Framework recognizes the jurisdictional responsibility for health system design and HHR planning as well as the importance of considering the unique health needs of regions and specific populations.

The Pan-Canadian framework for HHR planning is designed to facilitate the determination of HHR requirements based on the health needs of a defined population in a manner that is responsive to communities, patient-centered, culturally appropriate, evidence-based, and outcomes directed. The framework enhances capacity to achieve the appropriate mix of health providers and deploy them in service delivery models that make full use of their skills. This is accomplished by actively engaging government, educators, employers, funders, researchers, community leaders and service providers in the planning process. See Figure 1: Health System and Health Human Resources Planning Conceptual Framework.

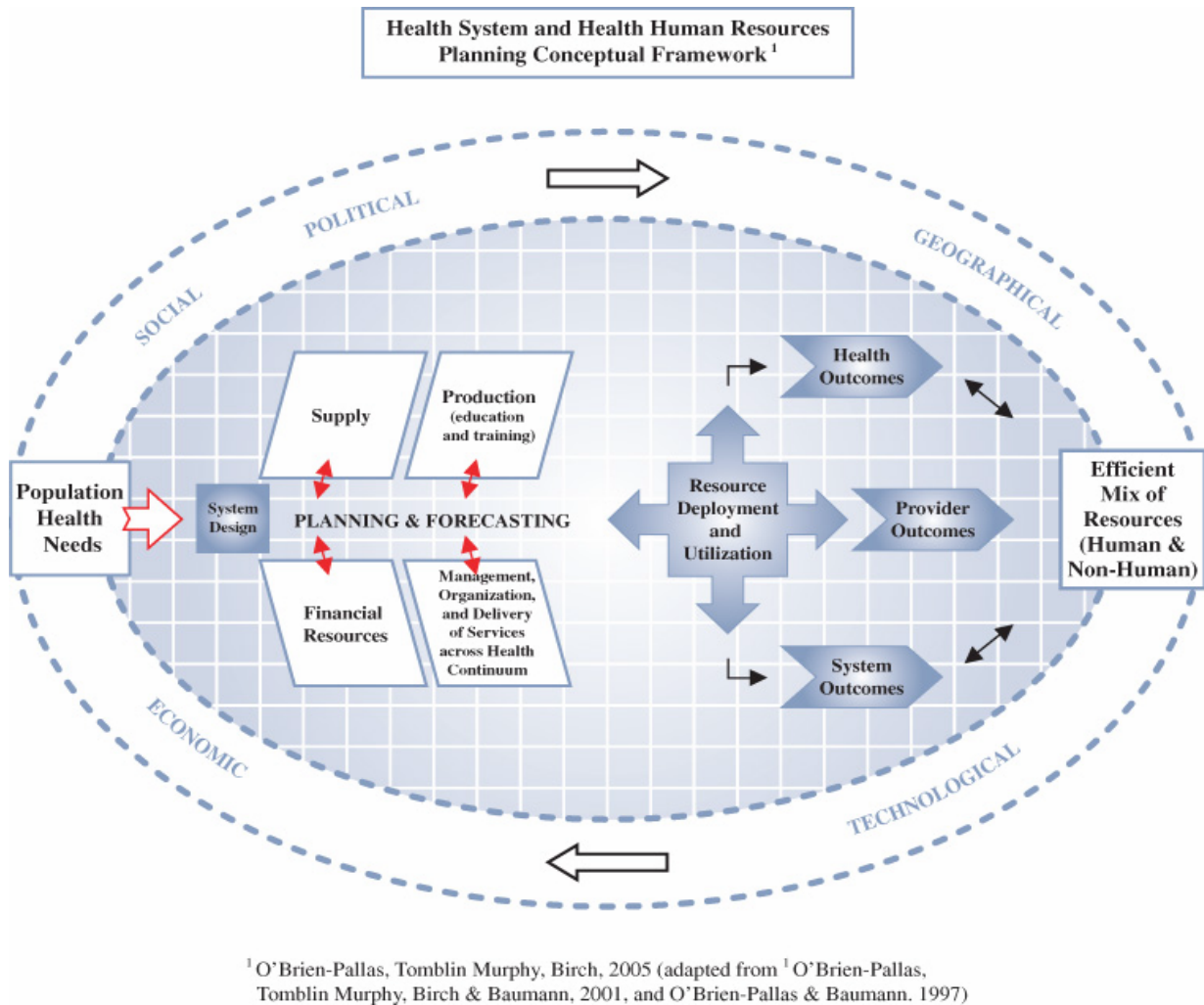


Figure 1: Health System and Health Human Resources Planning Conceptual Framework.

There are a number of key features associated with this framework:

1. The identified need for health care services is based on scientific evidence that those services are effective in improving health status or preventing its deterioration at a population level;
2. Requirements for HHR are derived from the need for health care services that those human resources produce;
3. Health care services are the product of health care inputs that include both human and non-human resources;
4. The production of health care services and the use of HHR in the production of those services take place in a defined social, cultural, economic and political environment;
5. The capacity of training programmes is just one of many policy levers available to policy makers to respond to projected gaps between future HHR requirements and supply.

Traditional approaches to determine the required number of health care providers have focused primarily on the supply side of the HHR equation (existing supply, distribution and production) and the predominant use of provider to population ratios in planning exercises. Typically, this approach estimated the required number of providers based on a weighted average of different age-sex groups in the population irrespective of any variations in health needs within population subgroups and changes in productivity among provider groups. Provider to population ratios are, in essence, a crude (and often inaccurate) method for estimating HHR requirements. Using provider to population ratios as a mean of HHR planning for First Nations Inuit & Métis communities would be inappropriate. Factors such as geography, sparse population density and unique service delivery challenges render provider to population ratios an inadequate method of HHR planning.

In contrast, a needs-based approach to HHR planning estimates the health services required to meet the health needs of the population and then translates this into the required roles or competencies and numbers of health providers to deliver this service. This approach utilizes two general sets of variables in the planning process: supply and productivity measures of health providers and population health need measures.

Supply and productivity measures of health providers include an analysis of a combination of variables including a determination of the available stock of providers (supply) and their level of activity/productivity in a given setting (including scope of practice and efficiency). See Table One below.

Table One Provider Supply and Requirements	
Variable	Key Questions Addressed ⁸
Provider Supply	<p>This part of the analytical framework addresses the following question: ‘How many providers are available to deliver health care services to the population?’ Supply can be seen as the ‘outcome’ of two broad determinants (1) the <i>stock</i> of individuals, representing the number of providers in each age and sex group who are potentially available to provide health care services, and (2) the <i>flow</i> of services generated from the stock, representing the quantity of service output (e.g., time spent in the production of services). The flow of activities depends on (a) the proportion of the current stock participating in the provision of health care (i.e., the participation rate) and (b) the quantity of time devoted to service provision of those who do participate in the provision of health care (i.e., the activity rate). Both participation and activity rates represent policy levers for HHR policy makers and, hence, alternative or complementary approaches for changing provider supply.</p> <p>In addition to changes in the flow of services, the size of the</p>

	<p>stock changes over time due to new entrants to the stock (inflows of providers from other regions and other countries together with new graduates within the region) and those leaving the stock (outflows of providers to other regions and other countries, retirements and deaths among providers). Also, because education/training (the production of new providers) are generally separated from the management and regulation of providers (the use of existing providers) in terms of policy responsibilities, provider supply can be seen as the combination of two components - training of new providers and management of existing providers.</p>
<p>Provider Requirements</p>	<p>This part of the analytical framework addresses the following question: ‘How many providers are required to ensure a sufficient ‘flow’ of health care services to meet the needs of the population?’</p> <p>In this way requirements can be seen as the ‘outcome’ of four broad determinants - the size and demographic mix of the population (demography), the levels of risks to health and morbidity in the population (epidemiology), the services deemed appropriate to address the levels of risks to health and morbidity (levels of service), and the rate of service delivery by providers (productivity). Because health care needs will differ by age and sex, the analytical framework is based on estimating the number of health care providers required to meet the health care needs of each age and sex group in the population. These estimated provider requirements are summed over all age and sex groups to estimate the total provider requirements.</p> <p>Productivity depends on a variety of factors, including the intensity of work (proportion of worked hours given to patient care), how work is organized, technological inputs, and inputs of other types of professionals.</p>

Because different providers may have different levels of activity (e.g., part-time, full-time, overtime), HHR requirements are measured as activity-adjusted providers (e.g., FTEs). The contribution of each determinant to the analytical framework is described below.

Demography: This captures the size and age distribution of the population, and changes to the distribution over time as a result of population aging, changes in migration, and birth and death rates. As the size and demographic mix of the population changes over

time the number of providers required to generate the capacity to meet the health care requirements of the population will change.

Epidemiology: An important contribution of the needs-based approach introduced in the conceptual framework is the central role played by the needs of the population in ‘driving’ provider requirements. Previous approaches to HHR planning have implicitly adopted age and sex as proxy measures of need, assuming the health status of each age group remains constant over time. This of course fails to allow for changes over time in the health care needs within age and sex subgroups of the population.

Level of service: Introducing different levels of need explicitly into the analytical framework means that some method is required for translating need into requirements for services. There are no ‘gold-standard’ ‘weights’ for this translation. Although we might expect populations with lower levels of health status to be provided with greater quantities of services, the strength of the ‘health status-service provision’ relationship is largely the result of provider discretion guided by professional guidelines and ethics and subject to the constraints imposed by prevailing budgets. Because *level of service* is a determinant of provider requirements, changes in the level of service will affect requirements for providers.

Productivity: If policies or technological improvements are identified and implemented that increase provider productivity (i.e., services produced per hour of work) then the number of providers required to satisfy service requirements falls.

The size and productivity of the pool of providers can vary over time due to a range of factors including for example, new graduates, in-migration of workers, retirement, death and out-migration and workplace factors. Population health needs measures include for example, levels of service, population epidemiology (disease prevalence and utilization patterns) and a range of demographic measures.

HHR planning models that do not account for trends in population health need and provider productivity will often overestimate the requirements for providers. This may lead to delivering a level of service that exceeds the requirements for the health care system.

4.0 Creation of a Minimum Data Set to Support Needs-Based HHR Planning for FNI&M Communities

A Minimum Data Set is, in essence, a compilation of relevant indicators and measures (with corresponding sources of data that are valid, reliable and high quality) that support longitudinal HHR planning.

A process to create a Minimum Data Set to support needs-based HHR planning for First Nations Inuit & Métis communities is outlined in the following Three Phased process.

4.1 PHASE ONE: Identification of specific indicators and measures that will comprise the Aboriginal MDS

Two basic kinds of indicators are required to support needs-based HHR planning:

1. Supply, production and productivity of HHR;
2. Epidemiological indicators - Health status indicators that reflect the burden of illness and indicators reflecting the broader determinants of health.

1. Supply, Production and Productivity of HHR ⁹

Regarding supply, production and productivity of health human resources there is a need to re-examine the CIHI recommended MDS indicators and measures and ensure they accurately reflect the cultural and geographical uniqueness of First Nations Inuit & Métis communities. In addition, First Nations Inuit & Métis communities should identify any new indicators or measures to supplement the basic data requirements to reflect the distinct character and interests of their communities.

Specifically, the factors that are important to the information-based functions of HHR management that relate to the supply of HHR include, but are not limited to: ¹⁰

- a. The number and characteristics of applicants to, and graduates of, HHR-related education programs, by geographical location and nature of practice area
- b. The number and characteristics of HHR personnel who are available, and those who are practicing;
- c. The number and characteristics of health personnel who are immigrating from other countries or who are emigrating from Canada;
- d. The number and characteristics of health personnel who are leaving the profession due to retirement, death or other factors;
- e. The employment practices of health personnel; and
- f. The productivity levels of health personnel.

The “Guidance Document for the Development of Data Sets to Support Health Human Resources Management in Canada” (February 2005) identified the following seven priority information needs to support needs-based HHR planning (See Table Two). ¹¹

Table Two Priority Information Needs to Support Needs-Based HHR Planning	
Demographics	The number and demographic characteristics of health personnel registered or licensed or who are part of the available health workforce.
Education/training	The number and characteristics of applicants and graduates of health education training programs in Canada. Regarding the education of health personnel: the number of institutions, the characteristics of each institution, the programs within each institution and the faculty employed within institutions.
Geographical Distribution	The number and characteristics of health personnel employed by geographical area.
Migration	The number and characteristics of health personnel who migrate to Canada from other countries and those who migrate between geographical locations within Canada (for example, between provinces and/or territories).
Non migration-related attrition	Attrition due to retirement, change of profession, including the number and characteristics of health personnel leaving the health workforce through various sources of attrition other than inter-provincial/territorial or international migration.
Employment/practice characteristics.	This includes the number and type of health personnel engaged in employed activity, e.g. full-time, part-time, or casual.
Productivity	This includes the output of any health human resource (for example, client/patients seen by health personnel) per unit of input (for example, earned compensation). Productivity indicators provide an understanding of the efficiency of health personnel in their delivery of health services.

In April 2007 NAHO presented a “Progress Report on First Nations, Inuit and Métis Health Human Resource Minimum Data Set and National Environmental Scan.” This presentation outlined the basic parameters for a Minimum Data Set that is specific to

FNI&M communities (See Table Three below). The identification of indicators focused primarily on supply, production and productivity.

Table Three Parameters for a Minimum Data Set	
First Nations Inuit & Métis Priority Information Areas	Canadian Priority Information Areas
Demographic characteristics of health personnel	Demographic characteristics of health personnel
Education/Training	Education/Training
Geographic Distribution	Geographic Distribution
Mobility	Migration
	Non-Migration
Workload	Productivity
Healthy Workplace	Employment/Practice Characteristics

The indicator development work that has been undertaken, while a positive first step, is incomplete and requires further refinement. The indicators related to supply, production and productivity of HHR that were identified in the April of 2007 presentation by NAHO represents a strong foundation upon which to further develop indicators.

2. Epidemiological indicators - Health status indicators that reflect the burden of illness and indicators reflecting the broader determinants of health.

The health status of a population can be measured in many different ways, but what is most important is that indicators should be specific to FNI&M culture. The second category of indicators that will need to be developed include those that reflect the burden of illness and the broader determinants of health. Health status measures should include the incidence and prevalence of both physical and mental disease (e.g. acute and chronic diseases such as cardiovascular disease, AIDS, diabetes, incidence and prevalence of addictions, etc.) as well as other health status measures that include some of the broader determinants of health or other indicators that may be culturally specific and influence the demand or need for health care. Examples of health status indicators are presented in the Recommendations section below.

It is also important to note that there are additional factors that influence the determination of HHR requirements for a particular population. These factors include, but are not limited to: ¹²

- a. The health and demographics of the population, which may influence the need for health services;
- b. The extent to which the population uses health services, by geographic location and nature of service;
- c. The volume, cost and nature of health services delivered, by geographic location; External factors (political, social, economic, etc.) that may influence the use of health services; and

- d. Client, health personnel and system outcomes by geographic location.

These factors will shape the requirements for data sources that will ultimately comprise the Minimum Data Set for the AHHRI. It is important to note that needs-based HHR planning requires access to longitudinal data, (i.e. data that is collected on a regular basis over a period of time). In the same way that the supply of health providers changes over time with migration and attrition, so too does the health needs of a community change over time. Analyzing HHR, demographic and health needs data that is collected on a regular basis over a period of time also permits trend analysis and improves the legitimacy of planning outcomes. Thus having access to data that is collected on a regular basis is of paramount importance when constructing a MDS.

4.2 PHASE TWO: Securing Data Sources

Access to valid and reliable data will form the corner stone of a First Nations Inuit & Métis MDS. Investing the time and resources to secure data sources for each identified measure will permit the kind of long term HHR planning envisioned in the Aboriginal Health Human Resource Initiative.

Each indicator and measure in the MDS will require a corresponding source (or multiple sources) of data. Once data sources are identified formal agreements with the owners of the data will need to be arranged. Agreements to access the data will need to address and/or specify:

- a. The type of data required
- b. The level of access to the data (aggregate or person level)
- c. Protection of privacy (including addressing informed consent issues or specifying provisions for secondary use of data for research purposes)
- d. Storage of data
- e. Hardware/software compatibility
- f. Rights to publish or disseminate data or research findings
- g. Costs
- h. Length of time period
- i. Formal acknowledgement of data sources in published reports

Formal agreements to access and utilize data may not be required in instances where the data is in the public domain. In instances where there are no data sources available to a particular indicator or measure, or in cases where data is available but not on a regular basis, then the MDS managers will need to either seek partnerships with research or data management agencies to generate the data or identify proxy measures for which data sources do exist.

While the National Environmental Scan identified organizations that collect data (and if they are willing to share this data) that may be relevant to the AHHRI MDS project, there is a further need to determine the following for each data source:

- a. Is the organization that owns the data prepared to enter into a formal agreement with NAHO to have this data included in the Aboriginal MDS?
- b. Is the data of high quality?
- c. Is the data stored and managed by software and hardware that is compatible with other data that will be included in the MDS?
- d. Is the data complete and comprehensive?

This is an important consideration given that the National Environmental Scan found the following:

As such, it is important to identify those organizations that have, in the past, entered relationships or partnerships with other organizations that collect health human resource information and to determine if they share the information that they have amassed.

Among respondents who could offer an answer, 91 percent indicated they have been a partner in health human resources research. Almost 61 percent indicated they have undertaken this type of research in the past. Seventy-six percent of respondents indicated they have had relationships with other organizations that have collected health human resources information. In other words, they have received data collected by another organization. Just over half, however, stated they have entered relationships where they share the information they have collected with another organizations. It should be noted that almost 18 percent of all respondents indicated that they did not know the answer to this question. (p.9)

4.3 PHASE THREE: Data Storage and Management

Once data sources have been identified and formal agreements have been secured with the owners of the data there is a need to ensure the data is “clean”, stored and managed in accordance with industry standards and respecting organizational, provincial/territorial and national protection of privacy legislation and/or policies. Appropriate technologies for storing and securing data should be implemented. Appropriate policies and technological capacity regulating the creation and management of data warehousing infrastructure should be developed. If NAHO is the repository for the data (in the form of a central database) then NAHO should create Data Access Guidelines (in addition to specifying a Privacy Policy) to regulate access to the central MDS HHR database.

All data sources should be reviewed to ensure the information is valid, reliable and should be assessed for software and hardware compatibility.

5.0 NAHO Regional and National Environmental Scans

Five regional and national level environmental scans were included in this review (See Table Four – First Nations Inuit & Métis HHR Environmental Scans)

Table Four First Nations Inuit & Métis HHR Environmental Scans	
Title	Geographic Scope
NAHO (2007) National Environmental Scan: Comprehensive Survey of the Aboriginal Health Human Resource Landscape. Prepared for National Aboriginal Health Organization: Policy Communications Unit by Philip Bird.	National
The Atlantic Policy Congress of First Nations Chiefs Secretariat Inc. (May 31, 2007) An Environmental Scan for the Aboriginal Health Human Resources Initiative: Final Report. Prepared by: Horizons Community Development Associates Inc.	Nova Scotia Prince Edward Island Newfoundland and Labrador New Brunswick
Smylie, Janet; Indigenous Peoples' Health Research Centre Environmental Scan of the First Nations' Health Sector Labour Force On Reserve in Saskatchewan; June 19, 2006.	Saskatchewan
First Nations Inuit Health Branch (October 2006). Literature Review of Aboriginal Health Care Worker Needs. Prepared by: Pommen Group: Management Consultants.	Alberta
Millennium (December 2006). Territorial Scan of Aboriginal Health Workers.	Northwest Territories Nunavut Yukon

The environmental scans were generally consistent in approach and in the presentation of findings and provided valuable insight into the HHR and health related challenges and opportunities facing First Nations Inuit & Métis communities in Canada.

The “National Environmental Scan: Comprehensive Survey of the Aboriginal Health Human Resource Landscape” (2007) serves as the main source of information regarding available sources of data to support the development of an MDS. There were some methodological challenges associated with the survey. The survey was posted on the Internet and potential respondents were invited to complete the survey on-line. The survey achieved a 65 percent response rate (a total of 28 responses were received). Data

was collected between April 13 and June 21, 2007. The survey asked questions to determine the following:

1. Organizations that collected and manage health human resource data;
2. The nature of the data;
3. How the data is managed;
4. Who has access to the data; and
5. What organizations, associations, and/or institutions are willing to collaborate with NAHO to develop a minimum data set about First Nation, Inuit, and Métis health professionals and health care workers?

One of the main objectives of the survey was to determine whether organizations were collecting information that was specific to First Nations Inuit & Métis peoples that could be use in needs-based HHR planning for FNI&M communities. The following excerpt outlines the Scan's general findings in this regard:

“When asked if specific information about First Nations Inuit & Métis ancestry was included in their data sets, 52 percent of respondents who offered an answer indicated that it was collected. Among those who collected information about health professionals, paraprofessionals, and/or students, 54 percent indicated they identify individuals with First Nations Inuit & Métis ancestry. When asked about the specific information their organization collects, 82 percent of the respondents indicated they collect basic contact information such as the person's name, address, phone number”. p. 5

The low response rate to the Environmental Scan in general, and the limited number of responses to the questions regarding data collection about First Nations Inuit & Métis ancestry strongly suggest there is further work to be done in the areas of building capacity in collecting and managing data related to needs-based HHR planning for First Nations Inuit & Métis communities.

The National Scan also highlighted some of the challenges associated with compiling data that focuses on culturally specific patterns of service delivery or healing practices. For example in the analysis of the results, the author noted that, typically, organizations did not collect data on First Nations Inuit & Métis healing practitioners, for example, First Nations Inuit & Métis Elders and traditional healers were identified by only 20 percent of the respondents and First Nations Inuit & Métis midwives were identified by 15 percent of the respondents. No organization or institution identified First Nations Inuit & Métis health ombudsmen.

Key findings from the scans document both strengths and weakness in terms of data available to support the development of an First Nations Inuit & Métis Minimum Data Set and engage in needs-based HHR planning, including:

1. Limited or sporadic availability of high quality, comparable data on First Nations Inuit & Métis health human resources (including supply, production and health needs across Canada);
2. While many FNI&M communities have conducted thorough assessments of their health and HHR needs, these studies are sporadic, local in focus and time specific (i.e. they represent a “snapshot” in time and are not applicable to longitudinal planning needs);
3. Many of the ad hoc HHR or health needs studies provide valuable information regarding the context of delivering health services in First Nations Inuit & Métis communities;
4. There are few HHR studies or data sources that span both the health service delivery (supply and productivity) and production of HHR (education, immigration) and health status of FNI&M communities;
5. There are inconsistencies regarding the documentation of First Nations Inuit & Métis specific HHR data (supply, production (education/migration) and productivity) in databases and information systems across Canada;
6. While the environmental scans provide an overview of issues and data sources related to HHR planning in jurisdictions they provide only a “snapshot” of the current HHR environment.
7. Data sources identified in the regional and national scans need to be evaluated on an individual basis (once indicators have been identified) to ensure they fulfill the requirements to include in the MDS.
8. The generally low response rate to the national environmental scan makes it difficult to assess the full breadth of data sources available.

In short, the environmental scans alone, do not provide the level of detail, or breadth of data sources, required to construct a Minimum Data Set consistent with the guidelines established by Tomblin Murphy & O’Brien-Pallas (February 2005).” Guidance Document for the Development of Data Sets to Support Health Human Resources Management in Canada.”

6.0 Summary

While the national and regional environmental scans provide valuable insight into the issues surrounding health human resources in First Nations Inuit & Métis communities and potential sources of data to support a Minimum Data Set, the environmental scans do not provide sufficient information to support the development of an MDS to support needs-based HHR planning for First Nations Inuit & Métis communities.

In the first instance, there is a need to first, clearly articulate the parameters of the MDS, including all indicators and measures of health needs, supply, productivity, health status and determinants of health and other issues relevant to FNI&M culture and communities.

Information that has been collected in the form of databases and ad hoc studies shed important light on the circumstances and context for HHR planning issues opportunities in First Nations Inuit & Métis communities. The information contained in the

Environmental Scans can inform the development of an MDS for First Nations Inuit & Métis communities, but in their current form they do not provide sufficient information to form the basis for the MDS without further development.

7.0 Recommendations:

Preamble: The national and regional environmental scans, while providing a good foundation upon which to build indicators, do not provide the full breadth of indicators (and data sources) to fulfill requirement for an MDS.

Constructing a Minimum Data Set requires, in the first instance, the identification of indicators and measures that document two distinct areas of interest, first: supply, production and productivity of HHR, and second, health needs in communities. Data sources must be identified for each indicator and must be valid, reliable, accessible, comparable and longitudinal.

While the NAHO presentation of April 2007¹³ outlining indicators represents a significant step forward in identifying MDS indicators there is a need to refine these indicators so they are quantifiable, measurable and specific and culturally appropriate to First Nations Inuit & Métis Communities.

There is also a need in some instances to determine methods of collecting data or conducting research where existing data sources do not exist (for example ad hoc studies must be conducted to collect relevant information.) For example, in the NAHO presentation on MDS the following indicators were identified as requiring further clarification:

- **Geography** – defining “levels of isolation”
- **Health Professionals** –
 - Defining a method of accounting for non-registered health professionals
 - Determining why health professionals are no longer practicing within their professions (e.g., coping skills, stress, safety, maternity leave, parental leave, wages, professional support, etc.)? How many times the individual has moved in and out of the profession?
 - The attrition rate of health personnel going to administrative positions.
 - Identifying mentors and retired workers as providers of care.
- **Education**
 - Identifying health career awareness at primary/high school.
 - Identify incentives (supports at school) and barriers to entry starting in primary school.
- **Cultural competency and safety**
 - Identifying information about non-Aboriginals providing services within the community. For example, were they provided with mentorship/support experience prior to their work in the

- community? Have they been exposed to traditional knowledge and healing practices?
- More work needs to be done to include indicators and data elements about primary, secondary and post-secondary education.
- **Work Environments**
 - Identifying indicators about the work place environment (e.g., Do you have the equipment to do your job? Do you have access to the technology to do your job? Do you feel safe at work? Do you receive support/guidance needed from your supervisor/manager? Do you have a support network at work? Do you have access to the information you need to do your job?).
 - Need to consider questions to address the capacity of the community to employ graduates.
 - Need to add an indicator and data elements for work other than job (e.g., board, voluntary, research, AHHRI, etc.).

The indicators and measures for a Minimum data Set as outlined in the CIHI document entitled, “Guidance Document for the Development of Data Sets to Support Health Human Resources Management in Canada” (2005) should form the starting point for discussions.

Planning for health human resources based on the health needs of populations also requires identification of indicators that highlight the health status of Aboriginal communities. Examples of indicators of health status measures that may be of interest to Aboriginal communities are listed in Table 5 below.

Table 5 Examples of Aboriginal-Specific Health Status Indicators ¹⁴	
Indicators of Aboriginal Health and Well-Being	<ul style="list-style-type: none"> • Self-rated health • Life expectancy • Chronic conditions • Infant mortality • Potential Years of Life Lost • Mortality rate
Healthy Child Development Learning Opportunities Healthy Choices Healthy Connections	<ul style="list-style-type: none"> • Low birth weight • Pre-term births • Post neonatal mortality • Teen pregnancy rate • School completion rate • Foundation Skills Assessment scores • Average GPA • Smoking rate • Binge drinking • Family connectedness • School connectedness

<p>Housing and Infrastructure Air Water Environmental Change</p>	<ul style="list-style-type: none"> • Housing quality • Housing need • Community services • Exposure to second-hand smoke • Drinking water quality • Mercury levels in food or water sources • Perceived progress in relationship with the land (e.g. land claims)
<p>Employment Income Educational Attainment Participation and Social Integration</p>	<ul style="list-style-type: none"> • Employment rate • Employment to population ratio • Average employment income • Income self-sufficiency • Children in low-income families • High school graduation • Post-secondary graduation • Disparity in socioeconomic conditions between Aboriginal and non-Aboriginal population • Community control • Children in care • Youth in justice institutions
<p>Accessibility - Doing the Right Things Right Culturally-Appropriate Services</p>	<ul style="list-style-type: none"> • Childhood immunization • Pap smears • Screening mammography • Use of hospital, residential care, and home support services • Preventable admissions • Children's dental procedures • Prescriptions for tranquilizers/ sleeping pills and anti-depressants • Antibiotic prescribing • Community follow-up after hospitalization • Aboriginal representation in health professions
<p>Non-Communicable Disease Communicable Disease Injuries</p>	<ul style="list-style-type: none"> • Diabetes • Arthritis prevalence/hospitalizations • Disability rate • Smoking-attributable deaths • Alcohol-related deaths • HIV/AIDS deaths • Tuberculosis rate • Unintentional injury deaths • Suicide deaths • Illicit drug deaths

For each indicator listed in Table 4 regional or national level data sources must be identified, as well as a supporting rationale to include the indicator in the MDS (either on a regional or national level). Sample indicators that have been validated are described below in Tables 6, 7 and 8). Once the indicator has been validated (clear rationale and an identified source of data) the indicator can be included in the Minimum Data Set.

Table 6 Sample Indicator ¹⁵ Low Birth Weight	
Definition	Proportion of live births with a birth weight less than 2500 grams.
Source	B.C. Vital Statistics Agency.
Rationale	The low birth weight rate is a well-established measure of child health. Babies born with a low birth weight are more likely to die during the first year of life. They are also more likely to have problems such as birth defects, illnesses, and poor health throughout childhood, and learning difficulties. Status Indian babies have a slightly higher rate of low birth weight than other babies born in B.C. (5.2 per cent vs. 4.7 per cent). North American native populations have a higher average birth weight than non-Natives, and “high birth weight” babies are more common. The exact causes and the health implications of this difference in birth weight distribution are not known. A genetic disposition to heavier babies, higher rates of glucose intolerance during pregnancy, and nutritional differences are some of the explanations that have been proposed.

Table 7 Sample Indicator ¹⁶ Children and Youth in Care	
Definition	(a) Aboriginal children as a proportion of all children and youth in care (b) estimated proportion of all Aboriginal children and youth who are in care. “In care” means in the care of child welfare authorities, including children in care delegated to Aboriginal agencies. Population estimates are based on responses to the 1996 Census “ethnicity“ questions and annual growth rates in the Status Indian population for subsequent years.
Source	B.C. Ministry of Children and Family Development. 1996 Census. Status Indian population estimates prepared by B.C. Vital Statistics Agency. BC STATS.
Rationale	A disproportionate number of Aboriginal children and youth are in government care, especially in the younger age groups. Aboriginal children comprise about 40 per cent of B.C.’s children in care, and everyone agrees that this number is too high. As more Aboriginal agencies assume responsibility for children in care, the number in care may go up, at least in the short term. Ultimately, if communities are stronger, families will be stronger, and so there will be fewer children and youth in care.

Table 8 Sample Indicator ¹⁷ Drinking Water Quality	
Definition	The number and proportion of households on reserve with water supplies that satisfy the health-related requirements of the Guidelines for Canadian Drinking Water Quality.
Source	Housing and Infrastructure Assets Summary Reports, Indian and Northern Affairs Canada.
Rationale	Clean drinking water is a basic requirement for health. The proportion of water systems meeting Canadian guidelines provides an indication as to the quality and safety of drinking water supplies. The most recent data (1998-99) show that 82 per cent of housing units on B.C. reserves had water supplies that met the health-related requirements of the Guidelines for Canadian Drinking Water Quality. Comparable data are not available for the water systems under provincial jurisdiction.

It is difficult to examine the need for health services without acknowledging that the health of a community is influenced by determinants other than the health care system. Determinants of health include for example, access to clean drinking water, access to culturally appropriate education, access to sources of income, community support networks, clean living environments, safe and affordable housing, etc. A MDS that is based on the health needs of the population must take into consideration the health status of the community (physical and mental health as well as non-health system determinants of health and focus on culturally specific patterns of service delivery or healing practices.

Therefore it is recommended that:

- 1. A consensus conference (or similar forum) with participation from appropriate stakeholders should be convened to identify a definitive list of indicators and measures that will form the basis for a Minimum Data Set to facilitate HHR planning in First Nations Inuit & Métis communities.**
- 2. Following the identification of indicators that will comprise the Aboriginal MDS to support needs-based HHR planning data, sources should be identified and evaluated for quality, compatibility and comprehensiveness.**
- 3. Once data sources have been evaluated for quality, compatibility and comprehensiveness NAHO should then negotiate with the institutional owners of the data to access data while respecting the organization's privacy policy.**
- 4. Following the identification of appropriate data sources and following negotiated agreements on protection of privacy and data access issues,**

- software and hardware compatibility, NAHO should establish an MDS database to support HHR planning in First Nations Inuit & Métis communities.**
- 5. NAHO should establish appropriate policies regarding data access and database management policies based on industry practices should be developed.**

[Recommendations 2, 3, 4, and 5 can be implemented concurrently.]

Appendix One
Minimum Data Sets
Priority Information Needs, Indicators and the Data Elements¹⁸

<p>1. Demographics of Health Personnel</p> <p>The number and demographic characteristics of health personnel who are registered or licensed, or who are otherwise part of the available health workforce.</p>	<ul style="list-style-type: none"> - Number of health personnel by personnel type per 10,000 population.* - Distribution of health personnel by personnel type and sex (percentage of health personnel that are male or female). - Distribution of health personnel by personnel type and by five-year age groups. <p>* This requires population data at the desired level of analysis (for example, sub-provincial/territorial, provincial/territorial, national). While generating personnel per 10,000 population ratios for all provinces and territories provides a basis for comparative reporting at the provincial level, when making decisions about the most appropriate population denominator, the following must be considered: the numerical size of the underlying population within a given geographic location (for example, personnel per 10,000 population will not account for varying health personnel resources in northern, rural and</p>	<p>Health care personnel</p> <ul style="list-style-type: none"> • National unique identifier or jurisdictional unique identifier • Personnel type • Sex • Year of birth <p>Note: An attempt was made to avoid repeating elements that are primarily associated with other proposed information needs.</p>
--	---	--

	<p>remote communities and often magnifies differences for the northern territories); the numerical size of a given health personnel group (for example, developing rates per 10,000 population for numerically smaller professions may be inappropriate); selecting a more relevant population denominator than simply the general population (for example, for midwives, a useful population denominator may be the population of women of childbearing years); and opportunities to use standardized rates in which personnel and population counts are adjusted based on the age and/or sex.</p>	
<p>2. Education/Training</p> <p>The number and characteristics of applicants to, and graduates of, health education/training programs that may potentially enter the workforce. In addition: the number of institutions, the characteristics of each institution, the programs within each institution and the faculty employed within institutions.</p>	<ul style="list-style-type: none"> - Ratio of qualified applicants to entrants within a given year. - Ratio of entrants to graduates within a given year. - Ratio of new graduates to number of health personnel in the current workforce. - Percentage of all new graduates who enter the workforce within one year of graduation. - Percentage of all new graduates who continue with further education (i.e. 	<p>Health personnel:</p> <p>Personnel entry to and exit from education/training (prior to entering the workforce):</p> <ul style="list-style-type: none"> • National student/trainee unique identifier • Year of birth • Sex • Postal code of residence at application to program • Province/territory or country of residence at application to program • Highest level of education at application to program • Postsecondary institution unique identifier • Education/training

	<p>after entry/initial practice education) within one year of graduation from health personnel related education programs, by education/program type and credential sought.</p> <p>- Average time to complete program.</p> <p>- Distribution of health personnel by place of education/training related clinical placement and province/territory or country of education / training-related clinical placement.</p> <p>- Distribution of health personnel by personnel type and highest level of health personnel specific education.</p> <p>- Distribution of health personnel by province / territory or country of graduation.</p>	<p>program type</p> <ul style="list-style-type: none"> • Expected date of completion • Date of entry (month, year) • Date of graduation (month, year) • Credential conferred upon graduation • Reason for failure to complete • Place of education/training related clinical placement (e.g. hospital, community, private) • Province/territory or country of education / training-related clinical placement <p>Personnel entry to and exit from education/training (after entry to the workforce)</p> <ul style="list-style-type: none"> • Entry/initial practice Education – personnel-type specific • Highest level of education. personnel-type specific • Postsecondary institution unique identifier • Certified area of specialized training - personnel-type specific • Source of certification • Province/territory of initial personnel-type specific registration in Canada • Year of initial personnel-type specific registration in Canada • Other education/training. Non-health personnel
--	--	--

	<p>Distribution of faculty instructors by five-year age group.</p>	<p>specific</p> <p>Institution:</p> <p>Health personnel education/training institution</p> <ul style="list-style-type: none"> • Postsecondary institution unique identifier • Education/training program type • Postal code of education/training program site • Level of credential offered • Available seats • Applicants • Entrants • Graduates <p>Faculty:</p> <p>Personnel education/training Faculty</p> <ul style="list-style-type: none"> • National postsecondary institution faculty personnel unique identifier • Year of birth • Sex • Postsecondary institution unique identifier • Education/training program type • Highest educational designation • Faculty primary area of Concentration <p>Note: An attempt was made to avoid repeating elements that are primarily associated with other proposed information needs.</p>
--	--	---

<p>3. Geographic Distribution</p> <p>The number and characteristics of health personnel by geographical distribution.</p>	<p>- Personnel-to-population ratio: number of health personnel per 10,000 population* (by Province / territory and sub-provincial / territorial area).</p> <p>- Number of health personnel employed in urban areas, per 10,000 population.*</p> <p>- Number of health personnel employed in rural areas, per 10,000 population.*</p> <p>* Requires population data at the desired level of analysis (for example, Sub-provincial/territorial, provincial/territorial, national). While generating personnel per 10,000 population ratios for all provinces and territories provides a basis for comparative reporting at the provincial level, when making decisions about the most appropriate population denominator, the following must be considered: the numerical size of the underlying population within a given geographic location (for example, personnel per 10,000 population will not account for varying health personnel resources in northern, rural and remote communities and often magnifies differences</p>	<p>Health personnel:</p> <ul style="list-style-type: none"> • National unique identifier or jurisdictional unique identifier • Personnel type • Current province/territory or country of residence • Primary employment. province/territory or country • Primary employment postal code • Secondary employment. province/territory or country • Secondary employment. postal code • Current province/territory of Registration <p>Note: Obtaining the six-digit postal code was identified as a priority in order to examine geographic distribution at all of the desired units of analysis (i.e. national, provincial/territorial and sub- provincial/territorial area). There is currently no singular gold standard for the geographical concepts of urban. and rural.. The collection of full postal codes permits multiple definitions for geographical constructs not easily defined or in a state of development and provides maximum flexibility in responding to information needs, as health care boundaries (e.g. health regions) continually</p>
--	--	---

	<p>for the northern territories); the numerical size of a given health personnel group (for example, developing rates per 10,000 population for numerically smaller professions may be inappropriate); selecting a more relevant population denominator than simply the general population (for example, for midwives, a useful population denominator may be the population of women of childbearing years); and opportunities to use standardized rates in which personnel and population counts are adjusted based on the age and/or sex.</p>	<p>change. An attempt was made to avoid repeating elements that are primarily associated with other proposed information needs. In the absence of national unique identifiers, elements associated with geography and migrations are closely connected, necessitating inclusion under both areas.</p>
<p>4. Migration The number and characteristics of health personnel who immigrate from other countries and those who emigrate from Canada to other countries, as well as those who migrate between geographical locations within Canada (for example, between provinces and territories).</p>	<p>Percentage of health personnel workforce who move between provinces / territories in Canada annually.</p> <p>Percentage of the health personnel workforce who join the Canadian workforce annually as a result of immigration.</p> <p>Percentage of health care workforce who leave the workforce annually as a result of emigration from Canada.</p> <p>Annual net inter-provincial migration rate, by personnel type and province/territory.</p> <p>Annual net international</p>	<p>Health care personnel:</p> <ul style="list-style-type: none"> • National unique identifier or jurisdictional unique identifier • Personnel type • Previous province/territory or country of residence • Previous province/territory or country of employment • Previous postal code of employment • Current province/territory or country of residence • Primary employment. province/territory or country • Primary employment. postal code • Secondary employment. province/territory or

	<p>migration rate, by personnel type and province/territory.</p>	<p>country</p> <ul style="list-style-type: none"> • Secondary employment. postal code • Province/territory of initial registration in Canada • Current province/territory of Registration • Previous registered activity status • Current registered activity Status <p>Note: Monitoring migration patterns (all sources) is hampered and made much more complex due to the absence of a national unique personnel identifier. An attempt was made to avoid repeating elements that are primarily associated with other proposed information needs. In the absence of national unique identifiers, elements associated with geography and migrations are closely connected, necessitating inclusion under both areas.</p>
<p>5. Non Migration-Related Attrition</p> <p>The number and characteristics of health personnel leaving the health workforce for various reasons other than migration (retirement, change of profession, etc.).</p>	<p>icators Data Elements</p> <p>Percentage of losses to the health personnel workforce due to non migration-related attrition (by geographical location and personnel type).</p> <p>Percentage of losses to the health personnel workforce due to specific reasons for non migration-related attrition.</p> <p>Average duration of departure (for select types</p>	<p>Health care personnel:</p> <ul style="list-style-type: none"> • National unique identifier or jurisdictional unique identifier • Personnel type • Current registered activity status • Previous registered activity status • Previous employment. duration (in months) • Previous employment. reason for leaving

	<p>of attrition, such as parental leave or education).</p> <p>Annual net attrition rate (non migration-related, by personnel type, type of attrition, and province / territory).</p>	<p>Note: The reason for non migration related attrition could be further developed to include more specific categories for measurement (retirement, parental leave, continuing education, etc.), depending on which areas warrant individual attention. An attempt was made to avoid repeating elements that are primarily associated with other proposed information needs.</p>
<p>6. Employment/Practice Characteristics The number of and nature of health personnel engaged in employed activity.</p>	<p>Percentage of the registered/licensed workforce currently employed in their specific profession (by profession, by sector, by age, by gender).</p> <p>Percentage of the registered/licensed workforce not currently employed in their specific profession (by profession, by sector, by age, by gender).</p> <p>Ratio of health personnel working full-time to health personnel working part-time.</p> <p>Proportion of employed health personnel by:</p> <ul style="list-style-type: none"> • Place of work (for example, hospital or community) • Area of responsibility (for example, direct care or 	<p>Health personnel</p> <ul style="list-style-type: none"> • National unique identifier or jurisdictional unique identifier • Personnel type • Certified area of specialized Training personnel-type specific • Source of certification • Current registration status • Current province/territory of registration • Previous registered activity status • Current registered activity status • Other provinces/territories or countries of registration • Primary employment. employment/practice status • Primary employment. preferred employment / practice status • Primary employment place of work • Primary employment area of responsibility

	<p>administration)</p> <ul style="list-style-type: none"> • Position (for example, manager, direct care personnel or researcher) <p>Percentage of health personnel with multiple employers.</p> <p>Percentage of health personnel with certified specialized training.</p>	<ul style="list-style-type: none"> • Primary employment. position • Primary employment. duration of service • Secondary employment. same elements as for primary employment • All employment more than two distinct employers? <p>Note: An attempt was made to avoid repeating elements that are primarily associated with other proposed information needs.</p>
<p>7. Productivity The output of any health human resource (for example, clients/patients seen by health personnel) per unit of input (for example, earned compensation).</p> <p>Comment: Productivity indicators are complex to measure. During the consultation, it was recognized that this subject area requires future research. The indicators identified provide a useful starting point.</p>	<p>The proportion of health personnel working beyond some measure of maximum capacity.* Worked hours/activity statistics.* Earned compensation / activity statistics.*</p> <p>*Note: The concepts of maximum capacity and/or activity statistics are not consistently defined for all types of health care providers. For example, research in these areas has been more prevalent for physicians and nurses. Therefore, it must be recognized that this may be an area that requires further customization based on the type of health care professional.</p>	<ul style="list-style-type: none"> • National unique identifier or jurisdictional unique identifier • Personnel type <p>Output elements</p> <ul style="list-style-type: none"> • Activity statistics (patient days, visits, exams, procedures, attendance days, workload units, etc.) <p>Input elements</p> <ul style="list-style-type: none"> • Earned compensation • Worked hours <p>Please note: The data elements required for productivity indicators are dependent on the type of productivity measure of interest.</p>

-
- ¹ NAHO (2007) National Environmental Scan: Comprehensive Survey of the First Nations Inuit & Métis Health Human Resource Landscape. Prepared for National Aboriginal Health Organization: Policy Communications Unit by Philip Bird.
- ² The Atlantic Policy Congress of First Nations Chiefs Secretariat Inc. (May 31, 2007) An Environmental Scan for the Aboriginal Health Human Resources Initiative: Final Report. Prepared by: Horizons Community Development Associates Inc.
- ³ First Nations Inuit Health Branch (October 2006). Literature Review of Aboriginal Health Care Worker Needs. Prepared by: Pommen Group: Management Consultants.
- ⁴ Millennium (December 2006). Territorial Scan of Aboriginal Health Workers.
- ⁵ Smylie, Janet; Indigenous Peoples' Health Research Centre Environmental Scan of the First Nations' Health Sector Labour Force On Reserve in Saskatchewan; June 19, 2006.
- ⁶ Source: A Framework for Collaborative Pan-Canadian Health Human Resources Planning Prepared by the HHR Planning Subcommittee of the Advisory Committee on Health Delivery and Human Resources (ACHDHR). September 2000, Revised March 2007
- ⁷ Aboriginal Health Human Resources Initiative Research Plan 2007-2010 (DRAFT) (July 2007). Prepared for First Nations and Inuit Health Branch and Public Health Directorate by Raymond Obomsawin.
- ⁸ Birch, S., Kephart, G., Tomblin Murphy, G., Alder, R. & MacKenzie, A. (January 2007). "Human resources planning and the production of health: A needs-based analytical framework" *Canadian Public Policy*, XXXIII, supplement.
- ⁹ The CIHI "Guidance Document for the Development of Data Sets to Support Health Human Resources Management in Canada" (February 2005) presents a more comprehensive list of indicators and measures that should comprise the basic data measures and indicators for Minimum Data Sets (See Appendix One).
- ¹⁰ Tomblin Murphy, G & O'Brien-Pallas (February 2005). Guidance Document for the Development of Data Sets to Support Health Human Resources Management in Canada. CIHI ISBN 1-55392-584-X
- ¹¹ Tomblin Murphy, G & O'Brien-Pallas (February 2005). Guidance Document for the Development of Data Sets to Support Health Human Resources Management in Canada. CIHI ISBN 1-55392-584-X. pp. 10-12.
- ¹² Tomblin Murphy G. & O'Brien -Pallas (2005).
- ¹³ NAHO (April 20, 2007). Progress Report on First Nations, Inuit and Métis Health Human Resource Minimum Data Set and National Environmental Scan. [PowerPoint Presentation]
- ¹⁴ British Columbia. Provincial Health Officer. (2002). Report on the Health of British Columbians. Provincial Health Officer's Annual Report 2001. The Health and Well-being of Aboriginal People in British Columbia. Victoria, B.C.: Ministry of Health Planning.
- ¹⁵ Ibid p. 151.
- ¹⁶ Ibid p. 150.
- ¹⁷ Ibid p. 156.
- ¹⁸ Source: Tomblin Murphy, G & O'Brien-Pallas (February 2005). Guidance Document for the Development of Data Sets to Support Health Human Resources Management in Canada. CIHI ISBN 1-55392-584-X. pp. 13-20.