OMA section on LABORATORY MEDICINE

Work2Quality*

Guidelines for Workload Measurement in Laboratory Medicine Professional Practices in Ontario – Medical Biochemistry

Companion document to Workload2Quality Pathology

Developed by and for Laboratory Physicians in Ontario

*A project of Path2Quality (A collaboration of the OMA Section on Laboratory Medicine and the Ontario Association of Pathologists)

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GLOSSARY OF TERMS

CACB	Canadian Academy of Clinical Biochemistry
CAP	Canadian Association of Pathologists
CCMG	Canadian College of Medical Geneticists
FTE	Full-time equivalent
MOH	Ministry of Health
OAP	Ontario Association of Pathologists
OHIP	Ontario Health Insurance Plan
OMA	Ontario Medical Association
OMA Section	OMA Section on Laboratory Medicine
P2Q	Path2Quality
RCPSC	Royal College of Physicians and Surgeons of Canada
S2Q	Standards2Quality
SOB	Schedule of Benefits
W2Q	Work2Quality
W2QWG	Work2Quality Working Group
WG	Working group
WMS	Workload Measurement System

SECTION 1

IMPORTANCE OF A WORKLOAD MEASUREMENT SYSTEM FOR MEDICAL BIOCHEMISTRY

GENERAL

Ontario's laboratory physicians and scientists share a common goal – the desire for an effective and efficient laboratory system that serves the best interests of the Province's citizens. An essential attribute of such a high-functioning laboratory system is appropriate resourcing. The guidelines here focus on one aspect of that – appropriate laboratory professional resourcing. Integral to the latter is a workload measurement system (WMS) that may be used for planning purposes.

This guideline is a companion document to be used along with the larger second version of Work2Quality released in September 2024 which provides a WMS for Diagnostic and Molecular Pathology (formerly Anatomical Pathology) and Diagnostic and Clinical Pathology (formerly General Pathology) that specifically addresses the unique environment in which the laboratory physicians of Ontario work. For more detailed information about the history of workload measurement in Ontario as well as background material please refer to the larger document entitled "*Guidelines for Workload Measurement in Laboratory Medicine Professional Practices in Ontario – Diagnostic and Molecular Pathology/Diagnostic and Clinical Pathology.*"

BACKGROUND AND PURPOSE OF WORKLOAD MEASUREMENT FOR MEDICAL BIOCHEMISTRY

Ontario's laboratory systems include many laboratories where clinical chemistry / medical biochemistry tests are performed, interpreted and reported. This includes the majority of the work done in core laboratories as well as many specialized laboratories such as special chemistry, immunology, newborn screening, biochemical genetics, therapeutic drug monitoring and toxicology.

A key difference, compared to Diagnostic and Molecular Pathology/Diagnostic and Clinical Pathology, is that professional oversight of this work includes non-physician scientists with specialized post-doctoral training in clinical laboratories. Professional designations may include fellowship in the Canadian Academy of Clinical Biochemistry and/or Canadian College of Medical Geneticists, or by equivalent certifications from other jurisdictions. Physician specialization in clinical chemistry is typically achieved with specialty or sub-specialty training in the Royal College of Physicians and Surgeons of Canada residency and sub-specialty training program in Medical Biochemistry, or by an equivalent designation from other jurisdictions. For the purposes of this document, the professional workload described may be performed by a PhD and/or MD with appropriate training and certification.

Another difference, compared to Diagnostic and Molecular Pathology/Diagnostic and Clinical Pathology, is that a high proportion of the workload in medical biochemistry is laboratory and assay oversight, rather than direct per-case involvement / reporting. This difference is reflected in the workload calculation tool.

APPROPRIATE INFRASTRUCTURE SUPPORTS

The WMS here assumes that the practice of each group is adequately and equitably resourced, and that each group is equally able to respond to and discharge similar workload volumes. For this, many variables need to be equal, or at least balanced. Some variables relate to attributes of the professional staff themselves – more than just their number. For instance, depending on the complexity or other features of a group's workload, sub-specialty training of staff may be required – an example might be a hospital that has a lipidology service or starts a transplant program; training appropriate to that workload needs to be provided as an infrastructure support to the group. If that is not provided, it may be difficult for the group to discharge its work as efficiently as planned.

Many other infrastructure supports that a host hospital or institution is responsible for help maximize a group's efficiency and allow it to perform at a high standard. The sorts of infrastructure supports that aid a professional group work to its potential include, but are not limited to:

- Skilled and efficient staff (among whose many duties is support for workload measurement), for instance:
    - Technical staff, including medical laboratory technologists and assistants;
    - Clerical and other support staff;
    - Information system support staff;
- Efficient technical and professional work processes with, for instance, automation and bar-coding in as many steps as possible;
- Laboratory information systems that adequately support efficient work processes, and related processes such as those of quality assurance and workload measurement;
- Effective communication tools, laboratory physician-to-laboratory physician, and laboratory physician-to-clinician, for instance:
    - Electronic medical records that integrate laboratory and hospital information systems;
    - Consulting service available to answer questions
- Adequate physical space, equipment and office accommodations for professional staff, with, for instance:

- Ergonomic work-stations;
- Computers with up-to-date software and applications that allow best practice;

- Readily available decision support tools, for instance:
  - Reference materials, such as text books;
  - Various web-based resources.

If adequate infrastructure supports of the sort just listed are not available to the group, then the expectations of efficiency described in these *W2Q Guidelines* may not be reasonable or accomplishable. Either those infrastructure supports would have to addressed, or the expectations of these *W2Q Guidelines* modified to deal with the situation.

BASIS FOR CODE RELATIVITY AND FACTORS TAKEN INTO ACCOUNT FOR THE MEDICAL BIOCHEMISTRY GUIDELINES

A scan of the literature did not find any reported measurement of the professional component of work associated with medical biochemistry clinical testing, nor is there any history of ascertaining and tracking this at the provincial level in Ontario. Many academic centres formally or informally try to collect this information for internal use (e.g. for annual faculty reviews or for determining distribution of clinical versus academic activities), but there is no generally accepted metric or methodology.

Informal inquiries within the medical biochemistry community in Canada revealed that the province of British Columbia had developed a professional component workload measurement for medical biochemistry, called the L3E model. Dr. Daniel Holmes was the medical biochemist lead for this work and he was kind enough to share B.C.'s L3E model (the most recent version from 2016-2017) with us for adaptation. This model has an extensive list of biochemistry tests, each with a relative weighting assigned and validated by the working group in B.C.

The *W2Q Guidelines* attempt to take into account a number of factors of interest to laboratory physicians in Ontario and to recognize the unique environment in which Ontario's laboratory physicians work.

These include:

- An allowance for clinical service work that is performed but which is not attributable to an individual case or service (e.g., general enquiries about clinical care);
- An allowance for the enhanced academic mission of some groups and research activities – whether in academic settings or in community hospitals that participate in distributed learning programs, or in clinical trial work;

The OMA Medical Biochemistry working group adopted the major components of B.C.'s L3E model without significant changes. This model was tested and validated in Ontario with a number of laboratory test menus and volumes. In order to align the workload measurement units with the other OMA Laboratory Medicine measures, the L3E weights were converted so that one FTE = 7500 units.

SECTION 2 FOUNDATIONAL ELEMENTS

TYPE OF WORK CAPTURED

The model is based on reportable test volumes. Rather than determining a list of professional staff activities and counting each one, instead, the reportable test volume itself is used to derive a workload measure that encompasses all of the varied components of professional staff clinical activities. One advantage of this approach over other model structures is that test volumes are already routinely collected for use in things like provincial volume reporting, technical workload calculations and cost analysis. Reportable test volume is also a completely objective measure upon which to derive workload data, and once the derivation method is agreed on, the workload data can be quickly applied across varied sites and over multiple timepoints. A disadvantage of this model is that, while it can robustly calculate the aggregate workload for an institution, it is not granular enough to calculate the relative workload between individuals.

APPLICABILITY TO VARIOUS TYPES OF PRACTICE

This model has been validated and used in British Columbia across hospital-based and private laboratories with varied sizes and test menus. The working group has validated it in a limited number of laboratories in Ontario.

PROVISIONS FOR OVERSIGHT AND NON-CASE SPECIFIC WORK

Like most models of workload, test or case complexity must be a factor in deriving workload. The majority of medical biochemistry tests do not have professional interpretation as part of the test report (e.g. plasma sodium is reported without being individually reviewed and commented on by a laboratory professional). Instead, the professional component for that result is encompassed in oversight for instrument and assay validation, quality control and quality assurance monitoring and troubleshooting, as well as consultation if needed when clinicians have questions or concerns about the result or assay. For these “straight-forward” tests, there are 4 levels of complexity within the L3E model with relative weights of 0.0025, 0.12, 1 and 6.7 for Levels 1, 2, 3 and 4, respectively. Examples of tests at the different levels are Aspartate Aminotransferase (AST) for Level 1, Cancer Antigen 125 for Level 2, Gastrin Level for Level 3, urine Oligosaccharides for Level 4. These scores correlate to approximately 59% of the minutes of professional oversight time needed per result. In addition to the Levels 1-4 assays, there are a small number of assays or provocative tests that do have direct interpretation by a professional (e.g. serum Electrophoresis) and there are certain activities that do not correlate well to test volume (e.g. development and validation of a new method by liquid chromatography tandem mass spectrometry). These activities are listed as Level 5, with each activity being assigned a weight that correlates to the minutes of professional time for that activity.

Some chemistry assays are done at very high volumes in certain laboratories. In these cases, the professional workload does not scale linearly with the test volume (i.e. the professional workload is overestimated with linear models). To account for this, the B.C. model set aside 41% of the oversight workload for each assay as an "oversight factor" and then discounted this component of the calculation for high-volume Level 1 tests. A level 1 test with annual volume from 50,001 to 75,000 has this oversight factor component discounted to 35%, while 75,001 to 100,000 is discounted to 18%, and over 100,000 is discounted to 8.8%.

Therefore, the final workload calculation for a single assay multiplies the reportable test volume by the assigned complexity weight for that assay and then the oversight factor is added (with any discount applied if this is a high-volume Level 1 assay). The overall workload in "L3E" units for a laboratory or network of laboratories is then the sum of all the assays performed in that system. One full-time equivalent professional workload is 108,800 L3E units. This workload is meant to include all of the direct and indirect clinical workload of a biochemistry professional (including local leadership roles such as head of a particular laboratory unit or clinical area) but would not include academic activities nor major leadership roles (e.g. chief of laboratory medicine).

In order to align the workload measurement units with W2Q guidelines of 1 FTE = 7500 units, the L3E weights were converted. This gives the weights for Levels 1 to 4 as 0.0002, 0.0083, 0.0689 and 0.4619, respectively. Level 5 values are similarly converted with the same factor (x 7500/108800).

The calculator also takes into account time required to fulfill academic work when the medical or clinical biochemist is at an academic centre as well as specific agreed to leadership responsibilities within an organization. This work should be considered and clearly reported in addition to the base workload calculation.

DETERMINATION OF A 'DENOMINATOR' FOR THE WMS

The *W2Q Guidelines* propose how the number of staff available to perform service work should be determined.

Further, the *W2Q Guidelines* propose the manner in which workload should be assessed, and suggest a 'denominator' that may be applied to the aggregate of that work – to determine how many FTE's would ordinarily/ ideally be required/ available to perform that volume of work.

It is in the comparison of the staff available with the estimate of those required to perform the work that any individual professional group will be able to determine whether they are appropriately resourced or not.

W2Q Guidelines
Using a denominator of 7500 workload units, baseline code W864 equates to approximately 12 minutes.

As the main purpose of the W2Q WMS is to allow for appropriate resourcing of the laboratory physician complement at each hospital, the estimation of the overall workload at each institution must be accompanied by some suggestion of how much work is reasonable, on average, per laboratory physician in the group. In only that way may it be determined if the number of staff is appropriate to the workload being performed. So, a 'denominator' is required by which to divide the aggregate of the workload units performed by the group – i.e., an estimation of the workload reasonable, *on* average, per FTE is required.

The denominator chosen by the W2Q WG is currently 7,500 W864 equivalents. This figure is supported by the experience to-date trialling the *W2Q Guidelines* by some of the W2Q WG, and by the early feedback from some of the laboratory directors who were provided the first draft of the *W2Q Guidelines.*

W2Q Guidelines
OHIP SOB is indexed to code L864 and W2Q Guidelines to code W864 so that these systems are aligned (L864 and W864 have a common definition)

The first edition of the W2Q guidelines were based on the OHIP Schedule of Benefits and CPT codes with correlation to time based studies. As a rough guideline, there are 52 weeks/year and about 8 weeks of time off (inclusive of vacation and CME allotment) leaving 44 weeks. There are about 10 statutory holidays and subtracting this time, results in 42 working weeks or 210 working days. Using an average workday of 7.5 hours, this equates to 1575 hours or 94,500 minutes. Using the denominator of 7500, this equate to 12.6 minutes/W864. This denominator was reviewed by the W2Q working group in 2023 and still considered an appropriate denominator.

The above time frame calculation is however, only a guideline to assist with new codes (particularly for laboratory workload which is not slide based) or revision of codes, since cases/services even of the same type may take longer or shorter amounts of time depending on differences in the case itself, departmental processes and individual styles.

The guidelines are meant to be used in aggregate to represent average workload within a department/organization and not meant for individual workload assessment.

The aggregate of the workload a group performs is determined by adding up the workload units (W864 equivalents) for all of the services the group performs(using the *W2Q Calculator;* see below); it is then divided by the 'denominator' (7500 W864 equivalents per FTE) to determine how many FTEs 'worth' of work the group performs.

SECTION 3 W2Q GUIDELINE USE

DETERMINATION OF STAFF AVAILABLE FOR SERVICE WORK

In order to assess whether a group is or is not appropriately staffed, the first task for those responsible for workload measurement is to determine how many staff are available for service work. In this, a number of factors need to be taken into account.

i) NUMBER OF FTES IN BUDGET

The base number from which the workload measurement committee will generally start is the number of FTEs in the budget provided by the hospital/ institution for the group.

W2Q Guidelines
Provides a modifier for 'oversight' to recognize clinical work that is not specific to an individual specimen or not recognized in the specific service codes

ii) ADJUSTMENT FOR ACADEMIC, ADMINISTRATIVE WORK, QUALITY of OTHER CLINICAL WORK

The medical biochemistry calculator incorporates standard administrative, quality and other work in the base FTE calculation. The calculator does not include a specific modification for work performed at an academic centre which should be taken into consideration in the first step of the calculator along with major administrative roles (e.g. laboratory director). Those roles should be accounted for by reducing the available FTE for routine clinical laboratory workload for those professionals (e.g., a laboratory director may have this role designated at 0.2 FTE, therefore they would only count 0.8 FTE towards the workload modeling).

No additional modifier to the workload calculation should be applied to avoid double-counting of workload.

iii) APPLICATION OF MODIFIER FOR OVERSIGHT WORK NOT SPECIFIC TO INDIVIDUAL SPECIMENS OR SERVICES

The medical biochemistry model accounts for routine work that is not specific to individual specimens, therefore no additional modifier is required.

DETERMINATION OF IDEAL STAFF COMPLEMENT

The major function of any workload measurement system is to determine how much service work the group performs, and then to determine how many laboratory physicians are appropriate to perform that work. The following are the steps for that purpose.

i) W2Q CALCULATOR FOR WORKLOAD DATA ANALYSIS

A calculator (the *Calculator*) that has been modernized in 2023 will be available from the OMA Section and OAP web-sites. The *Calculato*r includes the relative weighting of each service described in the *Table of Codes, Services and Relative Values Revised in 2023* (Section 4). Embedded in the *Calculator* are the formulas that will allow tallying of services, with computation of overall workload and estimated full-time equivalents (FTE) required for that work.

ii) APPLICATION OF WORKLOAD 'DENOMINATOR'

Once the group's workload measurement committee aggregates the workload data, it will need to apply the 'denominator' described earlier to determine how many FTEs' work is being performed by the group. This 'denominator' is provided as part of the *Calculator.*

iii) COMPARISON OF STAFF AVAILABLE WITH IDEAL STAFF COMPLEMENT

One of the most important functions of the workload measurement system is in the comparison of the number of staff available in the group for service work with the ideal FTE count for the amount of work performed – the derivation of each of those values described above.

If the numbers provided by analysis determine that the staff available for service work and ideal FTE count for the work performed are roughly similar, then the group is likely 'right-staffed'. If not, then the group may have a case to approach their host hospital's/ institution's administration for redress.

What degree of imbalance requires incremental staffing increase may be affected by many factors, for instance whether infrastructure supports mitigate or accentuate the imbalance. Determination of this is, necessarily, a local matter. So too is consideration of other forms of redress, for instance providing incentives for performing work in excess of that which might ordinarily be expected by a certain staffing number.

SECTION 4 APPLICATION OF TABLE OF CODES, RELATIVE VALUES AND CALCULATOR

See companion W2Q Medical Biochemistry Calculatory (Excel file)

APPENDIX A – W2Q MEDICAL BIOCHEMISTRY, WORKING GROUP MEMBERS AND ACKNOWLEDGEMENTS

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