



**MIS Standards, Workload Measurement and  
Statistical Data Collection**

**Reference Guide  
for  
Medical Imaging**

**September 2012**



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# 1 INTRODUCTION

## 1.1 Purpose

The purpose of this reference guide is to educate readers regarding the Management Information Systems (MIS) Standards and their application to the discipline of medical imaging services in the Newfoundland and Labrador Health Care System.

The workload measurement system (WMS) for medical imaging services was originally developed by Health Canada. Since the formation of the MIS Group, and subsequently the Canadian Institute for Health Information (CIHI) in 1994, the WMS was incorporated into the MIS Standards. The WMS for diagnostic imaging was last redeveloped for implementation April 2002. In April 2003 the Diagnostic Imaging Schedule of Unit Values-Addendum for Specialty Pediatric Facilities was added. Since that time, due to significant technology changes and changes in practice, a complete review of the WMS was undertaken. These revisions of the WMS for the renamed medical imaging came into effect April 1, 2011. CIHI has established a maintenance process to periodically update the MIS Standards and related WMS with the most recent updates for medical imaging services.

Highlights of the revisions include:

- to be consistent with current terminology the name diagnostic imaging has been changed to medical imaging throughout the MIS Standards;
- the names of the functional centres within medical imaging have been changed to reflect current practice;
- a new picture archiving communication system (PACS) functional centre has been added as a level five functional centre under the medical imaging administration clearing account in order to track these expenses separately;
- a new multi-functional medical imaging functional centre has been added for reporting by small medical imaging facilities;
- functional centres related to medical imaging nursing have been expanded at level five and are now a minimum reporting requirement to the CMDDB;
- some of the secondary financial accounts related to medical imaging supplies have been revised to reflect current practice; and
- the medical imaging schedule of unit values has been updated based on the work of a Diagnostic Imaging Advisory Working Group. This has resulted in a full revision to some sections of the schedule of unit values (e.g. new exam list and unit values for interventional angiography) and updates to unit values only in other sections. The addendum for specialty paediatric facilities has been removed and the exams have been integrated into the general schedule of unit values.

This reference guide has been developed to assist medical imaging staff to implement the MIS Standards within their facilities, including the WMS, in accordance with the 2011 MIS Standards. Medical imaging services recording MIS data based on previous versions of the MIS Standards are expected to make necessary revisions to their data collection processes to align with the 2011 MIS Standards.

## 1.2 What are the MIS Standards?

The Standards for Management Information Systems in Canadian Health Service Organizations, *the MIS Standards*, are published by the Canadian Institute for Health Information (CIHI). The MIS Standards are the national data standard for the collection and reporting of financial and statistical information from health service organizations. Originally developed for hospitals, the MIS Standards have been expanded over the years to include all types and sizes of health organizations. The MIS Standards specify:

- what data to collect;
- how to group and process data; and
- how to analyze and use the data to support management functions such as evaluation, control, budgeting, planning and quality initiatives (turning data into information).

Core components of the MIS Standards are:

- chart of accounts;
- accounting principles and procedures;
- workload measurement systems;
- indicators;
- management applications; and
- glossary of terms.

The primary goal of the MIS Standards is to provide standardized, basic operational management information to front line managers as well as administrators throughout the health system. Implementation of the MIS Standards enables organizations to have comparable financial information and related statistics (such as workload and patient activity) for the many clinical services they provide. This data can then be used to report calculation of key indicators, providing a useful tool to measure and monitor performance. Some examples are:

- accountability reporting by managers for resource use;
- development of budgets based on meaningful workload and activity projections;
- more precise resource allocation; and
- more informed management decisions.

The MIS Standards were adopted by the Newfoundland and Labrador Department of Health and Community Services in 1992. Provincial reporting requirements were developed based on the national reporting requirements with provincial customization as required to meet local information needs.

A national MIS Technical Working Group provides CIHI with expert technical advice on the development, maintenance and effective implementation of the MIS Standards across the continuum of health service delivery. The working group is composed of provincial and territorial MIS Coordinators, with additional members from the field added at CIHI's discretion.

### 1.3 What is the Role of the Provincial MIS Committees?

The Provincial MIS Committees are discipline-specific groups that:

- make recommendations regarding implementation of the components of the MIS Standards applicable to their discipline;
- promote the use of the workload measurement systems by their discipline; and
- provide a vital link between the professions, Department of Health and Community Services (DHCS) and the Data Quality and Standards Division of the Newfoundland and Labrador Centre for Health Information (the Centre).

Currently there are 18 provincial MIS committees for the following disciplines:

- Data Quality and Reporting (*Financial & Statistical Reporting*);
- Audiology;
- Clinical Laboratory;
- Electrodiagnostic, Cardiac and Vascular Laboratories;
- Food Services Administration;
- Health Information Services ;
- Medical Imaging;
- Nursing;
- Nutrition Services;
- Occupational Therapy;
- Pastoral/Spiritual Care;
- Pharmacy;
- Physiotherapy;
- Psychology;
- Respiratory Therapy;
- Social Work;
- Speech-Language Pathology; and
- Therapeutic Recreation.

The Provincial Data Quality and Reporting MIS Committee includes finance representatives from all Regional Health Authorities, the DHCS and the Centre. It has overarching responsibility for issues related to the quantity and quality of the data collected provincially.

The Provincial Medical Imaging MIS Committee was formed in 1994 to facilitate implementation of the MIS Standards (particularly the workload measurement system) as they apply to medical imaging and medical imaging support staff within the Regional Health Authorities. The ongoing work of the Committee includes:

- provision of education sessions on workload management and statistical data collection;
- maintenance of the discipline specific reference guide;
- development and administration of audit tools;
- promotion of data quality on a provincial basis;
- development of provincial performance indicators;

- provision of feedback on changes to the MIS Standards to CIHI through the provincial MIS Standards Manager;
- facilitation of revisions to the MIS Standards pertinent to medical imaging; and
- updating provincial implementation recommendations as required.

Information about the Terms of Reference and membership for all MIS committees can be obtained from the MIS Standards staff at the Centre, also see section 11 Resources.

## **1.4 What is the Role of the Centre for Health Information?**

The Centre for Health Information was established to provide quality information to health professionals, the public and health system decision makers. Through collaboration with the health system the Centre supports: the development of standards; maintains key provincial health databases; prepares and distributes health reports; and supports and conducts applied health research and evaluations. The Centre's mandate also includes the development of a confidential and secure electronic health record for the Province.

The MIS Standards are the responsibility of the Data Quality and Standards Division within the Centre. This division is responsible for developing and promoting the use of data standards for financial, statistical, social, demographic and clinical data collection in the health sector. It is responsible for ensuring that this data is uniform in definition, measurement, collection and interpretation. Many of these standards are developed with or mirror national standards; which ensures comparability and consistency of data across the health system.



## 2 KEY CONCEPTS

### 2.1 Code Structure and Matching Principle

The MIS Chart of Accounts general coding structure consists of several code blocks (see Figure 1).

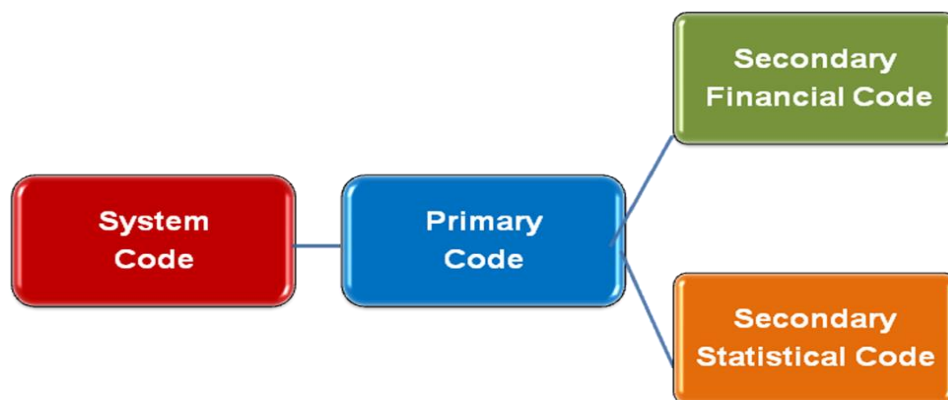


Figure 1

Using these code blocks, data can be recorded in a health service organization's financial and statistical general ledgers in a structured manner. The number of blocks used depends on the account being defined.

The first code in all account numbers is the **system code** block. It is assigned by the information systems or finance department when the Chart of Accounts is established for the health service/reporting organization and represents the highest level of data aggregation. Organizations use this code block to numerically identify a facility, site or program within the Regional Health Authority.

The **primary code** refers to a numerical name for a functional centre or accounting centre. Functional centres in the diagnostic and therapeutic functional centre framework section are discipline specific. See section 3 for further detail.

The **secondary codes** provide for the recording of either financial or statistical information and identify specific types of information about the functional centre. See sections 4 and 5 for further detail.

The creation of primary and secondary accounts should be discussed with the individual responsible for MIS reporting within an organization to ensure that accounts correctly reflect the activity that occurs and that the secondary accounts are correctly linked with the primary account or functional centre. The person responsible for coordinating MIS activities in an organization can provide additional information on the accounts used for a particular service.

The **matching principle** in accounting associates both revenues and expenses to a defined time period. The MIS Standards expand this matching principle to the reporting of statistics within the same period as the associated revenues and expenses to enable the calculation of accurate cost indicators. Within the MIS framework there are three levels of data collection and reporting:

- the **functional centre direct cost reporting** level builds on the functional centre framework, linking revenues, expenses, statistics and indicators to provide a comprehensive picture of a functional centre's resource utilization, activity and productivity. Functional centres in the diagnostic and therapeutic functional centre framework section are discipline specific;
- the **functional centre full cost reporting** level builds upon the functional centre direct cost reporting level by including the indirect costs associated with each functional centre; and
- the **service recipient reporting** level changes the focus from the functional centre to the service recipient and is often referred to as a "case costing." All financial and statistical data is linked to a specific person who receives services. This provides a comprehensive picture of how medical, nursing, therapeutic and support services are utilized in the treatment of various patient, client or groups. It can demonstrate the impact of practice patterns, programs, services and case mix groups on functional centres, service outcomes and the health service organization as a whole.

Functional centre direct cost reporting is the required level for reporting information to the Department of Health and Community Services. This means that all financial and statistical data are linked to defined functional centres and are reported in the functional centre in which the activity took place. While organizations may choose to collect information at the levels of the full cost or service recipient reporting, they will still be required to report to the Department of Health and Community Services at the functional centre level to ensure comparative data is available; however, they will have the advantage of enhanced information for internal decision making.

## 2.2 Broad Occupational Groups

The MIS Standards require all staff be assigned to one (or more) of three broad occupational groups. By doing so, the accuracy of productivity analysis is improved and the degree of overhead support associated with the service is identified.

### Management and Operational Support Personnel (MOS)

Management and operational support are the personnel, including purchased consultant services, whose primary function is the management or support of the operation of the functional centre, although at times they may carry out unit-producing activities. This group includes:

- directors;
- managers;
- supervisors;

- administrative support staff;
- clerical support staff, and
- PACS administrators.

If the manager generates workload statistics, the worked hours related to this activity must be recorded as unit-producing, not management and operational support. Failure to link workload with unit-producing worked hours will skew performance indicators.

### **Unit-Producing Personnel (UPP)**

Unit-producing personnel are those personnel whose primary function is to carry out activities that directly contribute to the fulfilment of the service mandate. UPP includes technicians, technologists and all other staff who are directly involved with service recipient care. These personnel are credited with workload units. It is recognized that UPP staff may, at times, perform activities that are not unit-producing.

### **Medical Personnel (MP)**

Medical personnel are physicians who are compensated for their professional services either on a fee-for-service or salary basis, including interns and residents.

Examples include:

- pathologists;
- psychiatrists;
- cardiologists;
- medical interns;
- medical students; and
- medical residents

*Note: The designation of a broad group category is based on function; job category and union category should not be considered. Job category is not appropriate because one job category in an institution can be management and operational support in one functional centre, yet the same job category can be unit-producing in another functional centre (e.g. clerical staff in most clinical departments are MOS but in admitting departments they are UPP). Union category does not apply as staff performing the same job is union in some organizations and non-union in others.*

## 2.3 Categorization of Earned Hours

Earned hours statistics measure the use of labour in fulfilling the mandate of the service. These hours should be recorded in the broad categories of workers as outlined in the previous section. The cost of a worked hour may vary from one period to another and from one shift to another. Overtime and standby compensation expenses are attached to the actual hours that are worked (e.g. an hour of overtime is recorded as only one earned hour but the compensation may be at time and half).

$$\text{Earned Hours} = \text{Worked Hours} + \text{Benefit Hours} + \text{Purchased Service Hours}$$

Figure 2

### Worked Hours

Worked hours are those hours that are spent carrying out the mandate of the service. Staff members are physically present and available to provide service. Worked hours include:

- regular worked hours, including paid coffee breaks;
- worked statutory holidays;
- relief staff hours, such as vacation relief and sick relief;
- overtime;
- call back hours paid and banked<sup>1</sup>; and
- attendance at on-site committee meetings and in-service education<sup>2</sup> (non-service recipient workload).

<sup>1</sup> Call back hours are a component of worked hours, recorded as the actual hours worked, rather than the minimum number of hours paid. Standby hours are not included in the count of worked hours but the associated expenses (compensation) are a component of worked salaries.

<sup>2</sup> Includes education sessions of less than ½ day; sessions greater than ½ day are considered benefit hours.

Costs are intended to link with activities and workload and therefore banked hours should be recorded in the payroll system during the period they are earned and not when they are taken.

### Benefit Hours

Benefit hours are those hours when staff members are not present but receive pay. Benefit hours include:

- statutory holidays and vacation;
- sick and bereavement leave;
- workers compensation leave;
- attendance at facility orientation, formal education and training sessions (educational leave);

- union leave with pay; and
- any other paid leave of absence.

### **Purchased Service Hours**

Purchased service hours are the hours spent carrying out the mandate of the service by personnel hired from an external agency. They have no benefit hour component. Purchased service hours are treated as worked hours. When contracting for external services, the costs related to management and support compensation, unit-producing compensation and supply costs should be differentiated within the contract.

### **Notables**

Education hours – Staff time spent in education can fall into both worked and benefit categories. The MIS Standards describe education recorded as benefit hours as formal planned events for self-development and education recorded as worked hours as informal, short duration in-service sessions. When education occurs during worked hours, non-service recipient workload is reported.

Hours spent in education sessions of greater than ½ day duration are considered to be benefit hours (education leave); time spent in sessions of less than ½ day are considered to be worked hours (non-service recipient workload). This will provide comparable information for performance indicators provincially.

Unpaid worked hours – Only paid hours can be recorded as worked hours. If staff work additional hours and record workload for that time, the comparison of worked hours to workload could demonstrate productivity greater than 100%. Submission of unpaid worked time as worked hours will have a negative effect, as performance indicators will not provide an accurate picture of the real situation. Staff working unpaid hours should record this information for internal purposes. Worked hours should be generated from the payroll system to ensure accuracy.

Volunteers – Work performed by volunteers cannot be recorded as part of the functional centres UPP workload. Sometimes this is work that would not be performed by the facility if staff had to be paid and sometimes this is necessary for the provision of services. The number of volunteer hours should be recorded and reported internally in order to gain an understanding of the contribution of volunteers to the organization. Details of the type of work will be helpful in determining the role of the volunteer in reducing costs or enhancing the quality of the service provided.

## **2.4 Categories of Service Recipient**

A service recipient is the consumer of service activities of one or more functional centres of the health service organization. Service recipients include individuals (e.g. inpatients, residents, clients), their significant others and others as defined by the health service organization.

Significant others are individuals who are acting on behalf or in the interest of, the service recipient such as parent, spouse/partner, child, legal guardian or substitute decision-maker.

Excluded from this definition are professionals such as teachers, lawyers or other health care professionals.

The MIS Standards recognize and define eight categories of service recipients. They are detailed below:

### **Inpatient**

An individual who has been officially accepted by a hospital for the purpose of receiving one or more health services; who has been assigned a bed, bassinet or incubator; and whose person identifiable data is recorded in the registration or information system of the organization and to whom a unique identifier is assigned to record and track services. This category includes: individuals receiving acute, physical rehabilitation: mental health and addiction services in a hospital setting: and those admitted to emergency while awaiting a bed on a nursing inpatient unit.

*Note: Also includes services provided by a contracted out third party provider that provides inpatient services typically provided by a hospital.*

This category excludes hospital clients receiving services of a specialty day/night care or specialty clinic nature on a nursing inpatient unit, as well as residents receiving services on a residential care unit, community hospice unit, mental health residential care unit, addiction services residential care unit and stillbirths.

### **Client Hospital**

An individual who has been officially accepted by a hospital and receives one or more health services without being admitted as an inpatient; whose person identifiable data is recorded in the registration or information system of the Regional Health Authority and to whom a unique identifier is assigned to record and track services. Examples include individuals who receive hospital-based emergency day surgery, specialty day/night care, specialty clinic, outreach, mental health, rehabilitation and independent diagnostic and therapeutic services (provincially defined).

### **Client Community**

An individual who has been officially accepted by a Regional Health Authority to receive one or more health services (other than home care), without being admitted as a resident or inpatient; and, whose person identifiable data is recorded in the registration or information system of the Regional Health Authority and to whom a unique identifier is assigned to record and track services. Examples include individuals receiving community-based mental health and/or addictions counselling, public health nursing, health promotion and wellness services, etc. (provincially defined).

### **Client Home Care**

An individual who has been officially accepted by a Regional Health Authority to receive one or more home health or home support services in his/her place of residence (e.g. private residence, assisted living residence), at an alternative health delivery location (e.g. community health office) or at a location that meets the client's needs (e.g. school, public place); and whose person identifiable data is recorded in the registration or information system of the Regional Health Authority and to whom a unique identifier is assigned to record and track services. Examples include individuals receiving home health services such as the treatment of acute conditions, maintenance of chronic health

conditions, rehabilitation to improve functional abilities, etc. and/or home support services such as homemaking, home maintenance, personal care and respite services (provincially defined).

This category excludes outreach services provided by hospital or community-services-based health professionals (e.g. home dialysis services provided by hospital staff, mental health services provided by the staff of a mental health outreach program).

### **Referred-In**

A hospital client or specimen: that has been referred for hospital services from another health service organization; and whose person-identifiable data is recorded in the registration or information system of the organization and to whom a unique identifier is assigned to record and track services. Examples include: individuals referred from a health service organization for an MRI exam; respiratory services such as hyperbaric chamber and specimens to be tested by the clinical laboratory.

*Note: This category is not used in the Newfoundland and Labrador master chart of statistical accounts.*

### **Resident**

An individual who has been officially accepted into a designated long-term care bed for the purpose of receiving one or more health services; and whose person-identifiable data is recorded in the registration or information system of the organization and to whom a unique identifier is assigned to record and track services. This category includes individuals admitted to residential facilities providing mental health or addiction services in a community setting (provincially defined).

This category excludes inpatients receiving services from hospital acute, rehabilitation, mental health and addiction services and palliative nursing units.

### **Facility/Organization/Citizen Partnership**

A facility or organization that has been officially accepted by a health service organization to receive one or more health services; and whose encounter is recorded in the registration or information system of the organization and to whom a unique identifier is assigned to record and track services; or whose encounter is recorded within a uniquely-identifiable, hard-copy file or record (rather than in the organization's registration or information system) that is used to record and track services. Examples include: restaurants; swimming pools and day care centres to which environmental health and licensing services are provided; and schools, businesses or community organizations to which consultative services are provided regarding concerns such as policy development, food safety or healthy living.

A Citizen Partnership that has been established to address an identified health issue and whose membership consists of citizens or citizen groups and other key stakeholders (e.g. health care providers, community agencies) that have knowledge of the concern and/or could influence change; and, whose encounter may be recorded within a uniquely-identifiable hard copy file or record rather than in the registration or information system of the organization. Examples include: a "farm safety coalition" that was formed to discuss ways to prevent tractor accidents amongst teenagers; a "food security coalition" organized to advance the concept of a food charter to support local agriculture

products; and a "playground partnership" established to discuss ways to build a safe new play area that will meet the needs of the children in a low-income community.

### **Service Recipients Not Uniquely Identified**

An individual who receives one or more services from a health service organization when not currently registered as an inpatient, resident, client hospital, client community, client home care, facility/organization/citizen partnership; and whose encounter is not recorded in the registration or information system of the organization and who has no unique identifier assigned to record and track services. Examples include: individuals calling hotlines for counselling services; individuals attending drop-in centres; and participants attending a general forum on smoking cessation that is aimed at educating the community as a whole.

Workload, service activity and caseload status statistics must be recorded separately for each category of service recipient. This separation supports more detailed analysis of the data, providing an understanding of different resource needs, as well as supporting external reporting requirements.



### 3 PRIMARY ACCOUNTS – FUNCTIONAL CENTRES

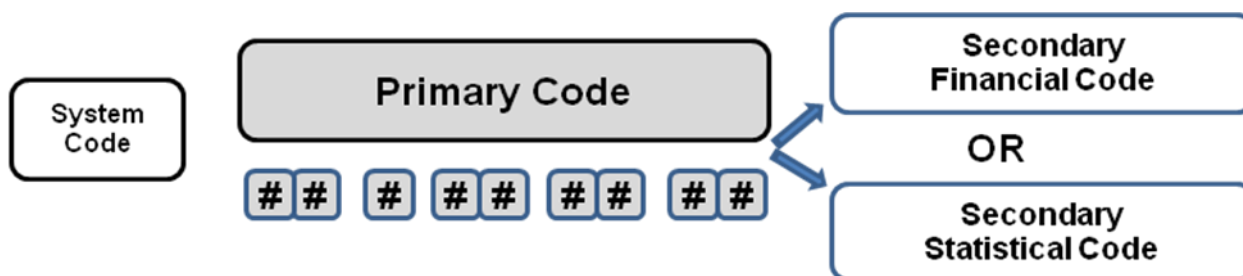


Figure 3

A key component of the MIS Standards is the functional centre framework. Functional centres are a type of primary account that forms the foundation of much of the reporting of the financial and statistical data within a health care organization. The functional centre framework is a five level hierarchical arrangement of departments or functional centres that recognizes the diversity in size and specialization of health service organizations. It provides a method for organizing information for both internal and external reporting purposes. The hierarchical arrangement allows varying sizes of health service organizations to use the structure and also permits information to be “rolled-up” or consolidated for external comparative reporting.

Each department or service that is a cost centre (has a designated budget) is assigned a primary account code. These primary account codes are typically used in conjunction with a secondary account code, to further label and define an account. This is required by a health service organization in order to track revenues, expenses and statistics associated with each department or service.

Primary account codes are made up of five segments; with a total of nine coding positions, which are structured in a specific manner (see Figure 4 below).



Figure 4

The following details the five segments of the primary account code:

#### Account Type

7

The 1<sup>st</sup> digit is the account type. The account number will always start with a 7 to indicate that this account represents a functional centre.

**Fund Type**

71 The 2<sup>nd</sup> digit indicates the primary source of funding for this activity. The finance department will designate this digit. In most cases this will be a 1 to indicate global/operating funding.

**Framework**

71 4 The 3<sup>rd</sup> digit indicates where the service was provided. Diagnostic and therapeutic services are represented by 71 4 (see Figure 5).

**Functional Centre (level 3)**

71 4 ## The 4<sup>th</sup> & 5<sup>th</sup> digits indicate the type of service provided. For diagnostic services these are primarily profession-specific functional centres. This is referred to as level three reporting.

**Functional Centre (level 4)**

71 4 ## ♦♦ The 6<sup>th</sup> & 7<sup>th</sup> digits indicate further breakdown of services for some functional centres. These accounts are sub-categories of level three accounts. This is referred to as level four reporting.

**Functional Centre (level 5)**

71 4 ## ♦♦ ★★ The last two digits of the primary account code are used to provide additional detail and may be reserved for board use in some situations. This is referred to as level five reporting.

Function centres are used to aggregate and integrate information concerning specific activities. The account assigned to a functional centre provides the reader of the information with insight into the activity that has generated the data reported. For example, the primary account number **71 4 15 20 20** tells the reader that the data is related to the mammography department specifically the diagnostic mammography service.

Refer to Section 3.1 for more information on the primary account section of the MIS Standards.

Example 1: Diagnostic mammography services are represented by account number **71 4 15 20 20** (as illustrated in Figure 5):

7	1	4	15	20	20
Account Type	Fund Type	Framework Section	FC Level 3	FC Level 4	FC Level 5
1-6 Balance Sheet Accounts <b>7 Functional Centres for Revenue, Expense and Statistics</b> 8 Accounting Centre	<b>1 Operating Fund</b> 2 Inactive 3 Inactive 4 Board Designated 5 Capital 6 Special Purpose 7 Inactive 8 Endowment Revenue – Unrestricted 9 Endowment Revenue - Restricted	1 Admin & Support 2 Nursing Inpatient/Resident 3 Ambulatory Care <b>4 Diagnostic &amp; Therapeutic</b> 5 Community & Social Services 6 Inactive 7 Research 8 Education 9 Undistributed	10 Laboratory <b>15 Medical Imaging</b> 35 Respiratory 40 Pharmacy 45 Nutrition 50 Physiotherapy 55 Occupational Therapy 60 Speech-Language Pathology & Audiology 70 Social Work 75 Psychology 80 Pastoral Care 85 Therapeutic Recreation	10 Medical Imaging Administration 18 Radiography <b>20 Mammogram</b> 24 Interventional Radiology 25 Computed Tomography 30 Ultrasound 35 Nuclear Medicine 55 Cardiac Catheterization Diagnostic Services 60 Positron Emission Tomography/Computed Tomography (PET/CT) 70 Magnetic Resonance Imaging 80 Multi-Functional Medical Imaging	10 Screening Mammography <b>20 Diagnostic Mammography</b>

Figure 5

Example 2: Echocardiography ultrasound services are represented by account number **71 4 15 30 30** (as illustrated in Figure 6):

7	1	4	15	30	30
Account Type	Fund Type	Framework Section	FC Level 3	FC Level 4	FC Level 5
1-6 Balance Sheet Accounts <b>7 Functional Centres for Revenue, Expense and Statistics</b> 8 Accounting Centre	<b>1 Operating Fund</b> 2 Inactive 3 Inactive 4 Board Designated 5 Capital 6 Special Purpose 7 Inactive 8 Endowment Revenue – Unrestricted 9 Endowment Revenue - Restricted	1 Admin & Support 2 Nursing Inpatient/Resident 3 Ambulatory Care <b>4 Diagnostic &amp; Therapeutic</b> 5 Community & Social Services 6 Inactive 7 Research 8 Education 9 Undistributed	10 Laboratory <b>15 Medical Imaging</b> 35 Respiratory 40 Pharmacy 45 Nutrition 50 Physiotherapy 55 Occupational Therapy 60 Speech-Language Pathology & Audiology 70 Social Work 75 Psychology 80 Pastoral Care 85 Therapeutic Recreation	10 Medical Imaging Administration 18 Radiography 20 Mammogram 24 Interventional Radiology 25 Computed Tomography <b>30 Ultrasound</b> 35 Nuclear Medicine 55 Cardiac Catheterization Diagnostic Services 60 Positron Emission Tomography/Computed Tomography (PET/CT) 70 Magnetic Resonance Imaging 80 Multi-Functional Medical Imaging	10 General Ultrasound <b>30 Echocardiography Ultrasound</b> 40 Obstetrical and Gynaecological Ultrasound 50 Fetal Assessment Ultrasound 60 Ophthalmological Ultrasound 90 Vascular Ultrasound

Figure 6

Individual frameworks are available for research and non-patient education. It is important that these activities are not included in the **71 4** functional centre as this will distort the performance indicators related to the provision of patient/client/resident diagnostic services.

### **Purchased/Referred-Out Diagnostic Services**

If the facility does not have a diagnostic department and purchases or refers-out all diagnostic services, a diagnostic functional centre is still required. All costs will be linked to this functional centre and all diagnostic costs will show as a purchased service. Purchased service is recorded when non-facility staff provide service to patients/residents within the facility. Referred-out service occurs when people are sent to another facility for service and the service is paid for by the sending facility. However, if there is no cost to the facility a functional centre is not created and no financial or statistical information is recorded.

### **Greater Levels of Detail**

Some organizations will elect to capture an even greater level of detail than requested for external reporting submissions. More detailed functional centres should only be established when it is reasonable and material to separate staffing, revenues, expenses and statistics. If functional centres have been created to meet internal needs, but are not valid accounts (i.e. not included in the provincial account code listing), these functional centres must be rolled up and reported under the appropriate MIS account.

### **Research (71 7)**

The research framework section is designed to capture the expenses and revenues (if any) of research services. This would include health care professionals and technicians whose mandate is research. As such, their hours and compensation are reported in this type of functional centre, not a medical imaging functional centre.

Compensation for unit-producing staff members that participates in research but is assigned to a medical imaging functional centre is reported in that diagnostic functional centre. The workload related to data collection is reported as non-service recipient activity, research and the workload related to clinical interventions is reported as service recipient activity, according to category of service recipient.

If a health care professional is involved, to a significant degree (greater than 20%) in both research and service recipient activities, the compensation for this individual should be apportioned to both of the appropriate functional centres to reflect the actual expenses. The workload and portion of earned hours that resulted in service recipient activity (patient/resident/client care) should be accounted for in the medical imaging functional centre and the workload and hours associated with the research should be accounted for in the research functional centre.

### **Education (71 8)**

The education framework section is designed to capture the expenses and revenue (if any) of dedicated staff educators. This would include staff members that provide employee orientation sessions, in-service classes or formal programs for students from educational organizations. As such, their hours and compensation are reported in this functional centre not the medical imaging functional centre.

Compensation for unit-producing staff members that provide staff education but are assigned to a medical imaging functional centre is reported in that functional centre. The workload related to education is recorded as the non-service recipient activity, teaching/in-service.

If a health care professional is involved to a significant degree (greater than 20%) in both education and service recipient activities, the compensation for this individual should be expensed to both of the appropriate functional centres to reflect the actual activity. The workload and portion of earned hours that resulted in service recipient activity should be accounted for in the medical imaging functional centre and the workload and hours associated with education should be accounted for in the education functional centre.

Unit-producing staff members that provide service recipient education should be assigned to the appropriate medical imaging functional centre. The workload related to educating service recipients is recorded as the service recipient activity.

### **Marketed Services Ancillary Operations (71 9 20 \*\*)**

Marketed services are in the nature of business enterprises and do not include the direct provision of clinical services to registered patients/residents/clients or the provision of education or research services associated with the organization. Marketed service activities may be cost recovery or profit-generating activities. Any excess of cost over revenue/recovery becomes a part of the cost per weighted case for the organization. Patient/resident/client services are never classified as a marketed service even if a profit is generated. If the service is funded outside of Department of Health and Community Services funding, the activity is designated as an “other fund” clinical service functional centre.

When services are financed by third parties that are not funding bodies, this is recorded as revenue and linked to the appropriate functional centre providing the service (e.g. WHSCC, insurance, self pay).

When services are provided for the service recipients or staff of another organization and this service is material, this is classified as a marketed service by the providing organization and a purchased service for the organization receiving the service. In particular, this would apply when a contract for the service has been negotiated and the service is continuous. All compensation and supplies must be distributed to the marketed service functional centre. It is recognized that in some situations a marketed service may be at cost. No service activity, caseload status or workload statistics are reported by the organization selling the service.

Example of marketed services:

If an organization is routinely providing services every Friday to another organization, the compensation and associated hours for the staff providing this service would be charged to the marketed service functional centre and all recoveries for this service would be credited to this functional centre.

The use of a marketed service functional centre will preserve the integrity of performance indicators for the provision of care by the organization.

### 3.1 Medical Imaging Functional Centres

The following accounts are provincial and match or mirror national primary accounts that are available for use by medical imaging services. Each organization should use only those applicable to the size and specialization of their medical imaging service. The decision to set up separate functional centres for various services should be made in consultation with the finance department staff. The 'C' noted after some accounts denotes clearing accounts from which all expenses must be cleared and assigned to the user functional centre at the end of each fiscal year. The 'P' identifies a provincial account that is mapped to an appropriate national account. 'CMDB' means this level of detail is required for national reporting to the Canadian MIS database.

71 4 05	Diagnostic and Therapeutic Nursing
71 4 05 15	Medical Imaging Nursing
71 4 05 15 05	General Medical Imaging Nursing (CMDB)
71 4 05 15 24	Interventional Radiology Nursing (CMDB)
71 4 05 15 25	Computed Tomography Nursing (CMDB)
71 4 05 15 55	Cardiac Catheterization Diagnostic Services Nursing (CMDB)
71 4 05 15 60	Positron Emission Tomography/Computed Tomography Nursing (CMDB)
71 4 05 15 65	Medical Imaging Recovery Room Nursing (CMDB)
71 4 05 15 70	Magnetic Resonance Imaging Nursing (CMDB)
71 4 15	Medical Imaging
71 4 15 10	Medical Imaging Administration (C)
71 4 15 10 10	Picture Archiving Communication System (C)
71 4 15 10 97	Medical Imaging Residual (C) (P)
71 4 15 18	Radiography (CMDB)
71 4 15 20	Mammography (CMDB)
71 4 15 20 10	Screening Mammography
71 4 15 20 20	Diagnostic Mammography
71 4 15 24	Interventional Radiology (CMDB)
71 4 15 24 10	Vascular Interventional Radiology
71 4 15 24 20	Non-Vascular Interventional Radiology
71 4 15 25	Computed Tomography (CMDB)
71 4 15 30	Ultrasound (CMDB)
71 4 15 30 10	General Ultrasound
71 4 15 30 30	Echocardiography Ultrasound
71 4 15 30 40	Obstetrical and Gynaecological Ultrasound
71 4 15 30 50	Fetal Assessment Ultrasound
71 4 15 30 60	Ophthalmological Ultrasound
71 4 15 30 90	Vascular Ultrasound
7 14 05 30 97	Diagnostic Ultrasound Residual (P)
71 4 15 35	Nuclear Medicine (CMDB)
71 4 15 35 10	General Nuclear Medicine
71 4 15 35 20	Single Photon Emission Computed Tomography/Computed Tomography (SPECT/CT)
71 4 15 35 30	Nuclear Medicine Medical Isotope Manufacturing
71 4 15 55	Cardiac Catheterization Diagnostic Services (CMDB)
71 4 15 61	Positron Emission Tomography/Computed Tomography (CMDB) (P)

71 4 15 61 10	General Positron Emission Tomography/Computed Tomography (P)
71 4 15 61 30	General Positron Emission Tomography/Computed Tomography (PET/CT) Medical Isotope Manufacturing (P)
71 4 15 70	Magnetic Resonance Imaging (CMDB)
71 4 15 80	Multi-Functional Medical Imaging (CMDB)
7 14 15 97	Medical Imaging Residual (P)
71 7 40	Diagnostic and Therapeutic Services Research
71 8 70 15	Medical Imaging Formal Education
71 8 40 40	Diagnostic and Therapeutic Services In-Service Education

## Definitions

### **71 4 05 Diagnostic and Therapeutic Nursing**

The functional centre pertaining to the services provided by nursing personnel when assisting with the clinical investigation and care of service recipients while diagnostic or therapeutic services are being provided.

### **71 4 05 15 Medical Imaging Nursing**

The functional centre pertaining to the services provided by nursing personnel when assisting with the clinical investigation and care of service recipients while diagnostic or therapeutic services are being provided in a medical imaging functional centre.

### **71 4 05 15 05 General Medical Imaging Nursing (CMDB)**

The functional centre pertaining to services provided by nursing personnel assigned on a rotational basis to any combination of the areas of radiography, mammography, ultrasound and nuclear medicine and where it is impractical to segregate the nursing hours amongst the different medical imaging functions when assisting with the clinical investigation and provision of nursing care to service recipients.

### **71 4 05 15 24 Interventional Radiology Nursing (CMDB)**

The functional centre pertaining to the services provided by nursing personnel when assisting with the clinical investigation and provision of nursing care to service recipients in the medical imaging interventional radiology functional centre.

### **71 4 05 15 25 Computed Tomography Nursing (CMDB)**

The functional centre pertaining to the services provided by nursing personnel when assisting with the clinical investigation and provision of nursing care to service recipients in the medical imaging computed tomography functional centre.

### **71 4 05 15 55 Cardiac Catheterization Diagnostic Services Nursing (CMDB)**

The functional centre pertaining to the services provided by nursing personnel when assisting with the clinical investigation and provision of nursing care to service recipients in the medical imaging cardiac catheterization diagnostic services functional centre. Excludes nursing services provided in Cardiac Catheterization Laboratory Specialty Day/Night Care (see 71 3 40 37).



#### **71 4 05 15 60 Positron Emission Tomography/Computed Tomography (PET/CT) Nursing (CMDB)**

The functional centre pertaining to the services provided by nursing personnel when assisting with the clinical investigation and provision of nursing care to service recipients in the medical imaging positron emission tomography/computed tomography (PET/CT) functional centre.

#### **71 4 05 15 65 Medical Imaging Recovery Room Nursing (CMDB)**

The functional centre pertaining to the services provided by nursing personnel in medical imaging where the beds are designated for the continuous observation and care of medical imaging service recipients during the immediate pre-procedure and post-procedure period of a medical imaging exam. May include observation and care post-general anaesthetic.

#### **71 4 05 15 70 Magnetic Resonance Imaging Nursing (CMDB)**

The functional centre pertaining to the services provided by nursing personnel when assisting with the clinical investigation and provision of nursing care to service recipients in the medical imaging magnetic resonance imaging functional centre.

#### **71 4 15 Medical Imaging**

The functional centre pertaining to producing visual records of body tissues and functions, and interpretation of the records to assist in the clinical investigation and management of the service recipient.

#### **71 4 15 10 Medical Imaging Administration (C)**

The functional centre clearing account pertaining to the provision of management and operational support to the entire medical imaging service. Before functional centre direct cost reports are prepared, comparative reporting is done or data is submitted to the Canadian MIS Database, any amounts in this account should be distributed by nature of expense using a cost distribution base such as the workload units produced by the consuming functional centres. Includes revenues from direct expense transfer recoveries for interdepartmental services.

#### **71 4 15 10 10 Picture Archiving Communication System (C)**

The functional centre clearing account pertaining to the provision of management and operational support related to the picture archiving communication system (PACS) to the medical imaging service. Before functional centre direct cost reports are prepared, comparative reporting is done or data is submitted to the Canadian MIS Database, any amounts in this account should be distributed by nature of expense using a cost distribution base such as the workload units produced by the consuming functional centres.

#### **71 4 15 10 97 Medical Imaging Administration Residual (C) (P)**

The functional centre clearing account pertaining to the provision of management and operational support to medical imaging services not reported separately in other level 5 accounts. Before functional centre direct cost reports are prepared, comparative reporting is done or data is submitted to the Canadian MIS Database, any amounts in this account should be distributed by nature of expense using a cost distribution base such as the workload units produced by the consuming functional centres.



**71 4 15 18 Radiography (CMDB)**

The functional centre pertaining to the utilization of ionizing radiation to produce and evaluate diagnostic images to assist in clinical investigations and treatment planning. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**71 4 15 20 Mammography (CMDB)**

The functional centre pertaining to the acquisition of breast tissue images using ionizing radiation for screening and/or diagnostic purposes and interventional mammography. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**71 4 15 20 10 Screening Mammography**

The functional centre pertaining to the acquisition of breast tissue images using ionizing radiation to produce a mammogram for screening purposes. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**71 4 15 20 20 Diagnostic Mammography**

The functional centre pertaining to the acquisition of breast tissue images using ionizing radiation to produce a mammogram for diagnostic purposes and interventional mammography. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**71 4 15 24 Interventional Radiology (CMDB)**

The functional centre pertaining to the use of radiographic techniques that use invasive methods and imaging guidance to perform studies that may replace conventional surgery to evaluate vascular and non-vascular diseases. Excludes nursing services related to interventional radiology nursing (see 71 4 05 15 24).

**71 4 15 24 10 Vascular Interventional Radiology**

The functional centre pertaining to the use of radiographic techniques that use minimally invasive methods and imaging guidance to perform studies that may replace conventional surgery such as, but not limited to, central venous access, renal vascular and peripheral vascular interventions, embolization, angioplasty and thrombolytic therapy. Excludes non-vascular interventional radiology (see 71 4 15 24 20) and nursing services related to interventional radiology nursing (see 71 4 05 15 24).

**71 4 15 24 20 Non-Vascular Interventional Radiology**

The functional centre pertaining to the use of radiographic techniques that use minimally invasive methods and imaging guidance to perform studies that may replace conventional surgery such as, but not limited to, needle biopsies, drainage, vertebroplasty and cholecystostomy. Excludes vascular interventional radiology (see 71 4 15 24 10) and nursing services related to interventional radiology nursing (see 71 4 05 15 24).

**71 4 15 25 Computed Tomography (CMDB)**

The functional centre pertaining to the acquisition of cross-sectional images using ionizing radiation and advanced computer technology to process images for diagnostic purposes. Excludes nursing services related to computed tomography nursing (see 71 4 05 15 25).

**71 4 15 30 Ultrasound (CMDB)**

The functional centre pertaining to the production of a visual record of body tissues by means of high frequency sound waves and to the provision of an interpretation of the record to assist in clinical investigations. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**71 4 15 30 10 General Ultrasound**

The functional centre pertaining to the production of a visual record of body tissues by means of high frequency sound waves and the provision of an interpretation of the record to assist in clinical investigations. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**71 4 15 30 30 Echocardiography Ultrasound**

The functional centre pertaining to the production of a visual record of heart and blood vessels by means of high frequency sound waves and the provision of an interpretation of the record to assist in the clinical investigations. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05). If this service is provided by personnel who are not part of medical imaging, see Echocardiography 71 4 30 20 20.

**71 4 15 30 40 Obstetrical and Gynaecological Ultrasound**

The functional centre pertaining to the production of a visual record of female reproductive organs by means of high frequency sound waves and the provision of an interpretation of the record to assist in the clinical investigation. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**71 4 15 30 50 Fetal Assessment Ultrasound**

The functional centre pertaining to the production of a visual record of fetal tissues by means of high frequency sound waves and the provision of an interpretation of the record to assist in clinical investigations. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**71 4 15 30 60 Ophthalmological Ultrasound**

The functional centre pertaining to the production of a visual record of ophthalmological tissues by means of high frequency sound waves and the provision of an interpretation of the record to assist in clinical investigations. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**71 4 15 30 90 Vascular Ultrasound**

The functional centre pertaining to the production of a visual record of blood vessels by means of high frequency sound waves and the provision of an interpretation of the record to assist in clinical investigations. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

#### **7 14 05 30 97 Diagnostic Ultrasound Residual (P)**

The functional centre pertaining to the provision of diagnostic ultrasound services not reported separately in other level 5 accounts. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

#### **71 4 15 35 Nuclear Medicine (CMDDB)**

The functional centre pertaining to the utilization of the nuclear properties of radioactive and stable nuclides to make diagnostic evaluations of the anatomic and/or physiologic conditions of the body and to provide therapy with unsealed radioactive sources. Includes the expenses related to the purchase or production of the required medical radioisotopes/radiopharmaceuticals. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

#### **71 4 15 35 10 General Nuclear Medicine**

The functional centre pertaining to the utilization of the nuclear properties of radioactive and stable nuclides to make diagnostic evaluations of the anatomic and/or physiologic conditions of the body and to provide therapy with unsealed radioactive sources excluding the use of photon emitting radionuclides (SPECT). Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

#### **71 4 15 35 20 Single Photon Emission Computed Tomography/Computed Tomography (SPECT/CT)**

The functional centre pertaining to the acquisition of a set of fused, cross-sectional images using combined ionizing radiation and the introduction of photon emitting radionuclides in the body detected by multiple gamma cameras to illustrate both physiologic and anatomic information of the body. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

#### **71 4 15 35 30 Nuclear Medicine Medical Isotope Manufacturing**

The functional centre account pertaining to the manufacturing of medical isotopes/radiopharmaceuticals other than those produced by a linear particle accelerator such as a cyclotron, for use in producing images in nuclear medicine. Includes revenues from recoveries from inventory of costs of raw materials on a value-added basis. In all cases, the manufactured products are returned to inventory on a value-added basis for subsequent use by various sections within the nuclear medicine functional centre, and for possible sale to external agencies.

#### **71 4 15 55 Cardiac Catheterization Diagnostic Services (CMDDB)**

The functional centre pertaining to the provision of cardiac catheterization and angioplasty when the service is provided by medical imaging personnel. Excludes nursing services related to cardiac catheterization diagnostic services nursing (see 71 4 05 15 55) and Cardiac Catheterization Laboratory Specialty Day/Night Care (see 71 3 40 37).

#### **71 4 15 61 Positron Emission Tomography/Computed Tomography (PET/CT) (CMDDB) (P)**

The functional centre pertaining to the acquisition of a set of fused, cross-sectional images using combined positron emitting radioisotopes and ionizing radiation to illustrate both physiologic and anatomic information of the body. Includes general

positron emission tomography/computed tomography (PET/CT) (see 71 4 15 60 10) and positron emission tomography/computed tomography (PET/CT) medical isotope manufacturing (see 71 4 15 60 30). Includes the expenses related to the purchase or production of the required medical radioisotopes/radiopharmaceuticals. Excludes nursing services related to positron emission tomography/computed tomography (PET/CT) nursing (see 71 4 05 15 60).

#### **71 4 15 61 10 General Positron Emission Tomography/Computed Tomography (PET/CT) (P)**

The functional centre pertaining to the acquisition of a set of fused, cross-sectional images using combined positron emitting radioisotopes and ionizing radiation to illustrate both physiologic and anatomic information of the body. Excludes nursing services related to positron emission tomography/computed tomography (PET/CT) nursing (see 71 4 05 15 60).

#### **71 4 15 61 30 Positron Emission Tomography/Computed Tomography (PET/CT) Medical Isotope Manufacturing (P)**

The functional centre account pertaining to the manufacturing of medical isotopes by a linear accelerator such as a cyclotron for use in producing images in the positron emission tomography/computed tomography (PET/CT) functional centre. Includes revenues from recoveries from inventory of costs of raw materials on a value-added basis. In all cases, the manufactured products are returned to inventory on a value-added basis for subsequent use by various sections within the PET/CT functional centre, and for possible sale to external agencies. Excludes nursing services related to positron emission tomography/computed tomography (PET/CT) nursing (see 71 4 05 15 60).

#### **71 4 15 70 Magnetic Resonance Imaging (CMDB)**

The functional centre pertaining to the acquisition of diagnostic images of body tissues and organs using magnetic fields and radio waves and advanced computer technology for image processing to assist in clinical investigations. Excludes nursing services related to magnetic resonance imaging nursing (see 71 4 05 15 70).

#### **71 4 15 80 Multi-Functional Medical Imaging (CMDB)**

The functional centre pertaining to medical imaging functions encompassing two or more areas in medical imaging such as radiography and mammography where it is impractical to segregate the revenue and expenses associated with the different functions. Personnel in this functional centre rotate between the different functional areas within a single shift performing all the exams, regardless of the area (e.g. radiography and mammography). *Note: When personnel are assigned in different functional areas on a shift-by-shift basis, separate functional centres must be used.* If more than 70% of the exams are related to one particular area (e.g. radiography) then the functional centre related to that area must be used (e.g. 71 4 15 18 Radiography) instead of the multi-functional functional centre. This functional centre is not for use by medical imaging facilities with any one of the following modalities: computed tomography, magnetic resonance imaging, nuclear medicine, interventional radiology and PET/CT; for use by small facilities only.

**71 4 15 97 Medical Imaging Residual (P)**

The functional centre pertaining to the provision of medical imaging services not reported separately in other level 4 accounts. Excludes nursing services related to general medical imaging nursing (see 71 4 05 15 05).

**Related Functional Centres****71 7 40 Diagnostic and Therapeutic Services Research**

The functional centre pertaining to formally organized research projects undertaken by personnel of the diagnostic and therapeutic services functional centres.

**71 8 40 40 Diagnostic and Therapeutic Services In-Service Education**

The functional centre pertaining to in-service education provided within the health service organization to personnel of the diagnostic and therapeutic services section.

**71 8 70 15 Medical Imaging Formal Education**

The functional centre pertaining to the provision of formal education and experience in a clinical setting to students who are fulfilling the requirements of a medical imaging technology program, which is accredited by the respective provincial licensing body.

## 4 SECONDARY FINANCIAL ACCOUNTS

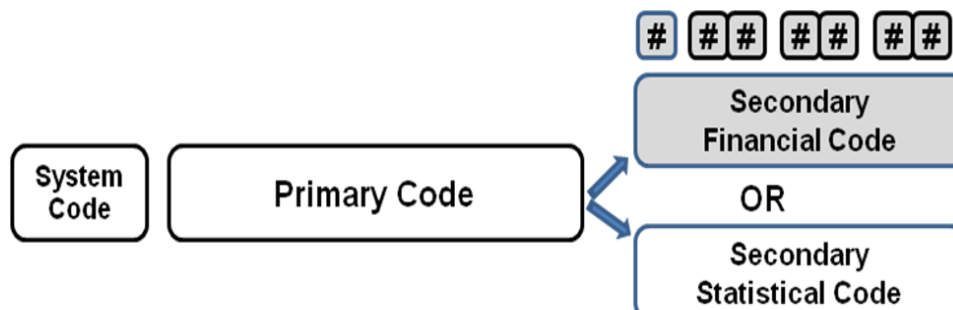


Figure 7

Secondary financial accounts are designed to provide additional information on the nature of revenues and expenses in an organization. Each secondary code is associated with an appropriate primary code. Financial accounts can then be linked to the secondary statistical accounts within the same functional centre to produce performance indicators for the functional centre. Secondary financial accounts establish the direct costs that are attributed to functional centres.

The secondary financial account code is made up of four distinct segments totalling seven coding positions. Secondary account codes are three, five or seven digits in length which are structured in a specific manner (see Figure 7).

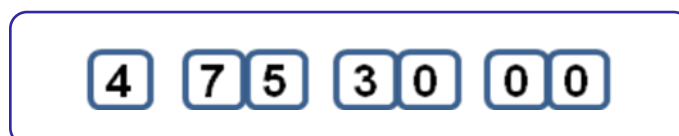


Figure 8

### Broad Group

- 4 The first block is a single character which identifies the secondary financial broad group. Broad group 4 is supplies. (See Figure 8 for further broad groups.)

### Nature of Secondary Revenue or Expense

- 75 The second block is two characters long and defines the nature of the revenue or expense. In this example it is supplies – medical imaging.

### Capture of Further Detail of Secondary Revenue or Expense

- 30 The third block is used to capture further detail and is specific to previous code block. In this example it is supplies – medical imaging – contrast media.

### Further breakdown of Secondary Revenue or Expense

00 In certain cases, the Newfoundland and Labrador Chart of Accounts, uses two more digits for further breakdown (provincially defined).

Example; Secondary financial account **4 75 30 00** is used to represent contrast media supply expenses specific to medical imaging (illustrated in Figure 9).

4	75	30	00
Broad Group	Nature of Revenue and Expense	Capture of further detail	Capture of further detail
1 Revenues 2 Inactive 3 Compensation <b>4 Supplies</b> 5 Traceable Supplies & Other Expenses 6 Sundry 7 Equipment Expense 8 Contracted-Out Services 9 Buildings and Grounds Expense	Supplies for the following 50 Food 60 Medical Surgical 64 Pharmacy 70 Clinical Laboratory <b>75 Medical Imaging</b> 77 Electro-Diagnostic 80 Respiratory 82 Therapeutics	Accounts specific to previous level and provide further breakdown. 10 Film Radiology 20 Cassettes <b>30 Contrast Media</b> 40 Radioactive Materials 65 Processing Chemicals 70 Electronic Archival Supplies 90 Medical Imaging Supplies not Elsewhere Classified	Accounts specific to previous level and provide further breakdown.

Figure 9

The broad groups of secondary financial accounts are:

### Revenue

Revenue is defined as proceeds earned by the health service organization from all sources including payment for services provided to service recipients, recoveries, contributed services, donations, grants and investment revenue. When revenue is generated in relation to clinical services for facility patients/residents/clients, this revenue is recorded as a recovery in the functional centre incurring the expense. This reduces the cost of providing service to these patients.

### Compensation

Compensation is defined as the sum of gross salaries plus benefit contribution expenses. Compensation costs are linked to the functional centre.

For the purpose of capturing and reporting compensation expenses, the MIS Standards require all staff of a functional centre be assigned to one (or more) of three broad occupational groups; then further categorized by type of earned salaries. By doing so, the accuracy of analysis is improved and the degree of overhead support associated with the service is identified. The following is a list of broad occupational groups:

- management and operational support personnel (MOS);
- unit-producing personnel (UPP); and
- medical personnel (MP).



For each broad occupational group, the types of earned salaries should be further categorized as:

- worked salaries;
- benefit salaries; and
- purchased service salaries.

Benefit contributions are an integral part of compensation expense. These costs must also be distributed to functional centres. The benefit contributions include salaries paid to casual and temporary staff in lieu of vacation, statutory holidays and termination. No hours are attached to these payments and therefore they are not included in benefit hours.

### **Supplies**

Supplies are consumable products used by a functional centre. Accounts exist for items ranging from paper, computer supplies, test manuals and forms, medications and other clinical products. In order to make supply transaction coding more efficient, finance and materials management departments should coordinate the stores catalogue to link individual stock item codes to supply expense codes. All expense accounts should be reviewed to ensure that the items included in these accounts are appropriate and to ensure that the expenses for all functional centres are recorded accurately. Only those items used by the medical imaging departments should be charged to the medical imaging functional centre.

### **Traceable Supplies and Other Expenses**

These are consumable supplies or other expenses that:

- can be directly associated with a particular service such as an operative; procedure or drug intervention;
- can be traced to a particular service recipient;
- vary according to the clinical needs of the service recipient; and
- usually do not behave linearly with workload.

### **Sundry**

Sundry costs are those that do not fit into other categories. It includes items such as long distance telephone charges, courier charges, travel expenses, etc. Most sundry expenses and some supply expenses are intended for administrative and support functional centres and are actually overhead costs for the organization as a whole. Some organizations have elected to distribute these costs to functional centres. The primary purpose for distribution is better accountability for expenses. An example of an overhead supply cost is laundry. An example of an overhead sundry expense cost is postage.

### **Equipment Expenses**

Equipment expenses are the operating expenses of equipment, including maintenance, repairs, depreciation, gain or loss on disposal, interest on equipment loans and rental or lease expenses incurred or any other operating expense incurred in the provision of equipment for use by functional centres in the facility. Depreciation costs for all equipment as well as preventative and repair costs for all clinical equipment are to be



expensed to functional centres. This will improve the comparability of costs across organizations. When comparing costs across organizations it is important to understand that there could be variations in the allocation methodology and reporting of these costs.

When comparing costs across organizations, it is important to note if the organization has a Reagent Lease Agreement in place. Such agreements enable the organization to pay a premium for the reagents used in return for provision of the equipment by the supplier. Therefore, equipment/lease costs will appear to be lower than those of organizations which purchase or lease equipment, however, reagent costs will be higher.

### **Contracted-Out Services**

The contracted-out services expenses are those related to one of a group of services performed for the health service organization by a contracted-out third party provider using their personnel and often their supplies, equipment and premises. The fee charged may include a cost for these items as well as a mark-up for employee benefits and administrative and support expenses.

### **Buildings and Grounds Expense**

Those expenses that are associated with the building, its service equipment and the grounds are usually charged to an accounting centre because it is not reasonable or practical to distribute to all functional centres in the organization.

## **4.1 Secondary Financial Accounts Applicable to Medical Imaging Services**

The accounts listed below are provincial accounts that match or mirror the national account structure. These accounts are presented as level 2 or level 3 and many have lower accounts that are not listed but may be a required reporting level. Definitions have been added for accounts that might be of interest to medical imaging functional centres. For a full listing of secondary financial accounts and the related definitions please refer to the Provincial Regional Health Authorities Reporting Requirements User Guide, published annually, or the MIS Standards CD, released bi-annually.

### **Broad Group No. 1 Revenues**

1 10	Revenue – Patient/Resident Services
1 20	Recoveries from External Sources
1 30	Contributed Services
1 40	Donations
1 50	Grants
1 60	Investment Revenue
1 70	Revenue from Other Funds
1 90	Other Revenue

### **Broad Group No. 3 Compensation**

3 11	MOS Worked Salaries
3 13	MOS Benefit Salaries
3 14	MOS Employee Benefit Contributions-Third Party
3 15	MOS Benefit Contribution Expenses
3 19	MOS Purchased Service Salaries
3 51	UPP Worked Salaries
3 53	UPP Benefit Salaries
3 54	UPP Employee Benefit Contributions-Third Party
3 55	UPP Benefit Contribution Expenses
3 59	UPP Purchased Service Salaries
3 91	MP Worked Salaries
3 93	MP Benefit Salaries
3 94	MP Employee Benefit Contributions-Third Party
3 95	MP Benefit Contribution Expenses
3 99	MP Purchased Service Salaries

### **Broad Group No. 4 Supplies**

4 10	Supplies - Printing, Stationery and Office Supplies
4 10 10	Printed Forms
4 10 20	Paper Stocks
4 10 30	Printing Supplies
4 10 40	Duplicating Supplies
4 10 50	Photocopying Supplies
4 10 60	Microfilm
4 10 70	Computer Supplies
4 10 90	General Office Supplies
4 15	Supplies - Housekeeping
4 20	Supplies - Laundry
4 25	Supplies - Linen
4 28	Supplies - Linen Reusable - Interdepartmental
4 30	Supplies - Plant Operation
4 35	Supplies - Plant Maintenance
4 40	Supplies - Plant Maintenance Equipment and Vehicles
4 45	Supplies - Biomedical Engineering
4 50	Supplies - Food
4 55	Supplies - Dietary

#### **4 60 60 General Medical Surgical Supplies**

This account is used to record the expense of general medical and surgical supplies such as dressings, catheters, gloves, needles, syringes, IV sets, pour solutions, trays, tape, drains and tubes. A sub-category of: Supplies - Medical and Surgical 4 60.

**4 60 60 10 Dressings**

This account is used to record the expense of general medical and surgical supplies which include dressings, tapes, bandages, gauze, etc. Also includes disposable procedure tray kits and sets. A sub-category of: General Medical and Surgical Supplies 4 60 60.

**4 60 60 20 Catheters**

This account is used to record the expense of general medical and surgical supplies which include various types of catheters (excluding IV catheters), drains, stylets, guide wires, stents, etc. A sub-category of: General Medical and Surgical Supplies 4 60 60.

**4 60 60 30 Needles**

This account is used to record the expense of general medical and surgical supplies which include disposable needles, IV catheters and butterflies. A sub-category of: General Medical and Surgical Supplies 4 60 60.

**4 60 60 40 Syringes**

This account is used to record the expense of general medical and surgical supplies which include disposable and reusable syringes. Excludes blood collection tubes such as Vacutainer (4 70 50). A sub-category of: General Medical and Surgical Supplies 4 60 60.

**4 60 60 50 Gloves**

This account is used to record the expense of general medical and surgical supplies which include disposable sterile and non- sterile gloves used to prevent transmission of infection. A sub-category of: General Medical and Surgical Supplies 4 60 60.

**4 60 60 60 Rubber Goods**

This account is used to record the expense of general medical and surgical supplies which include miscellaneous tubings, bags, pouches, etc. A sub-category of: General Medical and Surgical Supplies 4 60 60.

**4 60 60 70 IV Administration Sets**

This account is used to record the expense of general medical and surgical supplies which include administration sets for IVs, blood, blood products, etc. Also includes cassettes and all IV connectors, filters and accessories. A sub-category of: General Medical and Surgical Supplies 4 60 60.

**4 60 60 71 Closed System Transfer Devices**

This account is used to record the expense of closed system transfer devices. Includes drug vial adapters for closed reconstitution and equalization, encapsulated cannula that attached to syringe or IV tubing and luer lock connectors for IV line access. A sub-category of: General Medical and Surgical Supplies; Administration Sets (IV) 4 60 60 70.

**4 60 60 80 Pour Solutions**

This account is used to record the expense of general medical and surgical supplies which include sterile water, sterile saline, other irrigating solutions, etc. Does not

include intravenous solutions (4 65 50). A sub-category of: General Medical and Surgical Supplies 4 60 60.

#### **4 60 70 Medical Surgical Supplies Not Elsewhere Classified**

This account is used to record the expense of all medical and surgical supplies not elsewhere classified. A sub-category of: Supplies - Medical and Surgical 4 60.

4 64	Supplies - Pharmacy (Packaging and Compounding)
4 65	Supplies - Drugs
4 66	Supplies - Medical Gases
4 70	Supplies - Clinical Laboratory
4 75	Supplies - Medical Imaging
4 75 10	Film Radiology
4 75 20	Cassettes
4 75 30	Contrast media
4 75 40	Radioactive Materials
4 75 65	Processing Chemicals
4 75 70	Electronic Archival Supplies
4 75 90	Medical Imaging Supplies Not Elsewhere Classified

### **Definitions for Medical Imaging Supplies**

#### **4 75 Supplies - Medical Imaging**

This account is used to record the expense of supplies used in medical imaging processes carried out by the health service organization, such as film, cassettes, contrast media, radioactive materials, developer, fixer, electronic archival supplies, etc. A sub-category of supplies, broad group 4.

#### **4 75 10 Film – Radiology**

This account is used to record the expense of various films (miniature, dental, standard, roll, cine, kinescope) used in Medical Imaging procedures. Excludes films used for general photography purposes which are charged to tape and film (4 90 20). A sub-category of supplies - medical imaging 4 75.

#### **4 75 20 Cassettes**

This account is used to record the expense of cassettes/jackets used to contain radiological films during the actual procedure and subsequent processing of image(s). Also includes the cost to purchase the CR cassette used with the CR screen/plate and the CR screen/plate itself. The cost of repair should be reported in 7 10 Equipment Maintenance - External or 7 20 Equipment Maintenance - Interdepartmental. A sub-category of supplies - medical imaging 4 75.

#### **4 75 30 Contrast Media**

This account is used to record the expense of contrast media (i.e. material opaque to x-ray) used in various medical imaging procedures. Includes ionic/non-ionic, barium, and other contrast media. A sub-category of supplies - medical imaging 4 75.

**4 75 40 Radioactive Materials**

This account is used to record the expense of radioactive materials used in diagnostic and therapeutic processes. A sub-category of supplies - medical imaging 4 75.

**4 75 65 Processing Chemicals**

This account is used to record the expense of developing and fixative agents used in processing radiographic films. A sub-category of supplies - medical imaging 4 75.

**4 75 70 Electronic Archival Supplies**

This account is used to record the expense of supplies such as CD-ROMs or writeable compact disks which are used to permanently store digital images in a picture archiving network. A sub-category of supplies - medical imaging 4 75.

**4 75 90 Medical Imaging Supplies Not Elsewhere Classified**

This account is used to record the expense of medical imaging supplies not elsewhere classified, such as lead markers, lead apron and gloves, apron hangers, lead blockers, positioning sponges, lead glasses, compression paddles, vial shields, table pads and coverings, lead brick used in medical imaging procedures, special instrument recording paper, grids, film screens, etc. A sub-category of supplies - medical imaging 4 75.

4 77	Supplies - Electro-Diagnostic
4 80	Supplies - Respiratory Therapy
4 82	Supplies - Therapeutic
4 85	Supplies - Research
4 90	Supplies - Education
4 95	Supplies – General

**Broad Group No. 5****Traceable Supplies and Other Expenses – Not Applicable****Broad Group No. 6****Sundry**

6 10	Departmental Sundry
6 10 10	Postage
6 10 15	Delivery and Courier
6 10 20	Long Distance Charges
610 40	Tuition – Students (P)
610 53	Scholarships (Privately Funded) (P)
6 15	Continuing Education Fees and Materials
6 20	Travel Expense - Service Recipient
6 20 10	Local Travel
6 20 12	Provincial/Territorial Travel
6 20 14	Out of Province/Territory Travel
6 22	Travel Expense - Board

6 22 10	Local Travel
6 22 12	Provincial/Territorial Travel
6 22 14	Out of Province/Territory Travel
6 23	Travel Expense - Staff
6 23 10	Local Travel
6 23 12	Provincial/Territorial Travel
6 23 14	Out of Province/Territory Travel
6 26	Travel Expense - Recruitment and Relocation
6 26 10	Recruitment
6 26 20	Relocation
6 30	Bank Charges
6 40	Data Processing
6 50	Professional Fees
6 60	Other Fees
6 65	Bad Debt Expense
6 70	Advertising
6 75	Public Relations
6 80	Insurance
6 85	Board Honorariums
6 94	Grants – External (P)
6 95	Sundry Expenses - Not Elsewhere Classified
6 96	Meeting Expense
6 97	Interdepartmental Services

## **Broad Group No. 7**

### **Equipment Expense**

7 10	Equipment Maintenance - External
7 10 22	Software Maintenance – Contract
7 10 24	Equipment excluding Information Systems Maintenance - Contract
7 10 25	Information Systems Equipment Maintenance - Contract
7 10 42	Equipment Maintenance - Other
7 10 44	Equipment excluding Information Systems - Maintenance - Other
7 10 45	Information Systems Equipment Maintenance - Other
7 20	Equipment Maintenance - Interdepartmental
7 30	Replacement of Major Equipment Parts
7 30 24	Replacement of Major Equipment excluding Information Systems Parts
7 30 25	Replacement of Information Systems Major Equipment Parts
7 50	Amortization on Major Equipment - Distributed
7 51	Net Gain or Loss on Disposal of Major Equipment
7 55	Interest on Major Equipment Loans
7 60	Rental/Lease of Equipment and Telephone
7 60 24	Rental/Lease of Major Equipment excluding Information Systems

7 60 25	Rental/Lease of Information Systems Major Equipment
7 65	Minor Equipment Purchases
7 65 24	Minor Equipment excluding Information Systems Purchases
7 65 25	Information Systems Minor Equipment Purchases
7 80	Amortization - Software Licenses and Fees
7 90	Equipment Expense - Not Elsewhere Classified
7 90 24	Equipment Expense excluding Information Systems - Not Elsewhere Classified
7 90 25	Information Systems Equipment Expense - Not Elsewhere Classified

### **Broad Group No. 8** **Contracted-Out Services**

### **Broad Group No. 9** **Buildings and Grounds Expense**

#### **940 Renovations**

This account is used to record the expense relating to noncapital renovations carried out in and expensed to specific functional centres, including the charges from work orders when the work is carried out by health service organization personnel. A sub-category of: Buildings and Grounds Expense - Undistributed, Broad Group 9.

## 5 SECONDARY STATISTICAL ACCOUNTS

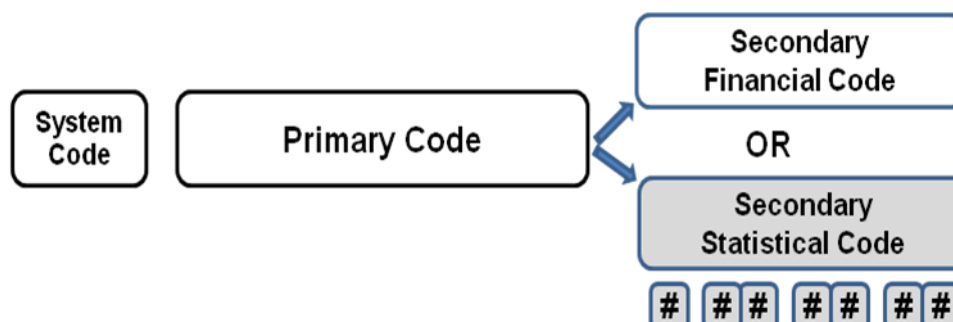


Figure 10

Secondary statistical accounts are designed to provide additional information on the nature of activities that occur within an organization. Each secondary code is associated with an appropriate primary code. Statistical accounts can then be linked to the secondary financial accounts within the same functional centre to produce performance indicators for the functional centre.

The secondary statistical account code is made up of four distinct segments totalling seven coding positions. Secondary account codes are three, five or seven digits in length. As with financial secondary accounts the first digit identifies the broad group. The remaining blocks provide additional detail with the meaning of each segment being dependent on the code used in the preceding segment.



Figure 11

### Secondary Statistical Accounts

- 1 The first block is a single character that identifies the secondary statistical broad group. In this example broad group 1, workload is used (see Figure 12 for further broad groups).

### Nature of Statistic

- 07 The second block consists of two characters and identifies the statistic itself and is specific to the previous code block (example – workload units, inpatient admissions, etc.).

### Capture of further detail of the statistic

- 10 The third block is used to capture further detail and is related the nature of the statistic and is specific to the previous code block (example – category of service recipient).



### Further breakdown of the nature of statistic

00 The fourth block is used to provide even greater detail on the nature of the statistic.

Example: Secondary statistical account 1 07 10 is used to represent inpatient workload service recipient units specific to medical imaging and electrodiagnostic, non-invasive cardiology and vascular laboratories.

1	07	10	00
Broad Group	Nature of Statistic	Capture of Further Detail	Additional Breakdown
<b>1 Workload</b> 2 Staff Activity 3 Earned Hours 4 Service Activity and Caseload Status 7 Functional Centre Operation 8. Health Service Organization Operation & Contracted-Out Services	Workload Units -Service Recipient Activities  02 Workload Units Service Recipient Activities 03 Drug Distribution <b>07 Diagnostic Therapeutic</b> 08 Respiratory Services 13 Food Services 14 Health Records 16 In-House Therapeutic 18 In-House Clinical Lab	Category of Service Recipient  <b>10 Inpatient</b> 20 Client Hospital 40 Resident 80 Client Community	Accounts specific to previous level and provide further breakdown.

Figure 12

The MIS Standards organizes all statistical data into six broad groups that identify the nature of the statistic. These broad groups are further explained below.

Secondary statistical accounts can only be reported at the level defined by the Department of Health and Community Services in the Provincial Chart of Statistical Accounts. If lower level accounts have been created for internal use, these must be “rolled-up” to the provincial account prior to data submission.

All statistics must be reported in the same functional centre as the activity took place. This includes workload, staff activity, earned hours, service activity and caseload status statistics, functional centre and health service organization operations and contracted-out services.

The broad groups of secondary statistical accounts are:

### Workload

Workload statistics are those applicable to functional centres that have a workload measurement system (WMS) in the MIS Standards such as nursing, nutrition services, speech-language pathology, medical imaging and pharmacy. This workload data is important to functional centres as it provides information for the analysis of service volumes, productivity and costs.

### Staff Activity

Staff activity statistics pertain to select activities performed by staff when fulfilling the service mandate of the functional centre. In some cases, these statistics may be used as a surrogate workload measure for functional centres that do not have a workload

measurement system in the MIS Standards. For example, laundry can track the number of kilograms of clean linen issued, human resources can track the number of grievances resolved and payroll can track the number of pay cheques/stubs issued.

### **Earned Hours**

Earned hours statistics are those that categorize earned hours by broad occupational group and type of hour. This data is collected by the organizations' compensation systems (payroll).

### **Service Activity and Caseload Status**

Service activity and caseload status statistics pertain to the service activities provided by the nursing in-patient services and ambulatory care, diagnostic and therapeutic services and community health services functional centres. Examples of service activity statistics include visits - face-to-face, visits - non-face-to-face, in-house exams and inpatient days. These statistics supplement workload information by defining the complexity of service activities provided and are used to determine costs for these activities. Caseload status statistics describe the status of service recipients of current, past and future caseloads (i.e. admissions, discharges, transfers and new referrals).

### **Functional Centre Operation**

Functional centre operation statistics are specific to the operation of a functional centre. They include those that describe its characteristics (e.g. physical size or capacity), catchment population and personnel complement.

### **Health Service Organization Operation and Contracted-Out Services**

Health service organization operations and contracted-out services statistics pertain to the operation of the health service organization as a whole. They include the number of cardiac arrests, medication errors, different types of revenue days, clients receiving home health/home support services and changes in employee status. They also include data related to the physical facility, such as energy consumption, heating days and cooling days and to those services that are provided by a contracted-out third-party provider.

## **5.1 Workload Statistics**

All medical imaging services within the Regional Health Authorities are expected to collect and report workload and related statistics based on the following accounts. Those accounts required for national reporting are indicated by 'CMDB' in the listing below.

### **1 07 Workload Units–Service Recipient Activities–Diagnostic/Therapeutic**

The minutes, measured retrospectively, that unit-producing personnel spent performing the diagnostic/therapeutic service recipient activities of the functional centre. It is a sub-category of workload, broad group 1.

By Category of Service Recipient

1 07 10	Inpatient (CMDB)
1 07 30	Referred-In (CMDB) (national account that is not used in NL)
1 07 20	Client Hospital (CMDB)

1 07 40	Resident (CMDB)
1 07 80	Client Community (CMDB) (national account that is not used in NL)

### **1 90 Workload Units - Non Service Recipient Activities (CMDB)**

The minutes, measured retrospectively, that unit-producing personnel spent performing functional centre activities, organizational/professional activities, teaching/in-service activities and research. Examples include, but are not limited to, board activities, caseload management, quality improvement activities, administrative activities and staff travel. It is a sub-category of workload, broad group 1. It includes travel to and from the place where service recipient activities are provided to a service recipient or a group of service recipients.

By Activity Category

1 90 10	Functional Centre Activities
1 90 20	Organizational/Professional Activities
1 90 30	Teaching/In-Service
1 90 40	Research

For more information on Workload Measurement System see chapter 6.0.

## **5.2 Service Activity Statistics**

Service activity statistics are captured in functional centres providing service recipient care. They identify the volume of activities that are provided to specific service recipients. Service activity statistics supplement workload data in providing valuable management information on the resources required in the provision of specific services. They are intended to be used with the corresponding workload data to measure functional centre productivity and the resource consumption of specific service activities. They can also be used with functional centre statistics to cost service recipient activity.

The service activity statistic for medical imaging functional centres is the in-house exam – diagnostic/therapeutic. An in-house exam is defined as the diagnostic/therapeutic examinations performed by the health service organization's personnel. It is a sub-category of service activity and caseload status, broad group 4.

Service activity statistics are to be reported by the following functional centres:

- Radiography;
- Mammography;
- Interventional Radiology;
- Computed Tomography;
- Positron Emission Tomography;
- Ultrasound;
- Nuclear Medicine;
- Cardiac Catheterization Diagnostic Services;
- Multi-Functional Medical Imaging (added 2011/04); and
- Magnetic Resonance Imaging.

Secondary statistical account **4 57 10 00** is used to represent the service activity called in-house exam related to an inpatient in a hospital setting (illustrated in Figure 13)



Figure 13

Example: Statistical account 4 57 10 is used to represent service activity inpatient in-house exams.

4	57	10	00
Broad Group	Nature of Statistic	Capture of Further Detail	Additional Breakdown
1 Workload 2 Staff Activity 3 Earned Hours <b>4 Service Activity &amp; Caseload Status</b> 7 Functional Centre Operation 8 Health Service Organization Operation & Contracted-Out Services	Service Activity and Caseload Status Statistics  01 Inpatient Admissions 03 Inpatient Days 50 Visits - Face-to-Face 56 Visits – Non-Face-to-Face <b>57 In-House Exams</b> 63 Laboratory Intervention 83 Attendance Days – Face-to-Face 85 Attendance Days - Non-Face-to-Face 89 New Referrals 90 Active Carryovers	Category of Service Recipient  <b>10 Inpatient</b> 20 Client Hospital 40 Resident 80 Client Community	Accounts specific to previous level and provide further breakdown.

Figure 14

The same category of service recipient should be used for service activity statistics as for workload units so as to identify the resource consumption of specific categories of service recipients.

By Category of Service Recipient

4 57 10 Inpatient (CMDB)  
 4 57 20 Client Hospital (CMDB)  
 4 57 30 Referred-In (CMDB) (national account that is not used in NL)  
 4 57 40 Resident (CMDB)  
 4 57 80 Client Community (CMDB) (national account that is not used in NL)

### 5.3 Schedule of Unit Values

The schedule of unit values provides a coding system for identifying most activities performed in a medical imaging department. Additionally, it indicates the exam that should be counted and lists the unit values for each. Each exam is assigned a five digit code number and is listed in the medical imaging service recipient activity list – by modality. Any activity in the schedule of unit values can be utilized by any medical imaging functional centre if the unit value is accurate and reflective of the realistic average time required to perform a specified activity. Please see most recent Medical Imaging Schedule of Unit Values under separate cover or follow link to the MIS Standards publication on the Centre's website.

<http://nlchi.nl.ca/index.php/mis-standards#publications>

## 6 WORKLOAD MEASUREMENT SYSTEM

### 6.1 What is a Workload Measurement System?

A workload measurement system (WMS) is defined as a tool for measuring the volume of services provided in terms of a standardized unit of productive personnel time and serves as a:

- department management tool to provide systematic quantification of workload to assist in staffing, planning, budgeting and performance monitoring; and
- standardized method for recording workload that will yield uniform data for internal and external reporting, permitting historical trending and selective national and peer group comparisons.

The generic workload measurement and reporting framework provides a model for data collection and reporting for many clinical disciplines while enabling users to customize the level of detail for their discipline or service.

Workload is collected for all activities that are undertaken on behalf of a service recipient. A service recipient is defined as the consumer of primary service activities of one or more functional centres of the health service organization. Service recipients include individuals (e.g. inpatient, residents, clients) and their significant others. Significant others are individuals who are acting on behalf or in the interest of the service recipient, such as parent, spouse/partner, child, legal guardian or substitute decision-maker.

*Note: There are other individuals who act on behalf of or in the interest of service recipients but are not considered to be a "significant other." Examples include: ministers, teachers, lawyers or other health care professionals. The time spent with these individuals is recorded as the service recipient workload, consultation/ collaboration. No service activity statistic is recorded.*

### 6.2 Who Records Workload?

The medical imaging WMS is intended for the unit-producing personnel of the functional centre. Unit-producing personnel are those personnel whose primary functions is to carry out activities that directly contribute to the fulfillment of the service mandate. Examples of medical imaging unit-producing personnel include medical radiation technologists and diagnostic medical sonographers.

The medical imaging WMS is not intended to be used by management and operational support personnel (e.g. directors, managers, secretaries, clerks, clerical, darkroom technician, film librarian) or medical personnel (e.g. radiologists) unless they perform activities typically associated with the unit-producing personnel of the functional centre.

If a UPP staff member is responsible for management activities on an occasional basis, this activity is recorded as non-service recipient activity workload (functional centre activities) within UPP worked hours. However if an individual is responsible for management activity for greater than 20% of their time, the worked hours of these staff should be split between MOS and UPP categories. **No workload is recorded for the management portion of their time.**

For example, a technologist III is a UPP due to the large amount of service recipient work performed by that person. Other technologists III may be considered MOS if the primary role is supervisory. If a technician III's time is spent in both service recipient work and supervisory roles, then the person should be assigned to both categories, based upon the proportion of time spent in each area. Such a split assignment should be arranged with your finance department to ensure correct financial and statistical reporting is accommodated for that person.

### 6.3 Medical Imaging Workload Measurement System

The medical imaging WMS applies to these functional centres:

- Radiography;
- Mammography;
- Interventional Radiology;
- Computed Tomography;
- Ultrasound;
- Nuclear Medicine;
- Cardiac Catheterization Diagnostic Services;
- Positron Emission Tomography/Computed Tomography (PET/CT);
- Magnetic Resonance Imaging; and
- Multi-Functional Medical Imaging.

## Conceptual Model for Medical Imaging

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Workload Categories	SERVICE RECIPIENT ACTIVITIES	NON-SERVICE RECIPIENT ACTIVITIES			
Activity Categories	Diagnostic/Therapeutic Intervention	Functional Centre Activities	Organizational/ Professional Activities	Teaching/ In-service	Research
Component Activities	Initial Handling/Set-Up Service Recipient Preparation/Instructions Diagnostic/Therapeutic Activities <ul style="list-style-type: none"> <li>Assessment (Pre &amp; Post Exam Monitoring)</li> <li>Administration of Radiopharmaceuticals, Contrast Media and Medications</li> <li>Service Recipient Care Activities</li> <li>MRSA/VRE/Latex Activities</li> <li>Catheterization</li> <li>Image Acquisition</li> <li>Image Processing/Post Processing</li> <li>Image Quality Assessment</li> </ul> Service Recipient Assistance Clean Up Clinical Documentation	Functional Centre Management Employee Meetings Caseload Management Maintenance Quality Management Travel for Functional Centre Activities Travel to and from the place where service recipient activities are provided*	Board/Committee Functions Public Relations Professional Activities Advocacy - Professional Program Management Travel	Students Professionals Academic In-Service Education Travel	Project 1 Project 2 Travel

Figure 15

The medical imaging WMS classifies workload into two major categories:

- service recipient activities; and
- non-service recipient activities.

Service recipient activities are unit-producing personnel activities that involve the delivery of services to or on behalf of a specific service recipient. These activities directly contribute to the fulfillment of the primary service mandate of the functional centre. Service recipient activities in medical imaging are classified as:

- diagnostic/therapeutic intervention.

Non-service recipient activities are unit-producing personnel activities that are integral to the functional centre's operations, but do not involve the delivery of services to service



recipients and/or their significant others. Non-service recipient activities in medical imaging are categorized as follows:

- functional centre activities;
- facility/community/professional activities;
- teaching/in-service; and
- research.

The specific component activities listed under the activity categories are provided as examples only. Users who wish to record and report workload at this level are encouraged to identify and define the activities standard to their profession and/or that are reflective of the service activities of their functional centre.

### Service Recipient Activities

All work on behalf of service recipients (e.g. inpatients, residents, clients hospital, etc.) is recorded, even if outside regular working hours (e.g. during overtime hours); but not unpaid worked hours. This is necessary in order to have a full understanding of service needs and potential costs.

Service recipient workload activities are all classified in an activity category of Diagnostic/Therapeutic Intervention. These are further defined as:

**Diagnostic Intervention** refers to an activity carried out/service provided that is often individually designed for a specific service recipient or group of service recipients and/or their significant other(s) that is associated with assessing the presence, absence or status of a disease process or health condition.

**Therapeutic Intervention** refers to an activity carried out/service provided that is often individually designed for a specific service recipient or group of service recipients and/or their significant other(s) that is aimed at health promotion and disease prevention, improving/maintaining health status, or minimizing the impact of deterioration on function and quality of life.

Workload times are attached to the dictionary item that you order and complete in your computer system (Meditech). Every time you sign off an exam requisition; workload is calculated in the background and attributed to your functional centre. The diagnostic/therapeutic intervention activity time includes:

- initial handling and set up;
- service recipient preparation and instruction;
- diagnostic/therapeutic activities:
  - assessment (pre & post exam monitoring);
  - administration of radiopharmaceuticals, contrast media and medications;
  - service recipient care activities;
  - MRSA/VRE/latex activities;
  - catheterization;
  - image acquisition;
  - image processing/ post processing; and
  - image quality assessment;

- service recipient assistance;
- clean up; and
- clinical documentation.

Refer to Schedule of Unit Values (CIHI national average times) link provided on page 41.

### Non-Service Recipient Activities

Non-service recipient activities are integral to the functional centre's operations but they do not involve the delivery of services to service recipients and/or their significant others. Non-service recipient workload is divided into four main components (see below) and has the following characteristics:

- it is not directly related to service recipient care but supports the activity of the department/program, the organization or the community;
- it includes activities related to education or research; and
- it is not normally census driven.

### Functional Centre Activities

Functional centre activities are activities required for the operation/maintenance of the functional centre and for the benefit of staff. This category includes but is not limited to:

- **Functional Centre Management:** Includes but is not limited to:
  - housekeeping/clerical activities;
  - organizing files;
  - orienting staff;
  - recording and calculating workload and other statistical data;
  - preparing non-clinical documentation;
  - compiling data for reports and management purposes;
  - management activities related to discipline specific activity; and
  - development of discipline specific service programs;
- **Employee Meetings:** Includes, but is not limited to, formal and informal meetings of functional centre staff for the purpose of disseminating and receiving information pertaining to the operation of the functional centre and the organization;
- **Caseload Management:** Includes, but is not limited to, prioritization and assignment of service recipients within a caseload, receiving of referrals, etc.;
- **Maintenance:** Includes, but not limited to, activities such as maintaining a safe, tidy environment, maintenance of equipment and inventory control;
- **Quality Management:** Includes, but is not limited to, time spent attending quality management meetings; performing and documenting activities that improve the quality of services delivered commensurate with functional centre policy, industry and accreditation standards; and

- **Travel:** Includes, but is not limited to, internal and external travel associated with the activities listed above, as well as travel associated with the provision of services to service recipients within the organization or in their home. Also includes portering\* of service recipients when performed by staff.

*\*Portering of service recipients is considered a non-service recipient activity, under activity category functional centre activities when it does not require the skills of your discipline.*

### Organizational/Professional Activities

Organizational/professional activities are performed for the general functioning and direct benefit of the organization, community or profession. Such activities may include:

- **Board/Committee Functions:** Activities performed during worked hours relating to the preparation, attendance and follow-up of health service organization board/committee functions (e.g. Accreditation Committee meetings, Occupational Health and Safety Committee work);
- **Program Management:** Management activities related to multidisciplinary program(s) and program management activities related to the organization as a whole;
- **Public Relations:** Activities directly associated with the public relations function of the health service organization. Includes, but is not limited to, planning, meetings and participation in the event (e.g. media events, information programs, preparing articles for publication, etc.);
- **Professional Activities:** Services provided to the professional, scientific and local communities, agencies and service groups during worked hours (e.g. participation in professional association committees);
- **Advocacy-Professional:** Activities related to advocacy on behalf of your profession; and
- **Travel:** Internal and external travel associated with the above organizational/professional activities.

### Teaching/In-Service

Teaching/in-service includes activities devoted to the dissemination of knowledge by functional centre staff, through lectures, presentations, observations or direct participation, to individuals other than service recipients. It includes, but is not limited to, clinical placements of students, information sessions for other staff, formal lectures to university/college students. This also includes in-service education received by staff. Some examples include:

- **Students:** Activities associated with the preparation, orientation, instruction, supervision and/or evaluation of students prior to, during or immediately following their clinical placements. Excluded are service recipient related activities performed during the course of teaching;

- **Professionals:** Activities associated with the preparation, orientation, presentation and/or instruction of other professional staff;
- **Academic:** Activities involved in the preparation and presentation of course/lecture material to students and evaluation of students as part of their academic curriculum;
- **In-Service Education:** Activities include, but are not limited to, receiving usually brief, in-house educational information sessions presented by other staff of the organization, orientation to new procedures or equipment, grand rounds and reading of professional journals, books and on-line articles; and
- **Travel:** Internal and external travel associated with the above teaching/in-service activities.

*Note: Professional development, which is tracked by the payroll system as a benefit hour (usually as education leave), is excluded from this in-service education definition. Professional development activities are longer, more formal, discipline-specific and are usually greater than ½ day in duration. Professional association annual conferences, courses, symposiums, seminars and workshops are examples of typical professional development activities. It also includes related travel.*

## Research

Research is defined as formally designed and approved clinical investigations directed towards advancing knowledge in the field of health and the delivery of health services, using recognized methodologies and procedures. This category includes activities performed during worked hours such as reviewing previous research, writing research proposals, compiling and analyzing data, report writing and travel related to these activities.

It excludes the provision of service recipient activities, which is provided as a part of the research program. These are recorded as service recipient workload units under the appropriate category.

*Note: Informal research is recorded as non-service recipient workload, teaching/in-service.*

## 6.4 Time Recording Methodology

The medical imaging WMS provides a method for the recording of the time spent on service recipient and non-service recipient activities.

The purpose of a workload measurement system is to track the hands-on time, in minutes, that unit-producing personnel spend performing the activities/tasks that fulfill the mandate of the functional centre. The time being tracked should be reflective of all service recipient and non-service recipient activities performed by the unit-producing personnel of the specific functional centre and be collected in a consistent manner. If the time is not reflective of the

work, performance indicators will not be accurate and comparative reporting will be compromised.

The following describes the three different time recording methodologies: average, standard and actual time recording. The method employed will vary from functional centre to functional centre, from organization to organization, and from one type of workload being collected to another. Service recipient activities within the medical imaging WMS are primarily based on the average time recording methodology. However, a standard time may work well for recording time associated with a specific service recipient workload activity that is performed frequently and for which no average unit value has been published. Standard time may also be used in those cases when the published average unit value does not reflect the time required to perform the activity (i.e. the published average unit value is either too high or too low). On the other hand, actual time recording may be the best methodology to record non-service recipient activities.

The unit of measure for all recording methodologies is the workload unit, where one workload unit is equal to one minute of unit-producing personnel time spent performing service recipient and non-service recipient activities of the functional centre.



One Workload Unit = One Minute

Figure 16

### Average Time Recording

The average time-recording methodology uses specific unit values that have been assigned to activities, based on time studies undertaken at a national level across a sample of Canadian health care organizations of varying size and type. The average times applicable to medical imaging services are included in the Schedule of Unit Values in MIS Standards and found as a reference document on the Centre's website (see page 41 for link). The published unit values represent the average number of minutes of unit-producing personnel hands-on time that it takes to complete a defined activity once. At the end of the reporting period, the unit values are multiplied by the number of times this activity was performed to arrive at the 'total workload units per activity'. The sum of all activity totals yields the total number of minutes of unit-producing personnel time spent in the performance of service recipient activities where the average time methodology is used.

Average time values, developed through time studies should be considered as "points of reference" rather than absolute measures of the time required to perform an activity. The responsibility for the relevancy and accuracy of the timings ultimately rests with the organization that is collecting WMS data.

Though the list of activities and the published unit values are reviewed regularly, there may be situations whereby the published average time may not be reflective of the work performed by the unit-producing personnel. In these circumstances, organizations are encouraged to conduct a time study and submit the results to the Provincial Medical Imaging MIS Committee for review. The MIS Committee will forward any provincial changes to CIHI for consideration and possible inclusion in the schedule of unit values.

## Standard Time-Recording

If average times are not reflective of the work performed by the unit-producing personnel in a specific functional centre, medical imaging may choose to use standard time for collecting workload data as an alternative to using the average time recording methodology. Standard times are assigned to activities performed by the staff of the functional centre, where each standard time represents the functional centre's average time to perform the exam for the average service recipient by the average service provider under average circumstances. Standard times are site-specific averages and therefore reflect the style of practice and the environment in which the service is provided. A health service organization may wish to conduct a concurrent evaluation to determine the appropriateness of the standard times if there is any concern that the standard times may be inaccurate or if an operational or technological change has occurred. Organizations should review/revise their standard times at least annually to ensure ongoing reliability and validity of the data collected.

Standard times can be developed using a variety of methods including but not limited to:

- **Work sampling:** In work sampling, random observations are made of service providers to determine the ratio or percentage of time an activity occurs within a given time period;
- **Activity time studies:** Time studies measure the time required by a service provider to perform a given task/procedure following a specified method under typical working conditions. The steps used in conducting a time study to determine a standard time are the same as those used to conduct a time study for the development of an average time (see Conducting a Time Study page 52 for more detail);
- **Consensus approach:** Expert opinion within the health service organization is used to determine standard times by consensus;
- **Published standards:** Published time values can be used by health service organizations to develop their standard times; and
- **Combination of several methods:** Standard times can be developed using a combination of methodologies such as those described above.

When developing standard times for activities the following steps should be used:

1. develop a functional centre master activity profile:
  - identify all exams/activities performed by the unit-producing personnel of the functional centre;
  - describe the tasks included in each of the defined exams/activities;
  - group each exam/activity into the appropriate workload category - service recipient activities and non-service recipient activities;
2. develop standard times:
  - include initial handling/set-up, service recipient preparation/instructions, diagnostic/therapeutic activities, service recipient assistance, clean-up and clinical documentation time in the standard time for exams;

- develop a standard time for each defined exam/activity and determine the method that will be used to determine the standard time;
3. develop a workload recording system:
- list the exams/activities identified in Step 1 and their corresponding standard times; and
  - develop a recording system (manual or computerized) which allows for a tally of exams/activities, categorized by workload or activity category, and by category and type of service recipient (e.g. inpatient, client hospital, resident).

### Actual Time-Recording

The most accurate way to record the exact time spent providing service recipient and non-service recipient activities is using a watch. Each unit-producing personnel would do this retrospectively throughout each calendar day. This method may be appropriate for recording times for activities that are not performed often or those in which the time varies from occasion to occasion. It may not be advantageous however to record workload data in this way for all activities as it may be too time-consuming for the staff to do on a day-to-day, hour-by-hour basis and may take valuable time away from fulfilling the mandate of the functional centre.

The use of time blocks may be one way to ease the workload data collection burden. Time blocks should be no more than 10 minutes in order to minimize variances due to rounding. Depending on the length of time it takes to perform most activities, time blocks of 5 minutes or less may be more appropriate to use. Although some error may be introduced, this is generally insignificant since the variances due to overestimating and underestimating the actual time spent tends to be offset when summed. Time should be captured as precisely as possible to ensure accurate data. All blocks should be converted to minutes at the end of the reporting period.

The following steps are integral to this methodology:

**Step 1:** Prepare a time block schedule as follows:

Minutes Spent Performing Workload Activity	Time Blocks
1-4	0
5-14	1
15-24	2
25-34	3
35-44	4
45-54	5
55-64	6
etc.	

Figure 17



**Step 2:** Develop a time block recording system whereby all unit-producing personnel would refer to their watch when they have completed an activity. The appropriate number of time blocks would be recorded to reflect this. For example, if Mary Smith attended a functional centre meeting for 50 minutes, she would record five time blocks under the non-service recipient functional centre activity category.

**Step 3:** At the end of the reporting period, all time blocks are converted to minutes by multiplying the sum of the time blocks in a particular workload activity category by ten to determine the workload units. For example, if 10 activities with a time block of 6 were collected and 20 activities with a time block of 5, then the total workload in minutes is  $(10 \text{ activities} \times 6 \text{ time blocks} \times 10 \text{ minutes} = 600) + (20 \text{ activities} \times 5 \text{ time blocks} \times 10 \text{ minutes} = 1000) = 1600 \text{ minutes or } 1600 \text{ workload units}$ .

### Conducting a Time Study

One of the ways to develop average times nationally, or standard times locally, is to conduct a time study within a particular functional centre. The goal is to determine the average time it takes the average service provider to perform a particular activity for the average service recipient under average circumstances.

Time studies should be conducted when activities that are being performed in the functional centre do not currently exist in the schedule of unit values or when an assigned value or the tasks within the activity differ from that in the schedule of unit values. A standardized timing protocol has been developed to promote flexibility and adaptability of unit values to a variety of settings and accurately reflect resource requirements. The time study protocol is also intended to provide a consistent approach to performing time studies.

Whenever a time study is performed for new activities, or when published values are significantly different; medical imaging departments are encouraged to submit the results of the time studies to Medical Imaging MIS Committee for evaluation and discussion. The MIS Committee will forward any provincial changes to CIHI for review and possible inclusion in the maintenance of the MIS Standards medical imaging WMS schedule of unit values.

In the medical imaging workload measurement system service recipient activities are typically assigned a unit value. Non-service recipient activities, on the other hand, are usually recorded using actual time methodology. By definition, the unit value for an activity is equivalent to the number of minutes of unit-producing personnel time required to complete the activity once. Therefore, to determine the unit value for an activity, time studies must be conducted in a routine setting to measure the amount of time required to perform all tasks that are part of that activity. It is preferable to time different personnel, at different times in order to obtain a representative average.

*Note: Activities, which are typically performed by clerical/secretarial staff, darkroom technicians, film librarians or physicians, are excluded from time studies. Examples include appointment booking and service recipient registration and order entry. Waiting time and non-service recipient activities such as teaching, in-service education, administrative duties (e.g. scheduling, purchasing), research and development, etc. are also not included in time studies.*



### Fields of Observation

When performing time studies, the following fields of observation are typically measured where applicable:

- initial handling/set-up;
- service recipient preparation/instructions;
- diagnostic/therapeutic activities;
- service recipient assistance;
- clean up; and
- clinical documentation.

The accuracy of the unit value for an exam will depend on identifying and measuring all the activities that occur as part of the exam. Further, the assignment of the unit value must reflect the average time it takes the average service provider to perform the activity for the average service recipient under average circumstances.

### Steps in Conducting a Time Study

A single individual (surveyor) who is knowledgeable about the activity would conduct the time study as follows:

1. Observe the exam to be studied. Identify and note each step to be timed including initial handling/set-up, service recipient preparation/instructions, diagnostic/therapeutic activities, service recipient assistance, clean up and clinical documentation time prior to performing the actual timings;
2. Prepare the necessary forms to record the times for each activity.
3. Measure the time spent by unit-producing personnel to perform the exam using a stopwatch or other suitable timer;
4. Time different personnel performing all tasks within the activity on different days of the week and at different times. Include productive time only—exclude waiting time or other unproductive time;
5. Time all steps as many times as required (the number of timings will depend on the time variability of each step). If the times vary markedly, perform additional timings. If an activity is rarely performed, it is acceptable to complete and document a timing only once;
6. Group activities consistently when conducting timings where activities are being grouped;
7. Average the time values by dividing the total time by the number of timings to determine the time to perform that exam once;
8. Record the average value in all systems that rely on this information to assign the workload units for a particular exam;
9. File all documentation related to the time study for future reference;
10. Re-conduct a time study on a regular basis to maintain the validity of the time value. These should be done when there is a consensus among the staff that the time does not reflect current practice, when the functional centre begins providing service to different types of individuals/organizations, when new workload data

collection processes are implemented, or when the workload measurement systems in the MIS Standards are revised.; and

11. Submit the completed time study to the Provincial Medical Imaging MIS Committee who will forward to CIHI for exams not currently in the schedule of unit values or exams where time requires revision. The time study will be considered for inclusion in the next revision of the medical imaging WMS.

### **Activities Included in Time Study Where Applicable**

#### **Initial Handling/Set Up**

Includes reviewing the requisitions for completeness and appropriateness, entering information/demographic data into a computer system when done routinely as part of an exam, and adding service recipient identification to images.

Includes setting up the equipment prior to the exam, preparing the examination room, preparing the equipment and materials for the service recipient and the room for aseptic techniques.

*Note: Only include the time spent by medical radiation technologists or diagnostic medical sonographers doing the technical component of the exam.*

#### **Activities:**

- review of requisition;
- enter information/demographic data into a computer system interfaced/integrated with imaging equipment;
- add service recipient identification to images;
- set-up equipment prior to exam;
- prepare examining room;
- prepare equipment and materials for the service recipient; and
- prepare room for aseptic techniques.

#### **Service Recipient Preparation/Instructions**

Includes activities associated with assessing the service recipient's status (e.g. vital signs, history, etc.) prior to the exam, educating the service recipient (e.g. breast self exam, post-exam care such as diet, activity levels, signs/symptoms to watch for), consulting and reviewing the chart, explaining the exam, ensuring the consent for treatment is complete and preparing and positioning the service recipient.

#### **Activities**

- assess the service recipient's status;
- educate service recipient;
- consult and review the chart;
- explain exam;
- ensure the consent for treatment is complete; and
- prepare and position the service recipient.

#### **Diagnostic/Therapeutic Activities**

Includes the actual exam itself as well as monitoring or taking the service recipient's vital signs during and following the exam, administering radiopharmaceuticals and/or

contrast media, administering injectables, and conducting activities related to the care of the service recipient.

Includes assisting a radiologist or other specialist in the performance of the exam. Includes the manipulation, acquisition, processing, and quality assessment of the images.

**Activities:**

- perform assessment (pre and post exam monitoring);
- administer radiopharmaceuticals, contrast media and medications;
- perform service recipient care activities;
- perform MRSA/VRE/latex activities;
- participate in catheterization activities;
- acquire image;
- process image;
- perform image quality assessment; and
- image processing/ post processing.

Definition: The processing of 3D digital imaging data, following the original examination, to reconstruct and then generate traditional radiological projection(s). This digital manipulation occurs following the encounter with the service recipient therefore there is no subsequent radiological exam required.

### **Service Recipient Assistance**

Includes assisting a service recipient to and from the waiting area to the bed/stretchers/wheelchair.

Includes assisting other health care providers with any preparation related to transferring the service recipient back to their originating functional centre or health service organization. Excludes portering activities.

**Activities:**

- assist service recipient to and from waiting area to bed/ stretchers/wheelchair; and
- assist other health care providers in preparing the service recipient for transport.

### **Cleanup**

Includes clean up of the work area, decontamination procedures and disassembly of equipment where necessary.

**Activities:**

- clean-up work area;
- perform decontamination procedures; and
- disassemble equipment.

### **Clinical Documentation**

Includes documenting of service recipient and exam-related information, processing of images and/or data after the exam, inserting tracings or other documentation into

the service recipient's file, performing any calculations or interpretation of data, and performing picture archiving activities.

Excludes processing of billing information, image filing, report typing and handling, and film library requests.

Activities:

- document service recipient and exam-related information;
- process images and/or data post exam;
- insert tracings or other documentation into the service recipient's file;
- perform calculations or interpretation of data; and
- perform picture archiving activities.

## 6.5 Validity and Reliability

The validity of a workload measurement system is defined as its ability to measure what it is supposed to measure. Workload measurement systems should be reviewed annually to ensure that:

- the system reflects the activities of the service;
- the times reflect current reality when a standard or average time methodology is used; and
- data collection is consistent by routine reliability audits.

The reliability of an instrument is the degree of consistency with which it measures the attribute it is supposed to be measuring consistently. Inter-rater reliability refers to the extent to which data is reproducible by various staff members. It is important that different staff using the same measurement tool, measuring the same individual, at the same time, will derive a consistent result. A reliable system provides consistent data.

Factors that may influence the reliability of workload information include:

- characteristics of the tool or system (Is it user friendly or difficult to use?);
- terminology and definitions used;
- time required to enter information;
- person entering data (best if the person providing the care enters data);
- time of completion (close to time of intervention);
- motivation of the person recording (reduced if information not shared, not relevant, not valued, not used); and
- staffing levels (often left undone if understaffed).

Factors to consider when selecting a workload measurement system reliability process:

- when reliability data does not meet standards, the number of checks should be increased until the problem is identified, strategies for improvement implemented and reliability scores have improved;
- audits should be random;

- when more than one category of service recipient is treated in one functional centre, audits should be completed on each category; and
- efforts should be made to review the workload recorded by several people.

The MIS Standards recommend at least an 85% inter-rater reliability rate. Inter-rater results that fall below the target indicate a need for re-education, redesign of the tool/system or the instructions on how to enter data. The frequency and number of checks should be related to the use of the data and the importance of the resulting decisions.

Workload data must be considered valid and reliable before it can be used for decision-making or for external comparisons. In some provinces, workload is used in the current funding formula as the base for cost allocation between funding groups. Service recipient workload is used inpatient/resident/client specific costing which is consequently used in the development of weights for case mix groupings.

## 7 MEDICAL IMAGING NURSING DATA COLLECTION

Nurses who work in medical imaging (MI) areas are assigned to the MI nursing functional centre. Section 3.1 gives a full listing of nursing functional centres that are available for use, as well as, definitions for those functional centres.

The MI nursing functional centre uses the generic model for collecting nursing workload. Key information is summarised below. For further detail the nursing WMS is described in detail in the Nursing MIS Reference Guide section 6.0.

Service activity statistics are also collected by nurses working in MI nursing functional centres. Ambulatory nursing functional centres collect the service activity statistic called Visit (450) and can also collect optional statistics as deemed appropriate. Further detail is outlined in section 7.2 below. Any further information can be found in section 7 and 8 of the Nursing MIS Reference Guide.

### **7.1 Generic Workload Measurement and Reporting Framework**

#### **What is a Workload Measurement System?**

A workload measurement system (WMS) is defined as a tool for measuring the volume of services provided in terms of a standardized unit of productive personnel time and serves as a:

- department management tool to provide systematic quantification of workload to assist in staffing, planning, budgeting and performance monitoring;
- standardized method for recording workload that will yield uniform data for internal and external reporting, permitting historical trending and selective national and peer group comparisons.

The Generic Workload Measurement and Reporting Framework provides a model for data collection and reporting for many clinical disciplines while enabling users to customize the level of detail for their discipline or service.

Workload is collected for all activities that are undertaken on behalf of a service recipient. A service recipient is defined as the consumer of primary service activities of one or more functional centres of the health service organization. Service recipients include individuals (e.g. inpatient, residents, clients) and their significant others. Significant others are individuals who are acting on behalf or in the interest of the service recipient, such as parent, spouse/partner, child, legal guardian or substitute decision-maker.

The workload measurement system classifies workload into two main categories: service recipient activities and non-service recipient activities. In this context the term “service recipient” should be considered synonymous with the terms “client,” “resident,”

“inpatient,” etc., whichever term best suits the health organization’s philosophy of care and mandate.

## GENERIC WORKLOAD MEASUREMENT AND REPORTING FRAMEWORK

### Conceptual Model for Nursing

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Workload Categories	SERVICE RECIPIENT ACTIVITIES			NON-SERVICE RECIPIENT ACTIVITIES			
Activity Categories	Assessment	Therapeutic Intervention	Consultation/ Collaboration	Functional Centre Activities	Organizational/ Professional Activities	Teaching/ In-Service	Research
Component Activities	Screening	Treatment Procedures	Case Conferences	Functional Centre Management	Board/ Committee Functions	Students	Project 1
	Physical Health Assessment	Self-care Facilitation	Professional Consultation	Employee Meetings	Public Relations	Professionals	Project 2
	Psycho-Social Assistent	Medication Management	Service Rounds	Caseload Management	Professional Activities	Academic	Travel
	Diagnostic Tests & Measures	Activity Enhancement	Team Meetings	Maintenance	Program Management	In-Service Education	
	Service Planning	Elimination Management	Clinical Documentation	Quality Management	Advocacy – Professional	Travel	
	Functional Needs Assessment	Communication Enhancement	Report	Travel for Functional Centre Activities	Travel		
	Cognitive Assessment	Coping Assistance & Support		Travel to and from the place where service recipient activities are provided*			
	Diagnostic Procedures	Cildbearing Care					
	Clinical Documentation	Locate/Arrange Resources					
		Service Recipient Transportation					
		Counselling					
		Service Recipient Teaching					
		Advocacy – Service Recipient Specific					
		Discharge Planning					
		Monitoring/ Evaluation					
		Clinical Documentation					

Figure 18

### Service Recipient Activities

All work on behalf of service recipients (e.g. inpatients, residents, clients) is recorded, even if outside regular working hours (e.g. during overtime hours); but not unpaid worked hours. This is necessary in order to have a full understanding of service needs and potential costs. Service recipient workload activities are divided into three main components: (See below);

### **Assessment**

Assessment refers to a series of activities/interventions conducted for the purposes of:

- evaluating the need for services;
- assessing an individual's physical, psycho-social, emotional and cognitive health status;
- identification of service recipient goals and expected outcomes;
- identification of a diagnosis and consequences of health conditions; and
- determining the extent of services required.

Assessment in this context is a formal, comprehensive process that may include observations, interviews/verbal reporting, the administration of specific assessment tools and standardized tests and measures.

This activity includes:

- preparation;
- collection of background information relevant to the service recipient's health and health management profile;
- analysis of the assessment findings;
- formulation of a working diagnosis;
- development of the care/therapeutic intervention plan;
- documentation of assessment findings;
- assessment for the purposes of re-evaluating and updating goals, expected outcomes; and
- documenting health status at the time of discharge.

Assessment excludes the ongoing monitoring activities and evaluation associated with a specific intervention.

Information may be obtained from a variety of sources such as the patient/client/resident, family, employer, teacher, written documentation from the health record and other sources.

### **Therapeutic Intervention**

Therapeutic intervention refers to all activities carried out with or on behalf of a service recipient and/or significant other(s) that are aimed at health promotion and disease prevention, improving/maintaining health status or minimizing the impact of deterioration on function and the quality of life. Therapeutic interventions are often individually designed and supervised by the service provider for a specific person, organization or group.



Activities include:

- selection and prescription of activities according to the individual's physical and psychological impairments or disabilities, physical and psychological limitations, and requirements for equipment or assistive technology;
- preparation of treatment (individual or group);
- provision of specific techniques and procedures ;
- monitoring, revising and/or progressing activity or programs based on the service recipient's responses; and
- clinical documentation related to the intervention activities.

Therapeutic intervention includes individual, family, couples, group sessions, preparation for therapy, administering the therapy and clinical documentation.

### **Consultation/Collaboration**

Consultation/collaboration refers to contact with service providers from within the organization, other organizations, the community or other agencies for discussion regarding specific service recipients to obtain, provide or exchange information relative to the person's care. The purpose of the consultation may be focused on the needs of a service recipient/family or on improving the effectiveness of a system/environment. Discussions may be formal or informal. It includes any regularly scheduled or attended meetings of professionals to coordinate team efforts for activities provided to service recipients.

Examples of consultation/collaboration activities:

- case conferences;
- service rounds;
- team meetings;
- completion of referrals;
- shift report; and
- clinical documentation related to these activities is also included.

*Note: Clinical documentation includes those activities related to the service recipient records, including documentation of assessment findings, service planning, intervention/treatment plans, discharge plans, specific interventions provided and preparation or review of reports, written opinions, etc. Time spent on documentation should be recorded under the appropriate category of assessment, therapeutic intervention or consultation/collaboration, depending on the nature of the documentation.*

### **Non-Service Recipient Activities**

Non-service recipient activities are integral to the functional centre's operations but they do not involve the delivery of services to service recipients and/or their significant others. Non-service recipient workload is divided into four main components (see below) and has the following characteristics:

- it is not directly related to service recipient care but supports the activity of the department/program, the organization or the community;
- it includes activities related to education or research; and
- it is not normally census driven.

### Functional Centre Activities

Functional centre activities are activities required for the operation/maintenance of the functional centre and for the benefit of staff. This category includes but is not limited to:

- **Functional Centre Management:** Includes but is not limited to:
  - housekeeping/clerical activities;
  - organizing files;
  - orienting staff;
  - recording and calculating workload and other statistical data;
  - preparing non-clinical documentation;
  - compiling data for reports and management purposes;
  - management activities related to discipline specific activity; and
  - development of discipline specific service programs;
- **Employee Meetings:** Includes, but is not limited to, formal and informal meetings of functional centre staff for the purpose of disseminating and receiving information pertaining to the operation of the functional centre and the organization;
- **Caseload Management:** Includes, but is not limited to, prioritization and assignment of service recipients within a caseload, receiving of referrals, etc.;
- **Maintenance:** Includes, but not limited to, activities such as maintaining a safe, tidy environment, maintenance of equipment and inventory control;
- **Quality Management:** Includes, but is not limited to, time spent attending quality management meetings, performing and documenting activities that improve the quality of services delivered in keeping with organizational policies and industry standards; and
- **Travel:** Includes, but is not limited to, internal and external travel associated with the activities listed above, as well as travel associated with the provision of services to service recipients within the organization or in their home. Also includes portering\* of service recipients when performed by staff.

*\*Portering of service recipients is considered a non-service recipient activity, under activity category functional centre activities when it does not require the skills of your discipline.*

### Organizational/Professional Activities

Organizational/professional activities are performed for the general functioning and direct benefit of the organization, community or profession. Such activities may include:

- **Board/Committee Functions:** Activities performed during worked hours relating to the preparation, attendance and follow-up of health service organization board/committee functions (e.g. Accreditation Committee meetings, Occupational Health and Safety Committee work);
- **Program Management:** Management activities related to multidisciplinary program(s) and program management activities related to the organization as a whole;
- **Public Relations:** Activities directly associated with the public relations function of the health service organization. Includes, but is not limited to, planning, meetings and participation in the event (e.g. media events, information programs, preparing articles for publication, etc.);
- **Professional Activities:** Services provided to the professional, scientific and local communities, agencies and service groups during worked hours (e.g. participation in professional association committees);
- **Advocacy-Professional:** Activities related to advocacy on behalf of your profession; and
- **Travel:** Internal and external travel associated with the above organizational/professional activities.

### Teaching/In-Service

Teaching/in-service includes activities devoted to the dissemination of knowledge by functional centre staff, through lectures, presentations, observations or direct participation, to individuals other than service recipients. It includes, but is not limited to, clinical placements of students, information sessions for other staff, formal lectures to university/college students. This also includes in-service education received by staff. Some examples include:

- **Students:** Activities associated with the preparation, orientation, instruction, supervision and/or evaluation of students prior to, during or immediately following their clinical placements. Excluded are service recipient related activities performed during the course of teaching;
- **Professionals:** Activities associated with the preparation, orientation, presentation and/or instruction of other professional staff;
- **Academic:** Activities involved in the preparation and presentation of course/lecture material to students and evaluation of students as part of their academic curriculum;
- **In-Service Education:** Activities include, but are not limited to, receiving usually brief, in-house educational information sessions presented by other staff of the organization, orientation to new procedures or equipment, grand rounds and reading of professional journals, books and on-line articles; and

- **Travel:** Internal and external travel associated with the above teaching/in-service activities.

*Note: Professional development, which is tracked by the payroll system as a benefit hour (usually as education leave), is excluded from this in-service education definition. Professional development activities are longer, more formal, discipline-specific and are usually greater than ½ day in duration. Professional association annual conferences, courses, symposiums, seminars and workshops are examples of typical professional development activities. It also includes related travel.*

## Research

Research is defined as formally designed and approved clinical investigations directed towards advancing knowledge in the field of health and the delivery of health services, using recognized methodologies and procedures. This category includes activities performed during worked hours such as reviewing previous research, writing research proposals, compiling and analyzing data, report writing and travel related to these activities.

It excludes the provision of service recipient activities, which is provided as a part of the research program. These are recorded as service recipient workload units under the appropriate category.

*Note: Informal research is recorded as non-service recipient, teaching/in-service workload.*

## 7.2 Service Activity Statistics

Service activity statistics are captured in functional centres providing service recipient care. They identify the volume of activities that are provided to specific service recipients.

Service activity statistics supplement workload statistics in providing valuable information concerning the resources required for specific activities; they are intended to be used with matching workload statistics to measure functional centre productivity and the resource consumption of specific activities. These statistics are used with financial statistics to cost service recipient activity. The same categories of service recipients applied to workload statistics should be used with service activity statistics in order to identify the resource consumption of specific service recipient types (e.g. inpatient, resident, and client). See section 2.4 for further detail on categories of service recipients.

### Service Activity Statistics for MI Nursing Functional Centres

Visits - Face-to-Face (Required)  
Visits - Non-Face-to-Face (Required)  
Attendance Days - Face-to-Face (Optional)  
Attendance Days - Non-Face-to-Face (Optional)

Figure 19

## Required Statistics - Definitions

- **Visits - Face-to-Face** are defined as the occasions during which service recipient activities are provided face-to-face or by videoconference on an individual or group basis, to a service recipient or significant other. These services are documented according to the organization's policy and are provided for longer than five minutes. If a person is seen more than once in a 24-hour period, more than one visit – face-to-face is recorded for that day. If a person is seen by two staff members at the same time, only one visit is recorded, both staff members record workload.
- **Visits - Non-Face-to-Face** are defined as the occasions when service recipient activities are provided to service recipients or significant others by means other than by face-face. These occasions take the place of a visit – face-to-face. Examples may include visits via telephone, email or other forms of electronic communication, either on an individual or a group basis. These services are documented according to the health service organization's policy and are provided for more than 5 minutes. A service activity statistic, a sub-category of service activity and caseload status, Broad Group 4. If a person is contacted more than once in a 24-hour period, more than one visit – non-face-to-face is recorded for that day.

Discussion of a service recipient with another professional over the phone is recorded as service recipient workload: consultation/collaboration but no activity statistic is recorded. When answering telephone requests from the general public for information about the service, the time is recorded as non-service recipient: organizational/professional activities, but no activity statistic is recorded.

## Optional Statistics

- **Attendance Days – Face-to-Face** refers to the number of calendar days during which primary service activities are provided to service recipients face-to-face or by videoconference on an individual or group basis. It is intended to represent a meaningful interaction that involves the provision of services and not simply a social interaction. Service is provided for longer than five minutes and is documented according to the health service organization policy.

Only one attendance day – face-to-face is recorded for each person, each day, for each functional centre even if several different staff interact with the person or if the person visits the department several times during the day. If several providers in one functional centre report contact with the same service recipient during a 24-hr period, the total workload associated with these contacts is recorded and linked to one attendance day – face-to-face for the functional centre.

An attendance day – face-to-face is intended to reflect a therapeutic interaction and a minimum of 5 minutes of service (not necessarily staff time) is required. If the person is involved in a group activity, the workload units of the nurse assigned for the individual patient may not be greater than 5 minutes, on a per person basis. However, the service received by the person is greater than 5 minutes; therefore an attendance day is counted.

An attendance day – face-to-face requires face-to-face contact with the service recipient or significant other, either in-person or by video conference. If the service recipient and significant other(s) are seen together, only one attendance day – face-to-face is recorded. The workload will reflect the additional time that may be required to communicate with more than one person. If the significant other is seen without the service recipient, an attendance day is recorded under the service recipient registration number/name.

- **Attendance Days - Non-Face-to-Face** refers to the calendar days during which service recipient activities are provided to service recipients or significant others by means other than by face-to-face. These calendar days take the place of an attendance – day face-to-face. Examples may include attendance days via telephone, email or other forms of electronic communication, either on an individual or group basis. These services are documented according to the health service organization's policy and are provided for more than 5 minutes.

*Note: If services are provided face-to-face and non-face-to-face on the same calendar day, only an attendance day – face-to-face is recorded for that day, regardless of which occurred first.*

## 8 TURNING DATA INTO INFORMATION

### 8.1 Information Pathways

Financial information is maintained in the Meditech systems of the Regional Health Authorities as well as the Client Pay Module of the Client and Referral Management System (CRMS).

Statistical information in Newfoundland and Labrador is collected by frontline staff in a number of ways:

- electronically (by spread sheet or computer program);
- as a by-product of charting (collected in the background in your computer system); or
- manually.

Regardless of the method of data collection, the information must be entered into the statistical general ledger of the regional Meditech system for regional use and external reporting.

Financial and statistical information is submitted electronically by the Regional Health Authorities to the Provincial MIS Database at the Department of Health and Community Services. The information is used for budget monitoring, service planning, resource allocation, etc.

The Department of Health and Community Services submits the data electronically to the Canadian MIS Database (CMDB) at CIHI. This information is used to determine Canada's health expenditures, meet international reporting requirements, calculate national economic indicators such as the gross domestic product and conduct health and health system evaluation and analyses. The diagram below illustrates the flow of financial and statistical information from the points of data collection within the Regional Health Authorities to the CMDB.

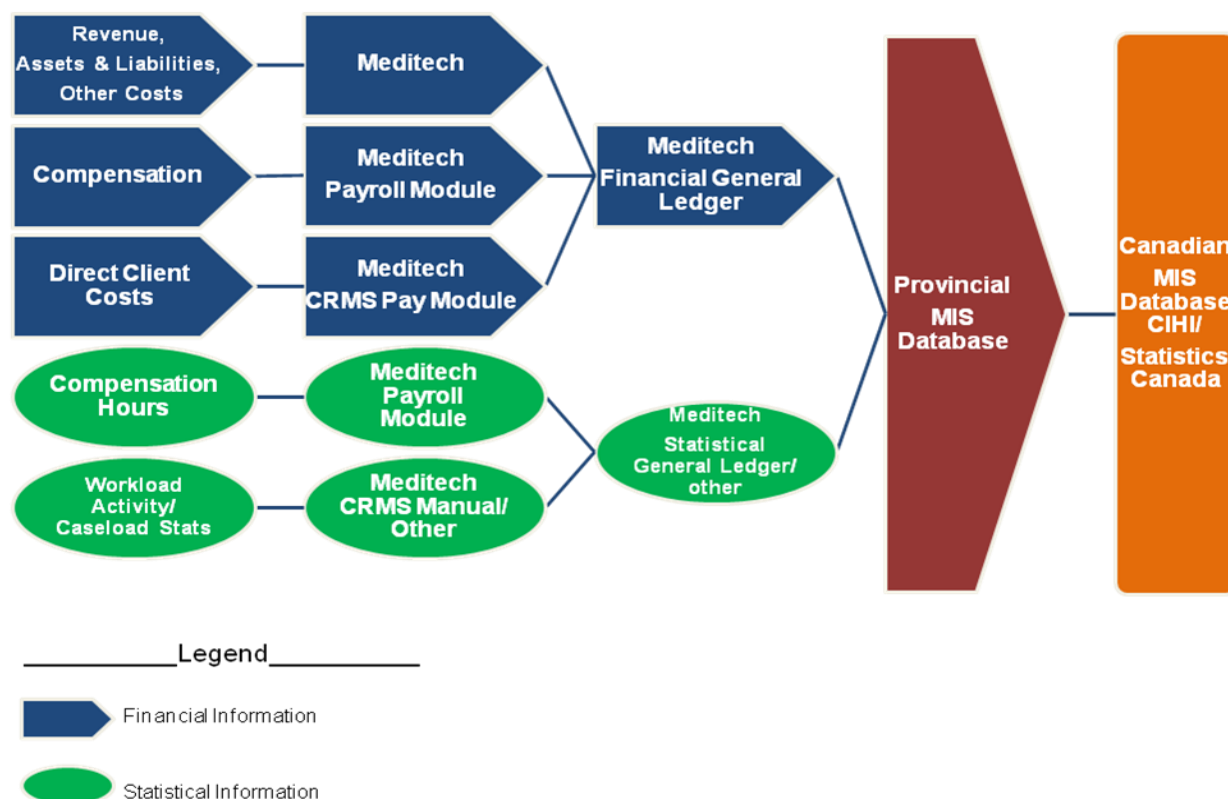


Figure 20

## 8.2 Performance Indicators

Data are statistics that, on their own, may not have a great deal of value or meaning. In order to be useful and relevant, good quality data must be turned into meaningful information which is accurate, timely, comprehensive, useable and relevant. When workload data is linked to financial or other statistical data to create performance indicators, the data can then be used for decision-making.

Indicators are ratios or percentages calculated from financial and/or other statistics that quantify a relationship between the data elements. Indicators measure performance and provide information that can be used to facilitate decisions or compare performance, such as, cost per workload unit (see Figure 18). They turn data into useful information.

The MIS Standards contain numerous indicators within the five categories of financial, staffing, productivity, utilization and workload. They can be used to analyze and interpret workload data and service activity statistics and can assist staff and managers in analyzing and evaluating their services. Indicators are valuable decision-support tools for service planning, impact analysis and effective management.

Implementation of a workload measurement system and reporting of workload and other statistical data is not the ultimate goal however; the primary value in workload measurement is the use of the information to make better management decisions. This is essential in order



to gain value from the time, effort and dollars consumed in the workload collection process. Appropriate use of the information and feedback to staff will enhance understanding and support for accurate information, resulting in better data quality.

Selected examples of some key indicators, their calculations and interpretation have been included in this section:

- cost per workload unit;
- workload units per activity;
- cost per workload unit by service recipient type; and
- worked productivity

### Cost per Workload Unit

This indicator describes the cost to provide one minute of service or one workload unit.

$$\text{Cost per Workload Unit} = \frac{\text{Defined Cost}}{\text{Workload Units}}$$

Figure 21

The costs in this formula can be defined as:

- **full cost** which includes both direct and indirect functional centre costs;
- **direct cost** which includes only direct functional centre costs; or
- **a specific component** of direct cost such as unit-producing compensation, supplies or sundry.

Workload can be defined as:

- **total** (service recipient and non-service recipient);
- **service recipient**; or
- **non-service recipient**.

The cost and workload values selected for measurement will be dependent on the intended use of the data. The components of this indicator must be known when comparing costs across organizations. One of the most commonly used financial indicators is direct cost per service recipient workload unit. Total cost per service recipient workload unit is used to support case costing analysis. Managers will find that compensation cost per workload unit is valuable to support human resource decisions as well.

Factors that may affect this indicator include:

- staff mix;
- workload measurement system in use;
- overtime;
- use of on-call staff; and

- sick time;
- education and orientation costs;
- benefit compensation packages; and
- compensation levels.

Cost per workload unit can be used, in conjunction with workload units per activity, to determine costs of new programs and services and to determine the financial resources to be added, transferred or removed from a functional centre due to changes in population served, program or service (i.e. impact analysis).

### Cost per Workload Unit by Service Recipient Type

Workload units by service recipient type is used in calculating the costs of specific patient/resident/client type services for funding purposes and for calculating the impact of changes in service recipient characteristics.

$$\text{Cost per Workload Unit by Service Recipient Type} = \frac{\text{Total Cost for Functional Centre}}{\text{Total Service Recipient Workload Units}} \times \text{Workload Units per Type}$$

Figure 22

### Workload Units per Activity

This indicator describes how workload is related to a specific activity, such as an attendance day, admission or visit.

$$\text{Workload Units per Activity} = \frac{\text{Workload Units for the Defined Activity}}{\text{Volume of Activity}}$$

Figure 23

The workload units used could be:

- **total** (service recipient and non-service recipient);
- **service recipient; or**
- **non-service recipient.**

The workload unit(s) used will depend on the intended use of the data. When calculating staffing for changes in-patient/resident/client volumes, only the service recipient workload should be considered as non-service recipient workload is not volume dependent and will remain despite changed service volumes. This would also apply when considering changes in service recipient type (i.e. chronic rather than acute, or inpatient rather than client).

Factors that can affect this indicator include:

- availability of support staff on the unit;
- availability of other health professionals;
- physician ordering practices;
- care delivery models;
- nursing care models;
- organizational policies;
- facility layout; and
- patient/resident/client acuity and demographics.

### **Productivity**

Productivity is the relationship between inputs and outputs. In this context inputs are worked hours and outputs are workload units. The goals or targets set for productivity indicators depend on the circumstances and the strategic goals of the organization.

The options for increasing productivity include:

- maintaining the worked hours but increasing the workload units;
- decreasing the worked hours but maintaining the workload units;
- decreasing both the worked hours and workload units but decreasing the worked hours more than the workload units;
- increasing both the worked hours and workload units but increasing the workload units more than the worked hours; or
- decreasing the worked hours and increasing the workload units.

The MIS framework does not include coffee breaks in workload measurement. Coffee breaks alone can account for 7-8% of worked hours; in addition, at least 5% is usually lost to personal or delay time. Therefore the maximum productivity which can be expected is approximately 87%. Realistically, 80-85% total productivity is a reasonable level of accountability of how worked hours were spent. If productivity is higher than this it could be related to:

- staff working through coffee and/or lunch;
- presence of students;
- staff working unpaid hours to provide service recipient care; or
- inaccurate reporting of either worked hours or workload.

Two of the most commonly calculated productivity indicators are:

- unit-producing personnel worked productivity (%); and
- unit-producing personnel total productivity (%).

### **UPP Worked Productivity (%)**

Productivity is expressed as a percentage and therefore will be multiplied by 100. This indicator calculates the percentage of all unit-producing personnel worked and purchased hours spent in the provision of service.

$$\text{UPP Worked Productivity \%} = \frac{(\text{Service Recipient Workload Units}) \div 60}{\text{UPP Worked} + \text{Purchased Hours}} \times 100$$

Figure 24

### UPP Total Productivity (%)

This indicator calculates the percentage of all unit-producing personnel worked and purchased hours spent in the provision of service recipient and non-service recipient activities.

$$\text{UPP Total Productivity \%} = \frac{[(\text{Service Recipient} + \text{Non-Service Recipient Workload Units}) \div 60] \times 100}{(\text{UPP} + \text{Purchased Hours})}$$

Figure 25

### Performance Indicators Related to Resource Consumption

The following performance indicators are considered the most useful for organizational comparisons and to also provide a comprehensive picture of a department/program. Individual organizations may elect to produce other indicators that are relevant to its needs.

The formulas for these indicators are included in the MIS Standards:

- unit-producing worked productivity (%);
- unit-producing total productivity (%);
- percentage of distribution of workload, by category of service recipient;
- percentage of distribution of workload, by workload categories;
- direct cost per workload unit;
- workload units per in-house exam;
- service recipient workload units per UPP full-time equivalent; and
- number of full-time equivalents per occupational group/class.

To effectively allocate and use resources policy makers, health administrators and professionals must understand resource consumption and costs of caring for groups of service recipients with varying needs, in different settings. Workload measurement data, in conjunction with other information, can provide valuable information to support decisions. At the department level these decisions include:

- identification of staff hours required to meet workload requirements;
- construction of a staffing schedule that reduces resource requirements;
- equitable staffing assignments;
- appropriate skill mix;
- optimal education level for the type of services provided; and
- best process for care delivery.

### How can Workload Information be used for Costing?

The allocation of functional centre costs is based on workload data that is considered to be the most accurate statistic to use. Workload values affect not only the allocation of functional centre direct costs to types of service recipients but also the distribution of indirect costs (administrative and support costs). This occurs because indirect costs are distributed to types of service recipients based on the direct costs.

### How can Organizations Apply Performance Indicators?

Reports generated using the financial and statistical data collected provide functional centre managers, senior health care executives and the board of trustees with information critical for decision-making. A view of specific information across all the organizations in a region (e.g. drugs, unit-producing compensation) can be important for a senior manager. The examples listed below will demonstrate some of the different ways financial and statistical data can be aggregated across health service delivery settings (e.g. acute care hospital, community health care centre, home care):

- budgeting/impact analysis;
- staffing/scheduling;
- human resource decisions;
- cost minimization; and
- quality initiatives

### Budgeting/Impact Analysis

Workload information can be used to determine zero based or flexible budgets for existing services or for planning the budget of a new or altered service

1. Predicted Volume X Service Recipient Workload per Activity = Predicted Service Recipient Workload
2. Predicted Service Recipient Workload X Cost per Service Recipient Workload Unit = Predicted Total Cost
3. Benefit Hours + Salaries + Benefit Contribution Dollars must then be added to develop the total budget.

Figure 26

### Increase/Decrease/Transfer of Service Recipients or Dollars within an Organization/ Between Organizations.

Workload information can prove helpful when trying to determine the staffing impact of increasing or decreasing a particular activity or when trying to determine the appropriate transfer of funds/staff that are linked to the particular activity.

Example: change of an acute inpatient service to a rehab service

To determine impact on staffing:

$$1. \text{ Number of Rehab Referrals } \times \text{ Service Recipient Workload Units per New Referral } = \text{ Expected Rehab Service Recipient Workload Units }$$

$$2. \frac{\text{Expected Rehab Service Recipient Workload}}{\text{Service Recipient Workload Units per FTE}} = \text{ \# of FTEs required }$$

3. To determine budget impact:

$$\text{Service Recipient Workload } \times \text{ Cost per Service Recipient Workload Unit } = \text{ Total Cost Estimated }$$

4. Then a comparison needs to be made between the costs of acute vs. rehab services to determine the impact of the change on staffing needs.

Figure 27

### Staffing/Scheduling

Workload can be used to justify current staffing and identify staff increases or reductions based on workload requirements. Patient census alone cannot identify needs since not all service recipients are equal and do not require the same health services.

An increase in productivity can reduce costs by eliminating non-productive time. This can be achieved through a better matching of workload requirements and actual staffing and by monitoring trends of resource needs by day of week and time of year. Staffing schedules can sometimes be altered to provide a better match.

Non-productive time can only be identified if service recipient and non-service recipient workload is accurately defined and measured. A system that presumes that all time not related to service recipient activities is automatically non-service recipient time or a system that assumes non-service recipient activity is directly related to service recipient time will not provide the required information. Non-service recipient activities need to be specifically defined with associated time values.

Workload information can also be used to determine staff assignments. Rather than determining staff assignments based on the number of service recipients, the assignments can be determined based on the workload generated by each service recipient. This can lead to more equitable assignments, higher staff morale and better care. This will lead to more accurate workload collection. Staff travel time also needs to be considered when assigning caseloads in order to reduce non-service recipient workload. Included in this decision process one must also consider the knowledge and skill required to provide care for specific types of patients/residents/clients.

## Human Resource Decisions

A workload measurement system, that identifies types of specific activities, can also be useful for skill mix decisions. The tasks that are frequently selected can be reviewed to determine the level of expertise that is required to complete the tasks and this information can be helpful in determining the appropriate ratio of staffing. **Caution should be exercised when using this process as the level of expertise required to provide service recipient care is not only the sum of specific tasks.** It should also take into account the analysis required to determine appropriate strategies to respond to the data generated by these tasks. The workload resources required could be the same in two units but the level of expertise necessary to provide care may be different depending on the complexity of care.

In order to improve productivity, if the appropriate matching of workload and actual hours cannot be achieved within the current staffing complement, the manager may need to alter the full-time/part-time ratio to allow the flexibility required to provide the desired match.

Given current fiscal restraints and recruitment/retention issues in many health disciplines, there is a growing interest in capturing more human resource related data through the MIS Standards.

## Cost Minimization

A workload measurement system, which examines specific activities, can be used to identify non-value added activities or to identify improved processes or timing for providing specific tasks. If activities are not vital to clinical outcomes or client satisfaction they may be considered for elimination. The identification of these activities usually occurs during the implementation and validation/revalidation of standard time tools.

Activities can be linked to care plans or critical pathways to assist in quantifying and selecting alternate modes of care. Physician-driven activities can also be quantified and this can provide valuable information when discussing critical paths with the medical staff.

A workload measurement system can identify specific tasks performed by diagnostic staff that could be performed by other staff, thus reducing costs. This could involve the work of other health care professionals or support staff. However, when these tasks do not consume significant time it may be more cost effective for diagnostic staff to continue to perform the tasks.

Example: If there are sufficient clerical or portering activities, it may warrant the transfer of these tasks to non-professional staff.

## Quality Initiatives

Workload data can identify processes that could be improved. These processes may be controlled by the functional centre manager or by another department. If tasks are transferred to another department the workload measurement systems will identify the staffing and cost implications for both departments.

## 9 PERFORMANCE INDICATORS FOR MEDICAL IMAGING

The Provincial Medical Imaging MIS Committee has identified a number of indicators as being appropriate for use by its discipline. Additional indicators can be found in the MIS Standards.

### 9.1 Financial Indicators

#### Direct Cost per In-House Exam

Direct cost per in-house exam is the average direct cost per in-house exam. It is calculated by dividing the functional centre's direct operating expenses by the total in-house exams generated by the functional centre in a given period. (Provincial Medical Imaging Indicator Reports includes in direct operating expenses all expenses related to compensation, supplies, and sundry; other expenses related to equipment and renovation costs have been removed from this calculation due to differences identified in reporting the information.)

$$\frac{\text{Direct Operating Expense}}{\text{Total In-House Exams}}$$

Figure 28

#### Direct Cost per Service Recipient Workload Unit

Direct cost per service recipient workload unit is the average direct cost per service recipient workload unit. It is calculated by dividing the functional centre's direct operating expenses by the total service recipient workload units generated by the functional centre in a given period. (Provincial Medical Imaging Indicator Reports includes in direct operating expenses all expenses related to compensation, supplies, and sundry; other expenses related to equipment and renovation costs have been removed from this calculation due to differences identified in reporting the information.)

$$\frac{\text{Direct Operating Expense}}{\text{Total Service Recipient Workload Units}}$$

Figure 29

#### Total Compensation Expense to Direct Operating Expense (%)

Total compensation to the direct operating expense is the proportion of the direct operating expense of a functional centre attributable to the total compensation expense. It is calculated by dividing the total compensation expense for all personnel by the direct



operating expense for that functional centre in a given period. (Provincial Medical Imaging Indicator Reports includes in direct operating expenses all expenses related to compensation, supplies, and sundry; other expenses related to equipment and renovation costs have been removed from this calculation due to differences identified in reporting the information.)

$$\frac{\text{Total Compensation Expense for All Personnel}}{\text{Direct Operating Expense}} \times 100$$

Figure 30

### **Total Supplies Expense to Direct Operating Expense (%)**

Supplies expense to the direct operating expense is the proportion of the direct operating expense of a functional centre attributable to the supplies expenses. It is calculated by dividing the supplies expense by the direct operating expense for that functional centre in a given period. (Provincial Medical Imaging Indicator Reports includes in direct operating expenses all expenses related to compensation, supplies, and sundry; other expenses related to equipment and renovation costs have been removed from this calculation due to differences identified in reporting the information.)

$$\frac{\text{Total Supplies Expense}}{\text{Direct Operating Expense}} \times 100$$

Figure 31

## **9.2 Staffing Indicators**

### **Number of Full-time Equivalents (FTE) by Broad Occupational Group**

Number of FTE by broad occupational group is the average number of full-time equivalents for each broad occupational group (MOS or UPP). It is calculated by dividing the earned hours for all employees (full-time and part-time) in a specific broad occupational group by the normal earned hours for a full-time equivalent in that specific group in a given period.

$$\frac{\text{Total Earned Hours for all Staff in a Broad Occupational Group}}{\text{Normal Earned Hours for one FTE in a Broad Occupational Group}}$$

Figure 32

The number of UPP FTEs can be further analyzed by occupational class by modifying this formula.

### Worked Hours to Earned Hours (%)

Worked hours to earned hours is the proportion of earned hours that is attributable to the worked hour's component. It is calculated by dividing the total worked hours by the total earned hours in a given period. This indicator may be calculated for a given functional centre, broad occupational group or occupational class.

$$\frac{\text{Worked Hours}}{\text{Earned Hours}} \times 100$$

Figure 33

A similar calculation can be used to analyze the types of worked hours (e.g. determine the proportion of worked hours that were regular hours vs. overtime hours).

### Benefit Hours to Earned Hours

Benefit hours to earned hours is the proportion of earned hours that is attributable to the benefit hours component. It is calculated by dividing the total benefit hours by the total earned hours in a given period. This indicator may be calculated for a given functional centre, broad occupational group or occupational class.

$$\frac{\text{Total Benefit Hours}}{\text{Total Earned Hours}}$$

Figure 34

A similar calculation can be used to analyze the types of benefit hours, e.g. determine the proportion of benefit hours which were related to sick leave, education leave, etc.

## 9.3 Productivity Indicators

Worked and total productivity are commonly used indicators; the ratios of worked and total productivity shows the amount of staff time spent in service recipient activities versus the total time spent carrying out the mandate of the service. While worked productivity is an important indicator on its own it should not be used exclusively as it does not take into account time spent in non-service recipient activity which can be significant in some functional centres. Both of these indicators can vary depending on the type and location of the service, as well as the support available to UPP staff and should be reviewed keeping these factors in mind.

### Worked Productivity (%)

Worked productivity (%) is the percentage of all unit-producing personnel worked hours spent in the delivery of services to or on behalf of specific service recipients. It is calculated by dividing the service recipient workload units (converted to hours) by the worked hours plus purchased hours of the unit-producing personnel in a given period and multiplying by 100. This has traditionally been the most widely used productivity indicator.

$$\frac{\text{Service Recipient Workload Units} \div 60}{\text{Unit-producing Personnel Worked} + \text{Purchased Hours}} \times 100$$

Figure 35

### Total Productivity (%)

Total productivity is the percentage of all unit-producing personnel worked spent in the provision of service recipient activities and non-service recipient activities. It is calculated by dividing the service recipient and non-service recipient workload units (converted to hours) by the worked hours plus purchased hours of the unit-producing personnel in a given period and multiplying by 100.

$$\frac{\text{Service Recipient} + \text{Non-Service Recipient Workload Units} \div 60}{\text{Unit-producing Personnel Worked} + \text{Purchased Hours}} \times 100$$

Figure 36

### Service Recipient Workload Units per Full-time Equivalent (FTE)

Service recipient workload units per FTE is the average number of service recipient workload units generated by each unit-producing personnel full-time equivalent. It is calculated by dividing the service recipient workload units by the number of unit-producing personnel full-time equivalents (see previous staffing indicator for the calculation of the number of unit-producing personnel FTEs). This indicator is commonly used to establish realistic caseload guidelines, monitor staff productivity and workload and determine the impact of changes in service demands.

$$\frac{\text{Service Recipient Workload Units}}{\text{Number of Unit-producing Personnel FTEs}}$$

Figure 37

## 9.4 Utilization Indicators

### Service Recipient Workload Units per In-House Exams

Service recipient workload units per in-house exam is the average length of unit-producing personnel time it takes to complete one exam. It is calculated by dividing the number of service recipient workload units by the number of in-house exams in a given period. This indicator may be further broken down by category of service recipient (i.e. inpatient, client hospital). In those cases, the numerator and denominator should only include the workload units and the exams associated with the category of service recipient.

$$\frac{\text{Service Recipient Workload Units}}{\text{Total In-House Exams}}$$

Figure 38

## 9.5 Workload Indicators

### Distribution of In-House Exams by Category of Service Recipient (%)

Percentage of distribution of in-house exams by category of service recipient is the percentage of in-house exams that originate from the various categories of service recipients. It is calculated by dividing the number of in-house exams for a specified category of service recipient (e.g. inpatient, resident, and client hospital) by the total number of laboratory interventions for a given period and multiplying by 100.

$$\frac{\text{In-House Exams (specified by category of Service Recipient)} \times 100}{\text{In-House Exams for all categories of Service Recipients}}$$

Figure 39

### Distribution of Service Recipient Workload Units by Category of Service Recipient (%)

Distribution of service recipient workload units by category of service recipient is the percentage of unit-producing personnel time that is attributable to the various categories of service recipients. It is calculated by dividing the number of service recipient workload units for a specified category of service recipient (e.g. inpatient, resident, client hospital) by the total number of service recipient workload units for a given period and multiplying by 100.

$$\frac{\text{Service Recipient Workload Units (Specified by Category of Service Recipient)} \times 100}{\text{Service Recipient Workload Units for all Categories of Service Recipients}}$$

Figure 40

### Distribution of Workload Units by Workload Category (%)

Distribution of workload unit by workload category is the percentage of unit-producing personnel time spent in the two workload categories (service recipient and non-service recipient activities). It is calculated by dividing the number of workload units of one of the specified categories by the total number of workload units (service recipient and non-service recipient activities) for a given period and multiplying by 100.

$$\frac{\text{Specified Category (e.g., Service Recipient Activities) Workload Units}}{\text{Service Recipient and Non-Service Recipient Workload Units}} \times 100$$

Figure 41

### Interpreting Workload Indicators Results

Why would your workload measurement values change when the type(s) of service recipients and volume remain the same? Some possible reasons that could affect service recipient and non-service recipient values include:

- service recipient activities:
  - physician ordering practices may have changed;
  - advances in technology;
  - staff may be over or under recording due to their perceived uses of the system;
  - there may be new staff who do not understand how to use the system; and
  - clinical practices may have changed.
- non-service recipient activities:
  - new organizational expectations for unit-producing staff involvement in committees;
  - development of a new service/program;
  - introduction of a new facility computer system requiring in-service education;
  - change in student volumes;
  - availability of support staff;
  - participation in a new research project; and
  - new expectation for community or staff support.

Why would your workload data differ from that of another organization when the type(s) of service recipients and volume are the same? Possible reasons include:

- differences in physician ordering practices;
- staff may be doing work in one hospital that is performed by other health care providers in another setting;
- differences in technological support;
- differences in the physical environment (e.g. distance between service recipients, availability of elevators);
- differences in support systems such as proximity of equipment or supplies;
- differences in service recipient needs despite having the same diagnosis (e.g. socio-economic needs, distance to the facility);
- differences in provider mix (e.g. professional to assistant ratio and levels of support staff); and
- differences in clinical practice.

The data collected through the WMS and the associated activity statistics should be compiled and reported on a monthly basis to the administrator of the medical imaging service. Individual site reports are of value to site managers, as well as to the director of medical imaging services. In combination with a monthly financial report, managers are able to calculate key performance indicators with which they can monitor and measure medical imaging performance. Ideally, such indicators can be automatically generated

from the Meditech system using an NPR report. Directors of medical imaging services are encouraged to work closely with information systems staff and finance department staff to develop automatic reporting for all stakeholders containing information at an appropriate level of detail for the user and in a timely fashion.

Many managers use MIS performance indicators as components of balanced scorecards, or other quality reporting required by their Regional Health Authorities. Such data is vital for benchmarking activities, a valuable process for discovering best practices among peer organizations.

The basic operational management information provided by the MIS data is the foundation for day-to-day management functions as well as strategic decision making and impact analysis.

## 10 IMPORTANT POINTS ABOUT DATA COLLECTION

Secondary statistical information, such as, workload and service activity statistics, is collected by unit-producing personnel (UPP) only.

Care should be taken to ensure that only the worked hours of staff (UPP) are matched to the workload that is generated, as these two pieces of data will be used to produce productivity information. Failure to accurately match these data elements will skew productivity indicators.

When management staff members provide direct care (unit-producing) for a portion of their time, their workload and earned hours for that time should be included in the functional centre totals.

### **Workload measurement collection expectations and targets should be incorporated into:**

- staff orientation programs;
- job descriptions for all staff;
- performance evaluations and reviews; and
- the strategic goals of the organization.

### **Maintenance of workload measurement systems requires:**

- involvement of all staff;
- formal annual review by staff or whenever there are changes in service recipient types or care processes;
- on-going in-service education; and
- regular reliability testing.

### **Manager responsibilities:**

- provide leadership for implementation;
- ensure adequate reference material is available;
- understand all components of the system;
- regularly monitor the results to ensure data quality;
- investigate sources of inconsistent data;
- use the information to support decision-making; and
- provide feedback to all staff recording workload (e.g. individual reports, discussion of analysis).

### **Staff responsibilities:**

- record data accurately to quantify services provided;
- record data in a timely manner;
- accurately measure the resource requirements of their patients;
- understand the workload measurement system, both recording and interpretation of results; and
- share knowledge with new staff, such as accurate use of reference material.

## 11 RESOURCES

### National Resource Materials

The Standards for Management Information Systems in Canadian Health Services Organizations (MIS Standards) are published on CD-Rom bi-annually by CIHI. A copy is sent to the Chief Financial Officers of each Regional Health Authority, the DHCS and the Centre upon release by CIHI. Further details regarding all topics enclosed in this reference guide are contained in the MIS Standards. If you require access to the national MIS Standards, please contact the appropriate regional financial department.

### Provincial Resource Materials

Resource documents and information available from the MIS staff of the Centre include:

- Provincial Reporting Requirements User Guide
- discipline specific reference guides;
- information sheets relating to earned hours, workload, data quality and statistical data collection (FACT sheets);
- audit tools and answer guides;
- discipline specific indicator reports;
- annual statistical summary;
- annual Nursing Report Card; and
- current membership lists and Terms of Reference for MIS committee.

Resource documents and support are also available through MIS Committee members.

### Education

CIHI provides a series of education sessions including eLearning and WebEx sessions on an on-going basis and in-person sessions a minimum of once per year. The topics for these sessions vary and a current schedule may be obtained either through CIHI's website or by contacting the MIS Staff at the Centre. Educational workshops are also available through the Centre and can be customized for specific needs and offered on a site specific or regional basis.

MIS Consultants  
 NL Centre for Health Information  
 70 O'Leary Avenue  
 St. John's, NL A1B 2C7  
 Telephone: (709) 752-6000

Website: [www.nlchi.nl.ca](http://www.nlchi.nl.ca)





☐ 70 O'Leary Avenue, St. John's, NL A1B 2C7  
Telephone: 709-752-6000 • Facsimile: 709-752-6011

Registry Integrity Unit, 41 Conception Bay Highway  
E. K. Jerrett & Associate Building, Bay Roberts, NL A0A 1G0  
Telephone: 866-279-1198 • Facsimile: 709-786-5337

[www.nlchi.nl.ca](http://www.nlchi.nl.ca)