Centre for Health Information
Newfoundland & Labrador

MIS Standards, Workload Measurement and Statistical Data Collection

Reference Guide for Clinical Laboratory

March 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 clinical laboratory services the Newfoundland and Labrador Health Care System.

The workload measurement system (WMS) for clinical laboratory 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. In 2006 a clinical laboratory services advisory committee and eleven working groups were formed to redevelop the MIS Standards related to clinical laboratory services. This work was completed in 2008. The functional centre changes became effective April 1, 2009 and the new workload measurement system became effective for implementation April 1, 2010. CIHI periodically updates the MIS Standards and related WMS with the most recent update for clinical laboratory services completed in 2011.

Highlights of the revisions include:

- the clinical laboratory functional centres were revised to more accurately reflect current service delivery;
- a new WMS conceptual model was developed;
- the published workload unit now includes only the hands-on time to perform an activity. Waiting time, maintenance and repair, solution preparation, glassware wash up, quality management and technical supervision are no longer included as part of the workload unit value;
- workload units are now based on specific activities rather than procedures;
- service recipient workload units are now reported by category and type of service recipient;
- quality control, calibration and research are categorized as non-service recipient workload; and
- the service activity statistic “laboratory intervention” replaces “procedure”.

This reference guide has been developed to assist laboratory staff to implement the MIS Standards within their facilities, including the WMS, in accordance with the 2011 MIS Standards. By doing so, clinical laboratory services will improve the accuracy and comparability of data available for internal and external use. Clinical laboratory 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 Clinical Laboratory MIS Committee was formed in 1997 to facilitate implementation of the MIS Standards particularly the workload measurement system as they apply to clinical laboratory and clinical laboratory 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 clinical laboratory; and
- update 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 Section15 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).

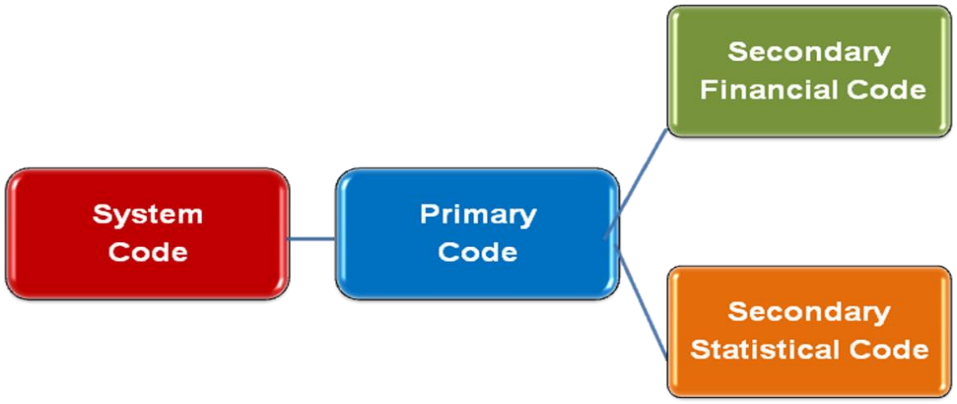

Figure 1

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.

- 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
- medical service aids, etc.

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 laboratory technicians, technologists, phlebotomists and all other staff who are directly involved with the receipt, processing, testing and reporting of specimens. These personnel are credited with workload units.

In the case of technologists III, these staff may be UPP if they perform bench work, or MOS if primarily fulfilling a supervisory role. If assigned to UPP they may perform many duties that are considered non-service recipient activities. It is recognized that UPP staff may, at times, perform activities that are not unit-producing.

Transcriptionists and lab order data entry operators are considered UPP in the clinical laboratory WMS due to the fact the current WMS includes transcription and data entry workload within its schedule of unit values. This is not the case with other WMS.

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 therapists performing the same job are 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).

Earned Hours = Worked Hours + Benefit Hours + 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[1]; and
- attendance at on-site committee meetings and in-service education[2] (non-service recipient workload).

[1] 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.

[2] 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

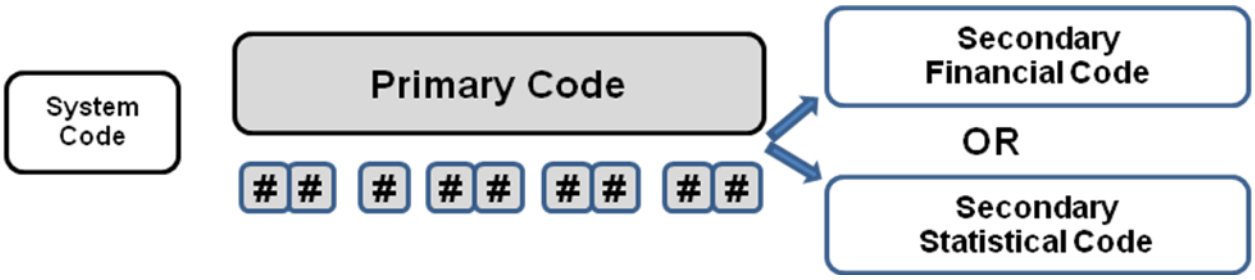

Figure 3

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 1st 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 2nd 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 3rd 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 4th & 5th 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 6th & 7th 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 10 25 10** tells the reader that the data is related to the routine chemistry service in the clinical chemistry functional centre (illustrated in Figure 5):

Refer to the Primary Account section of the MIS Standards for further information.

Example 1: Routine chemistry services provided in the clinical chemistry department of a hospital is represented by primary account **71 4 10 25 10** (as illustrated in Figure 5):

7	1	4	10	25	10
Account Type	**Fund Type**	**Framework Section**	**FC Level 3**	**FC Level 4**	**FC Level 5**
1. - 6. Balance Sheet Accounts **7. Functional Centres for Revenue, Expense and Statistics** 8. Accounting Centre	**1. Operating Fund** 2. Inactive 3. Inactive 4. Board Designated 5. Capital 6. Special Purpose 7. Inactive 8. Endowment Revenue – Unrestricted 9. Endowment Revenue - Restricted	1. Administration & Support 2. Nursing Inpatient/ Resident 3. Ambulatory Care **4. Diagnostic & Therapeutic** 5. Community & Social Services 6. Inactive 7. Research 8. Education 9. Undistributed	**10 Laboratory** 15 Medical Imaging 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	21 Pre/Post Analysis **25 Clinical Chemistry** 30 Clinical Hematology 35 Transfusion Medicine 41 Anatomical Pathology 42 Cytopathology 43 Electron Microscopy 45 Clinical Microbiology 50 Immunology 60 Histocompatability & Immunogenetics 85 Diagnostic Genetics 90 Multifunctional Laboratories (Core Lab)	**10 Routine Chemistry** 20 Urinalysis 30 Therapeutic Drug Monitoring/ Toxicology 40 Radio Immunoassay/ Enzyme Immunoassay 50 Specialty Chemistry Labs. 60 Blood Gas Lab 70 Point of Care Testing

Figure 5

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.

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 clinical laboratory functional centre.

Compensation for unit-producing staff members that participates in research but is assigned to a clinical laboratory functional centre is reported in that laboratory 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 discipline specific 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 clinical laboratory functional centre.

Compensation for unit-producing staff members that provide staff education but are assigned to a clinical laboratory 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 clinical laboratory 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 clinical laboratory functional centre. The workload related to educating service recipients is recorded as the service recipient activity, therapeutic intervention.

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 Clinical Laboratory Functional Centres

The following primary accounts are available for use by clinical laboratory services. Each organization should use only those applicable to the size and specialization of their lab 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. 'CMDB' means the level of detail is required for national reporting to the Canadian MIS database.

71 4 10 Clinical Laboratory:

The functional centre pertaining to the performance of laboratory investigative procedures through detailed analysis, assay, and examination of clinical specimens.

71 4 10 10 Clinical Laboratory Administration (C)

The functional centre clearing account pertaining to the provision of clerical, secretarial, quality, utilization, computer and management support of the entire clinical laboratory 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. This includes revenues from direct expense transfer recoveries for interdepartmental services. It excludes clerical, secretarial, quality, utilization, computer and management support related to a specific laboratory related functional centre (e.g. transcriptionist in anatomical pathology).

71 4 10 21 Pre/Post Analysis (CMDB)

The functional centre pertaining to the procurement of laboratory specimens from service recipients, the receipt and handling of all specimens, including registration and data entry, the preparation of appropriate specimens for dispatch to outside health service organizations, results reporting, distribution and specimen disposal.

71 4 10 21 10 Specimen Procurement
71 4 10 21 20 Specimen Receipt and Dispatch

71 4 10 25 Clinical Chemistry (CMDB)

The functional centre pertaining to the qualitative and quantitative chemical analysis of blood, urine, body fluids, tissues, or other materials for the purpose of detecting specific chemical components.

71 4 10 25 10 Routine Chemistry
71 4 10 25 20 Urinalysis
71 4 10 25 30 Therapeutic Drug Monitoring/Toxicology
71 4 10 25 40 Radio Immunoassay/Enzyme Immunoassay
71 4 10 25 50 Specialty Chemistry Laboratories
71 4 10 25 60 Blood Gas Laboratory (Clinical Laboratory)
71 4 10 25 70 Point of Care Testing

71 4 10 30 Clinical Hematology (CMDB)

The functional centre pertaining to the examination and study of cells and cellular components in blood and body fluids, as well as the study of coagulation disorders and associated hematopoietic functions.

71 4 10 30 20 Routine Hematology
71 4 10 30 40 Coagulation
71 4 10 30 60 Special (Non-Routine) Hematology

71 4 10 35 Transfusion Medicine (CMDB)

The functional centre pertaining to transfusion medicine and immunohematology laboratory interventions. Includes activities related to the collection, processing, storing and distribution of blood, blood components or blood products.

71 4 10 35 10 Routine Transfusion Medicine
71 4 10 35 20 Special Transfusion Medicine
71 4 10 35 30 Bone Marrow Transfusion

71 4 10 41 Anatomical Pathology (CMDB)

The functional centre pertaining to the performance of gross, microscopic, sub-microscopic and histochemical examination of body organs and tissues, including autopsies.

71 4 10 40 20 Surgical Pathology
71 4 10 40 40 Autopsy Pathology

71 4 10 42 Cytopathology (CMDB)

The functional centre pertaining to the preparation and microscopic examination of exfoliated cells and cellular specimens collected from various body organs or tissues.

71 4 10 43 Electron Microscopy (CMDB)

The functional centre pertaining to the preparation and examination of body tissues and other cellular material using an electron microscope.

71 4 10 45 Clinical Microbiology (CMDB)

The functional centre pertaining to the identification of the causative agents of infectious diseases, the susceptibility and resistance of service recipients to such diseases and the effect of drugs on the causative agent.

71 4 10 45 10 Bacteriology
71 4 10 45 20 Serology
71 4 10 45 30 Mycology
71 4 10 45 40 Parasitology
71 4 10 45 50 Virology
71 4 10 45 55 Environmental Testing

71 4 10 50 Immunology (CMDB)

The Functional Centre pertaining to the investigation of auto-immune disorders and to the performance of investigative procedures on behalf of residents/clients with conditions (including allergies) related to the body`s defense mechanism against the invasion of foreign substances.

71 4 10 60 Histocompatability and Immunogenetics (CMDB)

The functional centre pertaining to the typing of human lymphocyte antigens and to the performance of tissue cross-matching between donor and recipient.

71 4 10 85 Diagnostic Genetics (CMDB)

The functional centre pertaining to the analysis of blood, body fluids, tissues or other material for the purpose of identifying specific genetic constituents using DNA probes or other molecular markers and the investigation of cellular constituents related to heredity of service recipients with known or suspected chromosomal abnormalities.

71 4 10 85 10 Cytogenetics
71 4 10 85 20 Molecular Genetics

71 4 10 90 Multifunctional Laboratories (Core Lab) (CMDB)

The functional centre pertaining to the performance of laboratory testing from more than one laboratory functional area such as clinical chemistry and clinical hematology.

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 10 Clinical Laboratory 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 laboratory technology program which is accredited by the respective provincial licensing body**.**

Core Labs

Many lab services are using core labs to provide key laboratory functions, maximizing flexibility of staffing and space. Due to the significant variation in the cost of providing the component functions of a core lab, separate functional centres are still used, with the related expenses, workload and activity statistics reported for each type of service.

4 SECONDARY FINANCIAL ACCOUNTS

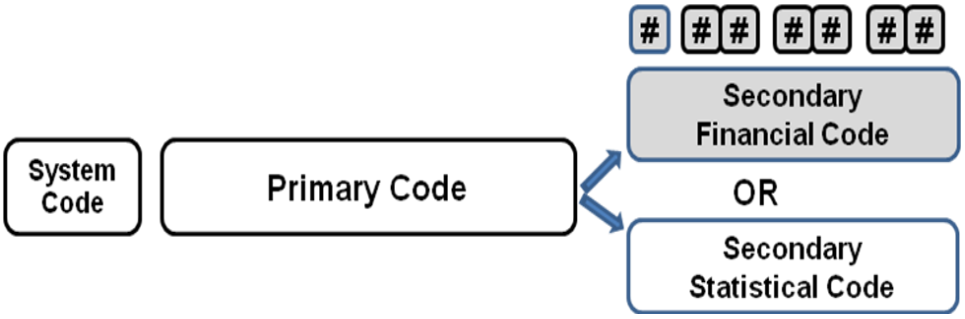

Figure 6

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).

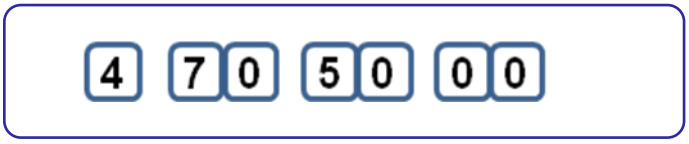

Figure 7

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

70 The second block is two characters long and defines the nature of the revenue or expense. In this example it is supplies – clinical laboratory.

Capture of Further Detail of Secondary Revenue or Expense

50 The third block is used to capture further detail and is specific to previous code block. In this example it is supplies – clinical laboratory – specimen collection supplies.

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).

Secondary Financial Account **4 70 50 00** is used to represent specimen collection supplies expenses specific to Clinical Lab (illustrated in Figure 8).

4	70	50	00
Broad Group	**Nature of Revenue and Expense**	**Capture of further detail**	**Capture of further detail**
1 Revenues 2 Inactive 3 Compensation **4 Supplies** 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** 75 Medical imaging 77 Electro-Diagnostic 80 Respiratory 82 Therapeutics	Accounts specific to previous level and provide further breakdown. 10 Reagents/Chemicals 20 Glassware 30 Plastics 40 Quality Control & Calibration Materials **50 Specimen Collection Supplies** 90 Clinical Lab Supplies not Elsewhere Classified	Accounts specific to previous level and provide further breakdown.

Figure 8

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 clinical laboratory departments should be charged to the clinical laboratory 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 Clinical Laboratory Services

For a full listing of the Secondary Financial Accounts and the related definitions, please refer to the MIS Standards CD, 2011 or the Provincial User Guide, 2011/2012.

Broad Group No. 1
Revenues

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 15 MOS Benefit Contributions - Individual
3 19 MOS Purchased Salaries/Fees

3 51	UPP Worked Salaries
3 53	UPP Benefit Salaries
3 55	UPP Benefit Contributions - Individual
3 59	UPP Purchased Salaries/Fees
3 91	MP Worked Salaries
3 93	MP Benefit Salaries
3 95	MP Benefit Contributions - Individual
3 99	MP Purchased Salaries/Fees

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	Supplies - Medical and Surgical
4 60 10	Donated Organs - Cost of Acquisition
4 60 20	Prostheses
4 60 20 20	Limbs
4 60 20 40	Joints
4 60 20 60	Artificial Organs
4 60 30	Orthoses
4 60 40	Instruments
4 60 40 10	Instruments - Disposable
4 60 40 20	Instruments - Reusable
4 60 50	Sutures and Staples
4 60 50 20	Sutures
4 60 50 40	Staples

4 60 60 General Medical and 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.

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 medicine 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 medicine 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 medicine 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 medicine 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 medicine 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 medicine and surgical supplies 4 60 60.

4 60 60 70 Administration Sets (IV)

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

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 medicine and surgical supplies 4 60 60.

4 60 70 Medical and Surgical Supplies Not Elsewhere Classified

This account is used to record the expense of all medical and surgical supplies not elsewhere classified.

4 64 Supplies - Pharmacy (Packaging and Compounding)

This account is used to record the expense of non-drug items used specifically in pharmacy for drug preparation and packaging. It includes items such as unit dose packaging. A sub-category of: Supplies, Broad Group 4.

4 65 Supplies – Drugs

(For Service Recipient Reporting, use this account for "low-cost" ward stock drugs and account 5 65 for prescription and all "high-cost" drugs.) This account is used to record the expense of pharmacological and therapeutic products, as defined in the American Hospital Formulary System (AHFS) Drug Information 1992. It includes antineoplastics, anti-infectives, autonomics and other drugs and products, such as intravenous solutions, vaccines, etc. A sub- category of: Supplies, Broad Group 4. Note: The 2004 version of the AHFS was used to refine national definitions and develop definitions for provincial accounts.

4 66 Supplies - Medical Gases

This account is used to record the expense of anaesthetic gases, oxygen and other medical gases. A sub-category of: Supplies, Broad Group 4.

4 70 Supplies - Clinical Laboratory

This account is used to record the expense of supplies used in the examination and analysis of biological specimens carried out in the laboratory, including such items as reagents/chemicals, glassware, plastics, quality control material, specimen collection supplies, and other miscellaneous supplies.

4 70 10 Reagents/Chemicals

This account is used to record the expense of all laboratory reagents, chemicals, serums, media, and stains. It includes all liquids, powders or lyophilised products used in the manufacturing of working solutions, commercially purchased (ready-to-use) products, urine/blood strips, etc. It excludes reagents/chemicals used/purchased specifically for quality control/calibration purposes (4 70 40). A sub-category of supplies – clinical laboratory 4 70.

4 70 20 Glassware

This account is used to record the expense of reusable glassware used in the laboratory, including beakers, flasks, cylinders, pipettes, cuvettes, etc. A sub-category of supplies – clinical laboratory 4 70.

4 70 30 Plastics

This account is used to record the expense of plastic or other disposable supplies used in the laboratory, including samples cups, trays, pipettes, pipette tips, petri dishes, etc. A sub-category of supplies – clinical laboratory 4 70.

4 70 40 Quality Control and Calibration Material

This account is used to record the expense of quality control material or calibration solutions used to calibrate or verify the performance/accuracy of tests, procedures or instrumentation, in the laboratory. A sub-category of supplies – clinical laboratory 4 70.

4 70 50 Specimen Collection Supplies

This account is used to record the expense of blood collection tubes (i.e. Vacutainer), blood culture tubes, swabs, capillary tubes, urine or stool containers, etc. It excludes needles (4 60 63) and syringes (4 60 64). A sub-category of supplies – clinical laboratory 4 70.

4 70 90 Clinical Laboratory Supplies Not Elsewhere Classified

This account is used to record the expense of miscellaneous laboratory supplies not elsewhere classified, including such items as special recording paper for instruments. A sub-category of supplies – clinical laboratory 4 70.

4 85	Supplies - Research
4 90	Supplies - Education
4 95	Supplies - General
4 95 10	Department 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
6 15	Continuing Education Fees and Materials
6 20	Travel Expense - Service Recipient
6 20 10	Local Travel – Service Recipient
6 20 12	Provincial/Territorial Travel – Service Recipient
6 20 14	Out of Province/Territory Travel – Service Recipient
6 22	Travel Expense - Board
6 22 10	Local Travel - Board
6 22 12	Provincial/Territorial Travel - Board
6 22 14	Out of Province/Territory Travel - Board
6 23	Travel Expense - Staff
6 23 10	Local Travel – Other than Service Recipient Related
6 23 12	Provincial/Territorial Travel – Other than Service Recipient Related
6 23 14	Out of Province/Territory Travel – Other than Service Recipient Related
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 60 10	License Fees
6 60 20	Membership Fees
6 60 30	Accreditation Fees
6 60 40	Subscription Fees
6 70	Advertising
6 75	Public Relations
6 80	Insurance
6 85	Board Honorariums
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 42	Software Maintenance - Other
7 20	Equipment Maintenance - Interdepartmental
7 30	Replacement of 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 Major Equipment
7 65	Minor Equipment Purchases
7 80	Amortization - Software Licenses and Fees
7 90	Equipment Expense - Not Elsewhere Classified

Broad Group No. 8
Contracted-Out Services

Broad Group No. 9
Buildings and Grounds Expense

5 SECONDARY STATISTICAL ACCOUNTS

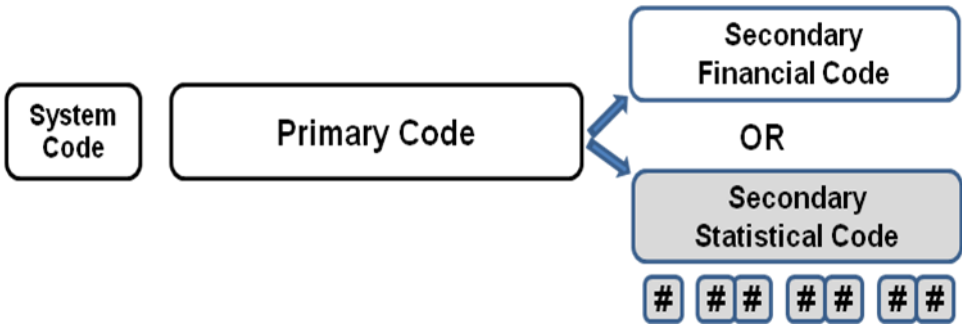

Figure 9

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.

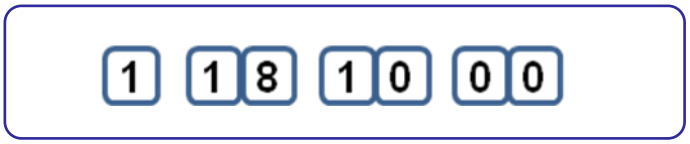

Figure 10

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 11 for further broad groups).

Nature of Statistic

18 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.

1	18	10	10
Broad Group	**Nature of Statistic**	**Capture of Further Detail**	**Additional Breakdown**
1 Workload 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 07 Diagnostic Therapeutic 08 Respiratory Services 13 Food Services 14 Health Records 16 In-House Therapeutic **18 In-House Clinical Lab**	Category of Service Recipient **10 Inpatient** 20 Client Hospital 40 Resident 50 Facility/ Organization/ Citizen Partnership 60 Service Recipient not Uniquely Identified 80 Client Community 90 Client Home Care	Accounts specific to previous level and provide further breakdown.

Figure 11

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

1 18 10 00 Workload Units - In-House, Clinical Laboratory

The standard units of time used to express the workload of the clinical laboratory services as measured by an appropriate workload measurement system. In diagnostic services, one workload unit is equivalent to one minute of unit-producing personnel time spent in the provision of service recipient care. It is a sub-category of workload, broad group 1.

By Category of Service Recipient

1 18 10	Inpatient (CMDB)
1 18 20	Client Hospital (CMDB)
1 18 40	Resident (CMDB)
1 18 50	Facility/Organization/Citizen Partnership (CMDB)
1 18 80	Client Community (CMDB)
1 18 90	Client Home Care (CMDB)

5.2 Activity Statistics

The service activity statistic used in clinical laboratory functional centres is the laboratory intervention. A laboratory intervention is defined as the diagnostic activity performed in a clinical laboratory to assist in the diagnosis, monitoring and treatment of disease on service recipients. The laboratory intervention may be an encounter, a diagnostic analysis or group of diagnostic analyses, a product issued or a case depending on the functional centre. A service activity statistic, a sub-category of: service activity and caseload status, broad group 4.

4 63 Laboratory Interventions

By Category of Service Recipient

4 63 10 Inpatient (CMDB)
4 63 20 Client Hospital (CMDB)
4 63 40 Resident (CMDB)
4 63 50 Facility/Organization/Citizen Partnership (CMDB)
4 63 80 Client Community (CMDB)
4 63 90 Client Home Care (CMDB

Secondary statistical account 4 63 10 00 is used to represent the service activity called laboratory intervention related to an inpatient in a hospital setting (illustrated in Figure 12)

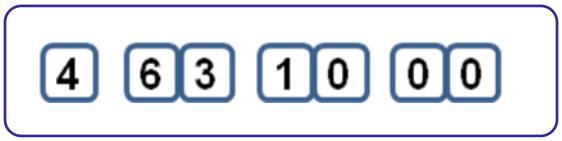

Figure 12

4	63	10	00
Broad Group	**Nature of Statistic**	**Capture of Further Detail**	**Additional Breakdown**
1 Workload 2 Staff Activity 3 Earned Hours **4 Service Activity & Caseload Status** 7 Functional Centre Operation 8 Health Service Organization Operation	Service Activity and Caseload Status Statistics 01 Inpatient Admissions 03 Inpatient Days 50 Visits - Face-to-Face 56 Visits – Non-Face-to-Face **63 Laboratory Intervention** 85 Attendance Days-Non-Face-to-Face 89 New Referrals 90 Active Carryovers	Category of Service Recipient **10 Inpatient** 20 Client Hospital 40 Resident 50 Facility/ Organization/Citizen Partnership 60 Service Recipient not Uniquely Identified 80 Client Community 90 Client Home Care	Accounts specific to previous level and provide further breakdown.

Figure 13

1 90 Workload Units - Non Service Recipient Activities

The minutes, measured retrospectively, that UPP 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. 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

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;
- 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 clinical laboratory 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 clinical laboratory unit-producing personnel include medical laboratory technologists, medical laboratory assistants and pathologist's assistants.

The clinical laboratory WMS is not intended to be used by management and operational support personnel (e.g. directors, managers, secretaries, quality coordinators) or medical personnel (for example, pathologists) 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 cytotechnologist III is a UPP due to the large amount of bench 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 bench 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 Clinical Laboratory Workload Measurement System

The clinical laboratory WMS applies to the following clinical laboratory functional centres:

- pre/post analysis;
- clinical chemistry;
- clinical hematology;
- transfusion medicine;
- anatomical pathology;
- cytopathology;
- electron microscopy;
- clinical microbiology;
- immunology;
- histocompatability and immunogenetics;
- diagnostic genetics; and
- multi-functional laboratories (core lab).

Conceptual Model for Clinical Laboratory

Workload Categories	SERVICE RECIPIENT ACTIVITIES			NON-SERVICE RECIPIENT ACTIVITIES			
Activity Categories	**Pre-Analytical**	**Analytical**	**Post-Analytical**	**Functional Centre Activities**	**Organizational/ Professional Activities**	**Teaching/ In-service**	**Research**
Component Activities	Service Recipient Preparation/ Instructions Test Ordering Mechanism Intensive Monitoring Service Recipient Sampling Specimen Labelling Specimen Preparation for Transport Specimen Reception (documentation and logging) Preparation and/or Storage (separation, preservation, etc. and storage)	Testing/ Analysis Verifying the results Appropriate Reflex Testing Recording of Findings, including Qualifiers (e.g. lipemia, hemolysis, icteric, etc.) and Interpretation of Findings	Posting of Results Communication of Results	Functional Centre Management Employee Meetings Caseload Management Maintenance (Instrument Set-up/Check) Quality Management (QC, Calibration) Travel for Functional Centre Activities Travel to and from the place where service recipient activities are provided*	Board/ Committee Functions Program Management Public Relations Professional Activities Advocacy – Professional Travel	Students Professionals Academic In-Service Education Travel	Project 1 Project 2 Travel

Figure 14

The clinical laboratory 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 clinical laboratory are classified into three activity categories:

- pre-analytical;
- analytical; and
- post-analytical.

These activities are further subdivided into components or fields of observation for time study purposes. These components may vary depending on the services studied (refer to time study section).

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 clinical laboratory are categorized as follows:

- functional centre activities
- facility/community/professional activities
- teaching/in-service
- 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 divided into three main components:

Pre-analytical: Refers to activities that pertain to service recipient preparation and instructions, test ordering, and the collection, transportation, reception and preparation of a specimen prior to analysis and the associated documentation;

Analytical: Refers to activities that pertain to the testing or analysis of a specimen, verification of results and reflexive testing for the purposes of diagnosis, monitoring or treatment of health status, disease or disorder including any interpretative activities and the associated documentation; and

Post-analytical: Refers to activities that pertain to the collation, release and communication of results of an analysis including authorization and the associated 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 commensurate with functional centre policy, industry and accreditation standards. It also includes: performing peer evaluations or assessments; drafting, revising and reading standard operating procedures; laboratory accreditation; and performance of audits that are internal and external to the clinical laboratory (example - specimen rejection rates, turnaround times, mislabelled specimens). Quality Control (QC) includes: analysis of calibration standards; analysis of QC samples; flow cytometry bead calibration; external proficiency testing samples; and inter-laboratory comparisons. For the assignment of unit values for quality control purposes, users may refer to the appropriate service recipient section in the schedule of unit values and assign a unit value based on the published average time workload unit for that activity; 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.

6.4 Time Recording Methodology

The clinical laboratory WMS provides a method for the retrospective 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 clinical laboratory 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.

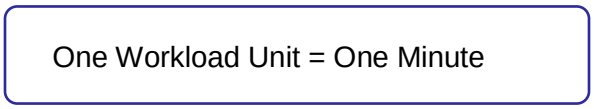

Figure 15

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. Where time studies are not available, average times can also be obtained using the Delphi method which considers professional expert opinion in estimating the average time. The average times applicable to clinical laboratory services are included in the schedule of unit values. 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.

Average time values, developed through time studies or the Delphi method, 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 CIHI for review and possible consideration for inclusion in the schedule of unit values.

Standard Time-Recording

In some situations a published average time may not be available, especially for activities where the variability between organizations is considered too great, or for an activity that has not yet been published. In these circumstances, the clinical laboratory may choose to use standard time for collecting workload data. Standard times are assigned to activities performed by the unit-producing personnel of the functional centre, where each standard time represents the functional centre's average time to perform the activity 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. 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;

- **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:

- define the activity and identify the appropriate fields of observation;
- where activities from more than one activity category breakdown (e.g. pre-analytical, analytical, and post-analytical) are included in a standard time, they should be disaggregated into component time values for each activity category breakdown. This will permit the capture of workload units by appropriate activity category breakdown;
- determine the method that will be used to determine the standard time;
- if a standard time is being developed for an activity that has not yet been published, the data should be submitted to CIHI for possible inclusion into the published schedule of unit values; and
- consider whether to establish standard times for some of the published non-service recipient activities. Standard time derivation for some activities (e.g. staff meetings under functional centre activities) may reduce the time recording effort. If time spent can be reasonably estimated, a standard time value can be derived and applied when the activity takes place. This would then be added to the workload summary record.

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 16

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 15 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 (15 activities x 6 time blocks x 10 minutes = 900) + (20 activities x 5 time blocks x 10 minutes = 1000) = 1900 minutes or 1900 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; clinical laboratories are encouraged to submit the results of the time studies to CIHI for evaluation by the appropriate expert working group and possible inclusion in the MIS Standards clinical laboratory WMS schedule of unit values. In the clinical laboratory workload measurement system discussed in this chapter, service recipient activities are typically assigned a unit value. Non-service recipient activities, on the other hand, are usually recorded using the standard or 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.

Note: Activities typically performed by administrative staff, transcriptionists or physicians, are excluded from time studies. Examples include appointment booking, transcription of a pathologist's report and document control. The time studies should ONLY include the hands-on time required to perform the activity. Waiting time should not be included. Travel time is captured as a separate activity (non-service recipient activity).

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.

Fields of Observation

Waiting time should never be included in time studies. For example, if staff must wait for an instrument to complete a cycle, the time should not be included. When performing time studies the following fields of observation are typically measured where applicable:

Pre-Analytical

- **Service Recipient Preparation/Instructions**
  Includes activities associated with greeting the service recipient, explaining the activity, ensuring the consent for treatment is complete when applicable, reviewing the orders and preparing and positioning the service recipient, clean-up and follow-up with the service recipient (e.g. pressure on venipuncture site, application of band aid, etc.);

- **Test Ordering Mechanism**
  Includes activities associated with reviewing the physician orders for completeness and appropriateness, service recipient registration in the Hospital Information System/Laboratory Information System (HIS/LIS), entering physician orders into the information system, printing barcode labels/requisitions. Also includes additional requests received on previously received specimens, sorting of barcode labels/requisitions and distribution of barcode labels/requisitions;

- **Service Recipient Sampling**
  Includes activities associated with the procurement of venipuncture/capillary puncture, procurement of biological specimens (e.g. swabs, 24 hr urines, etc.), monitoring the service recipient during specific procedures (e.g. glucose tolerance test). It may include assisting the physician (e.g. pathologist, hematologist) in the performance of a procedure (e.g. bone marrow, fine needle aspirate). It includes setting up the supplies to perform the activity and clean-up of area. It excludes any travel time to and from the area where the activity is performed (e.g. when travelling to an inpatient nursing unit to collect a specimen);

- **Specimen Labelling**
  Includes activities associated with specimen handling and specimen labelling.

- **Specimen Preparation for Transport**
  Includes activities associated with preparing the specimen for transport, dispatch of biological material, preparation of dry ice, documentation.

- **Specimen Reception (includes documentation and logging)**
  Includes activities associated with specimen receipt, receipt of biological material/slides, accessioning, specimen assessment, rejection of specimens, telephone calls, checking previous results/file, documentation; and

- **Preparation and/or Storage (includes separation and preservation)**
  Includes activities associated with centrifugation, aliquotting, specimen pre-treatment, specimen storage, disposal and documentation.

Analytical

- **Testing/Analysis**
  Includes activities associated with analysis of the specimen (e.g..loading of instrument with specimens, smear preparation and staining, group and Rh, embedding, cutting, staining and mounting, planting, reading cultures, bacterial identification, etc). Includes specimen programming and duplicate testing as part of the normal protocol. Excludes repeats performed for reasons of poor analysis, maintenance and repair, reagent preparation, instrument programming/loading of reagents, calibration, quality control and quality assurance;

- **Verifying Results**
  Includes activities associated with reviewing the results for accuracy and relevancy;

- **Reflex Testing**
  Includes activities associated with performing additional testing/analysis according to established protocols and/or best practices; and

- **Reporting the Findings including Qualifiers**
  Includes activities associated with recording and interpretation of the findings.

Post-Analytical

- **Posting of Results**
  Includes activities associated with releasing the results electronically or manual release of results including authorization;

- **Communication of Results**
  Includes activities associated with communicating results. (e.g. telephoning abnormal results to the physician or nursing unit);

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 SERVICE ACTIVITY STATISTICS

Service activity statistics are captured in functional centres providing service recipient care. Together with caseload status statistics 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. Service activity statistics 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 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.

The service activity statistic for clinical laboratory is the laboratory intervention. In order to ensure consistency in the collection and comparability of data, the definition of intervention has been specified in terms of activities related to each functional centre.

NOTE: It is important to note that the receipt and the dispatch interventions should be counted in the functional centre where the activity is performed. In some cases, this may be a central pre/post analysis functional centre, and in others, it may be the discipline specific functional centre (e.g. Microbiology or Anatomical Pathology). Note, however, that the receipt or dispatch laboratory intervention can ONLY be counted once in any given laboratory.

Pre/Post Analysis

The laboratory intervention in pre/post analysis is a service recipient encounter, defined as the occasions in which a service recipient or a service recipient sample is received in or by the laboratory, or is dispatched from the laboratory to another laboratory. When different types of specimens are received from a service recipient during the same occasion, the laboratory intervention count is dependent on the number of different types of specimens. The occasion may involve one or more specimens of one or more types. Multiple encounters occur only if there is a separate collection, receipt or dispatch event that occurs. A collection event means a different type of specimen or a different time of collection.

The following examples of how to count laboratory interventions are provided:

Example 1
Specimen Collection:

- a unit-producing personnel sees a service recipient to collect three vials of blood and a urine (two service recipient encounters because they are two different specimen types);

- a unit-producing personnel sees a service recipient collect three vials of blood and the service recipient is sent home to collect a urine specimen and drops off the urine specimen on the next day (two service recipient encounters);

- a unit-producing personnel sees a service recipient to collect a blood sample but the venipuncture is unsuccessful. A second unit-producing personnel sees the service recipient and is successful in collecting the sample (one service recipient encounter because there was only one successful specimen. Note that even if one service recipient encounter is counted, all the appropriate workload is collected);

- a unit-producing personnel sees a service recipient to collect blood cultures (x3) at 30 minute intervals (three service recipient encounters because the three cultures are collected at different times). If only two cultures are collected at the same time, one from each arm, and no other culture is collected, then only one encounter is collected (same specimen type and same time);

- a unit-producing personnel sees a service recipient to collect a blood sample. A different unit-producing personnel performs the bleeding time (two service recipient encounters because there are two specimen types).

- a unit-producing personnel sees a service recipient to collect a blood sample and a urine sample. The urine specimen is delivered to the laboratory later in the day (two service recipient encounters because they are two different specimen types);

- A service recipient is seen to collect a blood sample and a urine sample is provided to the staff member to deliver to the laboratory later in the day (two service recipient encounters because they are two different specimen types); and

- A service recipient is seen for a glucose tolerance test. The service recipient has a point of care (POC) glucose performed, and a blood sample collected for fasting glucose, followed by a glucose load and a blood sample at 30 minutes, one, two and three hours. (Five encounters because the specimens are collected at different times.)

  Note: That the POC glucose and the fasting glucose are counted as a single encounter because they are similar types of specimen taken at the same time).

Example 2
Specimen Receipt

Note: Only one intervention is collected in a single clinical laboratory for the receipt of the specimen. Collect the intervention for the receipt of the specimen in the functional centre where the official receipt occurs. In some cases, this will occur in a central receiving area (pre/post analysis functional

centre), in other cases, the receipt may occur in the discipline specific functional centre (e.g. microbiology).

- a number of blood specimens are received from another laboratory for processing (one service recipient encounter for each service recipient, regardless of the number of blood specimens received from any single service recipient);

- three blood samples, one oral swab and one urine specimen are received from a single service recipient from a physician's office (three service recipient encounters because three different types of specimens);

- a frozen plasma sample for coagulation testing is received in one bag, a refrigerated serum sample is received for clinical chemistry and a whole blood is received for a CBC in a second bag from the same service recipient (one service recipient encounter for all the blood received); and

- A service recipient had four blood samples taken at a clinic for glucose tolerance testing, and all four specimens are received in the laboratory at once (one service recipient encounters because the laboratory has received all specimens at the same time).

Example 3
Specimen Dispatch

(Note: only one intervention is collected in a single clinical laboratory for the dispatch of the specimen. Collect the intervention for the dispatch of the specimen in the functional centre where the majority of effort for the dispatch occurs. In some cases, this will occur in a central receiving area (pre/post analysis functional centre), in other cases, the dispatch may occur in the discipline specific functional (e.g. microbiology).

- the encounter for specimen dispatch is counted for each specimen (or group of specimens from the same service recipient) that is packaged and transported to a different organization. If a single specimen is split and sent to two different locations, count two encounters; and

- no encounter is collected if the specimen is sent by porter or by pneumatic tube.

Clinical Chemistry

If receipt or dispatch is performed in clinical chemistry, see note above.

The laboratory intervention in clinical chemistry is diagnostic analysis and is counted for each analyte if the analyte is requested, analyzed and reported uniquely. If an analyte is usually requested, analyzed and reported as a group with other analytes, the group of analytes is considered to be one laboratory intervention.

The following examples of how to count laboratory interventions are provided (not a comprehensive list):

- total protein;
- electrophoresis;
- Hb A1c;
- total catecholamines;
- fractionated catecholamines;
- urinalysis – chemistry;
- urinalysis – microscopic;
- blood gases
- urine drug screen (chromatography);
- specific drug panel (e.g. triage panel);
- ethanol (single enzymatic assay);
- alcohols (by gc, regardless of the number of alcohols found);
- sodium;
- potassium;
- CK;
- CK-MB (fractionated components: if analysed separately, each component is a separate laboratory intervention.);
- troponin;and
- point of care testing: count one intervention for each application of the service recipient's specimen to a separate cartridge or strip.

Clinical Hematology

If receipt or dispatch is performed in clinical hematology, see note above.

The laboratory intervention in clinical hematology includes all the diagnostic analyses performed on a specimen. Specifically, this is the CBC specimen, the coagulation specimen and the bone marrow specimen. A new laboratory intervention is only counted when a new specimen is collected at a different time. Multiple tubes of a single type of specimen received at the same time are considered a single specimen type and therefore a single hematology intervention would be counted.

The following examples of how to count laboratory interventions are provided:

- a specimen is received for CBC, reticulocytes and ESR (one laboratory intervention);
- three blood specimens are received to perform coagulation studies: specifically PT, PTT, thrombin time, D-Dimer, lupus anticoagulants and FVIII assay (one laboratory intervention);
- A blood specimen is received for a CBC and a separate blood specimen is received for PT/PTT. (Two laboratory interventions, as there are two types of specimens);
- A bone marrow aspirate is collected along with a bone biopsy, and an aspirate for clinical microbiology (one laboratory intervention); and
- A specimen is received for CBC and malarial blood smears (one laboratory intervention).

Transfusion Medicine

If receipt or dispatch is performed in transfusion medicine, see note above.

The laboratory intervention in transfusion medicine is the number of service recipients tested and the occasions in which product(s) are issued. Each time a service recipient is tested, regardless of the testing undertaken, a single laboratory intervention is counted. If a service recipient is re-tested on a new sample after a period of time defined by the standards of care, the new testing on the new sample is considered a new laboratory intervention. Each occasion in which a product, or pool of products is issued to an individual service recipient, is also counted as a laboratory intervention. In addition, when a number of units of the same or different products are issued to a single service recipient at one time, a single laboratory intervention is counted.

The following examples of how to count laboratory interventions are provided:

- two blood samples are received on Mr. Abbott for group, screen and crossmatch 12 units. All 12 units are issued on day one to the OR, and eight of the unused units are returned to the transfusion medicine functional centre. These units are issued on subsequent days (10 laboratory interventions – one for the testing, one for the issue of 12 units to the OR and one each for the issue of the eight units on subsequent days.);
- A blood sample is received for group and screen on day one on Mrs. Butler. Five days later, a new blood sample is received for cross-match of two units (two laboratory interventions);
- A pre-natal blood specimen is received on Mrs. Craft for a group and screen. A second blood sample is received on Mrs. Craft post-natal for Kleihauer-Betke (two laboratory interventions); and
- Several units of FVIII are issued to Mr. Davis for home infusion (one intervention).

Anatomical Pathology

If receipt or dispatch is performed in anatomical pathology, see note above.

The service activity for anatomical pathology is defined as any surgical pathology tissue sample that is received and is specifically and distinctly labelled for the purpose of histopathological examination (i.e. one sample in one container equals one intervention and can occur multiple times in a single case).

Any tissue that is specifically and distinctly labelled is considered a single intervention. If multiple organs are received attached, (e.g. total abdominal hysterectomy) they are counted as a single specimen/intervention. If the organs from a total abdominal hysterectomy (e.g. uterus, cervix, ovaries, tubes) are received in separately labelled containers, they are counted as separate specimens/interventions.

Any specimen that is received with multiple pieces in a single, inseparable container is considered a single specimen/intervention. If the specimen is separated into smaller components during grossing, it remains a single specimen/intervention. For example, if a resected colon is received, examined for nodules and eight pieces of tissue are processed in eight different blocks, this is counted as a single specimen/intervention. As

another example, if multiple colposcopy specimens are received in a single container, and are not distinguishable, they are considered a single specimen/intervention.

However, if multiple colposcopy specimens are received in a single container, and they are separately labelled and are distinguishable (e.g. 1, 5 and 10 o'clock), these are considered as separate specimens/interventions: (though these types of specimens are usually received separately).

In autopsy pathology, the laboratory intervention is the autopsy. Any tissues submitted for microscopic examination are considered part of the same autopsy and should not be counted as separate laboratory interventions.

Cytopathology

If receipt or dispatch is performed in cytopathology (see note above).

The laboratory intervention in cytopathology is counted as a case. A different case is counted if a specimen has been collected:

- for gynecological specimens, a case consists of any number of slides or specimens received from a single service recipient on any single calendar day;
- for non-gynecological specimens, a case consists of a specimen. A different case is counted if a specimen has been collected;
- from a different anatomical site (e.g. right and left breast specimens are each counted as a separate specimen);
- using a different technique (e.g. sputum and bronchial lavage are considered separate specimens);
- at different times (e.g. sputum collected pre treatment and post treatment); and
- multiple biopsy specimens collected at the same time using the same technique, but multiple passes (e.g. renal biopsy) are considered as a single case.

Electron Microscopy (EM)

If receipt or dispatch is performed in electron microscopy, see note above.

The laboratory intervention in EM is counted as a case. A case consists of a specimen that is intended to be examined by EM for clinical purposes. A different case is counted if a specimen has been collected:

- From a different anatomical site (e.g. right and left kidney biopsies are each counted as a separate case); and
- Multiple biopsy specimens collected at the same time using the same technique, but multiple passes (e.g. renal biopsy) are considered as a single case.

Clinical Microbiology

If receipt or dispatch is performed in clinical microbiology, see note above.

The laboratory intervention for clinical microbiology is the microbiological diagnostic analysis. The microbiological diagnostic analysis is all of the activities required to achieve a result (identification and characterization of micro-organisms) based on a particular request for examination of a specimen.

The following are considered as separate laboratory interventions:

- Ggam smear examination, only when performed alone, without any further microbiological analyses;
- microbiological rapid antigen testing (each antigen tested is equivalent to one diagnostic analysis);
- bacteriological culture (each specimen cultured is a diagnostic analysis);
- mycobacteriological culture (each specimen cultured is a diagnostic analysis);
- mycology culture (each specimen cultured is a diagnostic analysis);
- virology culture (each specimen cultured is a diagnostic analysis);
- parasitology rapid detection methods (each type of parasite tested for is a diagnostic analysis);
- parasitology specimen investigated (each specimen investigated for parasites is a separate diagnostic analysis);
- serology (every Ab or Ag tested is a diagnostic analysis);
- PCR (every agent sought is a diagnostic analysis); and
- Antibiotic Resistant Organisms (every specific ARO that is screened is a separate diagnostic analysis. If an ARO is identified as part of a routine culture, it is not considered a separate diagnostic analysis).

Immunology

If receipt or dispatch is performed in immunology (see note above).

The immunology service activity is defined as the “case.” The case includes all of the immunology testing performed on a single service recipient. For example:

- a CD 4/CD 8 test is a case;
- an immmunophenotyping including several antibodies is a single case;
- an ANA screen and titre, if performed on the same sample is a single case; and
- if an ANA screen is performed, and upon seeing the result, further testing (e.g. DNA and ENA) is performed on the same sample, then this is a single case.

Histocompatability and Immunogenetics

If receipt or dispatch is performed in histocompatability and immungenetics (see note above).

The laboratory intervention for histocompatability and immunogenetics is the reportable test defined as the identification of a particular antigen/antibody/locus/allele

by a particular methodology (serological, molecular, ELISA, flow cytometry, microsphere, CDC) or a cross-match. Note that medium resolution and high resolution typing are considered two separate laboratory interventions. B cell and T cell cross-matches are also considered to be separate interventions.

The following are considered as separate laboratory interventions:

- HLA typing is performed (count a separate intervention when doing low, medium or high resolution typing for each antigen typed). Performing a low resolution typing and a high resolution typing would result in two laboratory interventions;
- HLA antibody screening is performed (count a separate intervention for a class I or a class II screening);
- HLA antibody identification is performed (count a separate intervention for each identification performed. For example, count one intervention for the serological intervention, one for the medium resolution intervention, and one for each high resolution intervention);and
- A crossmatch is performed (count a separate identification for a B cell crossmatch, and a separate intervention for a T cell crossmatch).

Diagnostic Genetics-Cytogenetics

If receipt or dispatch is performed in cytogenetics (see note above).

The laboratory intervention in cytogenetics is the diagnostic analysis defined as the report of a karyotype, a FISH analysis, a microarray analysis, the culture or freezing of a culture for future testing or for referral to a different laboratory.

A FISH analysis consists of a probe or probe set used to rule in or rule out a particular abnormality or disease. For example, a CLL panel is one diagnostic analysis. A CML panel is one diagnostic analysis.

A new laboratory intervention is counted only when a culture is frozen for future testing (beyond 6 months), or when a culture is prepared and sent to a referral laboratory for testing. A laboratory intervention is counted whenever a report is generated, regardless of whether the culture or analysis is successful.

Diagnostic Genetics-Molecular Genetics

If receipt or dispatch is performed in molecular genetics (see note above).

The laboratory intervention in molecular genetics relates to the number of diseases tested as well as to the number of samples banked or referred.

For greater clarity, the following are each considered as a separate single intervention:

- SCA 1;
- SCA 2;
- Cystic Fibrosis;
- TaySachs;
- Hemochromatosis;

- BRCA 1;
- BRCA 2;
- Factor V Leiden;
- Angelmann Syndrome; and
- Prader-Willi:
- banking of DNA sample for future examination (future does not refer to storage for purposes of batch testing, but refers to banking of the specimen for retrieval at an undetermined time in the future); and
- referring a sample to another genetics laboratory (one intervention is counted for each sample referred, regardless of the number of diseases that will be tested at the referral laboratory).

7.1 Schedule of Unit Values for Clinical Laboratory Services

The schedule of unit values for clinical laboratory services provides a coding system for identifying most activities performed in a clinical laboratory. Additionally, it indicates the laboratory activities that should be counted and the lists the unit values for each. Each activity is assigned a five digit code number and is listed in the clinical laboratory service recipient activity list – by functional centre.

Any activity in the schedule of unit values can be utilized by any clinical laboratory functional centre if the unit value is accurate and reflective of the realistic average time required to perform a specified activity.

For a copy of the Clinical Laboratory Schedule of Unit Values, see attached document, or refer to the Newfoundland and Labrador Centre for Health Information website at http://www.nlchi.nl.ca/pdf/mis/Clinical%20Lab%20Schedule%20of%20Unit%20Values_SR%20%20NSR%20Activitiy%20List.pdf

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.

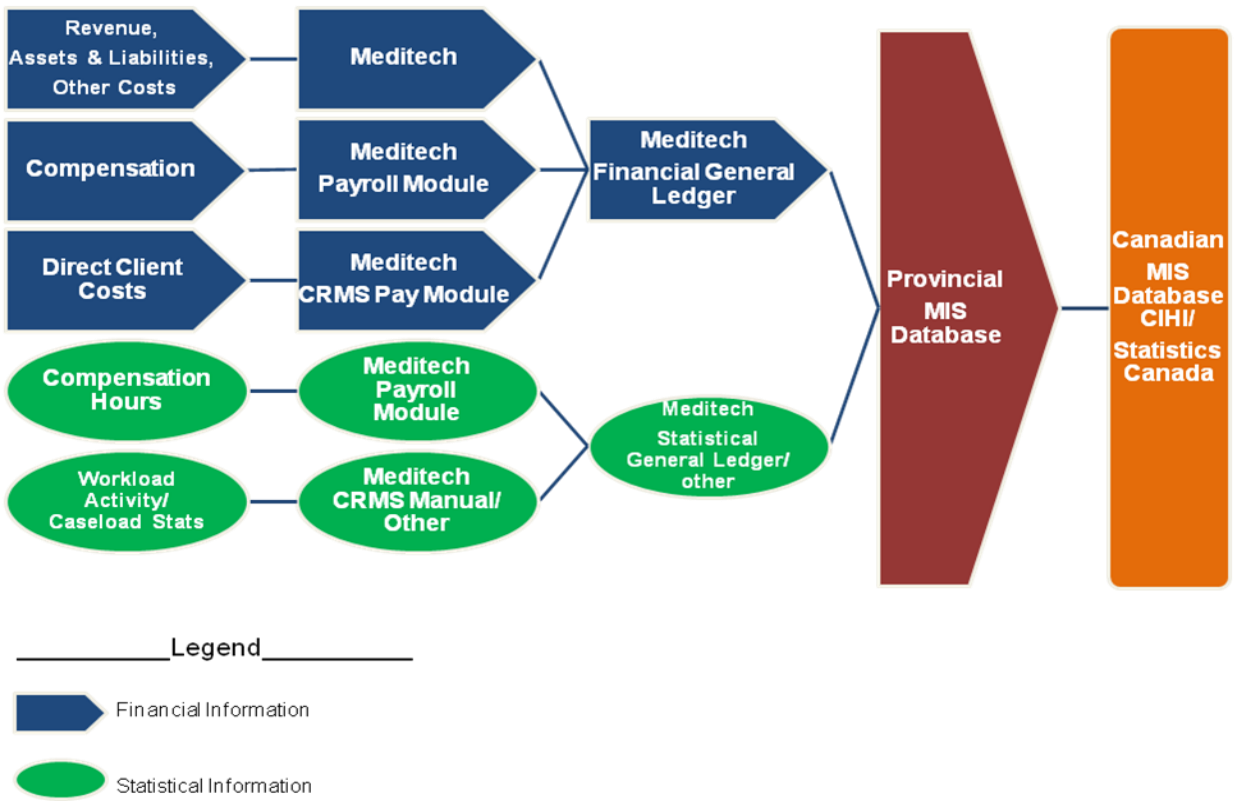

Figure 17

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, service activity and caseload status 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 18

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 19

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 20

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.

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

Figure 21

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.

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

Figure 22

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 attendance day;
- workload units per new referral;
- 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 23

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. Number of Rehab Referrals X Service Recipient Workload Units per New Referral = Expected Rehab Service Recipient Workload Units

2. Expected Rehab Service Recipient Workload / Service Recipient Workload Units per FTE = # of FTEs required

3. To determine budget impact:

Service Recipient Workload	X	Cost per Service Recipient Workload Unit	=	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 24

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 CLINICAL LABORATORY

The Provincial Clinical Laboratory 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 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.

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

Figure 25

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.

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

Figure 26

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.

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

Figure 27

Total Sundry Expense to Direct Operating Expense (%)

Sundry expense to the direct operating expense is the proportion of the direct operating expense of a functional centre attributable to the sundry expense. It is calculated by dividing the sundry expense by the direct operating expense for that functional centre in a given period.

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

Figure 28

Equipment Expense to Direct Operating Expense (%)

Equipment expense to direct operating expense is the proportion of the direct operating expense of a functional centre that is attributable to the equipment expense. It is calculated by dividing the equipment expense by the direct operating expense for that functional centre in a given period and multiplying by 100.

$$\frac{\text{Equipment Expense}}{\text{Direct Operating Expense}} \times 100$$

Figure 29

In organizations where expenses are identified for each service program area, calculations can be made in a similar manner to compare the costs of various programs to the total direct operating expenses. It is also possible to determine the proportion of costs attributable to administration vs. program services.

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 30

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 31

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).

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.

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

Figure 33

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.

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

Figure 34

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 35

9.4 Utilization Indicators

Service Recipient Workload Units per Inpatient Day

The average length of unit-producing personnel time devoted to one inpatient day of stay. It is calculated by dividing inpatient service recipient workload units by the inpatient days for the functional centre in a given period.

$$\frac{\text{Inpatient Service Recipient Workload Units}}{\text{Inpatient Days for the Functional Centre}} \times 100$$

Figure 36

9.5 Workload Indicators

Distribution of Laboratory Interventions by Category of Service Recipient (%)

Percentage of distribution of laboratory interventions by category of service recipient is the percentage of laboratory interventions that originate from the various categories of service recipients. It is calculated by dividing the number of laboratory interventions 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.

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

Figure 37

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.

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

Figure 38

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 39

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 clinical laboratory service. Individual site reports are of value to site managers, as well as to the director of laboratory services. In combination with a monthly financial report, managers are able to calculate key performance indicators with which they can monitor and measure lab performance. Ideally, such indicators can be automatically generated from the Meditech system using an NPR report. Directors of laboratory 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 boards. 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, service activity and caseload status 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

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