National
Hospital Productivity
Improvement Program

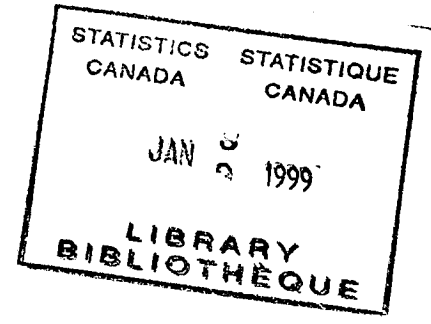
Laboratory Workload Measurement System

Health and Welfare Canada
Santé et Bien-être social Canada
Statistics Canada
Statistique Canada
Canada

Statistics Canada
Health Division

Health and Welfare Canada
Health Services Directorate

National Hospital Productivity
Improvement Program



Canadian Workload Measurement System

Laboratory

A Schedule of Unit Values for Clinical Laboratory Procedures

1989-90 Edition

The National Hospital Productivity Improvement Program is a conjoint, cost-shared Federal/ Provincial Program, conducted in collaboration with Hospitals and the Health Professions.

Published under the authority of the Minister of Regional Industrial Expansion and the Minister of State for Science and Technology

July 1989

ISBN 0-660-52845-2

Ottawa

PREFACE TO THE 1989-90 EDITION

This edition contains some changes, deletions and additions in each section. In general, the impact of these changes on performance indicators should be minor. Laboratories should be on guard however, to identify those functional sections which may be affected. Any alterations in aggregate unit totals should be investigated to determine what role, if any, new unit values have played. New information has been highlighted with asterisks.

The Schedule does not yet represent a fully comprehensive list of all laboratory procedures. All sections contain some new line items. Immunological procedures have been timed for the first time and these unit values appear in an Immunology section. This includes several DNA quantitation procedures. Universal precautions have been included in time studies as they occurred; however, this subject is under review with regards to Specimen Procurement.

The policy of not allowing the local assignment of unit values will continue. No unit values are to be assigned independently. Requests for unit values for procedures not listed anywhere in this edition must be accompanied by a request for temporary unit form, please refer to Appendix A, form 6.

Laboratories are instructed to record only those unit values which are listed in the 1989-90 edition or have been assigned an official temporary unit by the Workload Measurement Committee.

Requests and questions pertaining to established and temporary unit values should be made in writing and directed to:

Technical Unit
Workload Measurement Systems
c/o Ottawa Civic Hospital
1053 Carling Avenue
Ottawa, Ontario
K1Y 4E9
Telephone: 613-761-4462

Questions relating to the reporting of data in the Annual Return of Health Care Facilities - Hospitals and the Quarterly Hospital Information System should be directed to:

Information Development Section
Health Division
Statistics Canada
Ottawa, Ontario
K1A 0T6
Telephone: 613-951-1653

TABLE OF CONTENTS

INTRODUCTION

The effective management of any resource requires the analysis of current activities, a review of past experience and the projection of future trends. The Workload Measurement System (WMS) contributes to this process by providing a standard measure for that portion of human resources which is directly responsible for the production of patient answers. When used with other information, e.g. financial information, it can aid in decision making. The unit value is not influenced by such things as supply costs and depreciation. However, it is currently used to a greater or lesser extent for the deployment of laboratory resources. A method of audit to enhance the credibility of the system has been developed.

History

Hospitals in Canada have submitted annual records of their activities to Statistics Canada since 1931. Workload units in laboratory medicine were first used in Canada by the Laboratories Branch of the Ontario Ministry of Health and the Department of Veterans Affairs Laboratory Services. The Units were based on a System developed in the United Kingdom in the 1940's in which one unit was equal to 10 minutes of time consisting of seven minutes technical and three minutes support time. On the recommendation of a Sub-committee of the Technical Advisory Committee on Public Health Laboratory Services, Statistics Canada began using this system to collect laboratory units in 1954.

In 1965, the Canadian Association of Pathologists received a National Health Research and Development grant from the Department of National Health and Welfare to produce new units based on standard time studies. Time study protocols were developed for common high volume procedures and time studies were carried out in 60 hospitals. As a result of this project, the unit was restructured to represent one minute instead of 10 and the concept of "productive time" was introduced and defined. A new schedule was published in 1969. Since then the manual has been updated as required. In order to preserve standardization, the principles set down in the 1960's have remained the framework within which any new studies have been undertaken.

Current Status

The National Hospital Productivity Improvement Program is responsible for the maintenance of the Laboratory System. The current membership of this committee is listed in **Appendix C**. Members of this Committee act as chairmen for discipline specific sub-committees whose composition reflects the laboratory professional associations and a geographical spread across the country. In addition, one must acknowledge the invaluable contribution of hundreds of professionals whose laboratories have participated in time studies and information surveys.

This edition of laboratory unit values incorporates new information based on time studies performed in 1985 and 1988. Line items with code numbers identified with an asterisk highlight new information. This may indicate entirely new unit values, revisions to old unit values, new wording of a line item or the reinstatement of a value deleted from the 1986 edition.

It is recognized that not every laboratory activity has been time studied and assigned a unit value in this schedule. Time spent on important functions of the clinical laboratory e.g. education, administration and method development (also called non unit producing activities) are not included.

Although the time studies resulting in the assigned unit values were carried out in laboratories of various size and complexity across the country, they are still only averages. Nevertheless, the aggregate unit values generated by a clinical laboratory yield more information about workload than a simple tally of tests of diverse complexity and represent the best available management tool for laboratory directors, hospital administrators and ministries of health.

Time Studies and the Derivation of Unit Values

Time studies are performed in a standard fashion by full-time staff of the Technical Unit in consultation with the appropriate sub-committee. The goal of any study is to identify and measure all activities that occur as part of the procedure under normal conditions. The assignment is always to time what is being done without judgement of appropriateness or quality. An attempt is made to include a variety of hospital sizes and types in different areas of the country. At each site as many staff as possible are timed at each task, and varying routines from a single stat to high volume batching are examined. Studies are then edited at the Technical Unit and sent to the Statistics Canada computer which produces a composite mean time for each site. The mean of all sites becomes the suggested unit value. All the data for each line item are stored on master logs. These are regularly presented and reviewed by the sub-committees and the Workload Measurement Committee.

Activities which are measured have historically been listed under eight broad headings or fields:

1. **Initial Handling** covers the specimen from its arrival in the laboratory to the completion of all preliminary preparation and recording required before testing can begin:

   - time stamping requisitions
   - sorting specimens
   - recording patient I.D.
   - assigning a laboratory number
   - logging on a worksheet
   - separating serum from cells

2. **Specimen Testing** covers the performance of the procedure up to and including the first recording of a result:

   - diluting the specimen
   - adding reagents
   - monitoring the measuring instrument
   - placing the test material in the instrument
   - taking and recording the reading
   - removing the test material from the instrument

   Note: The target of the time study is the technologist working at the instrument not the instrument itself. Therefore, the time the instrument takes for analysis is not measured. The significance here is that unit values need not correlate with advertised specimen throughout capacity.

3. **Recording and Reporting** covers all that is required to convert the result into a meaningful report which leaves the laboratory:

   - calculating the results
   - recording the results on the patient report
   - checking, sorting and filing the final report
   - telephone calls associated with the report

4. **Daily or Routine Preparation** covers those preparatory steps required before a procedure can be performed which need not be repeated for each specimen being tested:

   - aliquoting reagents
   - diluting stock standards
   - instrument calibration
   - maintenance of work area

5. **Maintenance and Repairs** covers preventative maintenance done at regularly scheduled intervals as well as emergency trouble shooting and repairs performed by laboratory staff. Work done under service contracts would not be included.

6. **Solution preparation** covers the preparation of bulk reagents, solutions and quality control.

7. **Glassware Wash-up** covers all support activities related to the preparation of re-usable supplies and the disposal of specimens:

   - washing
   - drying
   - sterilization

8. **Technical Supervision** covers the technologist time required to directly supervise the procedure:

   - validation of quality control results
   - approval to report results

These examples are not meant to be a comprehensive list but merely to serve as an illustration of the types of activities incorporated in each field of study. Please note that specimen procurement is not one of the fields. This has been timed separately and assigned a unique unit value independent of subsequent testing. Activities specifically excluded from time studies are:

- waiting time
- teaching and in-service education
- administrative duties
- laboratory research and method development

Note: Count under the category of **Research** samples received from Research cost centres which request analysis for constituents with approved unit values.

Unit values are assigned after a sufficient number of time studies have been carried out at several sites. When there is insufficient data for a permanent value, a temporary unit value may be assigned. This will be based on a limited number of studies or extrapolated from components of previous time studies on similar procedures or instruments. Instruments should be in routine use at a site for six months before being time studied. The T (temporary) designation has been dropped from the current manual, however, studies will continue to establish permanent values.

IMPLEMENTATION OF THE WORKLOAD MEASUREMENT SYSTEM

Meaningful data collection is fundamentally important to the production of valid indices to monitor workload. There are four basic aspects to be considered in the set-up and operation of data collection practices. Within each of these areas many options exist and it is up to each individual laboratory to investigate and choose those alternatives which will produce the best quality data as efficiently as possible.

The four aspects are:

I. Consultation outside the department
II. Definition of functional sections
III. Development of simple, accurate methods for tallying procedures and activities
IV. Capture of information in appropriate summaries

I. Consultation Outside the Department

In making any of the decisions required in implementation of a counting method, care should be taken to consult with administration. It is vital that data compiled by the laboratory be understood by those outside the department who may be responsible for transcribing summaries or interpreting comparative reports.

Laboratory data should also be able to be related to similar data reported by other departments in the hospital. External co-ordination will ensure that hospital information systems are consistent and feed useful data back to the laboratory. External consultation will also ensure that the requirements of provincial and federal government agencies are met.

II. Definition of Functional Sections

The effectiveness of the Workload Measurement System as an internal management tool requires the definition of functional sections. This enables the isolation and comparison of a variety of workloads within the laboratory. This will also allow the tailoring of counting procedures to specific work patterns and spread the burden of responsibility for the actual tallying. The counting of smaller workloads should improve the accuracy of the overall total.

A functional section is an area or group for which work output and manpower input can be accurately and easily identified. The nature and number of groups it is useful to define will vary with each laboratory's individual organization. Factors which should be considered include:

1. cost centres.
2. spans of control (distribution of supervisory staff).
3. specialized or satellite areas (e.g., Stat Lab, Toxicology).
4. shift schedules.
5. Test groupings.
   - by methodology (automated, manual)
   - by clinical association (renal, cardiac).
6. standard Sections in the schedule.

III. Development of Simple, Accurate Methods for Tallying Procedures and Activities

There are many details to be considered when implementing counting methods. How these are set up is vitally important and the material in this section should be carefully reviewed and thoroughly understood by all those connected with data collection.

A. Creation of a Master File

For reference purposes, a list of all analyses being performed in the laboratory should be prepared. This should include unit values currently in use and the date of their assignment. It is important to keep this master list current through regular review and update. It will also be useful at this time to create a list of laboratory activities which do not generate unit values and record their frequency. You will then have a summary of all laboratory activities. An example of a master file can be found in **Appendix A**.

B. Choice of Method or Methods for Tallying Procedures and Activities

Four common methods are:

1. counting off requisitions
2. counting off master log or master worksheet
3. computer assisted
4. counting manually "as you go" at the bench

The last is the most common method used although it may be that a combination of methods is most useful. Factors which should be taken into consideration when choosing counting methods are:

a) Capture of Patient Classifications

The laboratory must determine where patient classification (inpatient, outpatient, etc.) can be identified during specimen handling. If the workbench receives samples from a central processing area labelled only with an accession number, patient classification cannot be identified at that workbench.

b) Capture of Quality Control Standards and Repeats

When these are not included within the unit values, they should be tallied in addition to patients and given the same unit value. Blanks and duplicates performed in accordance with method directions, however, are always incorporated into the unit value and should not be tallied separately. Refer to the special directions preceding each section for specific instructions in this area and to the Glossary for precise definitions of these terms. The laboratory must determine where procedures must be counted in order to ensure that quality control, standards and repeats will not be missed.

c) Item for Count

Today, in many instances, the number of tests performed is no longer the best parameter with which to measure fluctuating workloads. In addition, it is recognized that decreasing the number of items to be counted will reduce the opportunity for error. In this schedule of unit values, a variety of items for count can be found. These have been chosen carefully to define the marginal increase in time resulting from each additional request for patient service and to simplify the process of data collection.

It is very important to be aware of and to use the correct item for count. A simple tally using the item for count will generate a "raw count" which can then simply be multiplied by the unit value to express workload. Items for count are defined in the **Glossary**. Laboratories should consider at what point in the process of handling and analysis can the designated item for count be identified.

Note: The items for count are the best building blocks for human resource statistics. They may not provide a suitable "raw count" for other types of statistics. For example, to monitor reagent costs and consumption, one must know the total number of each specific test.

d) Profiling

i) Profiles with constant components

Protocols in some hospitals lead to consistent requests for certain procedures as a group. For the sake of convenience, this group may be requested as a profile and a single unit value can be designated to represent this specified test menu. For example, a hospital may choose a group of core liver function tests to monitor all patients with liver disease. Performance of these tests is

automatic when a request for a liver profile is received. The laboratory can list this profile in its master file with a unit value based on the sum of each of the component procedures. Care must be taken to ensure that the profile value is not assigned to any component test which may be requested as an individual procedure in other clinical circumstances.

ii) Profiles with variable components

Profiles may also be created from variable components if a standard pattern of practice can be established. For example:

a) In Microbiology, a composite unit value for a certain specimen type may be created by recording all the individual unit values garnered from 100 successive specimens of that type and taking the average. Such a unit value is valid as long as the patient population remains essentially the same, i.e. the percentage of positive remains constant and no changes in practice occur.

b) In Immunohematology, unit values have been related to the number of procedures from a defined list that a laboratory chooses to do in certain clinical circumstances. If the practice remains constant, so do the unit values.

Profiles created from variable components must be monitored closely for changes in practice or patient population.

Laboratories should consider when the use of profiles will reduce the complexity of counting.

e) Forms

The laboratory should consider how readily existing worksheets yield the information required. Forms may serve more needs than workload statistics alone but they should always be designed or revised with workload collection in mind. Each functional section should design and supply their own forms tailored to their specific requirements. Some standard forms are displayed in **Appendix A** and can be utilized by individual laboratories if found to be suitable.

f) Counting Activities Which Have No Unit Value

These fall into two categories:

i) Activities which are currently excluded by definition from the Workload Measurement System, e.g. waiting time, teaching time, administrative time and method development time. (Non-unit producing activities).

Keeping a count of hours consumed by these activities will enable a laboratory to examine the difference between total time available for work and time devoted specifically to unit producing activities. These activities must not be given unit values or "factored" into aggregate unit totals. Unit values are now reserved for those activities which produce the daily output of patient results.

ii) Activities which fall within the scope of the Workload Measurement System but have no unit value assigned.

Any laboratory requiring a unit value for a procedure not listed in the current schedule must request a unit value in writing through the office of the Technical Unit.

During the interval between requesting and receiving a temporary unit value, the laboratory should keep track of the number of requests for that procedure. In this way, the procedure may be included retroactively in the annual workload statistics. New temporary unit values will be published nationally via the Newsletter.

g) Collection of Paid and Worked Hours

In order to use workload data as a management tool, it can be combined with paid and worked hours. In many instances, paid hours are made available through administration. If a laboratory relies on an external report, care must be taken to discover exactly which personnel are included in total figures. The

laboratory must also know the breakout of regular hours, overtime hours and standby hours. These differ in the rate of pay per hour but one regular hour and one overtime hour are each one paid hour. Knowing precisely the components of the total paid hours figure is essential to the interpretation of workload statistics especially when they are being used for comparative purposes (refer to Manager's Guide for detail).

IV. Capture of Information in Appropriate Summaries

Laboratories should decide what information is required in summaries before selecting from the options available for tallying. As much as possible, data should be directly transferrable to external forms such as the Annual Return of Health Care Facilities-Hospitals. This avoids the possibility of error when laboratory data is transposed by non laboratory personnel. Internally, criteria must be selected to monitor workload over time. For a discussion of workload indicators, please refer to the Manager's Guide.

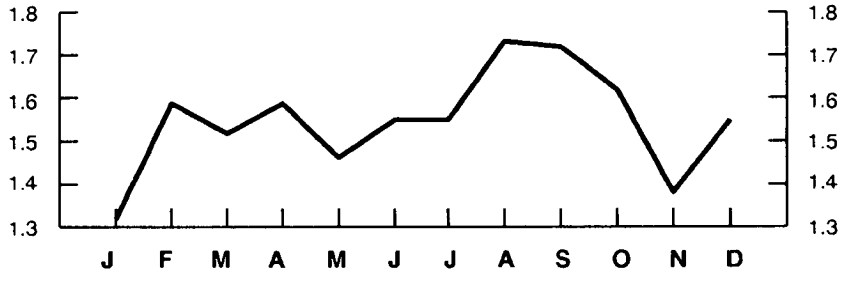
Summaries of workload data often result in huge numbers. Graphic summaries will simplify data and are a good way to monitor ongoing activities. Often they will highlight significant changes or emerging trends.

The three graphs illustrated here are reproduced from the 1984 College of American Pathologists Workload Recording Manual.

They represent:

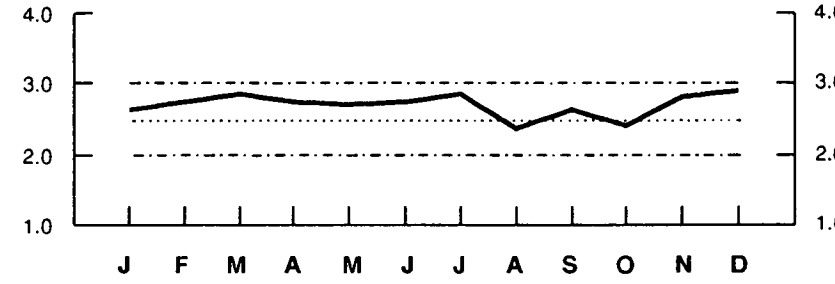
1. Units over time
2. Raw counts over time
3. Ratio of raw counts to units.

1. Units over time: Units x 10^4



2. Raw counts over time:
Raw count x 10^3

3. Ratio of Raw counts to units:
Ratio: total
Units/total Raw count



Totals will vary from month to month, but the ratio will remain constant as long as major changes do not occur in practice. This third graph can be used to quality control the collection of data since the ratio should not fluctuate beyond a narrow range. In addition, if kept for each functional section, the ratio will also yield the average unit value for that section. A comparison of the average unit values for each section will identify areas with high human resource requirements. These areas will be most sensitive to changes in workload and staffing.

MANAGER'S GUIDE

Why WMS?

The management of any resource is necessarily dependent on a fundamental information base of one sort or another. Simply stated, WMS provide basic information on:

- **What** is produced (activity/type of work);
- **How Much** of each (distribution of work);
- **By Whom** (staff category/who did what);
- **For Whom** (in/outpatient, group, etc.);
- **Where** (sections of the department);

The workload measurement system is a management tool designed to provide this information - the vital signs of the department if you like.

But to **What End?** Producing monthly workload reports may be well intentioned but of limited value unless it is a means to a larger goal, that of **Productivity Improvement.** Information-based management tools do not by themselves produce improvements; this initiative must come from the administrator and manager.

Productivity and Productivity Improvement

Productivity is the relationship between the output generated by a production or service and the input provided to create this output. The concept of productivity is also linked with quality of output, input and process itself, and can be measured in both quantitative and qualitative terms. Generally, it is described as the efficient use of resources - labour, capital, land, materials, energy, and information in the production of goods and services.[1] This is usually stated as:

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$

Generally, it is also possible to define productivity as the relationship between results and the time it takes to accomplish them. Hence, higher productivity should be noted when more is accomplished with the same amount of resources.

The following points should help clarify the concept of productivity:

- Productivity increases do not necessarily result from increasing production. If the department processes more procedures with a proportional increase in worked hours, the net result (procedures per worked hour) may well be the same productivity.
- Productivity is not necessarily efficiency. A department may gain 10% of its worked hours by introducing a more efficient instrument, but if this gain is not channelled into unit-producing work output, then there is no resultant change to the productivity ratio.
- Being effective does not necessarily mean higher productivity. If production or quality targets are established without regard for cost of resources, then one achievement is being traded for another: higher production or better quality but lower productivity.
- Productivity should not be confused with activity. No matter how busy a department may appear to be, a high productivity ratio will only be attained if effort is focused on "productive" work (unit-producing activity).

---

[1] *Joseph Prokopenko Productivity Management – A Practical Handbook, Geneva,1L0,1987.*

Productivity Improvement is not working harder, but working intelligently to improve the factors that affect productivity, such as: (i) the organization and systems, (ii) the equipment and technology, (iii) the work methods, and (iv) the motivation and attitudes of the staff.

It is important to note that productivity measurement does not equal productivity improvement. Improvement is accomplished through management action based on WMS information. Every health care facility or department has the potential to improve productivity.

The Incentives

There are numerous potential pay-backs to implementing and routinely applying WMS:

- tangible and hard evidence in justifying resource levels (budget, staffing, etc.);
- a solid base for determining the allocation and deployment of staff by shift, geographical section, etc.;
- a foundation for setting productivity goals and service levels;
- a sound, fundamental and accessible information base that can respond on very short notice to specific information needs of the manager to assist with day-to-day departmental management;
- impact studies (as required) for planning of staff, space, equipment, etc.

The WMS has tremendous potential, and the applications outlined in the following section are designed to prime managers in this regard and to demonstrate the value of the tool.

Applications

The various WMS data applications fall into two general areas:

- Selecting and monitoring key indicators, and
- Using the WMS for a specific purpose as a problem-solving tool.

Monitoring

Routine data analysis, whether it be plotting raw data on a graph (units) or plotting indicators units per Full Time Equivalent or FTE, requires the establishment of a departmental baseline – a reference level of relative consistency for departmental operations. Baselines will be adjusted as service patterns change, as staff are added or deleted, as new equipment or modalities are introduced, etc.

Around the baseline is a range. Within this range the indicator is allowed to fluctuate. The upper and lower limits of this range will be set by the manager to reflect the unique sensitivities of the department.

Each department and each manager has some common and unique information needs. In recognition of this, a number of **key indicators** have been developed for managers. The list is not exhaustive. It serves as a guide to the use of this information and to the construction of additional indicators that suit the individual needs of departments and institutions.

Indicators are, very simply, numerator:denominator statistics. They are quite useful in bringing complimentary data together and enhance the overall meaning of departmental/facility information. To further enhance the use of this information, workload units may be expressed as "workload hours" (i.e. units ÷ 60) to give workload hours per FTE. or the numerator:denominator statistics (indicators) can be multiplied by 100 to create an index or percentage.

The selection of indicators is largely dependent on individual managerial styles and on the scope of the service, i.e. in large and functionally complex departments, indicators that reflect the detail of the service can be selected or constructed.

The indicators listed below are **EXAMPLES** of what may be reported for the laboratory as a whole, or in larger laboratories what may be reported by individual section, shift, requesting service, staffing category, etc.

It is important to ensure that both the numerator and the denominator of any ratio represent the same functional section, staffing category or time period and that these remain consistent if the indicator is to be used for comparative purposes.

I. Staffing Indicators

(a) Number of full time **equivalents** (FTE) by category

$$\frac{\text{total paid hours of category}}{\text{normal paid hours of same}}$$

(b) Proportion of **staff** in any one category occupational class

$$\frac{\text{paid hours of category} \times 100}{\text{total paid hours of department or section}}$$

(c) Proportion of **worked hours** to total paid hours by category and/or occupational class

$$\frac{\text{worked hours of category} \times 100}{\text{total paid hours of same}}$$

II. Productivity Indicators

(a) Total output in units related to input in PAID hours of all unit-producing personnel within the laboratory budget

$$\text{Paid Productivity} = \frac{\text{total units in time period}}{\text{total paid hours for same}}$$

(b) Total output in units related to input in PAID hours of an occupational class

$$\frac{\text{total units in time period}}{\text{paid hours of specified group of same}}$$

(c) Output in units related to input in WORKED hours of all unit-producing personnel or any specified group

$$\text{Worked Productivity} = \frac{\text{total units in period}}{\text{worked hours for same}}$$

III. Workload Indicators

(a) Output in units related to specified time period

$$\frac{\text{total units}}{\text{time period}}$$

(b) Proportional distribution of units by source of request (inpatient, outpatient, quality control, etc.) for a specified time period

$$\frac{\text{units from source in time period} \times 100}{\text{total units in same}}$$

IV. Financial Indicators

Direct expenses per unit for all direct costs or any component of direct costs

$$\frac{\text{total costs}}{\text{total units}}$$

$$\frac{\text{total costs}}{\text{inpatient admissions}}$$

$$\frac{\text{personnel costs}}{\text{total units}}$$

$$\frac{\text{all direct costs excluding personnel costs}}{\text{total units}}$$

V. Utilization Indicators

Laboratory service (expressed in units) provided for a specified patient population

$$\frac{\text{inpatient units}}{\text{inpatient days}}$$

$$\frac{\text{inpatient units}}{\text{inpatient admissions}}$$

$$\frac{\text{total units}}{\text{clinical service}}$$

With cost indices, the "bottom line" is total direct costs per unit. Variations in this indicator may require a look at the individual components of direct costs. A laboratory with a low personnel cost/unit may operate within a normal peer group range by the use of more expensive supplies with a consequently higher supply cost/unit or vice versa. The total cost per admission must be followed bearing in mind the percentage of inpatient unit production to the total workload of the laboratory. Obviously, two hospitals of equal size and inpatient load may vary tremendously in outpatient practice.

With regard to workload indicators, a variance in the total production in the period may require a breakout of this indicator's component parts. Research units in a University Hospital laboratory may skew the total, or use of quality control may vary considerably from operation to operation.

Indicators of utilization are becoming more important with the development of specialty treatment units combined with the need of administrators to understand the component requirements and cost of therapy for definable disease states.

It is likely that the use of indicators in the laboratory will become more and more necessary as the specialty becomes more complex and its costs need to be justified.

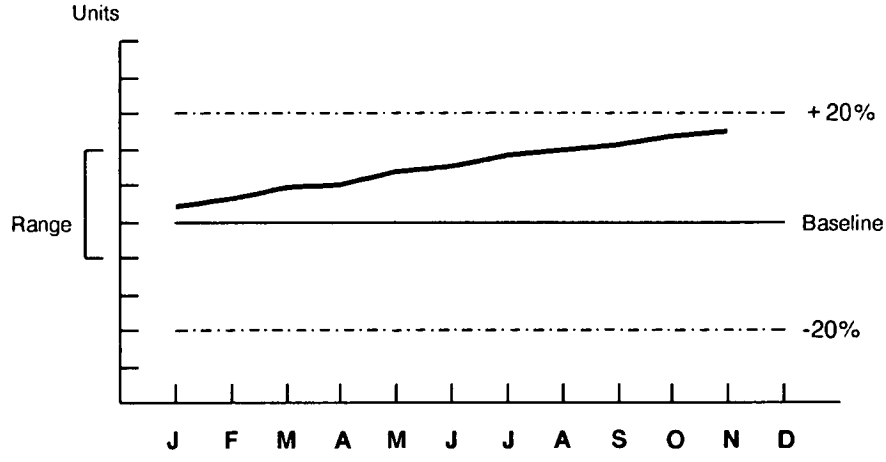
This schedule allows no assignment of units to items-for-count that are not in the publication. In order to maintain uniformity, all unit values must be obtained from the Technical Unit in Ottawa, and will be published regularly in the Newsletter.

Examples of Indicator Application for Monitoring

A. **WORKLOAD UNITS**

The manager has been monitoring the total department units over time and has established a baseline and range. The manager has also established that an additional 20% in this workload above the baseline represents enough work for another FTE.

Figure I
Workload Units



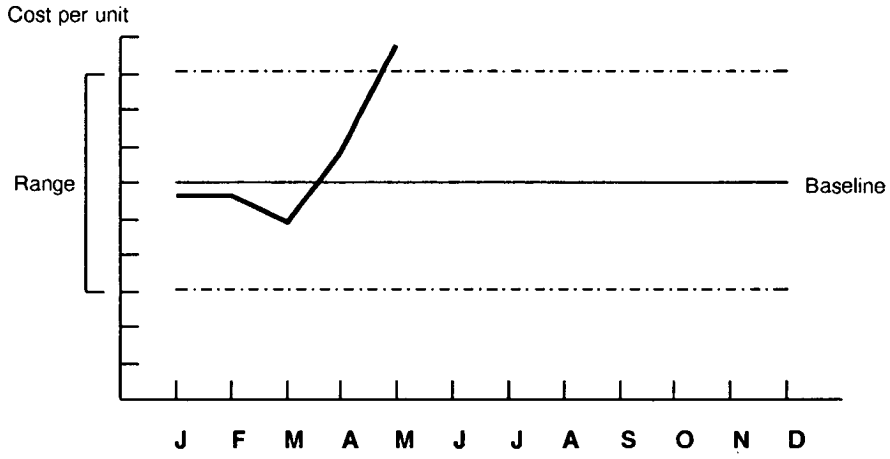
Over the past three months, workload has been climbing above the upper margin of the range, so the manager decides to investigate the situation.

Several possibilities should be considered: where is the work being generated (e.g. which section, which period); is any work being done on callback or overtime, and if so, is this due to poor scheduling; does the additional 20% in workload actually represent a FTE, in other words, is the presently accepted productivity appropriate? In reviewing these possibilities, the manager can take the necessary actions to address the additional work, e.g. consider another FTE **or** absorb the work with the present FTE complement.

B. **COST PER UNIT**

In reviewing the cost/unit indicator, the manager sees that the value for May was outside the comfort zone.

Figure II
Cost per unit



Only by examining the numerator and denominator components of the indicator can the manager explain this change.

The cost per unit indicator gives the average cost per unit produced. Costs include salaries with overtime and callback, supply expenses, etc., and units represent the relative complexity of work, with numbers of patients and procedures done.

An increase in the cost per unit could therefore be due to:

$$\frac{\text{increase in operating costs}}{\text{decrease in units or units remain constant}}$$

$$\frac{\text{increase in operating costs}}{\text{smaller increase in units}}$$

$$\frac{\text{smaller increase in costs or costs remain constant}}{\text{decrease in units}}$$

To investigate the denominator, the manager examines the graphs of Workload Units and the Productivity Index.

Figure III
Workload Units

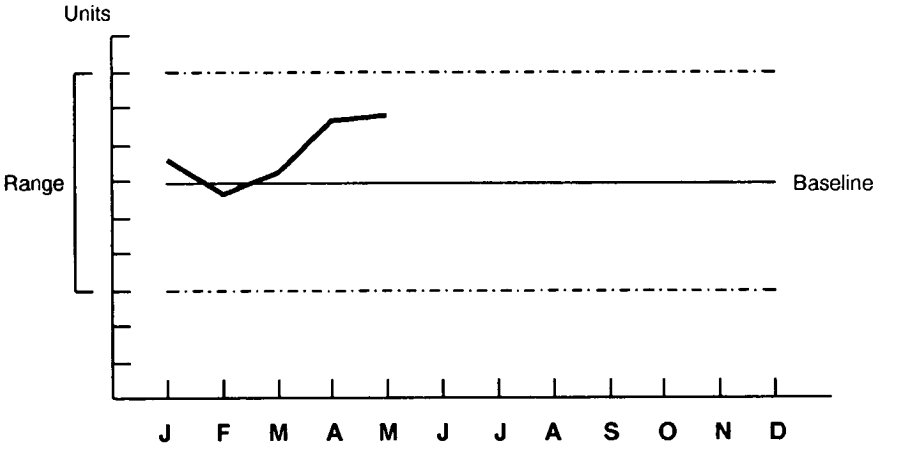
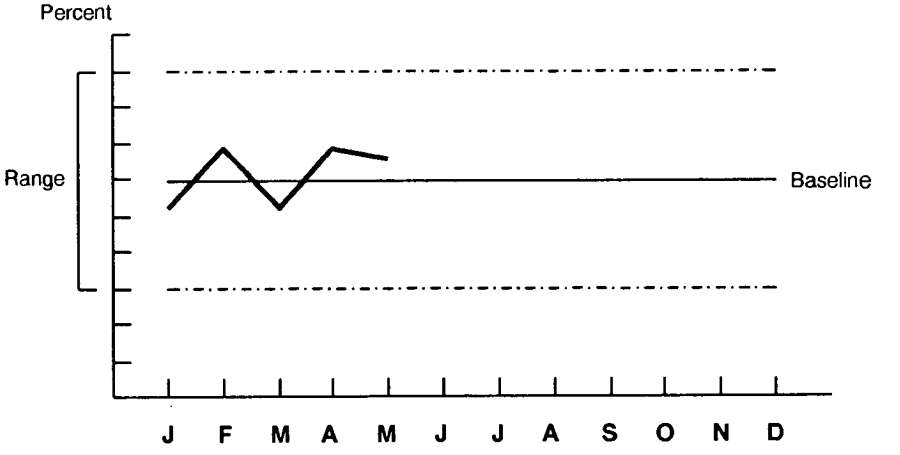


Figure IV
Productivity



The manager sees that the Workload Units and the Productivity Index have remained fairly constant. This shows that the staff were producing the normal amount of work at their usual rate. Therefore, it appears that the increase cost/unit ratio is due to a change in the cost components (numerator).

In reviewing the cost components, the manager notes that salaries are higher than normal. Further investigation shows that overtime had risen significantly due to the fact that two staff had been on annual leave in May.

With this information, the manager can now account for the increased cost per unit.

C. PRODUCTIVITY INDEX

The Worked Productivity Index is a widely used and key indicator. It is simply units per hour expressed as a percentage. When using this indicator to set productivity targets and in allocating resources, it is extremely important that the numerator data be correctly matched to the denominator data (i.e. units must only be matched to the worked hours of those who produced them – unit producing personnel).

Research and development is a good area to illustrate this general rule. It is also advantageous, in terms of this discussion, to view laboratory workload as falling into two categories:

(i) Measured Work (Patient Driven)
(ii) Unmeasured Work (Support)

Measured work (as captured by the WMS) primarily relates to producing a patient answer and generally varies directly with patient volume and physician ordering patterns. On the other hand, it can be generally stated that (unmeasured) non unit producing work for the most part is a constant and is not patient driven (e.g. research and development).

Measured work is primarily attributable to unit-producing personnel and, for the most part, unmeasured work is attributable to management and operational support personnel. Research and development is an operational support function. Hence, it follows that the worked hours of those personnel dedicated to this function should be **excluded** from the denominator of the productivity index so that units (output) and hours (input) are properly matched.

Finally, in cases where an individual has responsibilities that span both of the above mentioned occupational groups, his/her worked hours are apportioned in the appropriate percentages between the Unit-producing and Management and Operational Support Groups. For example, if an individual on average spends 30% of her/his time on method development activities and the remainder of time is spent producing patient answers (i.e. unit-producing or measured activity), then only 70% of that person's worked hours should be included in the denominator of the Worked Productivity Index.

D. WORKED VS. EARNED HOURS

The use of worked vs. earned (paid) hours in the denominator of the productivity ratio provides a truer indication of labour productivity.

The following example is intended to illustrate the effect of these data elements on the productivity index.

The following example demonstrates the theoretical relationship between earned and worked hours and illustrates the use of this information in combination with workload data. As well, the illustration serves to demonstrate to managers the relative impact of apparent unaccounted for time on calculated productivity. The numbers have been purposely simplified to facilitate the illustration. No particular department is represented. No standard is implied.

Example:

Period: Annual
Units: 320,000

During this period, the unit producing personnel consisted of a working chief technologist, three staff technologists, and an aide. Assuming a 37.5 hour work week, the earned hours for the year = 5 x 52 x 37.5 = 9,750. Therefore,

Unit Producing Personnel Earned Productivity Index =

$$\frac{\text{Inhouse units of Service in Period} \times 100}{\text{Unit Producing Personnel Earned Hours} \times 60} = \frac{320{,}000 \times 100}{9{,}750 \times 60} = 54.7\%$$

This example shows that 54.7% of the earned hours for the year were accounted for by unit producing activities. **It should be noted, however, that this is not a recommended indicator of productivity**. Rather, the calculation has been presented to demonstrate the utility of worked hours in more accurately assessing productivity.

Worked hours, essentially, are earned hours minus benefit hours. For demonstration purposes in our illustration, benefit hours amount to 1,163 hours. Therefore, given that our hypothetical department had no purchased hours,

Total Worked Hours = 9,750 – 1,163 = 8,587

and

$$\textbf{Unit Producing Personnel} = \frac{\text{Inhouse Units of Service in Period} \times 100}{\text{Unit-Producing Personnel Worked Hours} \times 60}$$

$$\textbf{Worked Productivity Index} = \frac{320{,}000 \times 100}{8{,}587 \times 60} = 62.2\%$$

This shows that 62.2% of the worked hours for the year were accounted for by unit producing activities. The worked productivity indicators produce higher numerical values than the exclusion of benefit hours.

E. NON UNIT PRODUCING ACTIVITIES

As certain regular department activities (staff meetings, education, training, etc.) are excluded from unit producing activities, by definition, the maximum activity level attainable is less than 60 units (minutes) per hour and the maximum productivity index attainable is less than 100%.

In our hypothetical department, the chief technologist spent one half of each working day on administrative duties. One staff technologist devoted an average of 4 hours per week to purchasing and computer activities. The aide spent one half of each working day on secretarial functions. All staff took two 15 minute coffee breaks each day. In addition, 364 hours were spent in method development.

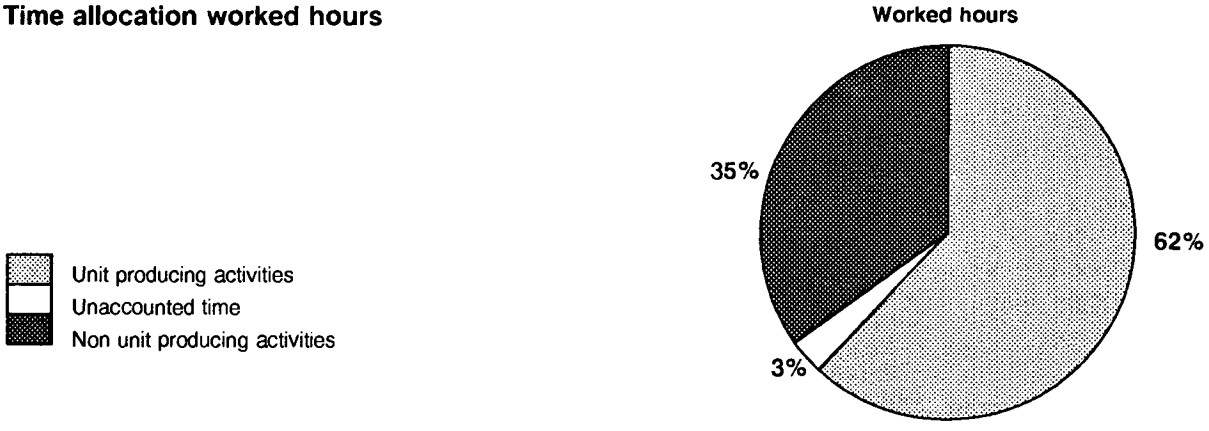
The time in hours, consumed by these activities was as follows:

Administration	975 hours
Purchasing/Computer	104 hours
Secretarial	975 hours
Coffee breaks	578 hours
Research & Development	364 hours
Total	2,996 hours

These 2,996 hours were excluded from the unit calculations but, nevertheless, accounted for 35% of the total departmental worked hours. When these percentages are combined with the Unit Producing Personnel Worked Productivity Index, less than 3% of the time available is unaccounted for (refer to figure 3 for an illustration of this analysis).

Figure V

Time allocation worked hours



It is important to realize that each department will have its own characteristic profile of earned and worked activity, reflecting the operation in terms of resource utilization. This profile will be affected by such factors as the type and number of services provided, the type and number of activities provided within each service and the physical layout of the department and/or satellites.

F. SPECIAL APPLICATIONS

Data produced by the WMS are valuable in special problem solving situations. Shown below is a brief analysis of projected increased workload.

Example:

The Hospital is investigating the feasibility of expanding the critical care unit. The Chemistry department has projected a 10% increase in workload. Management has stated that no more staff will be hired, but a capital investment (Instrument Z - 3 units/specimen) is a possibility. The chief technologist has provided the following information:

Workload Data: Based on the analysis of the past 12 months workload, the following averages have been established:

- Total number units per month 37,176
- Total number specimens per month 9,348
- Total number electrolytes 3,868
- Total number units/electrolytes 11,604
  (instrument X - 3 units/specimen)
- Total number other Chemistry test 8,524
  (instrument Y - 3 units/specimen)
- Total number units/other Chemistry 25,572
- Total number units produced by 1 Bench Technologist (i.e. FTE) 6,175

Question: What is the impact on staffing?

1. In the current situation?
2. With the purchase of Instrument Z.

Analysis: To determine number of FTE's required

1 (a) Requirements with current instrumentation and present workload

$$\frac{\text{37,176 (total units)}}{\text{6,175 (units/FTE)}} = \text{6 FTE's}$$

1 (b) Requirements with 10% increase

$$\frac{6.0 \times 110}{100} = 6.6 \text{ FTE's}$$

2) FTE requirements for new instrumentation

$$\frac{\text{9,348 (Raw Count in Specimens)} \times \text{3 (Unit Value per Specimen)}}{} = \frac{28{,}044}{6{,}175} = 4.5 \text{ FTE's}$$

Conclusion:

1. The increased workload will require an additional 0.6 FTE. With a re-organization or shift in personnel in Chemistry and/or the whole Laboratory, the 0.6 FTE can probably be absorbed.
2. The purchase of Instrument Z will show a potential savings in staff of 1.5 FTE. The savings in labour costs must be weighed against the purchase and operating costs of the new instrument. There is no doubt that the proposed new instrument will improve the response time for requests and increase the efficiency of the service.

G. REPORTING

The reporting of workload and other departmental information essentially has four dimensions:

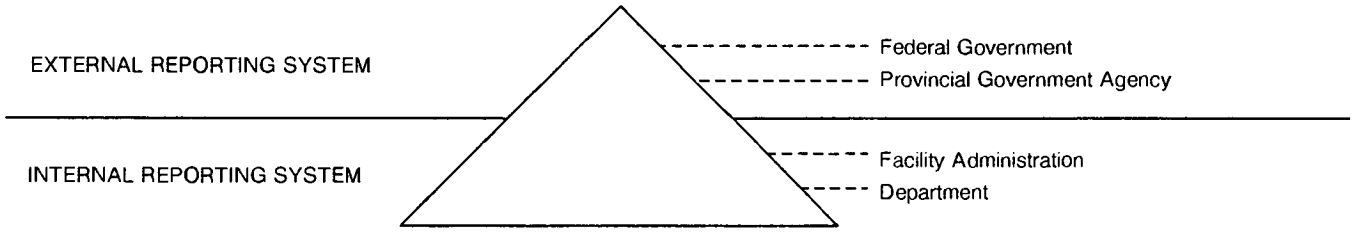
Internal

Reporting within the Department
Reporting to Facility Administration

External

Reporting to Provincial Government
Reporting to Federal Government

The triangular diagram below depicts the direction of flow of workload data from the internal to the external reporting system. A few gross totals are sufficient at the federal level while successively more detail is useful to the provincial government, facility administration and the department itself.



Internal Reporting

The reporting of WMS and other departmental information within the facility is extremely important to the manager. Very often this reported information is considered in the allocation of resources and in peer group comparisons. Hence, the manager's understanding and careful release and verification of this information is essential to senior management's understanding of the operation and any comparison to another department in a facility of similar scope and size.

Therefore, in terms of the internal reporting of WMS information, it is recommended that the manager become proactively involved in selecting a few "hard hitting" indicators that are readily digestible by senior management in order that they obtain an appreciation for the department's operations. The last thing a manager wants to do is "turn-off" or overload senior management with excessive detail. Rather, the ideal situation would have the department manager influence the identification and selection of these indicators and other departmental information for senior management interpretation.

External Reporting

National reporting of Laboratory data to Statistics Canada is presently in terms of number of units produced and reported in the Annual Return of Health Care Facilities - (AR).

In general, managers are encouraged to become proactively involved in generating external reports and in verifying the data pertinent to their department prior to the release of the report to an external agency.

H. COMPARISONS

Comparisons between departments within the same institution or between departments in different institutions that are similar in scope and size can be very useful in gauging departmental performance. Comparing offers an external perspective (comparing notes if you like) in assessing the department's position relative to its peers.

It should be recognized, however, that comparative analysis has limitations and definitive conclusions cannot be made when solely based on comparing numbers or indicators. Moreover, aggregate statistics and indicators, when compared between institutions, tend to hide important information. The worked productivity index (WPI) is a good example.

Facility "A"	Facility "B"
WPI = 75%	WPI = 60%

While both departments are in facilities with similar scope and size, there is a 15% variance in their worked productivity. However, it cannot be concluded that Facility "A" is more productive than Facility "B". In fact, 60% may be a very realistic and favorable productivity target for this institution.

The "bottom line" is that other indicators must be examined to add further meaning to this comparison. As well, managers must appreciate and be cognizant of other potential factors impacting on these comparisons that statistics do not necessarily bear out. For instance, Hospital "B" may provide a service that is traditionally under-productive through causes outside the control of the managers (e.g. a hospital emergency service with 24-hour coverage – a good example is a Blood Bank). If Hospital "B" offers this service that essentially operates like a fire station (e.g. only works/produces when there are fires), then one can expect a justifiably lower departmental productivity at Hospital "B".

Although simplistic, this hypothetical scenario should serve to demonstrate the limitations surrounding comparative indicators and the care that should be exercised with interfacility comparisons.

Finally, many peer comparisons use a group baseline or mean as a reference point. It should be recognized that **the mean is not a standard**. It is simply another gauge or an external reference point for the manager.

I. AUDITING THE USE OF THE WMS

An accessory to the WMS is the **Laboratory WMS Audit Guide.** It is a new management instrument which provides the "quality control" feature that assures credibility of the WMS and the information it provides. The principle objectives of the WMS Audit Guide are to provide management with a methodology to:

- evaluate how effectively the WMS are being applied;
- verify the accuracy and integrity of the data recorded and reported.

Since management decisions are based on workload data, it is important that this information be accurate, i.e. derived from the correct application of the WMS. Using the WMS Audit Guide, the manager has a mechanism for achieving a desired level of quality in applying the WMS. Use of this audit is encouraged.

PROCEDURE LIST ALPHABETICAL

The following list contains numerous new procedures, many with temporary unit values; however, the temporary or "T" designation has been dropped. Those procedures which require further time study are identified and work will continue to establish permanent values. There has been a re-organization of the line items as follows:

a) Chemistry instruments and Hematology profile instruments are listed separately at the end of this list.

b) All stains are listed alphabetically within each section under "STAINS".

c) Individual drugs and drug metabolites have been deleted from the list. Methods or techniques for their quantitation are listed in a separate section.

d) Individual analytes quantified by Ligand or Saturation Analysis have been deleted from the list. Techniques for their quantitation are listed in a separate section.

Procedures with asterisks indicate information which is new in this edition. These may be entirely new line items, revisions to old line items or occasionally a reinstatement of values dropped from previous editions.

Some unit values have been deleted. These represent procedures which are, in the opinion of the sub-committee, obsolete. If a laboratory is still responsible for the performance of these procedures, a unit value may be requested from the Secretariat.

Procedures listed as belonging to Microbiology, Anatomic Pathology, Immunology or Histocompatibility will have specific units for specimen handling which should be claimed in addition to the unit value for the procedure even if the procedure is performed by another section of the laboratory. Procedures listed as belonging to Chemistry, Hematology or Immunohematology have specimen handling time incorporated within the value for each procedure and no additional units should be claimed if any of these procedures happen to be performed in Microbiology or Anatomic Pathology.

The following abbreviations are used to indicate in which section the line item may be found. The Immunohematology and Microbiology sections have been broken down into smaller sub-sections.

SPD	Specimen Procurement and Dispatch
Chem	Chemistry
AutoC	Automated Chemistry
L/SA	Ligand/Saturation Analysis (Chemistry)
Hema	Hematology
AutoH	Automated Hematology
Immu	Immunology
I/HLA	Histocompatibility
ImmH	Immunohematology
AP	Anatomic Pathology
AP/SP	Surgical Pathology
AP/Cy	Cytopathology
AP/Cg	Cytogenetics
AP/EM	Electron Microscopy
AP/IP	Immunopathology
Micro	Microbiology - General
MiBac	Bacteriology
MiVir	Virology
MiPar	Parasitology
MiFng	Mycology
MiMyc	Mycobacteriology
MiChl	Chlamydia
MiMpl	Mycoplasma
MiSer	Serology
MiEnv	Environmental
Multi	Multi-discipline
Misc	Miscellaneous

ALPHABETIC INDEX

Procedure	Unit Value	Item for Count	Section	Code Number
ABO Hemolysin Test	5	Test	ImmH	01670
*Abandoned cultures	124	Specimen	AP/Cg	04150
*Acetoacetate, serum – enzymatic	7	Test	Chem	00400
Acetone quantitative	10	Test	Chem	00404
*Acetylcholinesterase acrylamide – electrophoresis	12	Specimen	Chem	00401
*Acetyl glucosaminidase, urine, enzymatic	7	Test	Chem	00402
Acid, free or total – Duodenal or Gastric	3	Specimen	Chem	00406
Acidified serum Hemolysin – Ham's test	18	Test	Hema	01202
Activated partial Thromboplastin Time – manual or fibrometer	5	Test	Hema	01312
Agglutination – enteric, single antigen	20	Organism	MiBac	09271
– each additional antigen	5	Antigen	MiBac	–
Agglutination – enteric, Widal test	25	Organism	MiBac	09274
Agglutination – Brucella with 09271 or 09274	5	Antigen	MiBac	09281
Agglutination – Leptospira, 4-6 serum dilutions single antigen	30	Organism	MiBac	09319
– each additional antigen	10	Antigen	MiBac	–
Agglutination, slide e.g., latex	1	Antibody/ Antigen Reaction	MiBac	09347
Air sampling, exposure and colony count – by Impinger	10	PBT	MiEnv	09443
— by slit samplers	8	PBT	MiEnv	09440
– by settle plate	5	PBT	MiEnv	09437
– each additional plate	4	PBT	MiEnv	09445
Albumin	12	Test	Chem	00860
*Albumin, reserve binding capacity HBAA dye method	12	Test	Chem	00405
*Alkaline Phosphatase Isoenzymes – electrophoresis	12	Test	Chem	00421

Procedure	Unit Value	Item for Count	Section	Code Number
*Allergic alveolitis investigation – see Ouchterlony diffusion	–	–	Imm	–
*Aliquoting specimens to be tested at a later date	1	Tube	SPD	00210
*Alphaglucosidase – sperm	7	Test	Chem	00407
*Amino Acids, – see chromatography	–	–	Chem	
*Amino Acid, serum or urine, quantitative chromatography	60	Specimen	Chem	00408
Amino Levulinic Acid, urine	40	Test	Chem	00420
*Ammonia, manual, enzymatic	7	Test	Chem	00411
Ammonia, Conway diffusion	39	Test	Chem	00422
Amniotic Fluid Scan	20	Test	Chem	00423
Amylase	10	Test	Chem	00425
*Angiotensin converting enzyme	10	Test	Chem	00412
Animal Inoculation for any purpose	100	Animal	Multi	08940
Anodic Stripping voltametry – see metals	–	–	Chem	–
Antibiotic level – bioassay	45	Specimen	Micro	09126
*Antibiotic level, EMIT, – see Multi-discipline section	–	–	Multi	–
Antibiotic Susceptibility Tests:				
– Broth disk method-anaerobes	1.5	PBT	MiBac	09122
– Kirby Bauer method	5	Organism	MiBac	09121
– Replicator – see Microbiology section	–	–	MiBac	09032
– MIC by manual method – 1 organism	65	Antibiotic	MiBac	09123
– MIC/MBC by manual method – 1 organism	75	Antibiotic	MiBac	09125
– MIC/MBC preparation per stock antibiotic series	20	Antibiotic	MiBac	09124
– Antibiotic Susceptibility Reading plus control (Mycobacteria)	15	Organism	MiMyc	08977
– Antibiotic Suscepting reading plus control	3	Organism	MiVyc	08978

Procedure	Unit Value	Item for Count	Section	Code Number
Antibody detection – Immunofluoresence	6	Specimen	MiVir	09620
– Immunofluorescence titration	12	Specimen	MiVir	09621
Antibody Identification	18	Panel run	ImmH	01800
Antibody Screen	13	Tray	I/HLA	08515
Antibody Titration	20	Antigen	ImmH	01830
*Antigen Detection – handling	11	Specimen	Micro	09501
*Antigen Detection – preparation of specimens other than blood	4	Specimen	Micro	09503
Antistreptolysin 0 estimation – Microtechnique	40	Specimen	MiSer	09344
– tube dilutions	30	Specimen	MiSer	09341
Antithrombin III, synthetic substrate assay	11	Test	Hema	01313
Antithrombin III, Automated Chemistry instrument – see Automated Chemistry	–	–	–	–
Apheresis – therapeutic * – leukocytes	235	Patient	ImmH	02522
* – thrombocytes	216	Donor	ImmH	02523
API 10S	4.5	Organsim	MiBac	09003
API 20A	8	Organism	MiBac	09001
API 20C	6	Organism	MiFng	09180
API 20E	6	Organism	MiBac	09002
API 20S	6	Organism	MiBac	09004
API Neident	5	Organism	MiBac	09010
API Staphident	5	Organism	MiBac	09011
*API Unisept ID or MIC	6	Organism	MiBac	09005
*Apolipoprotein A_1 or B (radial immunodiffusion – see Multi-discipline section)	–		Chem	
Arsenic – see metals	–	–	Chem	–
Arylsulphatase Mycobacteria	2	Organism	MiMyc	08968
Ascorbic Acid	25	Test	Chem	00427

Procedure	Unit Value	Item for Count	Section	Code Number
*Atomic absorption – see metals	–	–	Chem	–
Autobac	7	Organism	MiBac	09076
Autohemolysis Studies – see special direction #3	–	–	Hema	01110
Autoscan				
– no data management system	6.5	Organism	MiBac	09046
– with data management system	13	Organism	MiBac	09044
Autopsy Pathology:				
* – Autopsy attendant	130	Case	AP/SP	03308
* – Additional procedures:				
– X-Ray body	6	Case	AP/SP	03309
– photograph body	5	Case	AP/SP	03310
– photograph organs	11	Case	AP/SP	03311
– injection e.g. heart	5	Case	AP/SP	03312
– remove and fix spinal cord	15	Case	AP/SP	03313
– distension e.g. lungs	7	Case	AP/SP	03314
– brain fixation and cutting	14	Case	AP/SP	03315
* – Cut, trim, transfer tissue for blocking	10	Case	AP/SP	03316
* – Technical functions	5	Block	AP/SP	03358
* – Clerical functions	120	Case	AP/SP	03356
*Autopsy review: see section	26	Case	AP/SP	03317
Auto absorption warm e.g. Z-zap, W.A.R.M.	20	Panel run	ImmH	02804
*Autologous transfusion				
– blood pack collected from patient-donor includes initial clerical function	32	Patient	ImmH	02526
– additional clerical and inventory functions	10	Patient	ImmH	02005
B and T cell preparation (nylon wool column)	44	Specimen	I/HLA	08512
Bactec				
* – no data logger	5	PBT	MiBac	08932
* – with data logger	6.5	PBT	MiBac	08935
– for ID-Mycobacteria	13	PBT	MiBac	08960

Procedure	Unit Value	Item for Count	Section	Code Number
Bacterial Agglutination	1	Antibody/ Antigen Reaction	MiBac	09103
Bacterial Identification:				
– Biochemical – conventional tube methods, includes reading, e.g. coagulase TSI, etc.	1.5	PBT	MiBac	08916
– Biochemical – plate method includes reading e.g. DNase	1.5	PBT	MiBac	08917
– Disks – more than two for identification includes reading, e.g. X/V factor (not Kirby Bauer)	1.5	Organism	MiBac	08922
– Disks – single disk for for identification includes reading e.g. Bacitracin, optochin, novobiocin	1.5	Organsim	MiBac	08920
– Rapid tests – includes reading e.g., oxidase, catalase, bile solubility, slide coagulase	1	Organism	MiBac	08914
Bactericidal level – serum	20	Specimen	MiSer	09153
*Beta Galactosidase	20	Test	Chem	00431
– fluorimetric				
– fluorimetric with sonication	25	Test	Chem	00432
Beta hCG				
– see pregnancy tests	–	–	–	–
Beta Lactamase detection	1.5	Organism	MiBac	09106
*Beta Hydroxybutyrate, serum	7	Test	Chem	00433
Bile – pH, reducing substances, dipstick	3	Test	Chem	01013
Bile Pigments qualitative	6	Test	Chem	00440
– urine				
Bilirubin qualitative – feces	5	Test	Chem	00444
Bilirubin total and direct	16	Test	Chem	00446
Bilirubin total or direct	11	Test	Chem	00448
*Bleeding time	18	Patient	Hema	01115
Blood Cultures				
– Dupont Isolator	9	PBT	MiBac	08938
– Manual	6	PBT	MiBac	08930
Blood Film Examination	11	Slide	Hema	01116

Procedure	Unit Value	Item for Count	Section	Code Number
Blood Film Screen	5	Slide	Hema	01118
*Blood Film preparation and stain only	2	Slide	Hema	01113
Blood pack collected from donor	22	Donor	ImmH	02524
Blood qualitative – urine	3	Test	Chem	00452
Blood, Occult – feces	6	Test	Chem	00450
Blood Volume – total includes plasma volume and red cell mass	60	Test	Hema	07672
Bone Marrow – differential	8	100 Cell	Hema	01275
*Bone Marrow aspiration and film preparation	25	Patient	Hema	01280
Bone Marrow film preparation in laboratory	15	Patient	Hema	01276
Bone Marrow Stain Romanowsky	12	Specimen	Hema	01278
Bromides	15	Test	Chem	00456
Bromo sulphthalien	11	Test	Chem	00458
Broncho Alveolar lavage – cell count	8	100 Cells	AP/Cy	01275
Buffy Coat preparation and interpretation	16	Patient	Hema	01117
*Creactive protein, capillary tube	7	Specimen	Multi	09261
Calcium	6	Test	Chem	00462
Calcium – see Automated Chemistry	–	–	Chem	–
Calculation – special	3	Specimen	Chem	00791
Calculus Analysis	25	Test	Chem	00472
*Capillary Fragility or resistance	7	Test	Hema	01122
Capillary Puncture	12	Patient	SPD	00214
*Carbamyl Phosphate Synthesis – liver colorimetric method	100	Specimen	Chem	00473
*Carbohydrates – TLC – see chromatography	–	–	Chem	–
Carbon Dioxide, total	14	Test	Chem	00503
Carbon Monoxide – spectrophotometric	21	Test	Chem	00500
Carbon Monoxide – qualitative screen	10	Test	Chem	00477

Procedure	Unit Value	Item for Count	Section	Code Number
*Carbon Monoxide – GLC – see chromatography	–	–	Chem	–
Carotene	8	Test	Chem	00476
Case review	5	Specimen	AP/SP	03701
Catalase – Mycobacteria	2	Organism	MiMyc	08971
Catecholamines – serum – radio enzyme fractionated free and total	100	Specimen	Chem	00482
Catecholamines – urine	80	Test	Chem	00478
CBC procedure for lipemic samples – see special direction #4	–	–	Hema	–
*Cell Count/Viability Counts	5	Count	Immu/ I/HLA	08508
Cell Count with Cytospin, Film and Differential	21	Test	Hema	01125
Cell Count with Film and Differential	18	Test	Hema	01124
Cell Lines				
– Continuous or semi-continuous	4	PBT	MiVir	09611
– Primary culture e.g., amnion	3	PBT	MiVir	09610
– Purchased Cell Lines	0.6	PBT	MiVir	09612
Cell Surface Markers				
* – Labelling – direct antibody	11	Marker	Immu	08318
– indirect antibody	12	Marker	Immu	08319
* – Analysis – fluorescence microscopy	8	Marker	Immu	08320
– flow cytometer	6	Marker	Immu	08321
* – Rosetting T cell using SRBC – up to 200 cells	6	Count	Immu	08322
– by Immunobeads	18	Count	Immu	08323
*CH50 – preparation of Sheep Red Blood cells for Meyer's method	19	Prep.	Immu	08332
* – Meyer's method	9	Specimen	Immu	08331
*CH100 – see Radial Immunodiffusion	–	–	Immu	–

Procedure	Unit Value	Item for Count	Section	Code Number
Challenge in tissue culture	7	Specimen	MiVir	09605
Checkerboard for antibody/antigen or hemolysin	31	Test	MiVir	09619
Chlamydia				
– set up stain and read	11	Specimen	Micro	09634
– second passage	3	Specimen	Micro	09635
– Media reagent and tissue culture preparation	8	Specimen	Micro	09636
– specimen preparation	4	Specimen	Micro	09633
Chlamydospore Production	3	PBT	MiFng	09193
*Chloramine T, Radio labelling	75	Specimen	Chem	00487
Chloride sweat test includes sweat collection	33	Test	Chem	00969
Chlorides	6	Test	Chem	00488
*Cholesterol – HDL/LDL see Automated Chemistry add pretreatment of specimen (00060)	–	–	Chem	–
Cholesterol, total				
– with extraction	10	Test	Chem	00499
– without extraction	7	Test	Chem	00498
*Cholinesterase phenotyping	30	Test	Chem	00501
Chromatography (Chemistry)				
* GLC				
– includes up to 2 pretreatment steps	16	Specimen	Chem	00502
additional pretreatment see Code no. 00060	–	–	–	–
– each repeat injection	7	Specimen	Chem	–
* GC/MS	20	Specimen	Chem	00414
* HPLC				
– includes up to 2 pretreatment steps	16	Specimen	Chem	00505
– each repeat injection	7	Specimen	Chem	–
* TLC				
– 1 dimensional, simple or Toxi Lab B	16	Specimen	Chem	00506
– 2 dimensional, Toxi Lab A	25	Specimen	Chem	00507
Chromatography (Microbiology)				
GLC – First injection	16	Organism	MiBac	09119
– each repeat injection	7	Organism	MiBac	–

Procedure	Unit Value	Item for Count	Section	Code Number
Chromosome Karyotype – additional, in excess of three done on the same banding procedure. All specimen types	23	Karyotype	AP/Cg	04145
Chromosome Karyotype – Amniotic Fluid	465	Specimen	AP/Cg	04100
– Additional stain and band	285	Specimen	AP/Cg	04105
Chromosome Karyotype – Bone Marrow or Peripheral Blood	760	Specimen	AP/Cg	04120
– Additional stain and band	326	Specimen	AP/Cg	04125
Chromosome Karyotype – Peripheral Blood [Mitogenic stimulation]	315	Specimen	AP/Cg	04110
– Additional stain and band	206	Specimen	AP/Cg	04115
Chromosome Karyotype – Tissue	390	Specimen	AP/Cg	04130
– Additional stain and band	261	Specimen	AP/Cg	04135
Chromosome Karyotype – Additional tissue from POC	280	Specimen	AP/Cg	04132
Chromosome Karyotype – Counting of up to 25 additional cells from the same culture and using the routine staining procedure. All specimen types	56	Specimen	AP/Cg	04140
Circulating Anticoagulant Studies – see Hematology section for formula	–	–	Hema	01133
*Citrate, urine, manual, enzymatic	15	Test	Chem	00508
Clot Retraction, qualitative	6	Test	Hema	01128
Cold Agglutinins, qualitative	6	Test	Hema/ ImmH	01134
Cold Agglutinins, quantitative – see ImmH 01830	–	–	Hema	01830
Colony count – environmental studies	3	Filter	MiEnv	09433
Complement fixation – single antigen, includes controls	6	Antigen	MiVir	09615
– each additional antigen	3	Antigen	MiVir	09616
Complement fixation – preparation of cells	15	Prepa-ration	MiVir	09617
– titration per single row	6	Test	MiVir	09618
Confirmatory typing of donor pack	2	Pack	ImmH	02000

Procedure	Unit Value	Item for Count	Section	Code Number
Copper – see metals	–	–	Chem	–
*Counter Immunoelectrophoresis				
– 1st antigen	20	Antigen	Immu	08303
– each additional antigen	2	Antigen	Immu	–
Creatine	26	Test	Chem	00518
Creatine Kinase MB –				
– automated chemistry instrument, add pretreatment value if appropriate, electrophoresis, see electrophoresis	–	–	–	–
Creatinine	10	Test	Chem	00522
Crossmatch (Histo-compatibility)	13	Tray	I/HLA	08514
*Crossmatch				
– no donor typing	6	Pack	ImmH	02010
– with donor typing	8	Pack	ImmH	02020
– Quick Spin				
– no donor typing	5	Pack	ImmH	02015
– with donor typing	7	Pack	ImmH	02025
Cryofibrinogen	15	Test	Hema	01138
Cryoglobulin qualitative	9	Test	Chem	00532
Cryoprecipitate, thaw and pool	2	Pack	ImmH	02529
*Crystal analysis, duodenal or synovial fluid	6	Specimen	Chem	00533
Cystine (Nitoprusside) qualitative	8	Test	Chem	00536
*Cystine – urine, manual	11	Test	Chem	00534
Cytohormonal evaluation	10	Specimen	AP/Cy	04091
Cytoplasmic immunoglobulins				
– see Immunopathology	–	–	Immu	08345
Darkfield examination	10	Smear	MiBac	08852
Decalcification	3	Specimen	AP/SP	03632
*2,3 – Diphosphoglyeric Acid includes standards	38	Test	Hema/ Chem	00540
*Direct Antiglobulin Test	7	Test	ImmH	01675
– see special direction				
Dispatch of all biological materials to laboratories outside the hospital	6	Specimen	SPD	00181

Procedure	Unit Value	Item for Count	Section	Code Number
DMS				
* – rapIDe	6	Organism	MiBac	09014
* – rapIDe Ana	7	Organism	MiBac	09080
– rapIDe NH	6	Organism	MiBac	09081
*DNA quantitative				
– see Immunology	–	–	–	–
Donath – Landsteiner	23	Test	Hema/ ImmH	01148
*Drug Screen				
– see new "Drug" section				
Drugs – e.g. ethanol				
– enzymatic	7	Test	Chem	00057
– manual spectrophotometric, quantitative	12	Test	Chem	00058
Electron Microscopy				
– Embedding	8	Block	AP/EM	05260
– Thick section	10	Block	AP/EM	05293
– Thin section	15	Grid	AP/EM	05295
– Screen and photography of grid	31	Grid	AP/EM	05282
– Film – develop, enlarge, print	7	Print	AP/EM	08601
Electron Microscopy				
– Direct examination, includes maintenance	18	Specimen	MiVir	09629
– Examination of positive cultures	8	Grid	MiVir	09630
– Immunoelectron microscopy	9	Grid	MiVir	09631
Electrophoresis	12	Specimen	Chem	00566
*ELISA (other than Virology)	8	Test	Multi	00847
ELISA Abbott Quantum II includes controls Competitive	2	Antigen/ Antibody	MiVir	09625
ELISA Abbott Quantum II includes controls Sandwich	3	Antigen/ Antibody	MiVir	09626
ELISA Abbott Quantum II includes controls Antigen specific IgM	3	Antigen/ Antibody	MiVir	09627

Procedure	Unit Value	Item for Count	Section	Code Number
ELISA Abbott Quantum II includes controls Direct Fecal	3	Antigen/ Antibody	MiVir	09628
Eluate – preparation of any method	18	Specimen	ImmH	02800
*Embedding, Paraffin sections, cutting, staining (H&E, HPS) and mounting	9	Block	AP/SP	03058
– Additional sections, cut only	2	Slide	AP/SP	03781
* – Additional sections, cut, stain, (H&E, HPS) and mount	7	Slide	AP/SP	03782
*EMIT	8	Test	Multi	00056
Enterotube/Oxiferm	3	Organism	Micro	09016
Enzyme assays, manual	7	Test	Chem	00574
Enzyme treated cells – preparation	14	Panel run	ImmH	01860
Eosinophil Count in fluid	8	Test	Hema	01154
Eosinophil Nasal Smear	6	Slide	Hema	01292
Estrogen/Progesterone Receptor Assay – see Hormone Receptor Assay	–	–	–	–
Euglobulin Lysis Time (coagulation)	20	Test	Hema	01157
*Extractable nuclear antigen – hemagglutination	9	Specimen	Immu	08333
– see Counter Immuno-electrophoresis	–	–	Immu	–
– see Ouchterlony diffusion	–	–	Immu	–
F.A. from isolate	4	Organism	MiBac	08860
*Factor Assay, one stage – semi-automated instrument	12	Specimen	Hema	01158
– manual or fibrometer	33	Specimen	Hema	01159
*Factor VIII: von Willebrand factor, Factor VIII related antigen; see quantitative immunoelectrodiffusion (Laurell)	–	–	–	–
*Factor VIII Related Antigen – ELISA	8	Test	Hema	01167
Factor XIII Screen (Urea Solubility method)	10	Test	Hema	01175
Fat qualitative – feces	6	Test	Chem	00584

Procedure	Unit Value	Item for Count	Section	Code Number
Fat, total – feces	55	Test	Chem	00588
Fatty Acids				
– GLC – see chromatography	20	Specimen	Chem	00584
– free fatty acids	25	Test	Chem	00594
– enzymatic	7	Test	Chem	00580
*Fetal lung maturity (Foam Stability)	12	Specimen	Chem	00581
*Fibrin D dimer test	8	Test	Hema	01153
Fibrin Degradation Products – Latex Slide test	8	Test	Hema	01184
*Fibrin Monomer test – qualitative	8	Test	Hema	01155
Fibrinogen Chemical – quantitative	28	Test	Hema	01330
Fibrinogen test (based on Thrombin Time Method)	6	Test	Hema	01339
Fibrinogen quantitative ACA Dupont – see Automated Chemistry	–	–	Hema	01340
Fibrinogen Titre	4	Test	Hema	01338
Fibrinolysis (plate method)	16	Test	Hema	01180
Fibrinolysis, Clot Observation	7	Test	Hema	01182
Filtration (Environmental Bacteriology)	8	Specimen	MiEnv	09417
*Fine needle aspirate, preparation of smears **outside** the laboratory	25	Specimen	AP/Cy	04093
*Fine needle aspiration, preparation of smears in laboratory	15	Specimen	AP/Cy	04098
Flow Cytometry – labelling – direct antibody	11	Marker	Immu	08318
– indirect antibody	12	Marker	Immu	08319
Flow Cytometry – analysis	6	Marker	Immu	08321
Fluids – preparation by centrifugation	7	Specimen	AP/Cy	04090
– preparation by membrane filter	8	Membrane filter	AP/Cy	04089
Folates – Microbiological Method, Radioassay Method, see Chemistry	45	Test	Hema	01190

Procedure	Unit Value	Item for Count	Section	Code Number
Formal Ether Concentrate, includes preparation of smears	6	Specimen	MiPar	09208
*Fragile X alone	235	Specimen	AP/Cg	04155
*Fragile X with 04110	465	Specimen	AP/Cg	04112
*Free erythrocyte protoporphyrins	19	Specimen Chem	Hema/	01293
Frozen Cells				
– preparation	6	Cell Rg.	ImmH	02556
– thawing	10	Cell Rg.	ImmH	02557
Frozen sections				
– for rush diagnosis	15	Specimen	AP/SP	04378
– each additional block	6	Block	AP/SP	04375
– preparation				
– additional section, cut & stain	4	Slide	AP/SP	04376
Frozen sections				
– additional sections, cut only	2	Slide	AP/SP	04202
Fructose	14	Test	Chem	00932
GC/MS – see chromatography	–	–	Chem	–
GLC – see chromatography	–	–	Chem	–
*Galactose, manual	8	Test	Chem	00597
*Galactose 1-P RBC				
– manual	15	Specimen	Chem	00598
– manual with recovery experiment	30	Specimen	Chem	00599
– transferase	13	Test	Chem	00601
Galactose Tolerance				
– see Glucose tolerance	–	–	Chem	00934
Gamma Glutamyl transpeptidase				
– refer to 00574	–	–	Chem	–
*Gangliosides – extraction, TLC (complex)	45	Test	Chem	00602
Gas liquid chromatography	–	–	–	–
– see chromatography				
Germ tube	2	PBT	MiFng	09192
*Giant Sections (Neuro-pathology)				
– process and embed	39	Specimen	AP/SP	03065
– cut, stain, mount	4	Slide	AP/SP	03066

Procedure	Unit Value	Item for Count	Section	Code Number
Glucose	8	Test	Chem	00944
Glucose monitoring devices – see Automated Chemistry	–	–	–	–
Glucose Tolerance – unit value is equal to sum of units assigned to each procedure	–	–	Chem	–
Glucose 6 Phosphate Dehydrogenase qualitative	10	Test	Hema	01398
Glucose qualitative – urine or serum stick method	3	Test	Chem	00942
*Glycomethacrylate/Methylmethacrylate – process and embed	11	Specimen	AP/SP	03060
– cut, stain, mount – tissue	10	Slide	AP/SP	03061
– cut, stain, mount – bone	21	Slide	AP/SP	03062
– additional cuts only	3	Slide	AP/SP	03063
*Glycogen, tissue, manual anthrone	30	Test	Chem	00604
Gross: technical assistance	4	Specimen	AP/SP	03075
HPLC – see chromatography	–	–	Chem	–
Hair, examination by Ultra Violet light	3	Specimen	MiFng	09128
*Handling and documentation of specimen & packs only when not crossmatched on site	10	Specimen	ImmH	02558
*Handling and reporting of referred slides	5	Specimen	SPD	00184
Heinz Bodies, direct	15	Test	Hema	01206
Hemadsorption/ Hemagglutination	2	Specimen	MiVir	09606
Hemadsorption Inhibition – virology	30	Test	MiVir	09573
Hemagglutination Inhibition – virology	30	Test	MiVir	09570
Hematocrit,	3	Test	Hema	01210
Hemoglobin	5	Test	Hema	01212
*Hemoglobin A2 quantitative	17	Specimen	Multi	00606
*Hemoglobin Electrophoresis, acid or alkaline	16	Test	Hema	01214

Procedure	Unit Value	Item for Count	Section	Code Number
Hemoglobin Fetal – quantitative (Alkali Denaturation)	25	Test	Hema	01216
Hemoglobin Fetal – qualitative (feces)	12	Test	Hema	01219
Hemoglobin Fetal – acid elution eg Kleihauer Betke	8	Slide	ImmH/ Hema	01218
Hemoglobin A1C, column	12	Specimen	Multi	01054
Hemoglobin H inclusions	16	Specimen	Hema	01215
*Hemoglobin instability	20	Specimen	Hema	01217
Hemoglobin – plasma	15	Test	Hema	01220
Hemoglobin – urine, Spectro-photometric	5	Test	Chem	00624
*Hemoglobins Solubility test (kit method)	10	Test	Hema	01222
Hemosiderin – urine	3	Test	Chem	00628
Heparin – chromogenic substrate	5	Test	Hema	01226
– automated Chemistry instruments	–	–	–	–
Heparin – protamine titration	50	Test	Hema	01224
*Hexosaminidase-fluorimetric – with sonication	20 25	Test Test	Chem Chem	00609 00611
High Pressure Liquid Chromatography – see Chromatography	–	–	–	–
*High Resolution Chromosomes	275	Specimen	AP/Cg	04160
HLA typing	13	Tray	I/HLA	08513
Homocystine qualitative	8	Test	Chem	00631
Homogentisic Acid	9	Test	Chem	00632
*Homovanillic Acid, urine	30	Test	Chem	00612
*Hormone receptor levels				
– Scatchard plot	200	Specimen	Chem	00617
– single point	60	Specimen	Chem	00615
5 – Hydroxyindoleacetic Acid (5-HIAA)	22	Test	Chem	00636
5 – Hydroxyindoleacetic Acid (5-HIAA) qualitative	9	Test	Chem	00638

Procedure	Unit Value	Item for Count	Section	Code Number
*Hydroxyproline – urine	30	Test	Chem	00630
*Immunoelectrophoresis – first antiserum	9	Antibody	Immu	08301
– each additional antiserum	4	Antibody	Immu	–
*Immunoelectrophoresis, Laurell – 1st well per plate	35	Well	Immu	01160
– each additional well	4	Well	Immu	–
*Immune complexes – see Immunology section	–	–	Immu	–
*Immunodiffusion (radial)	5	Well	Immu	08307
*Immunofixation – first antibody	11	Antibody	Immu	08305
– each additional antibody	3	Antibody	Immu	–
Immunofluorescence – direct	5	Slide	Multi	05305
– indirect	8	Slide	Multi	05306
Immunofluorescence analysis of serum antibodies by any kit method	6	Antigen	AP/IP	05310
Immunofluorescence analysis of serum antibodies by any kit method; titration of positive	12	Antigen	AP/IP	05311
*Immunonephelometry	8	Specimen	Chem	00644
Immunoperoxidase – by other methods e.g., PAP, Avidin Biotin procedures	9	Slide	AP/IP	05321
Immunoperoxidase – direct	6	Slide	AP/IP	05320
Indices (MCV, MCH, MCHC) Manual Calculation	2	Specimen	Hema	01102
Initial identification – Gynecological	10	Specimen	AP/Cy	03928
– non gynecological	10	Specimen	AP/Cy	03930
*Irradiation of blood or blood products	1	Pack	ImmH	02530
Iron, total	10	Test	Chem	00648
Iron, total and binding capacity	15	Test	Chem	00650

Procedure	Unit Value	Item for Count	Section	Code Number
*Isolation of leukocytes – Ficoll Hypaque, each 10ml blood	11	Specimen	Immu	08506
– Leuco preparation	5	Specimen	Immu	08316
*Isolation of Leukocytes specimen preparation for – bone marrow	7	Specimen	Immu	08340
– lymph nodes	12	Specimen	Immu	08339
– tissue - include grinding	19	Specimen	Immu	08341
*Isolation & labelling leukocytes – Whole blood lysis	8	Marker	Immu	08317
Isolation of virus by – animal inoculation	100	Animal	MiVir	09609
– in eggs	30	Egg	MiVir	09608
Issue of blood, blood components or fractionation products for transfusion	2	Pack	ImmH	02030
Ketones qualitative – urine or serum, Dipstick	3	Test	Chem	00682
L.E. Cell preparation and examination	28	Test	Hema	01264
Lactate Dehydrogenase Isoenzymes qualitative Electrophoresis	12	Specimen	Chem	00710
Lactic Acid	27	Test	Chem	00702
Lactose qualitative – urine	6	Test	Chem	00948
Lancefield grouping	7	Organism	MiBac	09102
Lead – see metals	–	–	Chem	–
Lecithin/Sphingomyelin – Ratio	15	Test	Chem	00722
* – extraction, TLC, molybdate stain & scan	25	Test	Chem	00725
* – Ratio and phosphotidyl, glycerol, acetone precipitation, TLC, charring 1D chromatography	50	Test	Chem	00727
*Leukocyte Lysis – Sonicator	5	Specimen	Chem	00731
– Freeze thaw	5	Specimen	Chem	00608
Leukocyte poor blood				
– centrifugation	7	Pack	ImmH	02650

Procedure	Unit Value	Item for Count	Section	Code Number
– COBE 2991 (automated washings)	20	Pack	ImmH	02240
– inverted spin	15	Pack	ImmH	02806
– manual washing	10	Pack	ImmH	02230
– sedimentation	2	Pack	ImmH	02220
– "spin-cool" filter	7	Pack	ImmH	02656
*Lipoprotein (LDC) turbidometric	6	Specimen	Chem	00701
Liquifaction of Sputum – Mycobacteria	3	Specimen	MiMyc	08889
Lithium	7	Test	AutoC	00374
Lymphocytes – freeze – first vial	8	Vial	I/HLA	08510
– each additional vial	1	Vial	I/HLA	–
Lymphocytes – thaw	24	Specimen	I/HLA	08511
*Lymphocyte Stimulation Study – first Mitogen/Antigen	16	Mitogen	Immu	08324
– each additional Mitogen/Antigen	7	Mitogen	Immu	08325
Lyophilized blood products, Reconstitution of concentrate	5	Pack	ImmH	02590
*Lysozyme	7	Test	Chem	00733
Magnesium – see metals	–	–	Chem	–
Media Preparation	0.6	PBT	Micro	08825
Melanin qualitative – urine	10	Test	Chem	00735
Mercury – see metals	–	–	Chem	–
*Metabolic Screen, urine, spot test	2	Test	Chem	00734
*Metals – atomic absorption	11	Test	Chem	00311
– tissue grinding and ashing	9	Specimen	Chem	00424
*Metals, anodic stripping voltametry	8	Specimen	Chem	00737
Methemalbumin	21	Test	Chem	00740
Methemoglobin or Sulfhemoglobin	21	Test	Chem	00742
*Methyl Malonic Acid – manual	16	Test	Chem	00738

Procedure	Unit Value	Item for Count	Section	Code Number
Micro ID – 4 hour ID Enterobacteriaceae	5	Organism	MiBac	09020
Micromedia – semi auto MIC with frozen plates	6	Organism	MiBac	09079
Microscan – Combo	7	Organism	MiBac	09054
Microscan or Micromedia – Manual Reader	6	Organism	MiBac	09050
Microtrak – specimen handling	5	Specimen	MiBac	09637
– fluorescent stain	5	Specimen	MiBac	08862
Miles and Misra Count	7	PBT x 6	MiBac	08915
Minitek – Anaerobes	9	Organism	MiBac	09022
Minitek – Non fermenters	8.5	Organism	MiBac	09026
MS/Advantage – ID	5	Organism	MiBac	09058
– urine screen	2	Organism	MiBac	09060
– susceptibility	5	Organism	MiBac	09063
*Mucin clot	5	Test	Chem	00739
Mucopolysaccharides				
– Serum, screen	30	Test	Chem	00754
– urine, qualitative, Toluidine Blue	5	Test	Chem	00746
– urine, quantitative – CPC method	10	Test	Chem	00745
* – High M.W., urine preparation CPC precipitation and treatment	40	Specimen	Chem	00741
* – Low M.W. using Dowex columns	75	Specimen	Chem	00743
* – uronic acid, quantitative	15	Specimen	Chem	00744
Mycoplasma				
– Colony forming units – estimation of a single reading	30	Reading	MiMpl	09537
– estimation of each additional reading	10	Reading	MiMp1	09539
– Coverslip prep for Mycoplasma	10	Prepa-ration	MiMp1	09542
– Growth Inhibition test	10	Test	MiMpl	09534

Procedure	Unit Value	Item for Count	Section	Code Number
Mycoplasma				
- Hemabsorption test	15	Test	MiMpl	09531
- Hemolysis test	10	Test	MiMpl	09529
- Metabollic tests, diphasic media	4	Test	MiMpl	09523
- Methylene Blue plating test	10	Test	MiMpl	09526
- Primary Isolation				
- in diphasic media	4	Specimen	MiMpl	09514
- in solid media	4	Specimen	MiMpl	09511
- Subculture				
- solid or diphasic media	20	PBT	MiMpl	09517
- Stain for colonies				
- Dienes stain	3	Smear	MiMpl	09520
Myoglobin - Spectrophotometric				
- urine	11	Test	Chem	00756
- serum	9	Test	Chem	00805
*Natural Killer Cell Assay	55	Specimen	Immu	08338
*Nerve Tease Neuropathology	150	Slide	AP/SP	03070
- additional teasing on same slide	75	Slide	AP/SP	-
Neutralization of virus	2	PBT	MiVir	09607
Niacin - Mycobacteria	5	Organism	MiMyc	08965
Nitrogen, total	12	Test	Chem	00766
*Nitrogen, Ninhydrin	12	Test	Chem	00767
*Oligosaccharides TLC	-	-	Chem	-
- see chromatography				
*Organic Acid GC/MS	-	-	Chem	-
- see chromatography				
*Ornithine Trans Carbamylase, liver, colorimetric	75	Specimen	Chem	00771
*Orotic Acid, manual with minicolumn	18	Specimen	Chem	00772
Osmolality	10	Test	Chem	00776
Osmotic Fragility				
- quantitative	45	Test	Hema	01364
Osmotic Fragility Screen	35	Test	Hema	01363

Procedure	Unit Value	Item for Count	Section	Code Number
*Ouchterlony diffusion centre well	8	Well	Immu	08309
– each additional well	4	Well	Immu	–
*Oxalate, urine				
– chromotropic acid	30	Test	Chem	00773
– enzymatic	10	Test	Chem	00774
Parasites, blood film	22	Specimen	Hema	01274
Paul Bunnell test	25	Specimen	MiSer	09335
pH fluids	3	Test	Chem	00798
Phadebact	3	Organism	MiBac	09107
Phase Conversion by Craigie tube	4	Organism	MiBac	09118
Phenothiazine qualitative	8	Test	Chem	00802
Phenotyping by agglutination test (specimen and control)	7	Test	ImmH	01650
– each additional sample tested for same Antigen	2	Test	ImmH	01655
Phenotyping by indirect agglutination test (specimen and control)	10	Test	ImmH	01640
– each additional sample tested for same Antigen	3	Test	ImmH	01645
Phenylpyruvic Acid (PKU) qualitative	4	Test	Chem	00810
Phenylalanine Blood quantitative	15	Test	Chem	00804
Phosphatase, Acid – manual	10	Test	Chem	00815
Phosphatase, Alkaline	7	Test	Chem	00818
Phosphate Inorganic	7	Test	Chem	00824
*Phosphatidyl glycerol				
– slide agglutination	7	Test	Chem	00826
– amniostat FLM	7	Test	Chem	00825
– TLC – see chromatography	–	–	Chem	–
*Photographs of a single specimen, gross	5	Specimen	AP/SP	03080
Pinworm or scotch tape preparation	2	Smear	MiPar	09211
Plasma – thawing of	3	Pack	ImmH	02665
Plasma clotting time (recalcification)	8	Test	Hema	01318
Platelet adhesion with column preparation	12	Specimen	Hema	01325
*Platelet associated Immunoglobulins/platelet antibody, see Hematology Section	–	–	–	–

Procedure	Unit Value	Item for Count	Section	Code Number
*Platelet Concentrate, preparation by centrifugation	7	Pack	ImmH	02652
Platelet Concentrate – preparation for infusion including pooling	3	Pack	ImmH	02657
Platelet Count (microscopic)	9	Test	Hema	01326
Platelet Function – Aggregation	6	Tube	Hema	01323
– Factor 3 (PF3)	16	Test	Hema	01329
Retention Tests, see special direction #3	–	–	Hema	01320
*Platelet Neutralization procedure	14	Test	Hema	01321
Pooling of Red Cell concentrate and plasma	2	Resulting Pack	ImmH	02662
Porphobilinogen	32	Test	Chem	00840
Porphobilinogen qualitative	9	Test	Chem	00838
Porphyrin Isomers, – see chromatography	–	–	Chem	–
Porphyrins (total) feces, spectrophotometric	40	Test	Chem	00836
Porphyrins, qualitative	10	Test	Chem	00842
Porphyrins Screening Test (Lead)	10	Test	Chem	00844
Porphyrins, fractionation	67	Test	Chem	00846
Potassium – see Chemical Analyzers	–	–	Chem	–
*Pregnancy Test – any method includes controls	8	Specimen	Multi	00845
*Pretreatment of Specimen – see multi-discipline section	3	Specimen	Multi	00060
Prewarm technique for crossmatch or panel	4	Specimen	ImmH	02802
Procurement of material for microbiology culture or dark field microscopy	6	Patient	SPD	00220

Procedure	Unit Value	Item for Count	Section	Code Number
Profile A (10-12 procedures)	19	Specimen	ImmH	01600
Profile B (7-9 procedures)	16	Specimen	ImmH	01610
Profile C (4-6 procedures)	13	Specimen	ImmH	01620
Profile D (3 or less procedures)	11	Specimen	ImmH	01630
Protamine Sulfate	6	Test	Hema	01225
Protein C or S - see Immunoelectrophoresis (Laurell)	-	-	-	-
*Protein, urine, sulfosalicylic Acid	3	Test	Chem	00871
Protein precipitation - see pretreatment of serum	-	-	-	-
Prothrombin Consumption	20	Test	Hema	01334
Prothrombin Time - manual or fibrometer	5	Test	Hema	01336
*Pseudocholinesterase Phenotyping	30	Specimen	Chem	00875
*PT or APPT with substitution	1	Dilution	Hema	01310
*Pyruvate caroxylase ^{14}C bicarbonate	100	Test	Chem	00877
*Pyruvic Acid	27	Test	Chem	00878
Quantum II for bacterial ID	5	Organism	MiBac	09027
Quellung Reaction	5	Organism	MiSer	09091
*Radio immunoassay - see ligand/saturation analysis	-	-	Chem	00395
*Radio labelled hormone - manual purification	50	Procedure	Chem	00880
*Radio labelling Chloramine T - manual	75	Procedure	Chem	00487
Read culture - original culture plates (aerobic or anaerobic)	1	Reading	MiBac	08905
Read cultures	1	PBT	MiMyc/Fng	09178
Read tissue culture (virology)	1.5	Reading	MiVir	09603

Procedure	Unit Value	Item for Count	Section	Code Number
Receipt of blood from Red Cross	2	Pack	ImmH	02808
*Receipt of specimens (2 or more – i.e. in bulk, see SPD	6	Specimen	SPD	00180
Red Cell Concentrate preparation by:				
– centrifugation	7	Pack	ImmH	02654
– sedimentation	2	Pack	ImmH	02222
*Red Cell creatine, manual	15	Specimen	Hema	01269
*Red cell enzymes				
– Hemolysate prep. (includes Hemoglobin check)	17	Specimen	Hema	01265
– G6PD Assay	26	Specimen	Hema	01266
– Hexokinase	26	Specimen	Hema	01267
– Pyruvic Kinase	26	Specimen	Hema	01268
*Red Cell Folates and B_{12}/folates, Biorad quantaphase	14	Specimen	Chem	00883
Red Cell survival	176	Test	Hema	07572
*Reducing substances, urine (similar to TLC methods)	25	Specimen	Chem	00885
*Removal of granulocytes/monocytes	8	Specimen	I/HLA	08517
Replicator: 1 unit per organism plus 1 unit times number of plates used	–	Organism/ Plate	MiBac	09032
Reptilase Time	6	Test	Hema	01375
Reticulocyte Count (2 smears)	9	Specimen	Hema	01372
Return of blood pack to laboratory or Red Cross used or unused	1	Pack	ImmH	02040
*Rheumatoid factor				
– hemagglutination, quantitative	14	Specimen	Multi	00039
– latex agglutination	8	Specimen	Multi	00038
*Ristocetin co-factor Assay includes platelet preparation	60	Test	Hema	01322
Rubella IgM sucrose gradient	16	Test	MiVir	09624
Rubella screen by kit includes controls	2	Test	MiVir	09622
Rubella titration by kit includes controls	5	Test	MiVir	09623
Sceptor	7	Organism	MiBac	09066

Procedure	Unit Value	Item for Count	Section	Code Number
Schilling test	36	Test	Hema	06644
Screening (technical) - Gynecological	5	Slide	AP/Cy	04083
- non-gynecological	5	Slide	AP/Cy	04084
Second passage in tissue culture	3	Specimen	MiVir	09604
*Secretor studies	45	Specimen	ImmH	02205
Sedimentation Rate (E.S.R.)	4	Specimen	Hema	01384
Semen Analysis for the presence of sperm only	5	Patient	Misc.	09701
*Semen Analysis includes direct exam, count, motility, viability and morphology	25	Patient	Misc.	09702
Sensititre	9	Organism	MiBac	09069
Sensitized Red Cells - preparation plus Q.C.	15	Cell Rg.	ImmH	02210
Separation of donor pack into aliquots	15	Pack	ImmH	02715
Serial dilution for Culture	1	Dilution	Micro	08890
Set up and open jars any system	3	Jar	Micro	08910
Sex Chromatin Identification	16	Specimen	AP/Cg	04099
Sickle Cell preparation - meta bisulfate	14	Specimen	Hema	01390
*Single Radial Hemolysis	5	Test	MiVir	09637
Slide Culture	15	Culture	MiFun	09184
Sodium - see Chemical Analyzers	-	-	Chem	-
*Small bowel orientation - with biopsy	10	Specimen	AP/SP	03786
Smear: preparation and reading concentrate or direct exam	9	Smear	MiPac	09205
Special preparation of biopsy material	15	Specimen	AP/SP	03785
Specific Gravity	4	Test	Chem	00928
Specimen Handling - antigen detection	11	Specimen	Micro	09501
- Bacteriology	8	Specimen	MiBac	08822
- Chlamydia	14	Specimen	MiChl	09632

Procedure	Unit Value	Item for Count	Section	Code Number
Specimen Handling				
– Electron microscopy	52	Specimen	AP/EM	05255
– Histocompatibility	41	Specimen	I/HLA	08505
– Additional	10	Specimen	I/HLA	08516
* – Immunology	5	Specimen	Immu	08300
– Immunopathology	8	Specimen	AP/IP	05300
– Mycobacteriology	6	Specimen	MiMyc	09179
– Mycology	10	Specimen	MiFng	09177
– Mycoplasma	14	Specimen	MiMpl	09510
– Parasitology	6	Specimen	MiPar	09201
– Serology	5	Specimen	MiSer	08823
– Surgical Pathology	14	Specimen	AP/SP	03056
– Virology isolation	11	Specimen	MiVir	09600
– Virology screen	5	Specimen	MiVir	09613
– Virology Diagnostic	14	Specimen	MiVir	09614
Specimen Preparation – Includes digestion Mycobacteria	12	Specimen	MiMyc	09183
Specimen Preparation (other than blood) – antigen detection	4	Specimen	Micro	09503
Specimen Preparation – Includes grinding (Virology)	4	Specimen	MiVir	09601
*Sperm Antibodies – preparation	4	Specimen	Misc.	09703
– count	5	Specimen	Misc.	09704
– agglutination/ immobilization	4	Tube	Misc.	09705
Sperm – Fructose test – see Chemistry	–	–	Chem	–
*Sphingomyelinase, fibroblasts – ^{14}C sphingomyelin	100	Specimen	Chem	00924
Sputa, prep. by pick and smear technique	6	Specimen	AP/Cy	04096

Procedure	Unit Value	Item for Count	Section	Code Number
STAINS				
Anatomic Pathology includes stain preparation, staining, mounting and microscopic checks.				
*Acid fast bacilli	10	Slide	AP/SP	04503
*Alcian blue	9	Slide	AP/SP	04507
*Alcian blue/PAS	17	Slide	AP/SP	04506
*Alcoholic hyaline	23	Slide	AP/SP	04508
Amyloid e.g. Congo Red	12	Slide	AP/SP	04510
*Argentaffin granules e.g., Diazo	12	Slide	AP/SP	04514
*Bielschowsky	23	Slide	AP/SP	04534
Bile, e.g., Stein's or Gmelin's	12	Slide	AP/SP	04568
Bodian	17	Slide	AP/SP	04536
Calcium e.g., von Kossa	12	Slide	AP/SP	04541
*Cresyl Violet	6	Slide	AP/SP	04540
DNA e.g., Feulgen	17	Slide	AP/SP	04554
*Dieterle's	23	Slide	AP/SP	04558
Elastic e.g., Verhoff	12	Slide	AP/SP	04563
Enzyme stains	23	Slide	AP/SP	04566
* – photographs for permanent record	2	Print	AP/SP	04567
*Fontana without bleaching	12	Slide	AP/SP	04923
Fontana with bleaching	15	Slide	AP/SP	04922
*Fungus, manual or microwave	17	Slide	AP/SP	04578
Glees and Marsland	30	Slide	AP/SP	04584
*Gram	12	Slide	AP/SP	04587
*Grimelius	17	Slide	AP/SP	04588
*Hemosiderin e.g., Perls'	9	Slide	AP/SP	04592
Holmes	30	Slide	AP/SP	04596
Holzer	30	Slide	AP/SP	04597
Lipofuchsin e.g., Schmorl's	17	Slide	AP/SP	04915

Procedure	Unit Value	Item for Count	Section	Code Number
Luxal Fast Blue	17	Slide	AP/SP	04637
Marchi's technique for myelin	50	Slide	AP/SP	04929
*Mast cells e.g., Toluidine Blue	6	Slide	AP/SP	04645
*Movat's	20	Slide	AP/SP	04644
*Mucicarmine	9	Slide	AP/SP	04646
*Nile Blue Sulphate	6	Slide	AP/SP	04850
*Oil Red O	10	Slide	AP/SP	04942
*PAS without digestion	10	Slide	AP/SP	04926
*PAS with digestion	13	Slide	AP/SP	04585
PTAH for muscle or neuropathology	12	Slide	AP/SP	04677
*Reticulum	14	Slide	AP/SP	04972
*Romanowsky e.g., Giemsa	9	Slide	AP/SP	04583
*Shikata (Orcein)	14	Slide	AP/SP	04660
*Trichrome (one step) e.g., van Giessen	11	Slide	AP/SP	04647
Trichrome e.g., Masson, Mallory, Lendrum, M.S.B.	17	Slide	AP/SP	04643
Unna Pappenheim e.g., Methyl Green Pyronine	12	Slide	AP/SP	05005
*Warthin Starry	17	Slide	AP/SP	04668
Hematology includes stain preparation, making smears, staining, mounting and reading.				
Acid phosphatase with or without tartrate	20	Specimen	Hema	01475
Chloroacetate esterase	20	Specimen	Hema	01480
Iron	11	Specimen	Hema	01236
Leukocyte alkaline phosphate	18	Specimen	Hema	01450
Non-specific esterase	20	Specimen	Hema	01460
Periodic Acid Schiff	20	Specimen	Hema	01465
Peroxidase	20	Specimen	Hema	01470
Sudan Black	20	Specimen	Hema	01399
Microbiology includes stain preparation, making smear, staining mounting and reading.				

Procedure	Unit Value	Item for Count	Section	Code Number
Acridine Orange	2	Smear	Micro	08856
Complex stains, e.g., Giemsa or PAS	10	Smear	Micro	08866
*Cryptosporidium	8	Smear	Micro	08871
Dienes Mycoplasma colonies	3	Smear	Micro	09520
F.A. from isolate	4	Organism	Micro	08860
Fluorescent stain for Mycobacteria direct or from culture	5	Smear	Micro	08862
Gram				
– direct smear	4	Smear	Micro	08840
– for morphology	2.5	Smear	Micro	08842
– from blood cultures	3	Smear	Micro	08844
Iron Hematoxylin	14	Smear	Micro	08870
KOH or LPCB – direct smear for Mycology	3	Smear	Micro	08868
Simple stains e.g., Methylene Blue, Neisser	4	Smear	Micro	08864
Spore Stain	8	Smear	Micro	08846
Trichrome	8	Smear	Micro	08873
Ziehl-Neelsen				
– direct from specimen	15	Smear	Micro	08850
– confirmatory from culture	5	Smear	Micro	08854

Procedure	Unit Value	Item for Count	Section	Code Number
*Stercobilinogen, feces	10	Test	Chem	00926
Sterilization checks, e.g., autoclaves	4	Test	Micro	09416
Steroids Urinary	17	Test	Chem	00925
Subculture and reading	1.5	PBT	Micro	08908
Sucrose Lysis	10	Test	Hema/ ImmH	01221
Sugar Assimilation – Mycology	7	Test	MiFng	09191
Sulfhemoglobin	21	Test	Chem	00964
Sulfonamides Crystals qualitative	2	Test	Chem	00960
*Terminal Deoxynucleotidyl Transferase – see Immunopathology	–	–	Immu	08346
Tease Mount Mycology	5	Smear	MiFng	09181
Thin layer chromatography – see chromatography	–	–	Chem	–
Thiocyanates	15	Test	Chem	00974
Thrombin time	6	Test	Hema	01342
*Thyroglobulin and Microsomal Antibodies	14	Test	Multi	08344
Tissue culture – inoculation	5	Specimen	MiVir	09602
Tissue grinding excluding virology specimens	5	Specimen	Micro	08883
Toxin detection – Clostridium difficile	14	Specimen	MiBac	09094
Toxin – antitoxin reaction	9	Organism	MiBac	09093
Trays, preparation with antisera (Histocompatibility)	5	Tray	MiBac	08509
*Travel time for the transport or procurement of specimens or for the performance of technical functions	8	Round Trip	SPD	00200
Triglycerides	12	Test	Chem	00984
Trypsin qualitative	11	Test	Chem	00990
*Tyrosine	15	Test	Chem	00991

Procedure	Unit Value	Item for Count	Section	Code Number
*Uridine-diphosphate-galactose Epimerase, SRBC	13	Test	Chem	00992
Unitek N/F	8	Organism	MiBac	09028
Urate (Uric Acid)	8	Test	Chem	01010
Urea	7	Test	Chem	01002
Urinalysis, any single analysis	3	Test	Chem	01013
Urinalysis, routine	4	Specimen	Chem	01014
Urinalysis, routine including Microscopy	6	Test	Chem	01016
Urine Volume – Measurement and Calculation	2	Test	Chem	01017
Urobilin qualitative – urine	3	Test	Chem	01020
Urobilinogen qualitative – urine or feces	10	Test	Chem	01022
Urobilinogen quantitative – feces	35	Test	Chem	01026
Urobilinogen semi-quantitative – urine – 24 hour excretion	12	Test	Chem	01028
Vanilmandelic Acid (VMA)	30	Test	Chem	01042
VDRL Screen	3	Specimen	MiSer	09345
VDRL Titration	3	Dilution	MiSer	09346
Venipuncture	8	Patient	SPD	00212
*Viscosity – serum (Brookfield Viscometer)	7	Specimen	Multi	01044

Procedure	Unit Value	Item for Count	Section	Code Number
Vitamin A – manual	10	Test	Chem	01045
Vitamin A or E, Serum, Fluorimetric	10	Test	Chem	01046
*Vitamin B_{12} – Folates	10	Specimen	Chem	01048
Vitamin B_{12} see Ligand/Saturation Analysis	–	–	Chem	–
Vitek	5	Card	MiBac	09071
25 OH Vitamin D Assay see ligand/saturation	–	–	Chem	–
Wet preparation e.g.,Trichomonas	2	Smear	MiPar	08848
White Blood cell count – manual	6	Test	Hema	01444
Worm or arthropodes identification	10	Specimen	MiPar	09212
Xylose	8	Test	Chem	00956
Xylose, Absorption unit value is equal to the sum of units assigned to each procedure	–	–	Chem	–

Procedure	Unit Value	Item for Count	Section	Code Number
INSTRUMENTS				
Chemistry and Hematology				
Abbott				
– 50, 100, 200, vp	3.5	Specimen	AutoC	00330
each additional analysis	1	Specimen	–	–
– Quantum II TSH, Ferritin	7	Test	AutoC	00321
* – Spectrum	3.5	Specimen	AutoC	00286
– TDX	3	Test	AutoC	00312
*Allied:				
– Genesis	3.5	Specimen	AutoC	00287
– Monarch	3.5	Specimen	AutoC	00288
*American Optical bilirubinometer	4	Test	AutoC	00322
American Monitor				
– Parallel	2.5	Specimen	AutoC	00363
– KDA (ATS mode)	3.5	Specimen	AutoC	00354
– KDA	2.5	Specimen	AutoC	00337
each additional analysis	0.6	–	–	–
* – Perspective	3.5	Specimen	AutoC	00295
Ames				
– Clinitek (urinalysis)	3	Specimen	AutoC	00370
– Seralyser	3	Test	AutoC	00310
*Atomic absorption				
– see metals, manual chemistry	–	–	Chem	–
Baker Diagnostics				
– Centrifichem	4	Specimen	AutoC	00331
each additional analysis	1	Specimen	–	–
Beckman				
– Astra 4, 8	3	Specimen	AutoC	00350
* – Ideal	5	Specimen	AutoC	00293
– C1/CO_2 Analyzer	2.5	Specimen	AutoC	00371
* – Clinical System 700	4	Test	AutoC	00294
– E4A Electrolyte	3	Specimen	AutoC	00372
– Glucose and/or BUN Analyzer	2.5	Specimen	AutoC	00373
* – ICS, see Immunone – phelometry code no. 00644	–	–	–	–

Procedure	Unit Value	Item for Count	Section	Code Number
*Becton – Dickinson – Aria HT	4	Specimen	AutoC	00296
*Biokinetics	4	Specimen	AutoC	00326
Blood Gas				
– manual calibration, manual calculation	20	Specimen	AutoC	00306
– manual calibration, self calculation	12	Specimen	AutoC	00303
– self calibration, self calculation	4	Specimen	AutoC	00300
Boehringer Mannheim (BMC)				
* – Hitachi 704	3.5	Specimen	AutoC	00290
– Hitachi 705	3.5	Specimen	AutoC	00353
* – Hitachi 737	3.5	Specimen	AutoC	00291
* – Reflotron	3	Test	AutoC	00324
*Coulter – Dacos	3.5	Specimen	AutoC	00297
*Dade Paramax	3.5	Specimen	AutoC	00289
Dupont				
– ACA	3.5	Specimen	AutoC	00351
* – Dimension	3	Specimen	AutoC	00298
Electronucleonics				
– Gemini or Flexigem	3.5	Specimen	AutoC	00334
each additional analysis	1	–	–	–
* – Gem Profiler	3.5	Specimen	AutoC	00299
– Gemsaec	4	Specimen	AutoC	00333
each additional analysis	1	–	–	–
Flame Photometer (Dual Channel – Na/K)	4	Specimen	AutoC	00375
Gilford Systems				
– 203, 203-S, 3400, 3500, impact 400	3	Specimen	AutoC	00335
each additional analysis	1	–	–	–
Gilford Systems				
– 4, 5, 102, 103, 201, 292	4	Test	AutoC	00315
*Glucose meter	3	Test	AutoC	00323
Greiner – GSAII, G300	3	Specimen	AutoC	00352
Hematology – automated instruments				
– Profile A (7 parameters)	3	Specimen	AutoH	01100
– Profile B (8 parameters)	3	Specimen	AutoH	01101
– Profile C (8 parameters plus histograms)	3.5	Specimen	AutoH	01112

Procedure	Unit Value	Item for Count	Section	Code Number
Hematology - automated instruments				
- Profile D - as profile C, plus 3 part differential with appropriate response to abnormals.	5	Specimen	AutoH	01103
Hematology, Semi-automated				
- Single dilution	6	Specimen	AutoH	01104
each additional dilution	2	Specimen	AutoH	-
Automated Differential Counters				
- continuous flow cytometry or Technicon H6000 - as in profile D	5	Specimen	AutoH	01106
- high resolution pattern recognition, Hematrak, includes film preparation and staining	4.5	Specimen	AutoH	01107
Hematology - Coagulation semi-automated				
- PT & APTT run simultaneously	4	Specimen	AutoH	01108
- PT & APTT	4	Specimen	AutoH	01109
Hoffman - LaRoche				
- Cobas Bio	3	Specimen	AutoC	00332
each additional analysis	1	Specimen	-	-
* - Cobas Fara	3	Specimen	AutoC	00341
each additional analysis	1	Specimen	-	-
* - Cobas Mira	4.5	Specimen	AutoC	00364
Instrumentation Laboratories				
* - IL 282	4	Specimen	AutoC	00383
- IL 446 ($C1/CO_2$)	4	Specimen	AutoC	00380
* - Multistat ASCA	3.5	Specimen	AutoC	00340
each additional analysis	1	-	-	-
- Multistat III	3.5	Specimen	AutoC	00336
each additional analysis	1	-	-	-
KODAK				
* - DT60	3	Test	AutoC	00325
- 400	3.5	Specimen	AutoC	00356
* - 700	3.5	Specimen	AutoC	00365
Nova 4 + 4 Electrolyte Analyzer	3	Specimen	AutoC	00377
Nova 4 Electrolyte Analyzer	4	Specimen	AutoC	00376
*Nova 8	4	Specimen	AutoC	00384

Procedure	Unit Value	Item for Count	Section	Code Number
*Orion Research Inc. Orion 1020	4	Specimen	AutoC	00381
Polymak II	4	Test	AutoC	00316
Photovolt Stat Ion (Na, K, C1, CO_2 optional)	2	Specimen	AutoC	00378
Radiometer				
* – Radiometer I	4	Specimen	AutoC	00385
* – ICA	4	Specimen	AutoC	00386
*Syva Instruments, 5000, 6000, QST	8	Specimen	AutoC	00056
Technicon				
* – Assist (Cooper)	3	Specimen	AutoC	00366
– Auto analyzer – 2 channel	4	Specimen	AutoC	00357
– Auto analyzer – 4 channel	4	Specimen	AutoC	00358
* – RA 500	3	Specimen	AutoC	00367
– RA 1000	3	Specimen	AutoC	00359
– SMA 12/60	4	Specimen	AutoC	00361
– SMA 6/60	4	Specimen	AutoC	00360
* – SMAC	3	Specimen	AutoC	00362
– Stat Lyte (Na, K, C1, CO_2)	2.5	Specimen	AutoC	00379
Technicon, auto analyzer				
– methodology with extraction	6	Test	AutoC	00318
– methodology without extraction	4	Test	AutoC	00317
Worthington Chemetrics analyzer	3	Test	AutoC	00314

PROCEDURE LIST - BY SECTION

Procedures have been grouped into seven standard sections. There has been a re-arrangement of some of the line items and sub-sections in this book. Histocompatibility now appears as part of Immunohematology. A new sub-section, Immunology, appears under Immunohematology; this includes line items applicable to D.N.A. quantitation. A Multi-discipline section has been established for procedures which may be performed in more than one department, e.g. Pregnancy tests. If in doubt as to where a procedure may be listed, consult the alphabetical index.

Procedures with asterisks indicate new material appearing in this edition. This encompasses new unit values, revisions to old unit values or rewording of a line item, and occasionally the reinstatement of line items dropped from earlier editions. The "T" (temporary) designation has been dropped; however, procedures which need further time study are identified and permanent unit values will be established in the future.

Some unit values have been deleted. These represent procedures which are, in the opinion of the sub-committees, obsolete. If a laboratory is still responsible for the performance of these procedures, a value may be requested from the Technical Unit. All requests for unit values must be accompanied by form 6.

Procedures listed in Microbiology, Anatomic Pathology, Immunology or Histocompatibility will have specific unit values for specimen handling which should be claimed in addition to the unit value for the procedure even if it is performed by another section of the laboratory. Procedures listed in Chemistry, Hematology or Immunohematology have specimen handling time incorporated within the value for each procedure and no additional units should be claimed if any of these procedures happen to be performed in Microbiology, Anatomic Pathology, Immunology or Histocompatibility.

Specimen Procurement and Dispatch

The unit values in this section should be claimed only for work done by staff on the laboratory payroll.

Items for Count

The following items for count found in this section must be used when tallying workload. A full definition of terms used in this manual may be found in the glossary contained in the Appendix B.

1. **Patient**: This term is used when the presence of the patient is necessary for the performance of the procedure.
2. **Specimen:** This term is used to identify all biological material from a single patient which is being collected or dispatched.
3. **Trip**: This term refers to travel from the laboratory to a remote site and back (round trip).
4. **Area**: This term applies to environmental specimens collected from one site, e.g., 10 swabs from O.R. #2.

Special Directions

1. Considerable variation exists in the circumstances associated with blood collection. Data collected reflect a wide range of complexity and the average has been used to express the central tendency of the distribution. Special situations such as collection on isolation wards or collection of specimens for blood culture were included in the time studies and have influenced the unit value for venipuncture. These have not been assigned individual unit values in order to maintain the simplest approach to data collection.
2. Code 00200 may be used when laboratory staff go to the operating room, emergency room, the bedside, etc. Travel time is included in unit values for all types of blood collection. Code 00200 must not be claimed in addition to codes 00212 or 00214.
3. Do not claim units for procurement unless laboratory staff are actively involved in the acquisition of the specimen. Instructions given to patients are not procurement, e.g. urine specimens.
4. Code 00220 may be claimed when collecting environmental specimens for culture.

Code Number	Procedure	Unit Value	Item for Count
00212	Venipuncture	8	Patient
00214	Capillary puncture	12	Patient
00181	Dispatch of all biological materials to laboratories outside the hospital (includes subsequent distribution of reports).	6	Specimen
00184	Handling and reporting of processed slides received from a referring laboratory for pathologists' review	5	Specimen
00220	Procurement of material for microbiology culture or dark field microscopy	6	Patient/ Area

Code Number	Procedure	Unit Value	Item for Count
*00180	Receipt of specimens (2 or more i.e.i. n bulk) from an external referri laboratory (**outside** the hospital). This includes sorting specimens and re-writing requisitions and subsequent distribution of reports.	6	Patient
*00210	Aliquoting of specimens to be tested at a later date	1	Tube
*00200	Travel time associated with trips outside the department of laboratories for the transport or procurement of specimens or for the performance of technical functions – See Special Direction #2.	8	Round Trip

Multi-discipline Procedures

The following is a list of procedures which may be performed in more than one department of the laboratory. Some of these procedures may require an additional handling unit, and therefore, the unit values do not appear in this list. The unit values appear in the section where the procedures were originally timed along with the appropriate handling unit.

Special Direction

A new line item, Pretreatment of Specimen (whole blood, serum, CSF or urine), has been included to account for steps such as concentration using Minicon, filtration, heat inactivations, delipidation, deproteinization and other steps which occur before testing begins. Claim this value (code 00060) and add the appropriate value for each procedure except where it states that pretreatment steps are included e.g. Chromatography.

Code Number	Procedure	Unit Value	Item for Count
*08940	Animal inoculation for any purpose	100	Animal
*09261	C-Reactive protein – capillary tube	7	Specimen
*00791	Calculation – special	3	Specimen
*03701	Case review	5	Specimen
*08508	Cell Count/Viability Count – refer to Immunology	–	–
*08303	Counter immunoelectrophoresis – refer to Immunology	–	–
*01830	Cold agglutinins – quantitative	20	Antigen
*00532	Cryoglobulin	9	Test
*00566	Electrophoresis	12	Specimen
*00847	ELISA – other than Virology	8	Test
*00056	EMIT – Syva instruments	8	Test
*08510	Freezing lymphocytes, 1st vial – each additional vial	8 1	Vial Vial
*00184	Handling and reporting processed slides	5	Specimen
*01054	Hemoglobin A_1C – column	12	Specimen
*00606	Hemoglobin A_2 quantitation	17	Specimen
08307	Immunodiffusion (radial) – refer to Immunology	–	–
*08301	Immunoelectrophoresis – refer to Immunology	–	–

Code Number	Procedure	Unit Value	Item for Count
*08305	Immunofixation – refer to Immunology	–	–
*05305	Immunofluorescence – direct – refer to Immunopathology	–	–
*05306	Immunofluorescence – indirect – refer to Immunopathology	–	
*05310	Immunofluorescence analysis of serum antibodies – refer to Immunopathology	–	–
*05311	Immunofluorescence analysis of serum antibodies – titration of positive-refer to Immunopathology	–	–
*00644	Immunonephelometry – any instrument	8	Specimen
*05320	Immunoperoxidase – direct – refer to Immunopathology	–	–
*05321	Immunoperoxidase – other methods – refer to Immunopathology	–	–
*02530	Irradiation of blood	1	Pack
*08315	Isolation of leukocytes – refer to Immunology	–	–
*08309	Ouchterlony diffusion – refer to Immunology	–	–
*03080	Photographs, gross	5	Specimen
*00845	Pregnancy Tests – any method, includes controls	8	Specimen
*00060	Pretreatment of specimen, see special direction	3	Specimen
*08511	Thawing lymphocytes	24	Specimen
*08344	Thyroglobulin/Microsomal Antibodies	14	Test
	Rheumatoid Factor		
*00038	– latex agglutination	8	Specimen
*00039	– hemagglutination	14	Specimen

Clinical Chemistry

This section contains unit values for instruments grouped by mode of operation and manual procedures listed alphabetically by constituent. Unit values for manual procedures must not be applied to automated procedures even if a unit value for the instrument is not available. The unit values in this section do not include specimen procurement but do include all the categories outlined in the introduction to the manual.

Unless otherwise specified, unit values:

i) apply to all specimen types (blood, urine, etc.)

ii) are tallied for patients, quality control, standards and repeats

iii) are not tallied for blanks or replicate analyses performed as part of the standard methodology

iv) are tallied using "items for count"

Items for Count

1. **Specimen**: This term refers to a biological sample received for analysis and is used to reflect activity leading to the production of more than one result.

2. **Test**: This term is used to reflect activity leading to a single result.

3. **Antigen**: This term is used for detectable characteristics which can be identified by reaction with antibody.

See Appendix B for a complete definition of terms.

Automated Chemistry

The unit value is generally characteristic of the instrumentation irrespective of the analyses being performed. However, some instrumentation e.g., KDA may be used in single test mode or profile (multitest) mode and the unit values reflect the different timings in these two modes of operation. The most common instrumentation has been time-studied in routine operation. The following lists the instrumentation by group, providing for each a description, the item for count and the unit value.

I. Blood Gas Analysis

The unit values include, where required, calibration of the instrument, replicate analysis and the use of nomograms to generate additional parameters. Quality control samples should be counted as specimens.

Code Number	Instrument	Unit Value Per Specimen
00300	Blood Gas: self calibration, self calculation e.g., Radiometer ABL-1, ABL-2,IL 813, Corning 168 or 175	4
00303	Blood Gas: manual calibration, self calculation e.g., Corning 165, IL 513	12
00306	Blood Gas: manual calibration, manual calculation e.g., Radiometer Astrup, BMS3/MK2, IL2, 213, 313, 329, 413.	20

II. Chemical Analyzers: Batch or Single Test Mode

A. Analyzers in this group have been found to operate frequently in a single test mode with equal expenditure of effort required for each analyte requested. The item for count is "test".

Code Number	Instrument	Unit Value Per Test
00310	Seralyzer-Ames	3
*	Atomic Absorption – see metals, manual chemistry	–
00312	TDX-Abbott (most analyses) – see pretreatment of Specimen #00060 e.g., digoxin	3
*00326	Biokinetics	4
00314	Chemetrics analyzer – Worthington	3
00315	Systems 4, 5, 102, 103, 201, 202 – Gilford	4
00316	Polymak II	4
00317	Auto Analyzer – Technicon, Methodology without extraction e.g., Glucose, Urea, Ca, Creatinine, Enzymes, Cholesterol, Total Protein or Urate (uric acid)	4
00318	Auto Analyzer – Technicon, Methodology with extraction: e.g., Cholesterol or Triglycerides	6
*	I.C.S. – Beckman see Immunonephelometry #00644	–
*	Auto I.C.S. – Beckman see Immunonephelometry #00644	–
00321	Quantum II – Abbott, eg. TSH or ferritin	7
*00322	Bilirubinometer (American Optical)	4
*00323	Glucose meter	3
*00324	Reflotron (BMC)	3
*00325	Kodak DT 60	3
*00294	Clinical System 700	4

B. Analyzers in this group operate in either of two ways:
(a) to analyze a specimen for a single constituent, or
(b) to analyze a specimen for several constituents.

In the latter case, after the first analysis, each additional analysis requires less expenditure of effort for the complete processing of results. The item for count for these instruments is "specimen".

Code Number	Instrument	First Analysis	Unit Value for Same Specimen Each Additional Analysis
00330	Bichromatic Analyzer 50, 100, 200, or VP-Abbott	3.5	1
00331	Centrifichem-Union Carbid (Baker Diagnostics)	4	1
00332	Cobas Bio, Hoffman-Laroche	3	1
*00341	Cobas Fara	3	1
00333	Gemsaec-Electronucleonics	4	1
00334	Gemini or Flexigem – Electronucleonics (with or without automatic loader)	3.5	1
00335	Systems 203, 203-S, 3400, 3500 Impact 400-Gilford	3	1
*00340	IL Multistate ASCA	3.5	1
00336	IL Multistate III	3	1
00337	KDA-American Monitor	2.5	0.6

III. Chemical Analyzers: Profile or Multi Test Selection Mode

Analyzers in this group are capable of performing a selected series of analyses sequentially. The item for count is "specimen".

Code Number	Instrument	Unit Value Per Specimen
*00286	Abbott Spectrum	3.5
00350	Astra 4, 8 – Beckman	3
*00287	Allied – Genesis	3.5
*00288	Allied – Monarch	3.5
00351	ACA – Dupont (Automatic Clinical Analyzer)	3.5
*00289	American Dade – Paramax	3.5
00352	GSA II, G300 – Greiner	3
*00290	Hitachi 704 – BMC	3.5
00353	Hitachi 705 – BMC	3.5

Code Number	Instrument	Unit Value Per Specimen
*00291	Hitachi 737 – BMC	3.5
00354	KDA (ATS Mode) – American Monitor	3.5
*00293	ASTRA IDEAL – Beckman	5
*00296	ARIA HT – Becton – Dickinson	4
*00297	Coulter – Dacos	3.5
*00298	Dupont – Dimension	3
*00299	Electronucleonics – Gem Profiler	3.5
*00364	Cobas Mira	4.5
00356	Ektachem 400 – Kodak	3.5
*00365	Ektachem 700 – Kodak	3.5
00357	Auto Analyzer – Technicon (Dual Channel)	4
00358	Auto Analyzer – Technicon (Four Channel)	4
*00366	Assist (Cooper) – Technicon	3
*00367	RA 500 – Technicon	3
00359	RA 1000 – Technicon	3
00360	SMA 6/60 – Technicon	4
00361	SMA 12/60 – Technicon	4
*00362	SMAC – Technicon	3
00363	Parallel – American Monitor	2.5
*00295	Pespective – American Monitor	3.5

IV. Chemical Analyzers: Dedicated

Analyzers in this group are limited to performing one or more specified analyses. The item for count is "specimen".

Code Number	Instrument	Unit Value Per Specimen
*00381	Orion Research	4
*00056	Syva Instruments	8
00370	Clinitek – Ames (urinalysis)	3
00371	Cl/CO2 Analyzer – Beckman	2.5
00372	E4A electrolyte analyzer – Beckman	3
00373	Glucose and/or BUN analyzers – Beckman	2.5
00374	Lithium	7
00375	Flame Photometer – Dual Channel (Na and K) e.g., Beckman Klinaflame, IL 143, 343, Corning 430	4
00376	Nova 4 electrolyte analyzer	4
00377	Nova 4 + 4 electrolyte analyzer	3
00378	Photovolt Stat Ion (Na, K, Cl, C02 optional)	2
00379	Stat Lyte (Na, K, Cl, CO2) – Technicon	2.5
00380	IL 446 (Cl, CO2)	4
*00383	IL 282	4
*00384	Nova 8	4
*00385	Radiometer I	4
*00386	Radiometer ICA	4

MANUAL PROCEDURES

Special Directions

1. **Function** or **tolerance tests** involving the sequential performance of a number of procedures may be treated as profiles and assigned a unit value based on the sum of the individual components.

   Similarly, **clearance tests** can also be assigned an aggregate unit value. However, when a calculation is required over and above that involved in determining the result of each component test, code 00791, Special Calculation should be used.

2. Code 00791 should not be used in blood gas analysis when a nomogram is used to derive additional results.

3. Urine volume measurement and calculation, code 01017, includes the measuring and aliquotting of 24 hour urines and any calculations required to express analyte concentrations in terms of 24 hour excretion.

4. Individual line items referring to Ligand/Saturation analysis (RIA) have been dropped from the Chemistry section and the alphabetic list. Apply the unit values from the generic list to procedures performed by Immunoassay techniques.

5. Individual drugs or drug metabolites have been dropped from the list; a generic listing has been created and the appropriate method and unit value should be claimed for every analyte.

6. For all enzymes assays, assign #00574.

7. For allergen testing using Ligand/Saturation methods claim the appropriate value.

8. Chromatography is a new generic listing for analytes. They are not listed separately unless a specific value has been assigned to a procedure which is different from the usual.

9. The line item immunonephelometry Code no. 00644 refers to analyses done on instruments such as the Behring, Beckman(s). The item for count is "specimen".

Ligand/Saturation Analysis

The generic term Ligand or Saturation Analysis may include radioimmunoassays, radiometric assays, competitive protein binding assays and enzyme immunoassays. Unit values listed for RIA represent the total time needed to perform a manual assay in **duplicate**.

If non-RIA saturation analyses are performed manually, use the appropriate ^{125}IRIA value listed below. If non-RIA saturation analyses are automated or semi-automated, apply the appropriate unit value in the Automated Chemistry listings.

Code Number	Procedure	Unit Value Per Test
*00395	Immunoassay – direct, no extraction or chromatography	8
	Add pretreatment of specimen (code 00060) for steps if applicable, e.g. each extraction	
	If chromatography is involved add the appropriate GLC or HPLC value – see chromatography	

Drugs, Drug Metabolites and Substrates:

Claim the appropriate value for the method used for quantitation of any drugs, drug metabolites and substrates.

Where pretreatment of serum occurs, claim code no. 00060 (e.g., digoxin) except for GLC, HPLC and TLC procedures where these functions are included in the unit value. Code no. 00791 for Special Calculation may also be added if necessary.

Code Number	Procedure	Unit Value	Item for Count
	Chromatography		
*00502	GLC – includes up to 2 pretreatment steps	16	Specimen
	– each additional injection	7	Specimen
*00505	HPLC – includes up to 2 pretreatment steps e.g. extraction, derivitization	16	Specimen
	– each additional injection	7	–
*00506	TLC – 1 dimensional, simple or Toxilab B	16	Specimen
*00507	TLC – 2 dimensional, or Toxilab A	25	Specimen
*00414	GC/MS	20	Specimen
*00056	EMIT – Syva Instruments – see Automated Chemistry	8	Test
*00057	Manual – enzymatic	7	Test
*00058	– spectrophotometric quantitative	12	Test
*	RIA – see ligand/saturation analysis	–	–

MANUAL CHEMISTRY

Unless specifically stated, these unit values are generally characteristic of the constituent, irrespective of methodology. Be sure to apply the correct item for count.

Code Number	Procedure	Unit Value	Item for Count
*00400	Acetoacetate, serum, enzymatic	7	Test
00404	Acetone quantitative	10	Test
*00401	Acetylcholinesterase acrylamide gel electrophoresis	12	Test
*00402	Acetylglucosaminidase, urine, enzymatic	7	Test
00406	Acid, Free or Total – Duodenal or Gastric	3	Specimen
00860	Albumin	12	Test
*00405	Albumin, reserve binding capacity HBAA dye method	12	Test
*00421	Alkaline phosphatase Isoenzymes, cellulose acetate	12	Test
*00407	Alphaglucosidase (sperm)	7	Test
*00408	Amino Acids, quantitative chromatography	60	Specimen
*	Amino Acids – see chromatography	–	–
00420	Amino Levulinic Acid – urine	40	Test
*00411	Ammonia, manual, enzymatic	7	Test
00422	Ammonia, Conway diffusion	39	Test
00423	Amniotic Fluid Scan	20	Test
00425	Amylase	10	Test
*00412	Angiotensin converting enzyme HPLC – see chromatography	–	–
	Arsenic – see metals	–	–
00427	Ascorbic Acid	25	Test
*00431	Beta galactosidase fluorimetric	20	Test
*00432	Beta galactosidase fluorimetric with sonication	25	Test
*00433	Beta hydroxybutyrate, serum, manual enzymatic	7	Test
*01013	Bile, reducing substances, pH – refer to Code no. 01013	3	Test
00440	Bile Pigments qualitative – urine	6	Test

Code Number	Procedure	Unit Value	Item for Count
00444	Bilirubin qualitative – feces	5	Test
00446	Bilirubin Total and Direct	16	Test
00448	Bilirubin Total or Direct	11	Test
00450	Blood, Occult – feces	6	Test
00452	Blood qualitative – Dipstick	3	Test
00456	Bromides	15	Test
00458	Bromosulphthalein	11	Test
00462	Calcium	6	Test
	Calcium – Ionized, – see Automated Chemistry	–	–
00791	Calculation – Special	3	Specimen
00472	Calculus Analysis	25	Test
*00473	Carbamyl Phosphate Synthetase, liver, colorimetric	100	Specimen
	Carbohydrates, TLC – see chromatography	–	–
00503	Carbon Dioxide, Total	14	Test
00500	Carbon Monoxide	21	Test
*00477	Carbon Monoxide, qualitative, Screen	10	Test
	Carbon Monoxide – GLC, see chromatography	–	–
00476	Carotene	8	Test
00478	Catecholamines – urine	80	Test
00482	– serum Radioenzyme-fractionated free and total	100	Specimen
00480	– plasma Radiometer	22	Specimen
	Cell Count with or without Film and Differential – CSF or other Body Fluids – see Hematology	–	–
	Ceruloplasmin – refer to Immunodiffusion	–	–
*00487	Chloramine T, radio labelling	75	Procedure
00488	Chlorides	6	Test
00969	Chloride Sweat Test, includes specimen collection	33	Test
00499	Cholesterol, Total – with extraction	10	Test

Code Number	Procedure	Unit Value	Item for Count
00498	– without extraction	7	Test
*00496	Cholesterol, LDL, HDL – see pretreatment of specimen Code no. 00060	–	–
00497	Cholinesterase	30	Test
*00501	Cholinesterase phenotyping	30	Test
	Chromatography (chemistry)	–	–
*00502	– GLC – includes up to 2 pretreatment steps	16	Specimen
	– additional pretreatment see Code no. 00060		
	– each repeat injection	7	Specimen
*00414	– GC/MS	20	Specimen
*00505	– HPLC – includes up to 2 pretreatment steps	16	Specimen
	– each repeat injection	7	Specimen
*00506	– TLC – 1 dimensional, simple or Toxilab B	16	Specimen
*00507	– TLC – 2 dimensional or Toxilab A	25	Specimen
*00508	Citrate, urine, manual, enzymatic	15	Test
	Copper – see Metals	–	–
	Counter immunoelectrophoresis – see Immunology	–	–
00518	Creatine	26	Test
	CK Kinase MB – see ligand/saturation analysis – see Auto Chem – add pretreatment of specimen value if appropriate.	–	–
00522	Creatinine	10	Test
*00532	Cryoglobulin qualitative	9	Test
*00533	Crystal analysis, fluids	6	Specimen
*00534	Cystine, Urine manual	11	Test
00536	Cystine (Nitroprusside) qualitative	8	Test
*00540	2, 3, Diphosphoglyceric Acid, manual, includes standards	38	Test
	Drug Screen – see new section "Drugs"	–	–

Code Number	Procedure	Unit Value	Item for Count
*00566	Electrophoresis	12	Specimen
*00056	EMIT – Syva Instruments	8	Specimen
00574	Enzymes	7	Test
	Estrogen/Progesterone Receptor Assay – see Hormone Receptor Assay	–	–
00584	Fat qualitative – feces	6	Test
00588	Fat, Total – feces	55	Test
00594	Fatty Acids Free	25	Test
	Fatty Acids GLC – see chromatography	–	–
*00580	Ferritin	7	Test
*00581	Fetal lung maturity (Foam stability)	12	Test
*01293	Free erythrocyte protoporphyrin, manual	19	Specimen
00932	Fructose	14	Test
*00597	Galactose, manual	8	Test
*00598	Galactose, 1-P, RBC manual	15	Test
*00599	Galactose I-P RBC, manual with recovery experiment	30	Test
*00601	Galactose I-P Transferase, RBC	13	Test
00934	Galactose Tolerance – as Glucose Tolerance		
*00602	Gangliosides, extraction and TLC	45	Test
	Gas Liquid Chromatography – see chromatography	–	–
00944	Glucose	8	Test
	Glucose monitoring devices – see Automated Chemistry	–	–
	Glucose Tolerance – Unit Value is equal to the sum of units assigned to each procedure	–	–
00942	Glucose qualitative – urine or Serum – stick method	3	Test
*00604	Glycogen, tissue, manual anthrone	30	Test
00610	Gonadotropins – see FSH and LH	–	–
	Hemoglobin – HPLC – see chromatography	–	–

Code Number	Procedure	Unit Value	Item for Count
01054	Hemoglobin A_1C column	12	Specimen
00624	Hemoglobin, urine-spectrophotometric	5	Test
*00606	Hemoglobin A_2 quantitation	17	Specimen
00628	Hemosiderin – urine	3	Test
*00609	Hexosaminidase – fluorimetric	20	Test
*00611	– fluorimetric with sonication	25	Test
	High Pressure Liquid Chromatography – see chromatography	–	–
00631	Homocystine qualitative.	8	Test
00632	Homogentisic Acid	9	Test
*00612	Homovanillic Acid, urine, manual	30	Test
*00615	Hormone Receptor Assay – single point	60	Specimen
*00617	Hormone Receptor Assay – Scatchard plot	200	Specimen
00636	5-Hydroxyindoleacetic Acid (5-HIAA)	22	Test
00638	5-Hydroxyindoleacetic Acid (5-HIAA) qualitative.	9	Test
*00630	Hydroxyproline, urine manual	30	Test
	Immunoelectrophoresis – see Immunology	–	–
	Immunofixation – see Immunology	–	–
*00644	Immunonephelometry	8	Specimen
	Insulin – removal of Insulin Antibody see pretreatment of specimen Code no. 00060	–	–
00648	Iron, Total	10	Test
00650	Iron, Total and Binding Capacity	15	Test
00682	Ketones qualitative – Dipstick – Serum or urine	3	Test
00710	Lactate Dehydrogenase Isoenzymes qualitative – Electrophoresis	12	Specimen
*00701	LDL – lipoprotein, turbidometric	6	Specimen
00702	Lactic Acid	27	Test
00948	Lactose qualitative – urine	6	Test

Code Number	Procedure	Unit Value	Item for Count
	Lead or mercury – see metals	–	–
00722	Lecithin/Sphingomyelin – ratio	15	Test
*00725	– extraction, TLC, molybdate stain & scan	25	Test
*00727	– ratio and phosphotidyl glycerol acetone precipitation, TLC, charring, ID chromatography	50	Test
*00731	Leukocyte lysis – sonicator	5	Specimen
*00608	– freeze thaw	5	Specimen
*00733	Lysozyme	7	Test
	Magnesium – see metals	–	–
00735	Melanin qualitative – urine	10	Test
	Mercury – see metals	–	–
*00734	Metabolic screen, urine, spot test	2	Test
*00311	Metals – atomic absorption	11	Test
*00424	– tissue grinding and ashing	9	Specimen
*00737	– anodic stripping voltametry	8	Test
00740	Methemalbumin	21	Test
00742	Methemoglobin or Sulfhemoglobin	21	Test
*00738	Methyl Malonic Acid, manual	16	Test
*00739	Mucin clot	5	Test
00754	Mucopolysaccharides	30	Test
*00741	Mucopolysaccharides, urine, quantitative. – high M.W.; urine prep; CPC precipitation and treatment	40	Specimen
*00743	– low M.W.; Dowex columns	75	Specimen
*00744	– uronic acid quantitative	15	Specimen
*00745	– CPC method	10	Test
*00746	Mucopolysaccharides, urine, qualitative, Toluidine Blue method,	5	Test
00756	Myoglobin – Spectrophotometric – urine	11	Test
00805	– Serum	9	Test

Code Number	Procedure	Unit Value	Item for Count
00766	Nitrogen, total	12	Test
*00767	Nitrogen, ninhydrin	12	Test
*	Oligosaccharides TLC – see chromatography	–	–
*	Organic acids GC/MS – see chromatography	–	–
*00771	Ornithine transcarbamylase, liver colorimetric	75	Specimen
*00772	Orotic Acid, manual, with minicolumn	18	Specimen
00776	Osmolality	10	Test
	Ouchterlony diffusion – see Immunology	–	–
*00773	Oxalate – urine – chromotropic acid	30	Test
*00774	– urine – Sigma kit	10	Test
00798	pH Routine – see 01014 – urine test	3	Test
00810	Phenylpyruvic Acid qualitative (PKU)	4	Test
00804	Phenylalanine, Blood quantitative	15	Test
00815	Phosphatase, Acid	10	Test
00818	Phosphatase, Alkaline	7	Test
00824	Phosphate Inorganic	7	Test
*00825	Phosphatidyl Glycerol – Amnio STAT FLM	7	Specimen
*00826	– slide agglutination	7	Specimen
	– TLC – see chromatography	–	–
00840	Porphobilinogen	32	Test
00838	Porphobilinogen qualitative	9	Test
	Porphyrin Isomers – see chromatography	–	–
*00836	Porphyrin (total) feces, spectrophotometric	40	Test
00842	Porphyrins qualitative	10	Test
00846	Porphyrins, Fractionation	67	Test
00844	Porphyrins Screening Test (Lead)	10	Test

Code Number	Procedure	Unit Value	Item for Count
	Potassium – see chemical analyzers		
*00060	Pretreatment of specimen, – see Multi-Discipline Section	3	Specimen
*00871	Protein, urine, sulfosalicylic Acid	3	Test
*00875	Pseudocholinesterase phenotyping	30	Specimen
*00877	Pyruvate carboxylase ^{14}C Bicarbonate	100	Test
*00878	Pyruvic Acid, manual	27	Test
	Radial Immunodiffusion – see Immunology	–	–
*00880	Radio labelled hormone, manual	50	Procedure
*00487	Radio labelling Chloramine T, manual	75	Procedure
*00883	Red Cell Folates and B_12/Folates, Bio Rad Quantaphase	14	Specimen
*00885	Reducing substances, urine, similar to TLC	25	Specimen
	Sodium – see Chemical Analyzers	–	–
00928	Specific Gravity	4	Test
*00924	Sphingomyelinase, fibroblasts ^{14}C Sphingomyelin	100	Specimen
*00926	Stercobilinogen, feces	10	Test
00925	Steroids Urinary	17	Test
00964	Sulfhemoglobin	21	Test
00960	Sulfonamides Crystals qualitative	2	Test
	Thin Layer Chromatography – see chromatography	–	–
00974	Thiocyanates	15	Test
*08340	Thyroglobuin and Microsomal Antibodies – see Multisection	–	
00984	Triglycerides	12	Test
00990	Trypsin qualitative	11	Test
*00991	Tyrosine	15	Test
*00992	Urine-Diphosphate-galactose, Epimerase, SRBC e.g. blood or protein or sugar	13	Test
01002	Urea	7	Test

Code Number	Procedure	Unit Value	Item for Count
01010	Urate (Uric Acid)	8	Test
01013	Urinalysis, any single analysis,	3	Test
01014	Urinalysis, routine (sugar, protein, acetone, specific gravity, PH including diagnostic stick tests)	4	Specimen
01016	Urinalysis, routine as above but including Microscopy	6	Test
01017	Urine volume – measurement and calculation	2	Test
01020	Urobilin qualitative – urine	3	Test
01022	Urobilinogen qualitative – feces, urine	10	Test
01026	Urobilinogen quantitative – feces	35	Test
01028	Urobilinogen semi-quantitative – urine – 24 hour excretion	12	Test
01042	Vanilmandelic Acid (VMA)	30	Test
*01044	Viscosity – Brookfield Viscometer	7	Test
*01045	Vitamin A, manual	10	Test
*01046	Vitamin A or E – serum, fluorimetric	10	Test
*01048	Vitamin B_{12} – folates	10	Specimen
	Vitamin – B_{12} – see ligand/saturation analysis	–	–
	25 OH Vitamin D Assay – see ligand/saturation		
	Xylose Absorption – unit value ie equal to the sum of units assigned to each procedure	–	–
00956	Xylose	8	Test

Hematology

This section contains unit values for instruments grouped by mode of operation and manual procedures listed by constituent. Line items have been added with both new and revised unit values. Several have been deleted. The unit values do not include procurement but do include all the categories outlined in the introduction to the manual.

Items for Count

The following items for count are found in the Hematology section and must be used when tallying workload. A full definition of terms used in the manual may be found in the Glossary contained in the Appendix B.

1. **Patient:** This term is used when the presence of the patient is required for the performance of the procedure.
2. **Slide**: This term is used when material is placed on a slide for examination.
3. **Specimen:** This term is used when a number of related procedures are performed on one sample.
4. **Test:** This term is used for a defined activity leading to a single result.
5. **Dilution**: This term is used when a sample is mixed with another solution to reduce its concentration.

Special Directions

1. **Blood Film Examination,** code 01116, includes white blood cell differential count, red blood cell morphology and platelet estimate. **Blood Film Screen,** code 01118, differs from blood film examination in that white blood cells are estimated and not counted. For any single request for a differential, claim code 01116. For any single request for red cell morphology or platelet estimation, claim code 01118.

2. When duplicates are performed as part of the standard methodology, as in coagulation tests, they have been incorporated in the unit value for the procedure and that unit value should only be claimed once.

3. Unit values are no longer to be assigned without consultation with the Technical Unit. Laboratories performing **Autohemolysis Studies** code 01110, or **Platelet Function Retention Tests** code 01320 should submit a resume of their procedures to the Technical Unit via the Request for a new Unit Value see Appendix A, Form 6.

4. The following formulae may be used:

   a) Circulating Anticoagulant – claim code no. 01109 for the first tube and 1 for each additional tube.

   b) CBC – Lipemic sample – claim the appropriate profile plus repeats plus special calculation code no. 00791.

5. Blood film preparation and stain code 01113 includes making and staining a blood film where the films are made and filed away for reference. No interpretation of the film is included in this unit value. If the film is examined at a later date, claim the appropriate code number and unit value.

6. Code no. 00200 – travel time associated with trips outside the department of laboratories may be claimed if the bone marrow or bleeding time is performed in the hospital ward.

AUTOMATED HEMATOLOGY

Blood Cell Profiles

Instruments producing blood cell profiles have been grouped on the basis of sample introduction. Choose the description which best fits your instrument and apply the appropriate unit value.

Code Number	Profile	Unit Value	Item for Count
	I Whole Blood Aspiration (Automated)		
01100	Profile A		
	– 7 parameters (Hb, Hct, RBC, WBC, MCV, MCH, MCHC)	3	Specimen
01101	Profile B		
	– 8 parameters (Hb, Hct, RBC, WBC, MCV, MCH, MCHC, Platelets)	3	Specimen
01112	Profile C		
	– 8 parameters (as for profile B) plus histograms	3.5	Specimen
01103	Profile D – 8 or more parameters plus histograms, plus three part differential, with appropriate response to abnormals	5	Specimen
*01113	– Blood film preparation and stain only; no interpretation of film.	2	Specimen
	II Predilution of Sample Required (Semi-automated)		
01104	Initial Dilution regardless of number of parameters	6	Specimen
	Any number of additional dilutions regardless of number of additional parameters	2	Specimen
	III Automated Differential Counters		
01106	Continuous flow cytometry Technicon H6000 includes red cell parameters, as in Profile D	5	Specimen
01107	High resolution pattern recognition Hematrak includes film preparation and staining	4.5	Specimen

Code Number	Profile	Unit Value	Item for Count
	IV Semi-automated Coagulation Instruments		
01108	PT and APTT run simultaneously	4	Specimen
01109	Single PT or APTT	4	Test
*01310	PT or APTT with substitution	1	Dilution
	Routine Hematology		
01202	Acidified Serum Lysis (Ham's) Test	18	Test
01110	Autohemolysis Studies – see special direction Note 3		
01116	Blood Film Examination including WBC Differential, manual, RBC Morphology and Platelet Estimation	11	Slide
01118	Blood Film Screen including WBC estimate, RBC Morphology and Platelet Estimation	5	Slide
*01280	Bone Marrow Aspiration and Film Preparation (technical work in connection with aspiration and film preparation at the bedside, excluding staining) – see special direction #6	25	Patient
01276	Bone Marrow Film Preparation in Laboratory	15	Patient
01278	Bone Marrow Stain Romanowsky	12	Specimen
01275	Bone Marrow – Differential	8	100 Cell
01117	Buffy Coat Preparation and Interpretation	16	Patient
01122	Capillary fragility or resistance	7	Test
01124	Cell Count with Film and Differential (CSF or other body fluids, excluding blood)	18	Test
01125	Cell Count with Cytospin, Film and Differential (CSF or other body fluid)	21	Test
01134	Cold Agglutinins qualitative	6	Test
01830	Cold Agglutinins quantitative – see Immunohematology 01830	–	–
01138	Cryofibrinogen	15	Test
*00540	2-3 DPG includes standards	38	Specimen
01148	Donath – Landsteiner	23	Test
01154	Eosinophil Count in fluid	8	Test

Code Number	Profile	Unit Value	Item for Count
01292	Eosinophil Nasal Smear	6	Slide
*01293	Free Erythrocyte protoporphyrins	19	Specimen
01190	Folates – Microbiological Method	45	Test
	– Radioassay Method – see Clinical Chemistry	–	–
01398	Glucose 6 Phosphate Dehydrogenase (qualitative.)	10	Test
	Glucose 6 Phosphate Dehydrogenase assay – see Red Cell Enzymes	–	–
01206	Heinz Bodies, Direct	15	Test
01210	Hematocrit, Macro or Micro	3	Test
01212	Hemoglobin	5	Test
*01054	Hemoglobin A_1C by column	12	Specimen
*00606	Hemoglobin A_2 quantitation	17	Specimen
01214	Hemoglobin Electrophoresis, acid or alkaline	16	Specimen
01218	Hemoglobin Fetal – Acid Elution (Kleihauer Betke)	8	Slide
01216	Hemoglobin Fetal quantitative (Alkali Denaturation)	25	Test
01219	Hemoglobin Fetal qualitative (feces)	12	Test
*01215	Hemoglobin H inclusions	16	Test
*01217	Hemoglobin Instability	20	Specimen
01220	Hemoglobin Plasma	15	Test
*01222	Hemoglobin Solubility test – kit methods eg. Sickledex	10	Specimen
01102	Indices (MCV, MCH, MCHC) Manual Calculation	2	Specimen
01264	L.E. Cell Preparation and Examination	28	Test
01363	Osmotic Fragility Screen	35	Test
01364	Osmotic Fragility – quantitative	45	Test
01274	Parasites Blood (Malarial and other parasites) Red Cell Enzymes	22	Specimen
*01265	– Hemolysate preparation, includes hemoglobin checks	17	Specimen
*01266	– G6PD Assay	26	Specimen
*01267	– Hexokinase	26	Specimen

Code Number	Profile	Unit Value	Item for Count
*01268	– Pryruvic Kinase	26	Specimen
*01269	Red cell creatine, manual method	15	Specimen
01372	Reticulocyte Count (up to 2 slides)	9	Specimen
01384	Sedimentation Rate (E.S.R.)	4	Specimen
01390	Sickle Cell Preparation – metabisulphate	14	Specimen
01221	Sucrose Lysis	10	Test
01444	White Blood Cell Count – Manual	6	Test
	Special Stains		
01236	Iron	11	Specimen
01450	Alkaline Phosphate Leukocyte	18	Specimen
01460	Non Specific Esterase	20	Specimen
01480	Chloroacetate Esterase	20	Specimen
01465	P.A.S. (Periodic Acid Schiff)	20	Specimen
01470	Peroxidase	20	Specimen
01399	Sudan Black	20	Specimen
01475	Acid Phosphatase with or without tartrate	20	Specimen
	Coagulation		
01312	Activated Partial Thromboplastin Time – Manual or fibrometer	5	Test
01313	Antithrombin III, synthetic substrate assay (excluding Automated Chemistry)	11	Test
	Antithrombin III, ACA Dupont – see Automated Chemistry	–	–
*01115	Bleeding Time – see special direction #6	18	Patient
01133	Circulating Anticoagulant Studies – see special direction #4a	–	–
01128	Clot Retraction, qualitative.	6	Test
01157	Euglobulin Lysis Time	20	Test
*01158	Factor Assays: one stage, semi-automated instrument, up to 3 dilutions	12	Test
*01159	Factor Assays: one stage, manual or fibrometer, up to 3 dilutions	33	Test

Code Number	Profile	Unit Value	Item for Count
	Laurell (Rocket) Immuno-electrophoresis eg. Factor VIII: uWF Factor VIII related antigen		
*01160	– Ist well per plate	35	well
	– each additional well	4	well
01167	Factor VIII related antigen	8	Test
01175	Factor XIII: Screen (Urea Solubility method)	10	Test
01184	Fibrin Degradation Products – Latex Slide Test	8	Test
*01153	Fibrin D dimer test	8	Test
*01155	Fibrin/monomer test – qualitative	8	Test
01338	Fibrinogen Titre	4	Test
01339	Fibrinogen, quantitative (based on Thrombin Time method)	6	Test
01340	Fibrinogen, quantitative (ACA Dupont – see Automated Chemistry)	–	–
01330	Fibrinogen, chemical quantitative	28	Test
01180	Fibrinolysis (plate method)	16	Test
01182	Fibrinolysis, clot observation	7	Test
01224	Heparin, protamine titration	50	Test
01226	Heparin – Chromogenic substrate assay	5	Test
	– Heparin – Automated Chemistry e.g. Dupont ACA	–	–
01325	Platelet adhesion with column preparation	12	Specimen
01318	Plasma Clotting (recalcification) Time	8	Test
	Platelet Associated Immunoglobulins/Platelet Antibodies		
*01319	– Specimen handling and platelet preparation	15	Specimen
*05305	– Immunofluorescence – direct	5	Slide
*05306	– Immunofluorescence – indirect	8	Slide
	– Flow Cytometry		
*08318	– labelling – direct	11	Marker
*08319	– labelling – indirect	12	Marker
*08321	– analysis	6	Marker

Code Number	Profile	Unit Value	Item for Count
01326	Platelet Count (microscopic)	9	Test
01323	Platelet Function – Aggregation	6	Tube
01329	Platelet Function – Factor 3 (PF3)	16	Test
01320	Platelet Function Retention Tests – see special direction note 3	–	–
*01321	Platelet Neutralization procedure	14	Test
01225	Protamine Sulfate	6	Test
	Protein C or S, see Laurell Immunoelectrophoresis	–	–
01334	Prothrombin Consumption	20	Test
01336	Prothrombin Time – manual or fibrometer	5	Test
01375	Reptilase Time	6	Test
*01322	Ristocetin Cofactor, includes platelet preparation	60	Test
01342	Thrombin Time	6	Test
*01044	Viscosity – serum Brookfield Viscometer	7	Specimen
	Miscellaneous		
07672	Blood Volume, total, including Plasma Volume and Red Cell Mass	60	Test
07572	Red Cell Survival	176	Test
06644	Schilling Test	36	Test

Immunohematology

This section includes some revised and new line items. The unit values have been revised for each of the profiles. There is also a new special direction for direct antiglobulin test. Histocompatibility has become a sub-section of Immunohematology.

Items for Count

The following are items for count found in this section. These must be used when tallying workload. A full definition of terms used in this manual may be found in the Glossary contained in the Appendix B.

1. **Adsorption:** This term is used to represent each mixture of serum and adsorbing antigens used when separating antibody mixtures.

2. **Antigen:** This term is used for detectable characteristics which can be identified by use of an antibody or lectin.

3. **Cell Reagent (cellrg.):** This term is used to count the preparation of cellular reagent.

4. **Donor:** This term is used to count procedures pertaining to a donor.

5. **Pack:** This term refers to:
   (a) blood or blood product from a single donor.
   (b) fractionation product.

6. **Panel Run:** This term is used each time a patient's serum is tested against a panel of cells. The number of cells in the panel is not a decisive factor in determining the time involved to produce a result. In general, panels consist of 8-12 reagent cells.

   A patient's serum run concurrently against the same panel in two or more different phases constitutes only one panel run.

7. **Specimen:** This term is used for a biological sample received for analysis and reflects the performance of a number of related procedures on the one sample.

8. **Test:** This term is used to define an activity leading to a single result.

9. **Patient:** This term is used when the presence of the patient is required for the performance of the procedure.

Special Directions for Use of Immunohematology Unit Values

I. Except where specific instructions are given to count separately, controls have been considered a procedural step and are included in the unit value. For special quality control routines carried out, for example, when a new shipment of reagents is received, construct a profile and assign the appropriate unit value.

II. For transfusion reactions, construct a profile of procedures performed for each investigation and assign the appropriate unit value.

III. Most functions relating to Blood Bank inventory control have been incorporated into the unit value for the crossmatch. Telephone calls have been incorporated into the unit value for the profiles.

IV. Preparation of routinely used reagent cells (e.g., A, B, or O suspensions) has been incorporated in the unit values for profiles.

V. Code no. 02524 **Blood Pack collected from Donor** may be claimed for the work associated with a rejected donor.

VI. Blood Grouping and Antibody Detection Profiles

In recognition of the fact that most routine Immunohematology laboratories devote a major portion of their time and effort to performing Type and Screen (Antibody detection) and Crossmatch procedures, the Immunohematology Workload Measurement Sub-committee aims for functional simplicity and uses a profile approach to workload recording. The profile approach, once established, will reduce the number of procedures to be counted and will have implications in pre-natal, neo-natal and pre-transfusion testing, direct antiglobulin testing and blood grouping.

Since most laboratories have slightly different techniques, a profile has to be established for each individual situation. This profile can then be used throughout the accounting year unless changes in practice occur.

Twelve separate procedures have been defined as routine and common to these profiles. Sensitized control cells and confirmatory tests which are routinely carried out with the procedure (e.g., additional anti-Rh_0 (D) or forward typing) are included in the definition. The 12 procedures are as follows:

1. ABO forward (including anti-A, anti-B and anti-A, B)
2. ABO reverse (including A and B cells)
3. Rh_0 (D) type (one or more reagents used)
4. Rh_0 (D) control (one or more reagents used)
*5. D^utype (includes test and control)
6. Direct antiglobulin test (DAT) (polyspecific or monospecific)
7. Antibody detection (screen) – room temperature (with or without potentiating medium; with or without incubation)
8. Antibody detection (screen) – 37°C (with or without potentiating medium)
9. Antibody detection (screen) – indirect anti-globulin test (IAT) (with or without potentiating medium)
10. Auto control – room temperature
11. Auto control – 37°C
12. Auto control – IAT

* This is no longer considered relevant practice, however, if D^u typing is performed, it is counted as part of the profile.

Steps to Construct a Profile

1. From the above list, identify the procedures which are performed routinely in your blood grouping, type and screen, prenatal, neonatal and direct antiglobulin testing.
2. Total the number of procedures in each entire profile.

   Note that each phase of antibody detection counts as only one procedure even if:

   - multiple cells are used
   - multiple tubes are used

3. Choose the appropriate profile:

Profile		Unit Value	Code No.
A = 10	or more procedures	19/specimen	01600
B = 7-9	procedures	16/specimen	01610
C = 4-6	procedures	13/specimen	01620
D = 3	or less procedures	11/specimen	01630

Examples of Use of Profiles

1. Typical routine **type and screen testing** could involve:

   - ABO forward (anti-A, anti-B, and anti-A, B)
   - ABO reverse (A_1, A_2 and B cells)
   - Rh_0 (D) type (2 different reagents)
   - Rh_0 (D) control (2 different reagents)
   - Direct antiglobulin test
   - Antibody detection (screen) – room temperature, saline
   - Antibody detection (screen) – 37°C (with potentiating medium)
   - Antibody detection (screen) – indirect antiglobulin test
   - Auto control – 37°C
   - Auto control – IAT

   Number of procedures = 10; use Profile A (19 units) for each sample received.

2. Typical **prenatal testing** could involve:

   - ABO forward (anti-A, anti-B, and anti-A,B)
   - ABO reverse (A_1, A_2 and B cells)
   - Rh_0 (D) type (2 reagents used)
   - Rh_0 (D) control (2 reagents used)
   - Antibody detection (screen) – 37°C (with potentiating medium)
   - Antibody detection (screen) – IAT with 3 test cells
   - Auto control – IAT

   Number of procedures = 7; use Profile B (16 units)

3. Typical **neonatal testing** could involve:

   - ABO forward (anti-A, anti-B, and anti-A, B)
   - Rh_0 (D) type (2 reagents)
   - Rh_0 (D) control (2 reagents)
   - Direct antiglobulin test

   Number of procedures = 4; use Profile C (13 units)

4. **Direct Antiglobulin Test**

   a) When a DAT is performed routinely as part of a pre-transfusion type and screen profile, then the DAT should be included as one of the constituent steps of the type and screen profile (see 1 above) and the unit value appropriate for that profile should be used.

   b) When a DAT is performed on a sample separate from a crossmatch or type and screen, for example during the investigation of a patient with hemolytic anemia, then the unit values in item numbers 01675 and 01630 should be used. Item 01675 (7 units) should be used when only a single antiglobulin reagent is used, usually this will be a polyspecific reagent. When multiple antiglobulin reagents are used as part of an antiglobulin profile, e.g. polyspecific plus anti-IgG and anti-complement reagents, then item 01630 (11 units) should be used. The maximum unit value for a direct antiglobulin test **on one sample** is 11 units. Therefore, when an initial screen with a polyspecific antiglobulin test is positive and subsequent testing of the same sample with anti-IgG and anti-complement reagents is performed, then only a maximum of 11 units (Item 01630) can be claimed.

5. When considering use of Profile D, confirmatory typing of donor packs received from the Red Cross is a special case and has been found to have a unit value of 2 per pack. Code no. 02000.

VII. Crossmatch

Units for crossmatch are counted each time a patient's serum is tested against donor cells from a pack regardless of whether a type and screen is performed prior to the crossmatch or concurrently. If confirmatory typing of the donor pack has been done upon receipt from the Red Cross, the crossmatch has a value of 6 units per pack (code 02010). If confirmatory typing is done at the time of crossmatch, the value is 8 units per pack (code 02020). If only a "Quick Spin" crossmatch is done, these unit values are 5 and 7 respectively.

Example:

The laboratory quoted in Example #1 received a request to do a blood group, antibody screen and a 2 unit crossmatch. The blood groups of the donor packs selected had already been confirmed upon receipt from the Red Cross (unit value = 2 per pack and has been counted separately).

The following units were counted for this specimen:

Profile	Unit Value	Code No.
Profile A	= 19	01600
Crossmatch x 2	= 12 (6x2)	02010
Total	= 31	

VIII. Antibody Investigation

There are various steps involved in antibody investigations. The first step often involves the testing of one panel of cells in two phases **concurrently** (e.g., saline room temperature and an indirect antiglobulin test at 37°C). This then constitutes one panel run. If subsequent investigations are required they may involve the use of further panels in conjunction with elution, adsorption or inhibition, with or without potentiating media. **Each time** the patient's serum is tested against a panel of cells in a subsequent investigation, count one panel run. For example:

Given a patient with a positive antibody screen.

a) The patient's serum is tested against a panel of 12 cells in two phases concurrently. This is one panel run, unit value = 18; code no. 01800.

b) The results of the panel run suggest the presence of anti-E and anti-Fy^a. A second panel run is carried out to differentiate the two antibodies. A panel of enzyme treated cells is prepared, tested, and read after incubation at 37°C. To confirm the results, these are also tested in the indirect antiglobulin phase. Unit value = 14 + 18 = 32; code nos. 01860 and 01800.

c) Fy^a phenotyping using an indirect antiglobulin test was done on the patient, including positive and negative controls. Net value = 10; code no. 01640.

d) E typing using a direct agglutination test was also done on the patient. Again controls were included. Unit value = 7; code no. 01650.

$$\frac{\text{Total unit value for this investigation}}{18 + 14 + 18 + 10 + 7 = 67}$$

IX. Transfusion Reaction Investigation

Example:

In many cases the reported symptoms indicate the probable allergic or febrile nature of the transfusion reaction. The investigation may therefore, be limited to the following procedures:

1. Inspection of post-transfusion serum for hemolysis.

2. A check of all clerical data.

3. Direct antiglobulin test on post-transfusion specimen.

4. Repeat ABO group (forward) on donor pack.

5. Repeat ABO group (forward) on post-transfuion specimen.

Number of procedures = 5; Use Profile C (13 units) code no. 01620.

If any abnormality found in this testing indicates the need for further investigation, additional testing could include:

1. Repeat ABO group (forward) on pre- transfusion specimen.

2. Direct antiglobulin test on pre-transfusion specimen.

3. Antibody detection (screen) – indirect antiglobulin test (with or without potentiating medium).

4. Direct antiglobulin test on donor pack.
   - repeat crossmatch with pre-transfusion specimen
   - repeat crossmatch with post-transfusion specimen

   Number of procedures = 4; Use Profile C (13 units) code no. 01620. Crossmatch x 2 = 12 units. Total = 25 units.

$$\frac{\text{Total unit value for this investigation}}{13 + 25 = 38}$$

If the clinical nature of the transfusion reaction was such that all nine procedures were performed at the same time, then claim as follows:

Number of procedures = 9; Use Profile B (16 units) code no. 01610. Crossmatch x 2 = 12 units. Total = 28 units.

Note: In these examples, it has been assumed that the reaction has occurred during the infusion of the first donor pack; reaction later in a transfusion sequence may increase the number of donor units to be tested, thus increasing the number of procedures.

Code Number	Procedure	Unit Value	Item for Count
	Blood Grouping and Antibody Screen		
01600	Profile A (10-12 procedures)	19	Specimen
01610	Profile B (7-9 procedures)	16	Specimen
01620	Profile C (4-6 procedures)	13	Specimen
01630	Profile D (3 or less procedures)	11	Specimen
01640	Phenotyping by indirect antiglobulin test (I.A.T.) (test = negative controls)	10	Test
01645	Phenotyping by IAT for each additional sample tested for same antigen	3	Test
01650	Phenotyping by an agglutination test (test = patient plus negative and positive controls)	7	Test
01655	Phenotyping by an agglutination test for each additional sample tested for same antigen	2	Test

Code Number	Procedure	Unit Value	Item for Count
01670	ABO Hemolysin Test	5	Test
*01675	Direct antiglobulin test, see special direction VI, **Examples of Use of Profile, 4.**	7	Test
	Antibody Investigation		
01800	Antibody Identification – with or without potentiating medium – warm or cold – with or without neutralizing or inhibiting substance – including antiglobulin test	18	Panel run
01830	Antibody Titration – with or without potentiating medium – warm or cold – with or without neutralizing or inhibiting substance – including antiglobulin test – count a stored parallel control separately	20	Antigen
02507	Antibody adsorption	5	Adsorp.
*02800	Eluate (any method) by preparation	18	Specimen
01860	Enzyme treated cells – preparation	14	Panel run
02802	Prewarm technique for crossmatch or panel regardless of number of packs or cells in panel.	4	Specimen
02804	Autoabsorption warm e.g. Z-zap W.A.R.M.	20	Panel run
	Crossmatch		
*02005	Autologous transfusion – additional clerical and inventory functions	10	Patient
02000	Confirmatory typing of donor pack	2	Pack
*02010	Crossmatch no donor typing	6	Pack
*02020	Crossmatch with donor typing	8	Pack
*02015	Crossmatch – "quick spin" no donor typing	5	Pack
*02025	Crossmatch – "quick spin" with donor typing	7	Pack
02030	Issue of blood, blood components or fractionation products for transfusion	2	Pack
02040	Return of blood pack to laboratory or Red Cross used or unused	1	Pack
	Blood and Blood Components		
*02522	Apheresis-therapeutic-leukocytes	235	Patient
*02523	Apheresis-therapeutic-thrombocytes	216	Donor

Code Number	Procedure	Unit Value	Item for Count
02524	Blood pack collected from donor	22	Donor
*02526	Blood pack collected from patient-donor for autologous transfusion (includes initial clerical functions)	32	Patient
	– additional clerical and inventory functions	10	Patient
02529	Cryoprecipitate, thaw and pool	2	Pack
*02530	Irradiation of Blood/Blood product	1	Pack
	Leukocyte Poor Blood, preparation by:		
02220	– Sedimentation	2	Pack
*02650	– Centrifugation	7	Pack
02656	– "Spin-cool filter"	7	Pack
02230	– Manual washings	10	Pack
02806	– Inverted spin	15	Pack
02240	– Automated washing COBE 2991	20	Pack
02590	Lyophilized blood product – reconstitution of concentrate	5	Pack
02652	Platelet concentrate – preparation by centrifugation or manipulation to reduce product volume	7	Pack
02657	Platelet concentrate – preparation for infusion, including pooling	3	Pack
02662	Pooling of Red Cell Concentrate and Plasma pack	2	Resulting/ Pack
02808	Receipt of blood from Red Cross	2	Pack
02654	Red Cell Concentrate, preparation by centrifugation	7	Pack
02222	Red Cell Concentrate, preparation by sedimentation	2	Pack
02715	Separation of donor pack into aliquots	15	Pack
02665	Thawing of Plasma	3	Pack
	Miscellaneous		
	Concentration of sample e.g. eluates – see Multi-discipline Section	–	–
01148	Donath Landsteiner test – see Hematology	–	–
02556	Frozen cells, preparation	6	Cell Rg.
02557	Frozen cells, thawing	10	Cell Rg.

Code Number	Procedure	Unit Value	Item for Count
*02558	Handling Blood specimens and packs not crossmatched on site (another facility does the crossmatch). This unit value **includes**: – all documentation dispatch (**do not claim** an additional dispatch unit code 00181) – inventory functions – receipt of blood from Red Cross (code 02808) It does **not** include: – issue of blood (code 02030) – return of blood packs used or unused (code 02040)	10	Specimen
01218	Hemoglobin Fetal – Acid Elution (Kleihauer Betke) – see Hematology	–	–
*02205	Secretor Studies	45	Specimen
02210	Sensitized Red Cells, preparation including quality control	15	Cell Rg.
01221	Sucrose Lysis – see Hematology	10	Test

Histocompatibility

This section contains a revision of several line items as a result of time studies performed in Immunology.

Items for Count

The following items for count found in this section are what must be used when tallying workload. A full definition of terms used in the manual may be found in the Glossary contained in the Appendix B.

1. **Count**: This term applies to the lymphocyte or viability count performed in Histocompatibility – with or without adjustment of the number of cells.
2. **Specimen**: This is a biological sample received for analysis on which a number of related procedures are performed.
3. **Tray**: This term applies to the microtitre plates which are used in Histocompatibility.
4. **Vial**: This is the container used for freezing lymphocytes.

Special Use for Histocompatibility Directions:

1. The specimen handling unit (08505) may be claimed for each specimen which is tested in this laboratory. It includes logging in, all daily and solution preparation, wash up, technical supervision, maintenance and repair, recording and reporting and administration.
2. The specimen handling unit (08516) is claimed **only** for those specimens which have already claimed code 08505, but require additional handling because the test is continued, e.g., donor sera are frozen and screened every six weeks.
3. The preparation of trays filled with antisera may be claimed when the trays are prepared (e.g., 400 trays x 5.0 = 2,000 units) or built into a procedure (see example #4b).
4. **Examples:**

a) **HLA-ABC** typing (trays prepared in batch so unit is not claimed as part of the procedure):

Specimen handling (08505)	41/specimen
Isolation of leukocytes (08506)	
10 ml of blood	11/specimen
Cell count (08508)	5/count
HLA typing (08513) /tray	13/tray
Total for ABC typing	70/units/specimen

b) **HLA DR typing:**

Specimen handling (08505)	41/specimen
Isolation of leukocytes (08506)	
30 ml blood	33/specimen
Cell count (08508)	5/count
Preparation of B&T cells (08512)	44/specimen
HLA typing (08513) 2 trays x 13 each.	26/tray
Total for DR typing	149/specimen

c) **Crossmatch:**

(i) many recipients vs. 1 donor

Specimen handling (08505)x1 donor	41/specimen
Isolation of leukocytes (08506)	11/specimen
Cell count (08508)	5/count
Preparation of tray (08509)	5/tray
Crossmatch (08514)	13/tray
Total for Crossmatch	75/specimen

(ii) many donors vs. 1 recipient (e.g., 5 donors)

Specimen handling (08505) x 1 recipient	41/specimen
Specimen handling (08516) 5 donors x 10	50/specimen
Isolation of leukocytes (08506) 5 donors x 11	55/specimen
Cell count (08508) 5 donors x 5	25/count
Tray preparation (08509) 1 tray	5/tray
Crossmatch (08514) x 1	13/tray
Total for Crossmatch	189/specimen

d) **Antibody Screen:** see Crossmatch example c (ii)

Code Number	Procedure	Unit Value	Item for Count
08505	Specimen handling – claim for all specimens as defined in the items for count. This unit includes all clerical fonctions, daily and/or periodic preparation, maintenance and repair.	41	Specimen
*08506	Isolation of leukocytes – Ficoll Hypaque, each 10 ml blood	11	Specimen
*08517	Removal of granulocytes/monocytes	8	Specimen
08508	Cell counts (with adjustments) or viability counts	5	Count
08509	Preparation of trays filled with sera, performed in batches	5	Tray
08510	Freezing lymphocytes – first vial	8	Vial
	– each additional vial	1	Vial
08511	Thawing lymphocytes	24	Specimen

Code Number	Procedure	Unit Value	Item for Count
08512	Preparation of B and T cells (nylon wool column)	44	Specimen
08513	HLA typing	13	Tray
08514	Crossmatch - many recipients/1 donor	13	Tray
	- many donors/1 recipient	13	Tray
08515	Antibody screen	13	Tray
08516	Specimen handling - additional specimen handling - see special directions	10	Specimen

Immunology

Items for Count

The following for count found in this section are what must be used when tallying workload. A full definition of terms used in the manual may be found in the Glossary contained in the Appendix B.

1. **Antibody:** This term is used when an immunoglobulin reagent is used to identify an antigen.
2. **Antigen:** This term is used for detectable characteristics which can be identified by use of an antibody or lectin.
3. **Count:** This term applies to the lymphocyte or viability count performed with or without adjustment of the number of cells.
4. **Marker:** This term is used for a cell surface characteristic which is usually recognized by a monoclonal antibody.
5. **Mitogen/ Antigen:** This term is used to identify substances which cause lymphocytes to replicate.
6. **Preparation:** This term is used each time sheep red blood cells are prepared for CH50 using Meyer's method.
7. **Specimen:** This term is used when a number of related procedures are performed on one sample.
8. **Vial:** This term is used for the container used for freezing lymphocytes.
9. **Well:** This term is used for the circular hole in the gel into which either patient sample, an antigen or an antibody are placed.

Special Directions

1. The specimen handling unit may be claimed for each sample which is tested in this laboratory. It includes all logging in steps, centrifugation (if applicable), daily and solution preparation, wash up, technical supervision and recording and reporting steps.

2. Examples:

   Blood sample (10 ml) arrives with a request for cell surface markers.

   a) **Hospital X**

Description	Unit
Specimen handling 5/specimen x 1	5
Isolation of leukocytes using Ficoll-Hypaque 11/10 ml blood	11
Cell Counts 5/count x 2	10
Labelling – indirect antibody 12/marker x 5 markers	60
Analysis – fluorescence microscopy 8/marker x 5 markers	40
Total	126

   b) **Hospital Y**

Description	Unit
Specimen handling 5/specimen x 1	5
Isolation and labelling of lymphocytes using whole blood lysis 8/marker x 5	40
Cell Counts 5/count x 2	10
Analysis – flow cytometer 6/marker x 5	30
Total	85

Code Number	Procedure	Unit Value	Item for Count
*08300	Specimen handling	5	Specimen
*08307	Immunodiffusion	5	Well
	Immunoelectrophoresis		
*08301	– 1st antiserum	9	Antibody
	– each additional antiserum	4	
*08303	Counter Immunoelectrophoresis	20	Antigen
	– each additional antigen	2	
*08305	Immunofixation		
	– 1st antibody	11	Antibody
	– each additional antibody	3	
	Ouchterlony diffusion		
*08309	– centre well	8	Well
	– each additional well	4	Well
	LYMPHOCYTES STUDIES		
*08506	– Isolation of cells – Ficoll Hypaque/10 ml blood	11	Specimen
*08316	– Leucoprep	5	Specimen
*08317	– Isolation and labelling of cells – whole blood lysis	8	Marker
*08517	– Removal of granulocytes/monocytes (iron filings)	8	Specimen
08508	– Cell Counts or Viability Counts (with adjustments)	5	Count
	Cell Surface Markers		
	Labelling – includes aliquoting of antibodies (stock & working)		
*08319	– Indirect antibody technique	12	Marker
*08318	– Direct antibody technique	11	Marker
	Analysis		
*08320	– Fluorescence microscopy	8	Marker
*08321	– Flow Cytometry	6	Marker
*08322	Rosetting (includes cell counts up to 200 cell & replicates)	6	Count
*08323	Rosetting using Immunobeads	18	Count
	Lymphocyte stimulation study		
*08324	– 1st mitogen or antigen	16	Mitogen
	– each additional mitogen or antigen	7	

Code Number	Procedure	Unit Value	Item for Count
	MISCELLANEOUS		
*	Allergic alveolitis investigation – see Ouchterlony diffusion	–	–
*08331	CH50	9	Specimen
*08332	– preparation of Sheep Red Blood Cells	19	Prep.
*00532	Cryoglobulin – qualitative	9	Test
	Extracable Nuclear antigen – see Counter Immunoelectrophoresis	–	–
	– see Ouchterlony diffusion	–	–
*08333	– Hemagglutination	9	Specimen
08510	Freezing cells – 1st vial	8	Vial
	– each additional vial	1	
*08334	Immune Complexes: ELISA add the following when applicable:	3	Test
*08335	– coat microtitre plates (up to 3 plates)	10	Test
*08337	– Polyethyleneglycol treatment	10	Test
*00644	Immunonephelometry – see Chemistry	–	–
	Maintenance of cell lines – see Virology	–	–
*08338	Natural Killer Cell Assay	55	Specimen
	Preparation of Specimens to produce cell suspensions		
*08340	– bone marrow	7	Specimen
*08339	– lymph nodes	12	Specimen
*08341	– tissue	19	Specimen
*00060	Pretreatment of Specimens – see Multi-discipline Section	–	–
	Rheumatoid factor – see Multi-discipline section	–	–
*	Terminal Deoxynucleotidyl Transferase – see Immunopathology	–	–
*02257	Thawing cells	10	Specimen
	Thyroglobulin and Microsomal Antibody – see Multi-discipline section		
*01044	Viscosity Serum (Brookfield Viscometer)	7	Specimen

Code Number	Procedure	Unit Value	Item for Count
	DNA QUANTITATION		
	This section contains some line items which have been pulled from Immunology and some which are based on specific time studies. Further investigation of this area is underway.		
*08300	Specimen handling	5	Specimen
	Isolation of cells – see Immunology code nos 08315, 08316 Preparation of specimen to produce cell suspension – see Immunology code nos 08339, 08340, 08341.		
*08342	Processing of cell suspension for DNA	13	Specimen
*08344	Flow analysis for DNA	15	Specimen

Anatomic Pathology

This section encompasses Surgical Pathology, Autopsy Pathology, Immunopathology, Electron Microscopy, Cytopathology and Cytogenetics.

Pathology Laboratories should review all unit values and data collection forms currently in use to ensure that new values are applied correctly.

Note: Travel time associated with special trips to the operating room, emergency room, the bedside, etc., for the transport or procurement of specimens, or for the performance of technical functions has been assigned a unit value under Specimen Procurement and Dispatch, Code 00010 unit value = 8 per round trip.

Items for Count

The following items for count found in this section are what must be used when tallying workload. A full definition of terms used in the manual may be found in the Glossary contained in the Appendix B.

1. **Antigen:** This term is used when detectable characteristics are identified by reaction with an antibody.
2. **Block:** This term is used when tissue or sedimented material is embedded or frozen for histologic processing.
3. **Case:** This term is used to define each autopsy.
4. **Grid:** This term is used in Electron Microscopy where material is placed on a grating for viewing.
5. **Membrane:** This term is used in cytopathology and refers to the whole filter upon which the **Filter** material to be examined is retained.
6. **Print:** This term refers to each copy developed from photographic film. This also refers to photographic slides taken of enzyme stained preparations.
7. **Specimen:** This term is used when an assortment of related procedures are performed on one sample. A specimen in surgical pathology is considered to be all the tissue removed at a single surgical setting e.g., hysterectomy plus appendectomy is one specimen, multiple skin lesions removed at the same time are one specimen.
8. **Slide:** This refers to a flat piece of glass on which material is placed for microscopic viewing.

Code Number	Procedure	Unit Value	Item for Count
	AUTOPSY PATHOLOGY		
*03308	Autopsy Pathology – autopsy attendant includes: weigh body, identification procedures, knife sharpening, collection of aspirations, bone marrow, cultures and tissue for E.M., opening sinuses and clean up.	130	Case
	Additional procedures:		
*03309	– X-Ray body	6	Case
*03310	– Photograph – body	5	Case
*03311	– Photograph – organs	11	Case
*03312	– Injection of organs	5	Case
*03313	– Remove and fix spinal cord	15	Case
*03314	– Distention e.g. lungs	7	Case
*03315	Brain Fixation and Cutting	14	Case
*03316	Cut, trim and transfer tissue for blocking	10	Case
*03317	Autopsy Review: includes preparation of tissues for review (retrieval, washing, storing and/or discarding specimens and clean up)	26	Case
*03358	Autopsy Pathology – technical functions as #3058	9	Block
*03356	Autopsy Pathology – clerical functions	120	Case
	SURGICAL PATHOLOGY		
03056	Specimen Handling – claim for all surgical specimens as defined in the items for count. Includes: – all clerical functions (logging-in, reporting, filing, etc.) – daily and/or periodic preparation (e.g., tissue processor, solutions or routine stains) – maintenance and repair (including knife sharpening)	14	Specimen
*03058	Embedding – paraffin, cutting, staining, (H&E, HPS) and mounting	9	Block
03781	Additional sections – cut only	2	Slide
*03782	Additional sections – cut, stain (H&E, HPS) and mount	7	Slide
03075	Gross – technical assistance claim for each specimen as defined in the items for count when the unit producing staff assists the Pathologist	4	Specimen
03632	Decalcification – includes solution preparation	3	Specimen
03701	Case review – includes pulling and refiling of reports, blocks and slides and the generation of an additional report or photocopying of the old report etc., as a result of the review.	5	Specimen

Code Number	Procedure	Unit Value	Item for Count
	Glycomethacrylate/Methylmethacrylate		
*03060	– Process and embed	11	Specimen
*03061	– Cut, stain and mount – tissue	10	Slide
*03062	– Cut, stain and mount – bone	21	Slide
*03063	– Additional cuts only	3	Slide
03785	Special preparation of biopsy material – use this code when, for example, a renal biopsy is divided into portions for electron microscopy and immunopathology as well as for routine examination. Do not claim this unit for the simple transfer of a portion of tissue from one fixative to another.	15	Specimen
*03786	– small bowel orientation	10	Specimen
04378	Frozen sections for rush diagnosis – includes the preparation of up to 2 blocks, the preparation of first slide from each and the staining of the same. Also included is the maintenance, repair and decontamination of the Cryostat	15	Specimen
04375	– Preparation of each additional block for frozen section	6	Block
04376	– Additional sections – cut and stain	7	Slide
04202	– Additional sections – cut only	2	Slide
*03065	Giant sections – process and embed	39	Specimen
*03066	Giant sections – cut, stain and mount	7	Slide
*03070	Nerve tease Neuropathology	150	Slide
*	– additional teasing on same slide	75	Slide
*03080	Photographs (gross) of single specimen	5	Specimen

Special Stains

The special stains have been re-timed during the past few years and are now listed with new unit values; some stains need further timings. The old groupings have been removed and the stains are listed alphabetically in the same manner as previous editions. The old code numbers have been retained but most unit values have changed.

The unit value includes solution preparation, cutting, staining and mounting of sections for special stains.

Code Number	Procedure	Unit Value	Item for Count
*04503	Acid fast bacilli e.g. Ziehl Neelsen, Auramine	10	Slide
*04507	Alcian Blue	9	Slide
*04506	Alcian Blue – PAS	17	Slide
*04508	Alcoholic hyaline	23	Slide
*04510	Amyloid e.g. Congo Red	12	Slide
*04514	Argentaffin granules, e.g. Diazo	12	Slide
*04534	Bielschowsky	23	Slide
*04568	Bile, e.g. Steins or Gmelin	12	Slide
*04536	Bodian for nerve fibres	17	Slide
*04541	Calcium e.g. von Kossa	12	Slide
*04540	Cresyl Violet	6	Slide
*04554	DNA e.g. Feulgen	17	Slide
04558	Dieterle's	23	Slide
*04563	Elastic tissue e.g. Verhoff	12	Slide
*04566	Enzyme stains	23	Slide
*04567	Enzymes – Photomicrographs	2	Print
*04922	Fontana with bleaching	15	Slide
*04923	Fontana without bleaching	12	Slide
*04578	Fungus, manual or microwave	17	Slide
*04584	Glees and Marsland	30	Slide
*04587	Gram	12	Slide
*04588	Grimelius	17	Slide
*04592	Hemosiderin, e.g. Perls'	9	Slide
*04596	Holmes	30	Slide

Code Number	Procedure	Unit Value	Item for Count
*04597	Holzer	30	Slide
*04915	Lipofuchsin e.g., Schmorl's	17	Slide
*04637	Luxal fast blue	17	Slide
*04929	Marchi's technique for myelin	50	Slide
*04645	Mast Cells, e.g. Toluidine Blue	6	Slide
*04644	Movat's	20	Slide
*04646	Mucicarmine	9	Slide
*04850	Nile Blue Sulfate	6	Slide
*04942	Oil Red O	10	Slide
*04585	PAS with Digestion (PASD)	13	Slide
*04926	PAS without Digestion	10	Slide
*04677	PTAH for muscle or neuropathology	12	Slide
*04972	Reticulum	14	Slide
*04583	Romanowsky stains e.g., Giemsa	9	Slide
*04660	Shikata (Orcein)	14	Slide
*04647	Trichrome (one step) e.g. van Giesen	11	Slide
*04643	Trichrome e.g. Masson, Mallory, Lendrum, MSB	17	Slide
*05005	Unna Pappenheim e.g. Methyl Green Pyronine	12	Slide
*04668	Warthin - Starry	17	Slide

Immunopathology

Special Directions for Use of Immunopathology Unit Values

The preparation of fluids made daily is covered by Code 05300.

1. The titration of antibody for immunoperoxidase should be treated as a separate "specimen" and Code 05300 claimed once and Code 05320 or 05321 claimed for each slide done.

2. To identify human papilloma virus on a cervical biopsy showing condylomatous changes one would employ one test section for positive staining, one test section as a negative control, one control positive slide and one control negative slide.

Units claimed	Code no. 05300	8 x 1 = 8
	Code no. 05321	9 x 4 = 36
	Total	44

3. To identify hepatitis B core and surface antigens the following may be required:

   A test slide for the surface antigen and a negative control, a test slide for the core antigen, and a negative control, two control positive slides and two control negative slides.

Units claimed	Code no. 05300	8 x 1 = 8
	Code no. 05321	9 x 8 = 72
	Total	80

4. An investigation of a malignant lymphoma in paraffin sections may involve demonstrating the heavy chains of IgA, IgG, IgM and IgD, in addition to kappa and lambda light chains and a normal serum control. If an anti-albumin antiserum and a marker for histiocytes is also employed, a total of eight test slides and an equivalent number of controls would be required.

Units claimed	Code no. 05300	8 x 1 = 8
	Code no. 05321	9 x 16 = 144
	Total	152

5. When studying lymphoma on frozen sections, the number of tests can be expanded to include the identification of T-cell subsets using monoclonal antibodies and reagents specific for B-cell and macrophage subsets. A typical panel on frozen tissue would then include about 15 test sections and an equivalent number of controls.

Units claimed	Code no. 05300	8 x 1 = 8
	Code no. 05321	19 x 30 = 270
	Total	278

The above examples assume that only ONE tissue block would be examined. If more than one block were tested or if several different cases are tested on the same day for the same antigen, the number of tests would vary but only one set of controls may be required.

Code Number	Procedure	Unit Value	Item for Count
	Immunopathology		
	The preparation of solutions and the cutting of sections, either frozen or paraffin, has been included in each specific procedure.		
05300	Specimen Handling – includes all clerical functions (logging-in, reporting, etc.) and daily preparation	8	Specimen
05305	Immunofluorescence – direct	5	Slide
05306	Immunofluorescence – indirect	8	Slide
05310	Immunofluorescent analysis of serum antibodies by any kit method	6	Antigen
05311	Immunofluorescent analysis of serum antibodies by any kit method, titration of positive	12	Antigen
05320	Immunoperoxidase – direct	6	Slide
05321	Immunoperoxidase – by other methods e.g. PAP, Avidin Biotin procedures	9	Slide

Electron Microscopy

Code Number	Procedure	Unit Value	Item for Count
05255	Specimen Handling – receipt of specimen in gluteraldehyde, tissue processing, knife making, recording and reporting and maintenance of electron microscope	52	Specimen
05260	Embedding	8	Block
05293	Thick section – cutting, staining and mounting	10	Block
05295	Thin sections – cutting, mounting, staining and checking under electron microscope, includes preparation of staining solutions	15	Block
05282	Screening and photography of grid (if performed by technologist)	31	Grid
08601	Film develop, enlarge and print	7	Print

Cytopathology

Special Directions for Use of Cytology Unit Values

1. Specimen is counted when a number of related procedures are performed on one sample. Each sample received from a different anatomic location is counted as a separate specimen, e.g. bronchial washes taken from the same patient but a different location are counted as separate specimens.

2. In order to maintain the simplest approach to unit collection, code 04090 should be used for specimens prepared by Cytospin technique. Although this procedure is more time consuming than conventional centrifugation, this extra time is offset by a shorter screening time per slide. Therefore, appropriate compensation for Cytospin specimens is achieved through use of code 04090 plus code 04084.

3. Code number 04090 includes:

   a) the preparation of smears.

   b) the preparation of a cell block up to the point that the material is passed to Histology for processing, staining and mounting. If any of these latter functions are performed in Cytology, then surgical Pathology code 03058 should be claimed. Double counting of these activities in Histology and Cytology should be avoided.

4. The item for count for code 04083 is per slide regardless of the number of smears made on one slide.

5. Claim code 00200 – travel time when preparation of smears is done outside the laboratory, e.g. Radiology.

6. The Broncho-alveolar lavage cell count code 01275 may be claimed if **the technologist performs** the cell count. If a screen for abnormal cells is also done, claim code 04084 as well.

Code Number	Procedure	Unit Value	Item for Count
	Gynecological		
03928	Initial identification, clerical functions, staining (including daily preparation) reporting, slide filing and follow-up	10	Specimen
04083	Screening (technical)	5	Slide
04091	Cytohormonal evaluation expressed as a quantitative index after counting an adequate number of cells when it is requested by a physician	10	Specimen
	Non-gynecological		
03930	Initial identification, clerical functions, staining (including daily preparation) reporting, slide filing and follow-up	10	Specimen
04084	Screening (technical)	5	Slide
04089	Fluids – preparation by membrane filter technique	8	Membrane Filter
04090	Fluids – preparation by centrifugation for smears and/or cell block – see special direction #2	7	Specimen
04096	Sputa preparation by pick and smear technique	6	Specimen
*04098	Fine needle aspiration preparation of smears in laboratory	15	Specimen
*04093	Fine needle aspiration – preparation of smears outside the laboratory – see special direction note 5	25	Specimen
*01275	Broncho – alveolar lavage – cell count – see Special direction #6	8	100 Cells

Cytogenetics

Special Directions for Use of Cytogenetics Unit Values

1. Considerable variation exists in the types of cases encountered in Cytogenetics. Data collected reflects a wide range of complexity and the average has been used to express the central tendency of the distribution.

   A profile has been developed to illustrate the statistical average expressed by the four basic unit values. This profile is listed as a guideline for application of additional units and is not intended to recommend or suggest a standard of practice.

   Profile of the Statistical Average

   - up to 25 metaphase cells are examined
   - only one banding procedure is used
   - up to 10 photographs are taken and all chromosomes identified on each photograph
   - up to three karyotypes are prepared
   - cell culture photography and cell analysis are performed in the laboratory
   - all technical procedures are performed manually

   Laboratories in which a high percentage of the workload deviates significantly from this profile may consult with the Cytogenetic sub-committee through the office of the Secretariat.

2. These unit values are not intended to address special culture procedures such as extended chromosome studies, breakage studies, or fragile X studies. These are high priority procedures for future studies by the sub-committee.

3. In recognition of the effort associated with a failed culture, these specimens should be assigned the same basic unit value as a successful culture.

4. The term "specimen" refers to a single sample even though an assortment of related procedures may be performed on it. This is applicable to products of conception for cytogenetic studies. One specimen may provide a number of different tissues for culture and eventual analysis.

The first tissue which is set up for culture should use code 04130 (T 390 units). Each subsequent tissue set up from the same specimen should use code 04145 (T 280 units).

Special stains, additional cells counted, and additional karyotypes prepared should be handled in the usual manner using codes 04135, 04140 and 04145, which ever is pertinent.

Examples of Use of Cytogenetic Unit Values

I. Having examined 25 cells from a blood culture stained by the GTG method an additional 25 GTG stained cells must be analysed to rule out mosaicism.

Units Claimed		
	315	Code no. 04110
	56	Code no. 04140
	371	Total

If a further 10 cells are analysed, Code no. 04140 may be claimed again for a total of 427 units.

II. After 25 amniotic fluid cells stained by RFA have been studied, it is necessary to C stain and analyse 10 additional cells.

Units Claimed		
	465	Code no. 04100
	285	Code no. 04105
	750	Total

III. Initially 25 QFQ stained bone marrow cells are studied. Subsequently an additional 25 cells are examined and a decision made to stain for NOR. Eight cells stained by NOR are analysed.

Units Claimed		
	760	Code no. 04120
	56	Code no. 04140
	326	Code no. 04125
	1,142	Total

Code Number	Procedure	Unit Value	Item for Count
04100	Chromosome Karyotype – **Amniotic Fluid**	465	Specimen
04105	Additional special staining and banding procedure from the same culture, including analysis and karyotyping as required. **Amniotic Fluid**	285	Specimen
04110	Chromosome Karyotype – **Peripheral Blood** (mitogenic stimulation)	315	Specimen
*04112	Chromosome Karyotype – peripheral blood with Fragile X	465	Specimen
04115	Additional special staining and banding procedure from the same culture, including analysis and karyotyping as required. **Peripheral Blood** (mitogenic stimulation)	206	Specimen
04120	Chromosome Karyotype – **Bone Marrow or Peripheral Blood** (no mitogenic stimulation) for leukemia studies	760	Specimen
04125	Additional special staining and banding procedure from the same culture, including analysis and karyotyping as required. **Bone Marrow or Peripheral Blood** (no mitogenic stimulation) for leukemia studies	326	Specimen
*04130	Chromosome Karyotype – **Tissue** requiring long term culture e.g., skin and products of conception (for POC see special directions) and Chorion Villi Sample	390	Specimen
04132	Each additional tissue from products of conception	280	Specimen
04135	Additional special staining and banding procedure from the same culture, including analysis and karyotyping as required. **Tissue** (e.g. skin, products of conception) requiring long term culture	261	Specimen
04140	Counting of up to 25 additional cells from the same culture and using the routine staining procedure. **All specimen types**	56	Specimen
04145	Each additional karyotype in excess of three done on the same banding procedure. **All specimen types**	23	Karyotype
04099	Sex Chromatin Identification (either X chromatin or Y chromatin)	16	Specimen
*04150	Abandoned culture	124	Specimen
*04155	Fragile X alone	235	Specimen
*04160	High resolution chromosomes	275	Specimen

Microbiology

Special Directions

1. The specimen handling units include the activities common to the service received and should be applied precisely for each separate section listed. This includes all clerical functions; (e.g., entering, reporting, telephone and dispatch of results); daily or periodic preparation, maintenance (e.g., checking temperature of incubators); autoclaving discards and organization of supplies and media. All planting and all activities performed at the time of planting, e.g., Staph streak, are included.

2. The media unit value code 08825 reflects the preparation of all media, from simple procedures to more complex preparations (e.g., antibiotic plates), and is counted per plate, bottle or tube.

3. According to surveys, blood cultures generally are held from seven to twenty-one days and are examined daily. All readings or visual inspections are included in the unit value. However, routine subcultures and smears are not included in the unit value and must be counted separately.

4. All commercial kits and semi-automated or automated systems have been grouped under the heading "Systems". The unit value includes all steps in a procedure from picking the colony to the first recording of the result. Any maintenance and repair or daily preparation on an automated machine has been included in the unit value. For example, the API 20E strip, code 09001 would include the innoculation of the broth or saline, standardization, innoculation of the strip and purity plate, incubation, adding reagents, oxidase test, reading the strip and purity plate and recording the result.

5. The application of discs code 08922 does not apply to the Kirby Bauer susceptibility testing which has a separate unit value.

6. The Kirby Bauer procedure code 09121 includes all steps from the innoculation of the broth to the recording of the results. Quality Control organisms are not included, and should be counted separately, per organism.

7. The replicator method code 09032 is calculated in the following manner:

   1 unit per organism
   1 unit per plate

   e.g., if 1 organism has 12 antibiotic plates and 5 I. D. plates, the unit value becomes:

1 organism	+	17 plates	=	18 units

   If, however, the same 17 plates are innoculated with organisms, the unit value becomes:

30 organisms	+	17 plates	=	47 units

Note: Code 08908, Subculture and Reading, may be claimed for each organism innoculated into broth.

8. If a test is done directly from a specimen (i.e. specimen not planted) claim 6 units per specimen instead of 8 units for specimen handling, e.g. urine screen, smear received for examination, etc.

9. Quality Contol units should be counted for each procedure, where applicable.

10. The section Antigen detection should be used for any specimen other than blood (bacterial, viral, etc.) which is examined directly for an antigen. The unit value for the appropriate identification technique should be added.

Items for Count

The following for count found in this section are what must be used when tallying workload. A full definition of terms used in the manual may be found in the Glossary contained in the Appendix B.

1. **Antigen:** Refers to detectable characteristics which can be identified by reaction with an antibody.

2. **Card:** Refers to the card used on the AMS Vitek.

3. **Dilution:** Is used when a sample is mixed with another solution to reduce its concentration.

4. **Injection:** Refers to one entry of an extract into the portal of an instrument.

5. **Jar:** Refers to any jar set up to produce non aerobic atmospheric conditions.

6. **Organism:** Refers to a pure isolate.

7. **PBT:** Is used as an item for count when counting plates, bottles or tubes (PBT).

8. **Reading:** Applies to original culture plates or tubes. These units are calculated per specimen and **NOT** per piece of medium. All other procedures in Bacteriology include a reading value and should not have this value added. If a specimen is read at 24, 48 and 72 hours, claim 3 x 1 units.

9. **Smear:** Refers to material placed on a slide. There may be more than one smear per slide.

10. **Specimen:** Is a biological sample for analysis.

Code Number	Procedure	Unit Value	Item for Count
08825	Media Preparation	0.6	PBT
	MICROSCOPY: includes smear, prep, stain and examination		
08840	Gram stain – direct from specimen	4	Smear
08842	Gram stain – for morphology	2.5	Smear
08844	Gram stain – blood cultures	3	Smear
08848	Wet Prep – e.g., for Trichomonas, India Ink or motility	2	Smear
08850	Ziehl-Neelsen – direct from specimen	15	Smear
08854	Ziehl-Neelsen – confirmatory from culture	5	Smear
08856	Acridine Orange	2	Smear
08860	F.A. from isolate	4	Organism
08862	Fluorescent stain for Mycobacteria or Chlamydia direct or from culture	5	Smear
08864	Simple stains e.g., Methylene Blue Neisser	4	Smear
08866	Complex stains e.g., Giemsa or PAS	10	Smear
08868	KOH or LPCB – direct smear Mycology	3	Smear
08846	Spore stain	8	Smear
08852	Darkfield	10	Smear
08873	Trichrome Stain & Read	8	Smear
08870	Iron Hematoxylin Stain & Read	14	Smear
*08871	Cyptosporidium Stain & Read	8	Smear
	PREPARATION OF SPECIMEN FOR CULTURE		
08883	Tissue grinding excluding virology	5	Specimen
08889	Liquifaction of Sputum excluding processing for mycobacteriology	3	Specimen
08890	Serial dilution for Culture	1	Dilution
08915	Miles and Misra Count, including innoculation and reading; excluding preliminary dilution – see Code 08890	7	PBT x 6
	BACTERIOLOGY		
08822	**Bacteriology Handling** – includes handling of specimen from receipt to end of planting, all daily preparation, telephone calls, general maintenance and recording and reporting	8	Specimen

Code Number	Procedure	Unit Value	Item for Count
08905	Read culture – original culture plates (aerobic or anaerobic)	1	Reading
08908	Subculture and reading	1.5	PBT
08910	Set up and open jars – any system	3	Jar
08914	Rapid tests includes reading .g., oxidase, catalase, ebile solubility, slide coagulase, etc.	1	Organism
08916	Biochemical – conventional tube methods, includes reading e.g., coagulase, TS1, etc.	1.5	PBT
08917	Biochemical – plate method, includes reading e.g., DNase	1.5	Organism
08920	Disks – single disk for identification includes reading e.g., bacitracin, optochin, novobiocin	1.5	Organism
08922	Disks – more than two for identification includes reading, e.g., X/V factor (not Kirby Bauer)	1.5	Organism
08940	Animal Innoculation for any purpose including autopsy and collection of material for smears and culture	100	Animal
	Blood Cultures – includes all readings (aerobic and anaerobic) of the original culture bottles. Does not include Gram smears or subcultures.		
08930	Manual blood cultures	6	PBT
*08932	Bactec	5	PBT
*08935	Bactec with data logger	6.5	PBT
08938	Dupont Isolator	9	PBT
	Systems – all units include innoculation and reading of purity plates where it is part of the procedure.		
09001	API 20A	8	Organism
09002	API 20E	6	Organism
09003	API 10S	4.5	Organism
09004	API 20S	6	Organism
09010	API Neident	5	Organism
09011	API Staphident	5	Organism
09005	API Unisept ID or MIC	6	Organism
09014	DMS rapIDe	6	Organism
*09080	DMS ANA rapIDe	7	Organism
*09081	DMS NH rapIDe	6	Organism
09016	Enterotube/Oxiferm	3	Organism

Code Number	Procedure	Unit Value	Item for Count
09020	Micro ID – 4 hour ID Enterobacteriaceae	5	Organism
09022	Minitek – anaerobes	9	Organism
09026	Minitek – non fermenters	8.5	Organism
09027	Quantum II for bacterial ID	5	Organism
09028	Unitek N/F	5	Organism
09032	Replicator – 1 unit per organism plus 1 unit x # plates used		
09044	Autoscan with Data Management System	13	Organism
09046	Autoscan without Data Management System	6.5	Organism
09050	Microscan or Micromedia – Manual Reader	6	Organism
09054	Microscan – combo	7	Organism
09058	Ms/Avantage ID	5	Organism
09060	Ms/Avantage urine screen	2	Organism
09063	Ms/Avantage susceptibility	5	Organism
09066	Sceptor	7	Organism
09069	Sensititre	9	Organism
09071	Vitek	5	Card
09076	Autobac	7	Organism
09079	Micromedia – semi-auto MIC with frozen plates	6	Organism
	ADDITIONAL IDENTIFICATION PROCEDURES		
09102	Lancefield grouping	7	Organism
09103	Bacterial Agglutination e.g., Salmonella, Cryptoagglutination, Streptococcus, etc.	1	Antibody – Antigen
09106	Beta Lactamase	1.5	Organism
09107	Phadebact	3	Organism
09119	Gas Liquid Chromatography includes preparing the initial extract(s) and first injection	16	Organism
	– each repeat injection	7	Organism
09094	Toxin detection Clostridium difficile	14	Specimen
09091	Quellung Reaction including control	5	Organism

Code Number	Procedure	Unit Value	Item for Count
09093	Toxin-antitoxin reaction on plate e.g., Nagler or Elek plate	9	Organism
09118	Phase Conversion by Craigie tube	4	Organism
	Susceptibility Testing		
09121	Kirby Bauer	5	Organism
09122	Broth Disk method for Anaerobes	1.5	PBT
09032	Replicator – 1 unit per organism plus 1 unit x # plates used		
09123	MIC by manual method for 1 organism including controls	65	Antibiotic
09125	MIC/MBC by manual method for 1 organism including controls	75	Antibiotic
09124	MIC/MBC preparation per stock antibiotic series	20	Antibiotic
	Antibiotic Levels		
09126	Antibiotic level – bioassay	45	Specimen
09153	Serum bactericidal level	20	Specimen
	Antibiotic level – EMIT – see Multi-discipline section code 00056		
	MYCOLOGY		
09177	Mycology handling, includes handling from receipt to end of planting, all daily preparation, telephone calls, general maintenance and recording and reporting.	10	Specimen
09178	Each reading of cultures	1	PBT
08908	Subculture and reading	1.5	PBT
09128	Hair examination by ultraviolet light	3	Specimen
08868	KOH or LPCB – direct smear mycology	3	Smear
09181	Tease mount	5	Smear
09184	Slide culture	15	Culture
09192	Germ tube	2	PBT
09193	Chlamydospore production	3	PBT
09191	Sugar assimilation	7	Test
09180	API 20C	6	Organism

Code Number	Procedure	Unit Value	Item for Count
	MYCOBACTERIOLOGY		
09179	Mycobacteriology handling, includes logging in all daily preparation, telephone calls, general maintenance and recording and reporting	6	Specimen
08850	Ziehl-Neelsen – direct from specimen	15	Smear
08854	Ziehl-Neelsen, confirmatory from culture	5	Smear
08862	Fluorescent stain (Auramine Rhodamine)	5	Smear
09183	Specimen preparation, includes digestion and planting	12	Specimen
09178	Each reading of cultures	1	PBT
08960	Bactec for Id	13	PBT
08965	Niacin	5	Organism
08968	Arylsulphatase	2	Organism
08971	Catalase	2	Organism
08977	Antibiotic susceptibility preparation	15	Organism
08978	Antibiotic susceptibility reading plus control	3	Organism
	PARASITOLOGY		
09201	Parasitology handling includes handling from receipt to end of logging in, daily preparation, telephone calls, general maintenance and recording and reporting.	6	Specimen
09205	Direct or concentrate smear, preparation and reading	9	Smear
09208	Formal ether concentrate	6	Specimen
08873	Trichrome stain and read	8	Smear
08870	Iron hematoxylin stain and read	14	Smear
08848	Wet prep for trichomonas	2	Smear
09211	Pinworm or scotch tape preparation	2	Smear
09212	Identification of worm or arthropods	10	Specimen
*08871	Cryptosprodium stain and read	8	Smear
	SEROLOGY		
08823	Serology Handling – includes all handling of specimen from receipt to the end of separation of serum from red cells, all daily preparation, telephone calls, general maintenance, and recording and reporting	5	Specimen

Code Number	Procedure	Unit Value	Item for Count
09335	Paul Bunnell Test (sheep or horse red cells and absorption by Guinea pig kidney or ox cells)	25	Specimen
09345	VDRL screen	3	Specimen
09346	VDRL titration	3	Dilution
09347	Agglutination slide – latex – rbc – heterophile antibodies	1	Antibody – Antigen Reaction
*	Pregnancy test (includes controls) – see Multi-discipline section		
09271	Agglutination test Enteric, single antigen (Brucella, Weil-Felix test, P. tularensis)	20	Organism
	– each additional antigen	5	Antigen
09274	Agglutination test Enteric (Widal) VI agglutination test includes titration of standard serum	25	Organism
09281	Agglutination test Brucella if performed simultaneously with enteric agglutination test (code 09271 or 09274)	5	Antigen
09319	Agglutination test Leptospiral 4-6 serum dilutions – single antigen	30	Organism
	– each additional antigen	10	Antigen
09341	Antistreptolysin 0 estimation, tube dilutions	30	Specimen
09344	Antistreptolysin 0 estimation – Micro-technique – 18 dilutions	40	Specimen
	ANTIGEN DETECTION		
	This pertains to specimens other than blood.		
*09501	Specimen handling includes handling from receipt to end of logging in, daily preparation, telephone calls, general maintenance and recording and reporting.	11	Specimen
*09503	Specimen preparation	4	Specimen
	Claim the unit values for the appropriate techniques applied for identification. e.g. ELISA – see Virology Latex agglutination – see Serology		
	VIROLOGY		
	Virus Isolation		
09600	Virology handling, includes logging in of specimen for Virus Isolation, all daily preparation, telephone calls, general maintenance and recording and reporting	11	Specimen

Code Number	Procedure	Unit Value	Item for Count
09601	Specimen preparation, includes grinding	4	Specimen
09602	Inoculation – tissue culture	5	Specimen
09603	Read – tissue culture	1.5	Reading
09604	Second passage – tissue culture	3	Specimen
09605	Challenge – tissue culture	7	Specimen
09606	Hemadsorption/hemagglutination	2	Specimen
09607	Neutralization virus	2	PBT
09608	Isolation of virus in egg	30	Egg
09609	Isolation of virus by animal innoculation	100	Animal
*09637	Single radial hemolysis	5	Test
	Preparation and/or Maintenance of Cell Lines		
09610	Primary tissue culture, e.g., amnion	3	PBT
09611	Continuous or semi-continuous	4	PBT
09612	Purchased	0.6	PBT
	Virus Serology		
09613	Virology handling, screening includes all handling of specimen to the end of separation of serum, all daily preparation, telephone calls, general maintenance and recording and reporting.	5	Specimen
09614	Virology handling, diagnostic as code 09613 above, but also includes search for, and matching of data from a previous specimen, e.g., acute and convalescent sera on the same patient history.	14	Specimen
09615	Complement fixation, includes ALL controls	6	Antigen
	– each additional antigen	3	Antigen
09617	Complement fixation – preparation of cells	15	Prep
09618	Complement titration per single row	6	Test
09619	Checkerboard for antibody antigen or hemolysin	31	Test
09620	Antibody detection by immunofluorescence screen	6	Specimen
09621	Antibody detection by immunofluorescence titration	12	Specimen
09622	Rubella screen by kit method, includes controls	2	Test
09623	Rubella titration by kit method, includes controls	5	Test

Code Number	Procedure	Unit Value	Item for Count
09624	Rubella IgM, sucrose gradient	16	Test
09625	ELISA Abbott Quantum II includes controls – competitive	2	Antigen/ Antibody
09626	ELISA Abbott Quantum II includes controls – sandwich	3	Antigen/ Antibody
09627	ELISA Abbott Quantum II includes controls – antigen specific IgM	3	Antigen/ Antibody
09628	ELISA Abbott Quantum II includes controls – direct fecal	3	Antigen/ Antibody
09570	Hemagglutination inhibition	30	Test
09573	Hemabsorption inhibition	30	Test
	Electron Microscopy		
09629	Direct electron microscopy, includes maintenance	18	Specimen
09630	Examination (E.M.) of positive culture	8	Grid
09631	Immunoelectron microscopy	9	Grid
	CHLAMYDIA		
09632	Chlamydia handling, includes logging in of specimen, all daily preparation, telephone calls, general maintenance, and recording and reporting	14	Specimen
09633	Specimen preparation	4	Specimen
09634	Set up, stain and read	11	Specimen
09635	Second passage	3	Specimen
09636	Media, reagent and tissue culture preparation	8	Specimen
09637	Microtrak – specimen handling, **do not** claim	5	Specimen
	additional handling unit, code 09632		
08862	– fluorescent stain	5	Specimen
	MYCOPLASMA		
09510	Mycoplasma handling, includes logging in of specimen all daily preparation, telephone calls, general maintenance and reporting and recording	14	Specimen
09511	Primary isolation of mycoplasma on solid media	4	PBT
09514	Primary isolation of mycoplasma on diphasic media	4	PBT

Code Number	Procedure	Unit Value	Item for Count
09517	Subculture on solid or diphasic media	20	PBT
09520	Dienes Stain for mycoplasma colonies	3	Smear
09523	Metabolic Tests in diphasic media	4	Test
09526	Methylene Blue plating test	10	Test
09529	Hemolysis test for Mycoplasma pneumoniae	10	Test
09531	Hemadsorption Test	15	Test
09534	Growth Inhibition test	10	Test
09537	Colony forming units, estimation first reading	30	Reading
09539	Colony forming units, estimation each additional reading	10	Reading
09542	Converslip prep for mycoplasma	10	Prep
	ENVIRONMENTAL BACTERIOLOGY		
	Specimen handling - claim bacteriology unit		
09416	Test of Sterilization e.g., autoclaves	4	Test
09417	Filtration	8	Specimen
09433	Colony count	3	Filter
09437	Air sampling - settle plate (exposure and colony count)	5	PBT
09440	Air sampling by slit samplers (exposure and colony count)	8	PBT
09443	Air sampling by Impinger - including subculture of sampling fluid and colony count, single plate	10	PBT
09445	Air sampling, each additional plate	4	PBT

Miscellaneous Procedures

Code Number	Procedure	Unit Value	Item for Count
*09701	Semen Analysis for the presence of sperm only	5	Patient
*09702	Semen Analysis includes direct example (ph, volume, viscosity) motility, viability, morphology and count	25	Patient
	Sperm Antibodies		
*09703	– preparation	4	Specimen
*09704	– count	5	Specimen
*09705	– agglutination/immobilization	4	Dilution
	– Fructose – see Chemistry	–	–

APPENDIX A

Forms

1. Data Recording
2. Functional Section Workload Summary
3. Total Laboratory Workload Summary
4. Collection and Allocation of Paid and Worked Hours.
5. Master Procedure and Activity file
6. Request for A New Unit Value

Forms 1-5 are samples of how workload data may be collected. They may be utilized by individual laboratories if found to be suitable.

Form 6 may be photocopied when a request is submitted to the Technical Unit. If the form does not suit the particular procedure a free form description should be submitted which includes the elements outlined in Form 6.

FORM 1

Date _____

DATA RECORDING

Laboratory Section _____ Instrument _____

Total Specimens _____ Total Tests _____ Total Workload Units _____

No.	Specimen Name	Classification									Tests Performed																
		Patients		Ref. In	Qual. Cont.	Cal. Std.	Envir.	Staff Health	Re-search	Re-peats	GLUC	UREA	Na	K	Cl	CO_2	AST	CREAT	BILIR	ALK PHOS	LDH	ALT	CK	TOT. PROT.	URATE	TRI-GLY	Ca
		In	Out																								
1																											
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											
10																											
11																											
12																											
13																											
14																											
15																											
16																											
17																											
18																											
19																											
20																											
21																											
22																											
23																											
24																											
25																											
26																											
27																											
28																											
29																											
30																											
	Total																										

Simplify forms by including only the columns required for specimen classification and the tests performed by the instrument.

a) Total Specimens _____ b) Unit Value per Specimen _____ c) Total Units (a x b) _____

Total Tests _____

FORM 2

FUNCTIONAL SECTION
WORKLOAD SUMMARY

SECTION: **HEMATOLOGY**

SUB-SECTION _____ MONTH _____

Code No.	Procedure	Unit Value	In-patients		Out-patients		Referred-In		Quality Controls		Standards		Repeats		Environ-mental		Staff Health		Research		Total	
			Raw Count	Units	Raw Count	Units	Raw Count	Units	Raw Count	Units	Raw Count	Units	Raw Count	Units	Raw Count	Units	Raw Count	Units	Raw Count	Units	Raw Count	Units
01116	Blood Film Examination	11	1,703	18,733	965	10,615	109	1,199	60	660							4	44			2,841	31,251
01384	Sedimentation Rate (E.S.R.)	4	127	508	167	668	66	264	9	36							1	4	6	24	376	1,504
01336	Prothrombin Time	5	87	435	19	95	16	80	34	170							3	15			159	795
01326	Platelet Count (Microscopic)	9	473	4,257	174	1,566	8	72	45	405									7	63	707	6,363
01312	Activated Partial Thromboplastin	5	86	430	22	110	17	85	45	225							3	15			173	865
01372	Reticulocyte Count	9	109		53		10		11										1		184	
01115	Bleeding Time	18	7	126	8	144															15	270

FORM 3

TOTAL LABORATORY WORKLOAD SUMMARY

Date _____

Raw Counts and Standard Units Done by Hospital Laboratories During the Year	Inpatients		Outpatients		Referred-In		Quality Controls, Calibration Standards and Repeats		Environmental, Staff Health and Research		Total Accumulated Hours	
	Raw Count	Units	Raw Count	Units	Raw Count	Units	Raw Count	Units	Raw Count	Units	Paid	Worked
01 Specimen Procurement and Dispatch												
02 Clinical Chemistry												
03 Hematology												
04 Immunohematology (Blood Bank)												
05 Surgical Pathology												
06 Autopsy Pathology												
07 Cytopathology												
08 Cytogenetics												
09 Immunology												
10 Microbiology												
11 Miscellaneous												
12 Other (Please specify)												
13 TOTAL												

FORM 4

COLLECTION AND ALLOCATION OF PAID AND WORKED HOURS

Name: _____ Month: _____

Record the time worked each day to the nearest ¼ hour, excluding lunch and coffee-break time.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
7	7			Vacation							7	7	7	7	7		

19	20	21	22	23	24	25	26	27	28	29	30	31	Hours Worked 112 / Hours paid 176
7	7	7	7	7			Sick	7	7	7	7		

Estimate the time (as %) worked in the various departments

Clinical Chemistry	Hematology	Blood Bank	Surgical Pathology	Autopsy Pathology	Cyto-pathology	Cyto-genetics	Micro biology	Immu-nology	Specimen Procure-ment
25	50	25							
Hours worked and paid									
28 / 44	56 / 88	28 / 44							

FORM 5

HEMATOLOGY LABORATORY
MASTER PROCEDURE AND ACTIVITY FILE

Revised: (i) 1983, August
(ii) 1984, July
(iii) 1985, March
(iv)
(v)

Functional Sections: 1) Routine (R)
2) Coagulation (C)
3) Special (S)

Unit Producing

Procedure	Method	Funct. Section	Code	Unit Value & Item for Count		
				1978	1982	1988
Blood film exam.	manual	R	01116	11 slide	11 slide	18 slide
PT, PTT Profile	coagamate 2 channel	C	01530	10 spec	4 spec	4 spec
Platelet Count	manual	R	01326	14 test	9 test	9 test
Sed. Rate	manual	R	01384	5 test	4 test	4 test
CBC Profile Hgb, HCT, RBC, WBC indices and platelets	Coulter S plus	R	01520	-	3 spec	3 spec
Hgb. elec.	Beckman	S	01214	46 test	25 test	25 test

Non Unit Producing

Activity	Who	Frequency	Duration	Date Started	Date Stopped
Prep shift schedule	chief tech	every 3 months	5 hours	1981-01-12	
Student lectures	clinical instructor	weekly	1 hour	1981-09-07	
In-service	2.0 FTE & clinical instructor	bi-weekly	1 hour	1982-03-15	
Hematology meeting	8.0 FTE	monthly	1 hour	1983-02-13	
TOA 120 Instrument evaluation	1.0 FTE	daily	2 hours	1984-04-16	1984-04-20

FORM 6

CANADIAN LABORATORY WORKLOAD MEASUREMENT SYSTEM

REQUEST FOR A NEW UNIT VALUE

Please complete one request (FORM 6) for each instrument or procedure and send to:

WMS Technical Unit
c/o Ottawa Civic Hospital
1053 Carling Avenue
Ottawa, Ontario
K1Y 4E9

NAME OF PROCEDURE OR INSTRUMENT: _____

COMPLETED BY TECHNOLOGIST:

HOSPITAL NAME: _____

ADDRESS: _____

_____

_____

REQUESTED BY:

SECTION: _____

POSITION: _____ PHONE: _____

DATE OF REQUEST: _____

All applications for new unit values must include:

- **Package Insert and/or**
- **Detailed Procedure**

COMPLETED BY WMS TECHNICAL UNIT:

HOSPITAL CODE: _____

APPLICATION PROCESSING INFORMATION:

Date Received: _____

Date Start: _____

Date Completed: _____

Date Distributed: _____

Referrals: _____

_____

RESULTS:

Procedure Code: _____

Unit Value Assigned: _____

Item for Count: _____

COMMENTS: _____

_____

_____

_____

_____

COMPLETE AS APPLICABLE:

Methodology Description: _____

_____

_____

_____

_____

Type of Specimen Analyzed: _____

Manufacturer: _____

Model (type and number): _____

Features (list of send bochure): _____

_____

Test Menu: _____

Workload per Month:

Patients	_____	Q.C.	_____
Standards	_____	Average Batch Size	_____
Research	_____	or Routinet	_____
Increase	_____	Decrease	_____
Stable	_____		

What Preventative Maintenance is Required?

Procedure	Frequency	Estimated Time Involved
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Are solutions prepared inhouse? (state yes/no). _____

_____

List glassware items washed. _____

_____

_____

Check if done by you?

a) Chief Technologist reviews calculations: _____

b) Chief Technologist processes requisitions: _____

If computerized, state whether inhouse or hospital integrated. _____

_____

_____

Please include with this application any additional information concerning performing the procedure e.g. special precautions, documentation, etc.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Note: All questions/comments concerning the completion of Form 6 may be communicated directly to the WMS Technical Unit in Ottawa.

APPENDIX B

Glossary of Terms

Allocation — The process of distributing hours and/or workload units in order to ensure that they are credited to the appropriate functional section or cost centre.

Calibration Standards — Pure solutions or reference samples run for the purpose of establishing the calibration curves required to determine the value of the unknowns. When counted separately, calibration standards receive the same unit values as the unknowns.

Employee Health — A source of request for laboratory service emanating from the Employee Health Program. Employees and students receiving laboratory service not related to this program are classified as patients of the hospital.

Environmental Control — A source of request for laboratory service encompassing procedures such as a bacteria count on linen samples.

Full-Time Equivalent — This represents the standard number of paid hours for one employee under the terms and conditions of employment in any given institution.

Functional Section — A section organized and/or operating within the department of laboratories where work output and manpower input have been isolated.

Hours, Normal Paid — The paid hours of a full time equivalent for a defined period of time. Normal hours may vary for different occupational groups or with collective agreements. They are usually expressed per annum or per week.

Hours, Total Paid — All paid time including vacation time, sick time and any other paid time off. Total paid hours represent normal hours **PLUS** overtime, call back or standby hours.

Hours, Overtime — Hours paid over and above normal paid hours. This includes unscheduled overtime, callback, or standby. These may have a different rate of pay from normal hours (e.g., time and a half) but one normal paid hour and one hour of overtime each count as only one paid hour.

Hours, Worked — Worked hours are paid hours MINUS vacation, sick time and any other paid time off. This represents the time actually available for work.

Indicator — A ratio or other number derived from a set of data and used as an index or measure of the relationship of one dimension to another.

Inpatient — A source of request for laboratory service emanating from an individual who has been admitted to hospital and to whom a bed has been assigned.

Item for Count — This defines for each procedure what must be counted to obtain the raw total to which the unit value is applied.

The following terms are used as items for count. They are listed in their specific context at the beginning of each section in which they are used.

- Adsorption — A mixture of serum and absorbing antigens used when separating antibody mixtures.
- Antibody — When an immunoglobulin reagent is used to identify an antigen.
- Antigen — Detectable characteristics which can be identified by reaction with an antibody or lectin. This term may be used for antigen/antibody reactions regardless of whether the antigen is the reagent or the constituent under investigation.

Block	Sedimented material embedded or frozen for histologic processing.
Card	Each card used for the identification or **MIC** of an organism on the Vitek.
Case	Each autopsy.
Cell Reagent (Cellrg)	A reagent prepared from cellular products.
Count	A lymphocyte or viability count performed in Histocombatibility or Immunology.
Dilution	When a sample is mixed with another solution to reduce its concentration.
Donor	An individual who is used as a source of biological material. This term is used for procedures requiring the presence of a person.
Grid	A device on which material is placed for viewing through the electron microscope.
Injection	The method by which material is introduced through the portal of a chromatographic instrument.
Jar	An apparatus used in Microbiology to produce non-aerobic conditions.
Marker	A cell surface characteristic which is usually recognized by a monoclonal antibody.
Membrane	The whole surface upon which material to be examined is retained.
Mitogen/Antigen	Used to identify substances which cause lymphocytes to replicate.
Organism	One pure isolate.
Panel Run	The testing of a patient's serum against a selected group of any number of cells in any number of phases run concurrently.
Pack	1. Blood or blood products from a single donor. 2. A vial of fractionation products.
Patient	An individual under medical care and treatment. This is used as an item for count when the presence of the patient is required for the performance of the procedure. This term is also used for the "patient-donor" in procedures related to the autologous transfusions.
Per 100	The counting of each 100 elements (e.g., cells)
PBT (Plate Bottle, Tube)	Containers for media used to culture micro-organisms. A biplate is considered to be two plates.
Preparation	Sheep red blood cells are prepared for CH50.
Print	Each copy developed from photographic film. Refers also to photographic slides in enzyme stem preparations.
Reading	A visual inspection of Microbiology cultures.
Slide	A flat piece of glass on which material is placed for microscopic viewing.
Smear	The material placed on a glass slide for microscopic viewing. There may be more than one smear per slide.

Specimen	Generally a specimen is defined as a biological sample received for analysis on which a number of related procedures are performed. Specifically, it has two applications as an item for a count. 1. When the unit value relates to activities not resulting in reportable patient answers, e.g., initial handling, preparation of smear. 2. When the unit value relates to the production of multiple test results e.g., urinalysis, blood cell profiles.
Surgical Specimen	All the tissue removed at a single surgical setting regardless of number of sites or number of issue types.
Test	A defined activity leading to a single patient result.
Tray	The microtitre plates used in Histocompatibility.
Trip	Travel from the laboratory to a remote site and back.
Vial	The container used for freezing lymphocytes.
Well	The circular hole in a gel into which either sample, antigen or antibody are placed.
Laboratory Workload Unit	One minute of composite technical, clerical, and lab aide time spent actively engaged in the production of patient answers.
Outpatient	A source of request for laboratory service emanating from individuals who have been formally accepted by the hospital and have received diagnostic and therapeutic service without being admitted. This includes private outpatients as well as patients attending a day or night care unit.
Procedure	A sequence of technical, clerical and lab aide steps constituting a laboratory activity listed in the Schedule of Unit Values. An **automated procedure** is one in which most of the analytical steps are performed by an instrument. A **manual procedure** is one in which the analytical steps are performed by hand.
Productivity	The ratio of outputs (e.g., paid or worked hours). Productivity is a measure of efficiency i.e. the extent to which output is maximized with minimum input.
Productivity Index	Productivity expressed as a percent. e.g.: $\text{Worked Productivity Index} = \frac{44 \text{ units/worked hour} \times 100}{60}$
Profile	A device used to simplify the collection of workload statistics. A profile may have constant or variable components, see section on profiling in the introduction to the manual.
Quality Control	Reference samples or pure solutions run for the purpose of monitoring the accuracy and precision of the method. This includes external proficiency surveys. When counted separately quality control samples receive the same unit values as unknowns.
Raw Count	The total tally of items for count.
Referred-in	A source of request for laboratory service encompassing specimens received from other hospitals or physicians' offices, and those sent to the laboratory for public health purposes. These patients are neither in-patients nor out-patients of the reporting hospital.

Repeat

A procedure performed to solve a problem encountered in a sample run. To qualify as a repeat all the steps subsequent to the initial handling of the specimen must be performed.

The routine performance of duplicate analysis simply for quality assurance purposes, i.e. without a reasonable probability of discrepant results, does not qualify as a repeat.

Repeat procedures receive the same unit value as the original.

Replicate

The planned multiple performance of certain steps. Where this is an integral part of the method, it has been incorporated in the unit value assigned. **Replicates are never added to the raw count.**

Research

A source of request for laboratory service emanating from research or experimental programs within the hospital.

Staff Health

See Employee Health.

Staffing Category

A group of personnel by function in context of the Laboratory Workload Measurement System. (See Manager's Guide.)

Unit Producing Staff are those personnel whose **primary function** is to carry out the activities which are credited with units of service. The requirements for staff in this category are directly related to workload.

Others are those personnel whose primary function is the administration or enhancement of laboratory service. The requirements for staff in this category are related to the degree of sophistication or the complexity of the laboratory services required in any given institution.

Step

A well defined single function such as logging-in, pipetting, inoculating, etc.

Unit Value

The number of units (minutes) of composite technical, clerical, or lab aide time required to complete a defined procedure **Once**.

Workload

The sum of all the products obtained by multiplying the raw count of each procedure by its unit value.

APPENDIX C

CANADIAN LABORATORY WORKLOAD MEASUREMENT
FULL COMMITTEE

NAME	ADDRESS	AFFILIATION
T. Albert	Consultant Productivity Improvement Program, Institutional & Professional Services Health Services Directorate Ottawa, Ontario K1A 1B4 (613) 954-8683	Federal/ Povincial Sub-Committe on Productivity Health and Welfare, Canada
R. Baillie, Ph.D.	Dept. of Laboratory Medicine Victoria General Hospital 35 Helmcken Road Victoria, B.C. V8Z 6R5 (604) 727-4167	Canadian Society of Clinical Chemists
K. Buchan, M.D.	Dept. of Microbiology & Infectious Diseases Foothills Provincial General Hospital 1403 - 29th Street N.W. Calgary, Alberta T2N 2T9 (403) 270-1202	Canadian Association of Medical Microbiologists
G. Chapman	Executive Director Brandon General Hospital 150 McTavish Avenue East Brandon, Manitoba R7A 2B3 (204) 728-3321	Canadian Hospital Association
F.N. Dawson	Information Development Section Health Division Statistics Canada Robert H. Coats Building 18th Floor, Tunney's Pasture Ottawa, Ontario K1A 0T6 (613) 951-1653	Statistics Canada

K. Davis	Director of Information Canadian Society of Laboratoray Technologists P.O. Box 830 Hamilton, Ontario L8N 3N8 (416) 528-8642	Canadian Society of Laboratory Technologists
C. Fitzgerald	M.I.S. 24 Clarence street Suite 100 Ottawa, Ontario K1N 9J6 (613) 238-7860	Management Information Systems
A. Fletcher, M.D.	Dept. of Pathology Kingston General Hospital Stuart Street Kingston, Ontario K7L 2V7 (613) 548-3232	Canadian Society of Cytopathologists
L. Fournier	Information Development Section Health Division Statistics Canada Robert H. Coats Building 18th Floor, Tunney's Pasture Ottawa, Ontario K1A 0T6 (613) 951-8569	Statistics Canada
H. Friesen	Laboratory Consultant Manitoba Health Services commission Box 925 599 Empress Street Winnipeg, Manitoba R3C 2T6 (204) 786-7243	Provincial Laboratory Consultants
P. Gordon, M.D.	Director, Hematology University of Alberta Hospital 112 Street & 83rd Avenue Edmonton, Alberta T6G 2B7 (403) 432-8816	Canadian Association of Pathologists

A. Janzen	W.M.S. Technical Unit c/o Ottawa Civic Hospital 1053 Carling Avenue Ottawa, Ontario K1Y 4E9 (613) 761-4685	National Hospital Productivity Improvement Program
T.F. McElligott,M.D.	Dept. of Pathology Hôtel Dieu Hospital 166 Brock street Kingston, Ontario K7L 5G2 (613) 544-3310	Canadian Association of Pathologists
H. Rubarth, Ph.D.	Institutional and Health Services Directorate Room 650 Jeanne Mance Building Ottawa, Ontario K1A 1B4 (613) 954-8657	Federal Provincial Sub-Committee
L.D. Wadsworth, M.B.	Dept. of Pathology B.C. Children's Hospital 4480 Oak Street Vancouver, B.C. V6H 3N1 (604) 875-2306	Canadian Association of Pathologists

SUBCOMMITTEES

Clinical Chemistry

R. Baillie, Ph.D. (Chairman)	Victoria, British Columbia	CSCC
R. Hill, Ph.D.	Halifax, Nova Scotia	CSCC
W. Hughes	Stratford, Ontario	CSLT
K.L. Massey, M.D.	Saskatoon, Saskatchewan	CAMB
M. Moss, Ph.D.	Halifax, Nova Scotia	CSCC
C. Petitclerc, M.D.	Montréal, Québec	CSCC

Microbiology

K. Buchan, M.D. (Chairman)	Calgary, Alberta	CAMM
K.F. Givan, M.D.	Toronto, Ontario	CAMM
M. Laverdière, M.D.	Montréal, Québec	CAMM
R. Pierce	Halifax, Nova Scotia	CSLT
A. Yatsura	Saskatoon, Saskatchewan	CSLT

Anatomic Pathology

A. Fletcher, M.D. (Chairman)	Kingston, Ontario	CSC
F. Alexander, M.D.	Calgary, Alberta	CAP
Agnes Bruch	Hamilton, Ontario	CSLT
W.P. Duguid, M.D.	Montréal, Québec	CAP
J.T. Feltis, M.D.	Mississauga, Ontario	CAP

Hematology

P. Gordon, M.D. (Chairman)	Edmonton, Alberta	CAP
Gerald W. Barry	Cambridge, Ontario	CSLT
T. Cunningham, M.B.	Saskatoon, Saskatchewan	CAP
B.L. Sheridan, M.D.	Halifax, Nova Scotia	CAP
L.D. Wadsworth, M.B.	Vancouver, British Columbia	CAP

Immunohematology

L.D. Wadsworth, M.B. (Chairman)	Vancouver, British Columbia	CAP
A. Baxter	Ottawa, Ontario	CANADIAN RED CROSS
Grace A. Bell	Downsview, Ontario	CSLT
P. Gordon, M.D.	Edmonton, Alberta	CAP
D. Krancenblum	New Westminster, British Columbia	CSLT

Immunology

L.D. Wadsworth, M.B. (Chairman)	Vancouver, Bristish Columbia	CAP
J. Chapman	Kamloops, British Columbia	CSLT
J. Gauldie, Ph.D.	Hamilton, Ontario	
E. Hoffman, MSc.	London, Ontario	CSLT
D. McFadden, M.D.	Toronto, Ontario	