

Canadian Association of Pathologists

Guidelines for Measurement of Pathologist Workload

Purpose

These workload guidelines aim to:

1. Facilitate pathologist workforce planning
2. Provide a tool for equitable workload distribution among pathologists within a department
3. Provide benchmarks for a reasonable, non-excessive, practical, and safe pathologist workload

Principles

1. Population-based benchmarks have a role in pathologist workforce planning but do not constitute a workload measurement system.
2. A workload measurement system must take into account case complexity. Workload measurement based simply on case accessions or specimen counts are inadequate.
3. Workload measurement systems designed for anatomic pathology, although not ideal for clinical laboratory disciplines, can be adapted to measure a pathologist's workload in the laboratory specialties of hematopathology, clinical chemistry, and medical microbiology for work related to direct patient care.
4. Pathologist workload measurement should encompass the direct clinical care involved in generating a pathology report, and include other patient care-related activities, e.g. consultation, clinical rounds, and quality assurance.
5. Pathologists with University/Academic appointments and an expectation of teaching activity and academic output should have a maximum of 50% of their time assigned to direct clinical care duties.
6. Workload benchmarks must consider that pathologists require sufficient additional time for administrative functions and continuing professional development.
7. Workload measurement systems must be able to adapt to changing pathology practice.

Position Statement

The Canadian Association of Pathologists recommends the use of complexity-weighted workload measurement and endorses the Level 4 Equivalent (L4E) system to measure workload in Anatomic Pathology, with modifications for clinical laboratory disciplines.

L4E System

1. The L4E System assigns relative workload units to diagnostic pathology work based on time required, medical value to clinicians and patients, clinical urgency, and medico-legal responsibility. Recommended annual L4E workload is applicable to an average pathologist performing direct patient care duties, including quality assurance activities and professional development. The method does not include academic (research and teaching) and administrative activities.
2. The key component of the L4E system is weighting of different specimen types and pathologist activities relative to level 4 surgical pathology specimens. This approach allows for a flexible system adaptable to changes in pathology practice and work complexity.
3. Recent application of the original L4E system to workload measurement in British Columbia, Alberta, Manitoba, and Newfoundland demonstrated that although relative weighting assigned to less complicated specimens (levels 1-3) was appropriate, complex specimens warranted higher relative workload values, as did autopsies, frozen sections, and cytopathology cases. The following weighing system is a consensus of the different system, taking into account the work and value of each specimen type.
4. Despite the potential advantages of using >6 complexity levels, six levels are currently used in B.C, Alberta, and Ontario, and in Current Procedural Terminology (CPT) coding, and therefore the CAP supports retention of six complexity levels as the basis for the L4E system.
5. Using the L4E system, in most instances each specimen (not each case) is assigned a complexity level based on the final pathologic diagnosis. However, for more involved cases including all level 6 complexity and some level 5 complexity the entire case is assigned the appropriate complexity level, not each individual specimen.
6. The L4E system assumes that pathologist is totally responsible for gross and micro on every case.

Table 1: L4E Relative Weighting of Pathologist Workload Activities

	Work Activity	Relative Value (L4E)	
Surgical Pathology*	Level 1	Any special stains =<3 is considered part of the case	0.15
	Level 2		0.33
	Level 3		0.5
	Level 4		1
	Level 5		5
	Level 6		15
	Special stains (including immunohistochemistry) ≥4 per case	+1 L4E to the case	
	Immunofluorescence	+ 0.5 L4E to the case	
	Intraoperative consultation	3	
	Each additional intraoperative consultation on same case	2	
Cytopathology	Exfoliative cytology including Pap smears (urine and sputum)	1	
	All other Non-Gyne cytology	2	
	Performed FNA biopsy	3	
	Performed FNA biopsy with immediate review	5	
Autopsy Pathology	Routine full autopsy (adult & pediatrics)	24	
	Complex full autopsy (medicolegal and hospital)	48	
	Limited autopsy	18	
	External only autopsy	10	
	Brain and/or spinal, full neuropathology	18	
Consultations (second opinion)	Internal consultation (for each case although multiple pathologists may have seen the case)	1	
	Complex case consultation	Original level x 1.5	
	Case Review (e.g. cancer centre, external request)	Original level x 0.75	

*Details of surgical pathology complexity levels are shown in Appendix A.

**Examples of clinical pathology direct clinical care activities are shown in Appendix B.

Workload Recommendations

Annual Workload

Based on regression analysis of original survey data, with modifications as noted in Table 1, the recommended workload per pathologist full-time equivalent (FTE) is 5453 L4E per year (range 5277 to 5640; i.e. approximately +/- 3.5%). As the original data do not include internal consultative work that is in the present modified system (internal consults – average of 10%, adds 7.5% to the L4E value), case reviews, difficult case consults, for special stains (approximately 5% have special stains, of which 10% has =>4 IHC stains, given a positive bias of 0.5%), more detailed collection on intraoperative consults and level migration (approximately 1.5-2% on average). To account for all these, the L4E/pathologist should be increased by approximately 10%.

The workload/productivity is best calculated on a departmental basis. The L4E methodology should not be used to calculate individual productivity of an individual pathologist as the stratification of the levels is not granular enough and other activities such as administrative, research, teaching (medical students, residents, technologists, other paramedical personnel and physicians), committee work, provincial and national activities, are difficult to quantify and document.

Study in BC indicates that the productivity of a pathologist depends on the pattern of practice. It can be roughly divided into 3 practice patterns, with decreasing productivity.

- (1) Specialized: when there is pure AP practice with some degree of specialization such as skin, gastrointestinal, gynecology, urology, etc,
- (2) Independent: where there is general AP/GP practice with in-house immunohistochemistry and adequate number of colleagues for intradepartmental consults, and
- (3) Rural: small groups of 1-3 pathologists where there is no in-house immunohistochemistry and insufficient colleagues for adequate intradepartmental consults. It also depends on adequate technical, secretarial, transcription and IT support.

RECOMMENDED ANNUAL WORKLOAD FOR AVERAGE PATHOLOGIST

(do not include internal consults – 2.5% premium)

	rural	independent	Specialized
mean	5589	6316	7043
lower limit (-3.5%)	5393	6095	6797
upper limit (+3.5%)	5784	6537	7290

In addition to the pattern of practice, the productivity of the pathologists is influenced by many factors. The list given below is not totally inclusive and the annual workload for an average pathologist should take into consideration these and other factors.

- computer system
- IT support
- secretarial support
- technical support
- work environment
- administrative support

Clinical Pathology

There is no established model for clinical pathology. There are many studies which indicate that the manpower in Anatomic Pathology can be used as a baseline to calculate the number of FTEs needed in CP. A large survey in the US indicates that for

- Academic institutions and institutions with residents, the appropriate AP:CP ratio is 1.5:1
- For community institutions, the appropriate AP:CP ratio is 2:1.

CP above also includes direct patient consultation and administration. Although this is not totally satisfactory, it may in most situations give the appropriate FTE needed to provide adequate laboratory services in an institution.

Impact of Professional extenders (PE)

In many institutions, there are dedicated pathologists' assistants (PA) and in some, trained histotechnologists (TT) that do some or all of the grossing. It must be understood that the grossing is done under the supervision of the pathologist. The pathologist, who signs out the case, reviews the gross dictation of the PE, re-grosses and takes more blocks from the specimen as needed, correlates the slides key to histology and is thus ultimately responsible for the work performed by the professional extender. Similar to other professional extenders in other professions – lawyers, accountants and dentists, the degree of autonomy and responsibility of the professional extender depends on the ability, training and experience of the individual as well as the comfort and trust of the professional who takes responsibility of the work done. We propose in a similar way the degree of autonomy and extent of the grossing done by the pathologists' assistants and trained technologists should be totally at the discretion of the pathologist who will be responsible for the case.

APPENDIX A: Surgical Pathology Complexity Levels

General rules that should be applied to appropriate specimens to reflect the degree of difficulty and effort.

	DESCRIPTION	LEVEL	COMMENT
rule 1	for biopsies other than skin (gastrointestinal, genitourinary, etc.)	4	1- 4 biopsy fragments for same diagnostic purpose
	e.g. screening biopsies for IBD will be given level 4 or 5 depending on the total biopsy fragments from cecum to rectum irrespective of the number of containers they are submitted in.	5	5-20 biopsy fragments for same diagnostic purpose
rule 2	for core biopsies (prostate, breast, etc.)	4	1- 4 cores for same diagnostic purpose
	e.g. 2 breast core biopsies from right upper + 2 core biopsies from right lower lesion = level 4 x 2	5	5-20 cores for same diagnostic purpose
	4 breast core biopsies from single lesion = level 4 x 1 5 breast core biopsies from single lesion = level 5 x 1	6	=>21 cores for same diagnostic purpose
rule 3	for currettings and tissue fragments (Uterine currettings, bladder, TURP, TUR-UB, etc)	4	1- 4 blocks for same diagnostic purpose
		5	5 or more blocks
rule 4	For small organs and surgical excisions, benign or malignant (e.g. lumpectomies, hysterectomies +/- SO, adrenalectomy, thymectomy, thyroid resections, etc.)	4	1-4 blocks
		5	5-25 blocks
		6	26 or more blocks
	Immunohistochemistry - if 3 or less IHC done on a case, will be considered part of the case	0 L4E	
	Immunohistochemistry - if 4 or more done on a case, 1 L4E will be added to the case, assumes a significant work - both work time and complex case premium	+1 L4E	
* A specimen is defined as the content in a container with unique medical and legal implications.			
A case includes all related containers received from the same operation under 1 Accession Number.			

SYSTEM	DESCRIPTION	Level	COMMENT
autopsy	brain and/or spinal cord, full neuropathology	18 L4E	
autopsy	partial	18 L4E	
autopsy	full pediatrics	24 L4E	
autopsy	full uncomplicated autopsy	24 L4E	
autopsy	complex - medicolegal and hospital	48 L4E	
autopsy	external only	10 L4E	
Breast	implants capsules, gross only	1	
Breast	implant capsules, gross & micro	3	
Breast	reduction mammoplasty	4	
Breast	mastectomy partial/full with/without nodes for malignancy. Sentinel nodes are included	6	sentinel nodes is not categorized separately
Breast	lumpectomies alone, benign or malignant, includes gynecomastia	4/5/6	rule 4
Breast	needle core biopsy	4/5/6	rule 2
Consults	internal consults	4	even if examined by single or multiple pathologists
Consults	for difficult cases	150% of original level	
Consults	routine review for cancer clinic	75% or original level	no gross done
CVS	aneurysm contents, thrombus, hematoma, arteromatous plaque - gross only	1	
CVS	heart valve, gross only	1	
CVS	vessels, vein - varicose veins, gross only	1	
CVS	aneurysm contents - gross & micro	2	
CVS	arteromatous plaque - gross & micro	2	
CVS	vessels, vein - varicose veins, gross & micro	2	
CVS	heart valve, gross & micro	3	
CVS	hematoma - gross & micro	3	
CVS	artery - biopsy	4	
CVS	pericardial biopsy	4	
CVS	ventricle heart, aneurysm, atrium partial resection	4	
CVS	cardiac, myocardial biopsy without EM, includes transplant	5	
CVS	cardiac, explant	6	

SYSTEM	DESCRIPTION	Level	COMMENT
cytology	pap smears, urine and sputum	1 L4E	
cytology	Diagnostic cytology - fluids and FNA	2 L4E	
EM	electron microscopy - any biopsy requiring EM	6	any specimen which includes an EM is upgrade to level 6 and not an additional level 6
endocrine	pituitary biopsy/resection	5	
endocrine	thyroid - thyroidectomy with neck dissection, malignant	6	
endocrine	adrenal resection	4/5/6	rule 4
endocrine	parathyroid - biopsy	4/5/6	rule 4
endocrine	thyroid - lobectomy or total thyroidectomy	4/5/6	rule 4
Eye	conjunctiva - biopsy, benign, includes pterygium	3	
Eye	cornea, benign	3	
Eye	conjunctiva - biopsy, premalignant or malignant	4	
Eye	cornea, premalignant or malignant	4	
Eye	eye - eversion	4	
Eye	orbit - biopsy	4	
Eye	eye - enucleation, benign	5	
Eye	eye - enucleation, malignant	6	
Eye	eye - exenteration	6	
Frozen	for immunofluorescence	3	
GIT	verruform appendix - incidental & no pathology	2	
GIT	gallbladder, benign	3	
GIT	Gastrointestinal tract - fissure/fistula in ano	3	
GIT	hemorrhoids	3	if gross only 1, if gross and micro 3
GIT	pilonidal sinus/cyst	3	
GIT	stoma - enterostomy, ileostomy, colostomy, etc., and donuts	3	
GIT	verruform appendix - nonneoplastic	3	
GIT	gastrointestinal tract polyps (oral to anus)	4	for each separate/discrete polyp identified
GIT	liver biopsy / wedge resection, for metastases	4	
GIT	liver biopsy / wedge resection, for medical conditions, includes pretransplant and transplant	5	
GIT	Gastrointestinal tract (oral to anus) - resection with LN dissection, malignant	6	
GIT	pancreas - segmental or total resection, malignant	6	
GIT	gallbladder, malignant	4/5/6	rule 4

SYSTEM	DESCRIPTION	Level	COMMENT
GIT	Gastrointestinal tract (oral to anus) - resection, benign	4/5/6	rule 4
GIT	liver resection	4/5/6	rule 4
GIT	pancreas - core biopsy	4/5/6	rule 2
GIT	pancreas - segmental or total resection, benign	4/5/6	rule 4
GIT	salivary gland - resection, benign or malignant	4/5/6	rule 4
GIT	vermiform appendix - neoplastic	4/5/6	rule 4
GIT	Gastrointestinal tract (oral to anus) - biopsy	4/5	rule 1
GIT	peritoneal biopsy	4/5	rule 1
GIT	small bowel biopsy for transplant	4/5	rule 1
GIT	tongue biopsy	4/5	rule 1
Gyne	fallopian tubes - sterilization	2	
Gyne	products of conception, therapeutic (family planning)	2	
Gyne	vagina repair	2	
Gyne	bartholin's gland - abscess/cyst	3	
Gyne	hydatid of morgagni	3	
Gyne	products of conception, missed/ spontaneous	3	
Gyne	fallopian tubes or contents - ectopic pregnancy	4	
Gyne	hysterectomy +/- adenexae - prolapse	4	
Gyne	omentum	4	
Gyne	ovary biopsy or wedge resection	4	
Gyne	Placenta, gross & micro	4	
Gyne	cervix - cone/LEEP biopsy	5	
Gyne	Placenta, multiple gestation, gross & micro	5	
Gyne	hysterectomy +/- adenexae - malignant condition	6	
Gyne	vulva / vagina - malignant with nodal dissection	6	6
Gyne	fallopian tube resection for benign & malignant conditions	4/5/6	rule 4
Gyne	hysterectomy +/- adenexae - benign conditions	4/5/6	rule 4
Gyne	leiomyoma(s) - with or without uterus	4/5/6	rule 4
Gyne	ovary with/without tubes, benign or malignant	4/5/6	rule 4
Gyne	vulva / vagina - resection, without nodal dissection	4/5/6	rule 4
Gyne	cervix - biopsy or curettings	4/5	rule 1 or 3
Gyne	endometrial biopsy / curettings	4/5	rules 1 or 3
Gyne	fallopian tube - biopsy	4/5	rule 1
Gyne	vulva / vagina /perineal - biopsy	4/5	rule 1

SYSTEM	DESCRIPTION	Level	COMMENT
head & neck	nasal cartilage - gross only	1	
head & neck	teeth - gross only	1	
head & neck	cholesteoma	3	
head & neck	mucus retention cyst - salivary / oral	3	
head & neck	nasal /sinonasal polyps - inflammatory or allergic	3	
head & neck	lip biopsy / wedge resection	4	
head & neck	odontogenic/dental cyst	4	
head & neck	paranasal sinus - biopsy/currettings	4	
head & neck	pharynx - biopsy	4	
head & neck	thyroglossal duct / cyst	4	
head & neck	larynx - partial or total resection with nodes, malignant	6	
head & neck	larynx - partial or total resection, non-malignant	4/5/6	rule 4
head & neck	odontogenic tumor resection	4/5/6	rule 4
head & neck	salivary gland resection - benign or malignant	4/5/6	rule 4
head & neck	tongue resection - benign or malignant	4/5/6	rule 4
head & neck	larynx - biopsy	4/5	rule 1
head & neck	oral, nasal sinus, nose, tongue & ENT, mucosal biopsy	4/5	rule 1
head & neck	salivary gland biopsy	4/5	rule 1
Hem/lymph	adenoid/tonsils, 15 and under, Gross only	1	
Hem/lymph	adenoid/tonsils, 15 and under, Gross & micro	2	
Hem/lymph	spleen - trauma	2	
Hem/lymph	adenoid/tonsils, 16 & over. Gross & micro	3	
Hem/lymph	lymph node - metastatic tumor	4	
Hem/lymph	lymph node - sentinel nodes alone	4	for each identified numbered sentinel node
Hem/lymph	bone marrow biopsy	5	
Hem/lymph	extranodal lymphoma, biopsy	5	
Hem/lymph	lymph node - hematolymphoid neoplasm or infection	5	
Hem/lymph	lymph node - regional resection per side of body	5	
Hem/lymph	spleen - diagnostic or for tumor	5	
Hem/lymph	adenoids/tonsils - malignant, resection with nodal dissection	6	
Hem/lymph	lymph node - sentinel node(s) with tumor resecton	6	
Hem/lymph	mediastinal mass / tumor	4/5/6	rule 4
Hem/lymph	thymus - tumor resection	4/5/6	rule 4

SYSTEM	DESCRIPTION	Level	COMMENT
Intraoperative consult	first specimen	3 L4E	
Intraoperative consult	after the first specimen, on the same case	2 L4E	
Male	foreskin incidental in pediatrics 15 years and below	2	
Male	Testes, orchidectomy for carcinoma of prostate	2	
Male	testis - appendix	2	
Male	vas deferens for sterilization	2	
Male	foreskin, 16 years and over	3	foreskin <1 year (??)
Male	testis, appendage	3	
Male	testis, spermatocele	3	
Male	testis, varicocele	3	
Male	vas deferens, non sterilization	3	
Male	testicular biopsy	4	
Male	testicular biopsy for medical conditions	5	
Male	penis resection for malignant conditions	6	
Male	prostate - prostatectomy, malignant	6	
Male	prostate - needle core biopsies	4/5/6	rule 2
Male	prostate - prostatectomy, benign	4/5/6	rule 4
Male	testes, orchidectomy for primary benign or malignant condition	4/5/6	rule 4
Male	prostate - TURP	4/5	rule 3
Male	hydrocele sac	1 or 2	if gross only 1, if gross and micro 2
miscellaneous	calculus (stone), foreign body	1	
miscellaneous	abscess	3	
miscellaneous	material passed per vagina or other orifices	3	
miscellaneous	branchial cleft cyst	4	
miscellaneous	mesothelium (peritoneum / pericardium / pleural) - biopsy / tissue	4/5	rule 1
miscellaneous	hernia sacs	1 or 2	if gross only 1, if gross and micro 2
miscellaneous	thrombus or embolus or blood clot	1 or 2	if gross only 1, if gross and micro 2
Nervous	brain/meninges - trauma, gross & micro	2	
Nervous	nerves, confirm nerve (vagus, sympathectomy, ganglions)	2	
Nervous	brain cyst	4	
Nervous	brain biopsy	5	
Nervous	brain/meninges - tumor resection	5	

SYSTEM	DESCRIPTION	Level	COMMENT
Nervous	CNS, spinal cord - tumor resection	5	
Nervous	muscle biopsy, metabolic and medical conditions	5	
Nervous	nerve - biopsy	5	
ortho	amputation, finger and toes, traumatic - Gross only	1	
ortho	intervertebral disc - gross	1	
ortho	joint, loose body, gross only	1	
ortho	joint, meniscus - gross only	1	
ortho	rib, incidental, gross only	1	
ortho	amputation, finger and toes, traumatic - Gross & Micro	2	
ortho	intervertebral disc - gross & micro	2	
ortho	joint, cartilage and shavings, gross & micro	2	
ortho	joint, loose body, gross & micro	2	
ortho	joint, meniscus - gross & micro	2	
ortho	bone - exostosis	3	
ortho	bone fragments requiring histology	3	
ortho	bone, femoral head - benign conditions, gross +/- micro	3	
ortho	joint, bursa	3	
ortho	joint, synovium cyst	3	
ortho	amputation, extremities , traumatic - Gross & Micro	4	
ortho	amputation, finger and toes, benign & non-traumatic	4	
ortho	bone - metastatic tumor & pathologic fracture	4	
ortho	bone biopsy or currettings for metastatic carcinoma	4	
ortho	joint resection	4	
ortho	joint, synovium - biopsy	4	
ortho	amputation, extremity, benign & nontraumatic condition	5	
ortho	amputation, finger and toes, malignant	5	
ortho	bone biopsy for medical and metabolic disorders	5	
ortho	bone biopsy or currettings for primary bone tumor	5	
ortho	amputation/disarticulation , extremity, malignant condition	6	
ortho	bone, primary bone tumor - resection	6	
Pediatrics	gross only	5	
Pediatrics	gross and micro, full examination	6	
Respiratory	lung transplant biopsy	5	
Respiratory	lung, explant	5	

SYSTEM	DESCRIPTION	Level	COMMENT
Respiratory	lung - resection (segmental, lobe, total), malignant conditions	6	lung - total/ lobe / segmental for malignant condition
Respiratory	lung - resection (segmental, lobe, total), benign conditions	4/5/6	rule 4
Respiratory	lung - biopsy (transbronchial or wedge)	4/5	rule 1 or 3
Respiratory	pleural biopsy	4/5	rule 1
Respiratory	respiratory tract (trachea to lung) - all types of biopsies	4/5	rule 1 or 3
skin	finger and toe nail, gross only	1	
skin	skin, plastic repair, gross & micro	2	
skin	epidermal inclusion cyst	3	
Skin	skin, all benign skin tumors (includes non-atypical nevus) except skin adenexal tumor	3	
Skin	skin, basal cell carcinoma	3	
Skin	skin, adenexal tumors	4	
Skin	skin, all malignant skin tumors except basal cell carcinoma	4	
Skin	skin, atypical nevus and melanoma (without minimal data set)	4	all melanocytic lesions including melanoma if no checklist completed
Skin	skin, Inflammatory skin disease	4	
skin	skin, for alopecia	5	
Skin	skin, immunoflourescence	5	
Skin	skin, melanoma with minimal data set	5	
Skin	skin, malignant condition with nodal dissection	6	can be melanoma, squamous or Merkel cell carcinoma
Skin	skin, large excisions	4/5/6	rule 4
soft tissue	carpal tunnel tissue	3	
soft tissue	fibromatosis - palmar/plantar/others	3	
soft tissue	ganglion cyst	3	
soft tissue	lipoma or traumatic neuroma	3	
soft tissue	soft tissue, debridement	3	
soft tissue	muscle biopsy	5	
soft tissue	soft tissue, malignant - radical surgery	6	
soft tissue	Soft tissue, benign tumors other than lipoma & traumatic neuroma	4/5/6	rule 4
soft tissue	soft tissue, malignant tumors biopsy or excision	4/5/6	rule 4
urinary	immunoflourescence - kidney, 3 month transplant kidney, tranplant kidney	3	
urinary	kidney - biopsy for allograft rejection	5	
urinary	kidney - biopsy without EM	5	kidney biopsy without EM,

SYSTEM	DESCRIPTION	Level	COMMENT
urinary	kidney - biopsy with EM	6	kidney biopsy with EM
urinary	kidney - partial or total nephrectomy, malignant (includes ureteric lesions)	6	
urinary	urinary bladder - partial or total resection, malignant (includes urethra lesions)	6	
urinary	kidney - partial or total nephrectomy, non-malignant (includes ureteric lesions)	4/5/6	rule 4
urinary	ureter / urethra - biopsies or resection for benign lesions	4/5/6	rule 4
urinary	urinary bladder - partial or total resection, benign (includes urethra lesions)	4/5/6	rule 4
urinary	urinary bladder - biopsy or TUR	4/5	rule 1 or 3
urinary	urinary tract, ureter and urethra - biopsy	4/5	rule 1

APPENDIX B: Examples of Clinical Pathology Direct Clinical Care Activities

These are suggestions and should be discussed and consensus reached amongst the interested pathologists

Pathologists Interpretative Reports = 1 L4E	
Serum protein electrophoresis	
Cardiac enzymes	
Routine blood culture interpretation	
Gram stain interpretation	
Peripheral blood smear	

Routine Clinical Consults: 2.0 L4E	
Hematopathology	Flow cytometry
	Routine coagulation consult
	Fluid morphology
	Semen analysis
	Consultation for test selection
Transfusion Medicine	Routine transfusion/blood products consult
	Routine transfusion reactions
	Interpretation of antibody investigations
	Autologous blood transfusion consults
Microbiology	Interpretation of culture results and susceptibility testing
	Review and consultation for complicated infections
	Mycology/parasite identification and interpretation
	Consultation for test selection
Clinical Chemistry	Consultation in lipid clinics
	Routine metabolic and endocrine problems
	Consultation for test selection

Complicated Clinical Consults (may include chart and laboratory results review and recommendations): 10 L4E
Infection outbreak investigations
Consult and investigation of complex metabolic disorders
Consult and investigation of complex coagulation disorders