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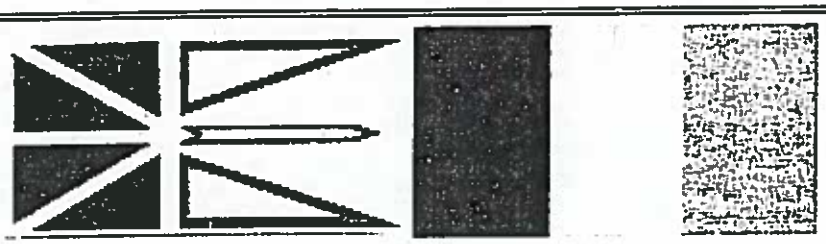
Pathology Workload Review Newfoundland & Labrador



Commissioned
by
Mr. John Abbott
Deputy Minister
Department of Health & Community Services
P.O. Box 8700
St. John's, Newfoundland & Labrador
Canada A1B 4J6

Review and Report
by
Dr. Raymond Maung
Department of Laboratory Medicine
Royal Inland Hospital
311 Columbia Street
Kamloops, BC

Summary

The following table is the comparison of the present to optimal manpower to provide the necessary laboratory services at various regions of Newfoundland and Labrador. The optimal FTE does not include regional and other unique functions that are performed at each centre.

	James Paton	Central West Health	Western Memorial Regional	Eastern	Rural Avalon	St. John's	Charles S. Curtis
Present FTE	2.00	2.00	5.00	1.00	1.00	13.20	1.00
Optimal FTE	2.71	2.76	5.13	1.94	1.33	15.73	1.24

Because of the national and international shortage of pathologists, several strategies are suggested to improve laboratory services in the region and retain / recruit necessary professionals to Newfoundland and Labrador. These must be adapted to local conditions. These are -

1. Strategies for recruitment and retention of professional staff
    a. Competitive remuneration
    b. Strategies to attrack local medical students into the specialty of pathology. Local graduates tend to stay in the province.
    c. Flexibility in work schedule
    d. Work/life balance for modern life style.
    e. Departmental Mentoring
    f. Opportunity to sub specialize at St. John's to become the tertiary and consulting centre for the province.
2. Exclusion list – *to have an efficient Anatomic Pathology service*
3. Regionalization – *to have an efficient delivery of laboratory service in the province and prevent pathologist "burn out".*
    a. For on-call services – *to avoid one in one/two on calls service.*
    b. Support to the smaller regions in times of need (vacations, CME, sick).
    c. Subspecialization at St. John's to provide consultation service for the province.
4. Training of technologists *or pathologists' assistants* to gross the specimens. *This will free the pathologists to concentrate on other issues which will improve laboratory services without sacrificing quality.*
5. Good support services – *to make the pathologists more efficient and effective in their duties.*
    a. Good technical support
    b. Good Secretarial support
    c. Good IT support

This report is to review workload and the manpower situation in the province of Newfoundland and Labrador. The author is very grateful to the all pathologists in Newfoundland and Labrador who provided me with the necessary data and information without which this project would not be possible. A special thanks to Dr. Cathi Bradbury, Dr. Nash Denic and Mr. Steve Jerrett who organized the meetings that moved the process forwards in a timely fashion.

The report addresses the following:
1. Why there is a crisis in pathology manpower
2. How workload and manpower are measured and determined
3. Method to measure pathology workload and manpower in NFL),
4. Results of the study
5. Suggestions to improve services

1. Introduction – Why?

There has been an intense interest in pathology manpower in recent years. There are ongoing studies in many provinces and the Canadian Association of Pathologists (CAP) is currently drafting a position paper. This is mainly due to a *pending crisis in pathology human resources* in the near future. How has this crisis occurred? Basically it is related to the unique nature of pathology practice and how the majority of pathologists are remunerated.

Unlike most medical disciplines, pathology has no physical limiting factor that will bring staffing shortages to the attention of administrators, the government and, most importantly, to the public at large.

- Many pathology services, like clinical chemistry and hematology, are highly automated. The analyzers have very high output, and only a small percentage of their capacity is utilized in most laboratories. The increased technical workload can be accommodated with ease by these highly automated machines with minimal increase in technical staff. This is not necessarily true for microbiology and anatomic pathology. Nonetheless, the professionalism of the technical staff coupled with increased staffing and some degree of automation allow the laboratory to process most of the work in a reasonable period. When laboratory data and histology/hematology slides are produced, the professional input and interpretative (medical consultation) work of the pathologist begins.

- The slow but steady increase in workload is usually incorporated into the pathologist's work day. However, this *increased workload cannot be accommodated indefinitely* without jeopardizing quality. Total technical work units from St. John's shows that work had increased steadily each year, except in 2004 because of a 28 day strike. In the following year 2005, there was a catch up increase. The yearly increase from 1999 to 2005 were 1.91%, 2.86%, 2.57%, 11.33%, - 6.72% (year 2004) and 15.38% annually, with a combined 29% increase from 1999 to 2005. This may lead to increased medical errors which ultimately affect patient safety.

In addition to increased case volume, there are many compounding factors that increase the workload of pathologists, ***now and in the future***. These factors intensify their professional development and CME requirements.

- **Increased complexity** e.g. the recent classification of lymphoma and leukemia needs an extensive workup including flow cytometry, immunohistochemistry and molecular studies; diagnosis of new cases of breast carcinoma requires routine estrogen and progesterone receptors, and Her2 studies (especially labour intensive) for therapeutic and prognostic guidance.

- **More intensive informational needs** (e.g. almost all malignant diagnoses require a complete a minimal data set which acts as a "map" for further surgical, medical and radiation oncological management).

- **Attention to reduce medical errors** (built in redundancies to reduce medical errors such as routine second reviews of all first malignant diagnoses that either involves a high risk site such as breast and prostate or when there is great management risk to patients, etc.)[1]

- **Upgraded standards and reporting** requirements recently.

    - Beginning January 1, 2004, the American College of Surgeons Commission on Cancer mandated that all scientifically validated or regularly used *data elements* checklists be used in their reports for each site and specimen[2]. Many of the cancer treatment centres in Canada also mandate these data elements in all cancer reports.

    - The need to have at least 12 lymph nodes isolated in all colectomy specimens for QA purposes

    - New standards for reporting core biopsies of the prostate which require each core to be reported separately (up to 12-18 cores) rather than collectively[3].

- **Recent advances** in cytogenetics, molecular pathology, proteinomics, new therapeutic options and other advances

    - Even community pathologists must be aware of the new advances so they will be able to request, collect, and triage the appropriate specimens to the local tertiary centre for processing/interpretation in a reasonable time frame. Then the results have to be incorporated with other findings for their clinicians and patients.

    - Although specimens such as blood and urine can be recollected, many specimens are unique (melanocytic skin lesions, breast masses, colonic polyps). The pathologist has only one opportunity to properly handle the specimen. If improperly handled, a proper evaluation of the excised specimen may be lost.

- **Aging demographics** will increase the medical and laboratory needs of the population. The population in Newfoundland and Labrador is aging rapidly and

the percentage of people over the age of 65 years will increase from 13% to 19% of the population in a decade resulting in an absolute increase of 42% (Please see Appendix I). The following table shows the number of surgicals done per thousand populations in Kamloops according to the different age groups. The Kamloops figures are used as it is easily available from the Laboratory Information System (Meditech and highly knowledgeable staff) in Kamloops. It is also true for other medical procedures and there is no reason to believe that the stats in Newfoundland will be any different. This shows that the laboratory procedures increase rapidly with each age group. In the population over 65 years it rises dramatically by nearly 50% compared with the 45-64 year age group. This combined with the aging population will rapidly increase the need for more pathology services in Newfoundland and Labrador.

Distribution of surgicals according to age groups in Kamloops (annuals procedures per thousand population)

Year	0-4	5-17	18-24	25-44	45-64	65+
1998	3.5	27.2	92.7	130.8	172.5	239.3
2001	4.2	25.9	72.5	123.4	176.7	238.0
2006	1.5	20.1	76.2	109.4	173.5	253.9

- **Medicolegal (Coroner or Medical Examiner) Autopsy Service** – This is another area where hospitals and pathologists have been subsidizing the system. The Attorney General's office which funds the coroners/medical examiner office has not adequately funded these services. The technical and professional fees are insufficient to cover the services provided. The Attorney General's office needs to negotiate with all interested parties and fund accordingly. It must be noted that in addition to the determining the cause and nature of death, there are many benefits to the family and society by this service (please see appendix C). In many jurisdictions, pathologists are put in a position to either perform forensic work at unreasonable hours or not perform this valuable service at all.

Unlike many other medical disciplines, fee for service is not an option for many pathologists. Although the fee for service model has its own problems, income is directly proportional to workload. In many centres across Canada, pathologists are paid by salary or fixed contract. As workload has increased over time, there is neither an increase in compensation nor resources made available to recruit additional pathologists by administration. The fact that hospital administrators, government officials, the general public and even other physicians do not understand what is required to provide high quality laboratory medical services and its impact on patient care make the matters worse.

- Most clinicians have physical and temporal limitations in terms of office or operating room time that limits the number of consultations and procedures performed. If limits are exceeded, a "waiting period" results. In diagnostic imaging, funding limitations of the MRI, CT scanner and other equipment places a ceiling on the number of procedures and consultations done by the radiologist, which results in "waiting period".

- Recently, because of lack of human resources in BC Cancer Agency, Vancouver, there was a backlog of 18 months worth (TO CONFIRM) of review cases creating a barrier to patient care. This fact was a huge factor in the success of the department in receiving funds for 2 new positions.

- *Pathologists do not have any physical limitations.* As such, all laboratory data and slide interpretation by pathologists take precedence to their other essential but not urgent duties such as Administration which includes QA/QI activities and utilization management, reading and research regarding difficult cases (by taking shortcuts) and education of technologists and laboratory users. The latter duties are essential to the proper running of a quality laboratory services.

    - One of these activities, **QC/QI is essential** to assure that all laboratory results are medically accurate. Alternatively, the increased work is performed on their own personal time. Deferral of these other essential duties may be done in the short term, but in the long term this deferral will affect the quality of the laboratory services and have a negative impact on patient care. The problems arising in the Eastern Health related **Estrogen Receptor is directly related to a lack of proper QA/QI activities.** The implications were huge with many breast cancer patients not receiving proper treatment.

    - Modern oncology treatment protocols are extremely expensive and can have serious side effects, and pathology tests are being used as **guidelines**. E.g. Estrogen receptor, Her2, bcr-abl gene rearrangement and C-kit status to determine prognosis and specific treatment regimes in Breast carcinoma (anti-estrogen therapy and treatment with Herceptin), chronic myeloid leukemia (diagnosis and treatment with Gleevec) and malignant gastrointestinal stromal tumors (diagnosis and treatment with Gleevec). Some of these tests are technically and professionally very demanding with high probability of errors if proper QA activities are not in place. Recently, new standards are being imposed by regulatory agencies to ensure that these tests are performed properly and are medically accurate[4]. Lapses in proper administration of these tests will lead to **serious medical errors and/or delays** in the management of patients especially oncologic patients.

    - Utilization management and education of laboratory users are essential to ensure that laboratory services are used appropriately as needed. This is the principle method to control runaway laboratory cost without compromising patient care.

- Because of the professionalism of the pathologists and technical personnel and the lack of "wait times" requests for new positions to administration are difficult in most situations. In this time of financial restraint, fulfillment of these requests is almost impossible. In my study, 20 of the 27 departments that responded indicated that they were understaffed. *The fact that laboratory services is* **not highly visible** *(compared with, say, emergency medicine or orthopedic surgery),* **has no "waiting time", lacks obvious service dysfunction** *(apparent reasonable quality laboratory service – which may not be true as in the case of ER/PR testing, accessible pathologists and turnaround time) and* **lacks an acceptable workload model** *makes the necessary funding for new positions easy to ignore.* This is also true for laboratory equipment. It is common to find equipment in the laboratory (like microscopes) that is over 30 years old and many instruments are funded only when the manufacturer no longer supports the

equipment or is beyond repair. It is also extremely difficult to introduce new technologies and tests, e.g. breath test for H. pylori.

- The implication of inadequate pathology are many and includes:
    - **Delay in the diagnosis of all cancers.** Patients will be waiting 6 weeks or more to know if their breast, lung, colonic or prostate biopsies are benign or malignant. In addition, to the psychological hardship, this can have serious adverse impact on prognosis and treatment options. Some cancers are considered "urgent", such as acute leukemia, and any delay has very serious consequences for the patient.
    - **Delay in infectious disease diagnosis.** This delay will result in delay treatment and if some instances early recognition of an epidemic such as cholera, influenza or SARS.
    - Pathologists are sometimes called **"Diagnostic Oncologists"**. 50-60% of an anatomic pathologist work is related to diagnositic oncology. Almost all oncology treatment plans starts with the pathology reports. That is why pathology reports are referred to as **"maps"** for cancer treatment.
    - At locations where there is cancer treatment centres, the pathologists are **an integral part of the oncology team** that meet regularly to review and plan the management of each individual cancer patient. Inadequate pathology services will have a negative impact in this important activity.
    - Some post-surgery oncology treatments have time limitations, and if the pathology report is delayed, the **patient may miss the opportunity** to receive additional treatment that may be life saving.

2. How – to measure work and appropriate workload per FTE

There are a few workload collection and appropriate workload models published recently that reflect the present work pattern. They are Level 4 Equivalent (L4E) model[5], CPT coding system from the US, recent Royal College of Pathologist of UK[6] and the recommendations from the Royal College of Physicians and Surgeon of Canada[7].

L4E model divides specimens into 6 levels and give weights to each level according to the degree of difficulty and responsibility in relationship to level 4 which has a value of 1 – thus the name, Level 4 Equivalent. The less complex specimens (levels 1 to 3) have lower L4E values and the more complex specimens (levels 5 & 6) have higher values. Thus, L4E model is a weighted specimen calculation. In the study, many parameters were considered, and L4E was found to be the most statistically sound. The recommended workload per Anatomic Pathology FTE is 3455 L4E.

In a recent article in the Canadian Association of Pathologist Newsletter[8] and talk at a recent InSight symposium on Laboratory Services[9], I have shown that the recommended

workload for an average Anatomic Pathologist (1 FTE) from the L4E model, Royal College of Pathologist – UK (adapted to the Canadian situation), the US (Medical Group Management Association - MGMA) and the Royal College of Physicians and Surgeon of Canada are very similar if not identical as shown in the following table.

MODEL	Recommended workload per AP FTE	Equivalent workload in terms of L4E
The Royal College Physicians and Surgeons of Canada	24,500	3278 L4E
The Royal College of Pathologists (UK) – June 2005*	12,000 UK units	3000 L4E
The Royal College of Pathologist (UK), adapted to Canada**	14,280 UK units	3570 L4E
Medical Group Management Association (MGMA), US	4639 RVU	3442 L4E
*UK work year = 40 weeks/year, 7.5 sessions per week(total of 10 session per week), 4 hours per session and 10 UK units per hour **Canada work year = 42 weeks/year, 8.5 sessions per week (15% for CME/Professional Development), 4 hours per session and 10 UK units per hour		

As the Level 4 Equivalent (L4E) model is based on Canadian data and the other recommendations are almost identical, it will be used to determine the work done and FTE needed in **Anatomic Pathology medical consultation work** at the 7 institutions in Newfoundland and Labrador.

How to determine the number of FTE need **for Clinical Pathology (hematopathology, biochemistry, medical microbiology, transfusion medicine) and administration** is more problematic. There are no good direct measurements tools available but recent publications on distribution of pathologists' time give good guidelines. Recent "time studies" (please see appendix A) indicate that in a community setting that there should be 1 FTE devoted to CP and administration (includes all the functions to assure that the laboratory results are medically sound and accurate) to every 2 FTE devoted to Anatomic Pathology, i.e. **AP:CP = 2:1.** This ratio is a reasonable approach to determine the total pathologist FTE needed in the 6 community institutions in this study.

For St. John's laboratory which is devoted only to AP, the situation must be tailored to meet its many goals placed on it. In addition to its routine anatomic pathology service work which is easily calculated by the L4E model, it also serves the province as the **tertiary, esoteric, referral,** *and* **academic centre** *with undergraduate and graduate training programs*, and time allocated to **research activities.** Similar time studies in various academic institutions give reasonable methods to determine the FTE needed to fulfill non-consultation functions, namely academic and administrative.

- **Academic function:** It is recognized that it is less efficient when signing out cases with residents. There is no study to indicate the reduction in efficiency and the appropriate time needed for other teaching/academic purposes. The reduction can be inferred from time studies from other specialties. Time motion study on 11 full time emergency physicians indicates that supervision of trainees consume 22.3 to 27.3% of their time[10]. Discussions at the recent Canadian Association of Pathologists for Manpower in Ottawa indicate that it takes approximately 25% more time to sign out cases in the presence of residents

(Ontario). Time motion study done in the University of Texas Health Science Center at San Antonio shows that clinical teaching makes 11.4% of a clinical faculty time, with further 12 % devoted to preparation and giving lectures and group teaching (which is now more prevalent with problem based teaching) for a total teaching time of 23.4% [11]. The PathFocus study from over 200 institutions indicates that teaching and academic activities in universities and in institutions with residents consume 23.76% and 26.47% respectively. The detailed study in Calgary laboratory system shows that academic pursuits take approximately 12% of the time for A.P. pathologists, but this is average for the whole laboratory which includes academic as well as community pathologists. These studies indicate that for an academic department, physicians devote approximately 20-25% of their time in academic functions.

- **Administrative function**: In the study from San Antonio, pure administrative function takes 8.3% and administration relation to academic functions takes an additional 3.9%, for a total of 12.2%. Usually administrative function is a fixed "cost". In my study, the highest proportion (approximately a third) chose complexity of the department as the best predictor of FTE needed for administration out of a possible 10 choices. St. John's department though small is of the highest complexity level as it is a tertiary laboratory and academic centre with a medical school. As a relatively small department the administrative overhead for St. John's will be higher than The Department in San Antonio (18 members in St. John's vs 987 who completed the survey in San Antonio) rate of 12.2%. The detailed time study in Calgary also indicates that Administrative functions vary from 24.5% in AP to a high of 46.8% in Biochemistry. This rate is for laboratory as a whole which includes both academic and non-academic laboratories within the Calgary laboratory system. The PathFocus data also shows Administration and Management taking on average 22% and 25% in institutions with residents and in university laboratories. These published studies indicate that administrative functions take approximately 20-25% of the human resources for a properly run academic department.

3. Method

The necessary stats were requested from each institution using a standard form (see appendix F). Follow up discussion(s) with each institution was done to clarify and identify unique situations of each region. In addition, one representative month's worth of reports without patient identifiers - surgicals and non-gyne cytology were requested and the levels assigned to each report according to the L4E model (see Appendix B)[12].

- **Anatomic Pathology Service work:** The total work done in Anatomic Pathology was calculated using the L4E model as published. This gives the recommended FTE need to perform regular anatomic pathology (no academic and referral functions) in each institution. The FTE calculated includes the regular professional development, CME and educational work done by pathologists in a community setting of approximately 15%.

- **Clinical Pathology and Adminstration in Community Laboratories**: For the community hospitals, I have used the **AP:CP+administration ratio of 2:1** to determine the appropriate FTE need to fulfill all the duties adequately, i.e. anatomic pathology, clinical pathology (hematopathology, medical microbiology and clinical biochemistry) and administrative function (to assure that the laboratory services provide is medically sound and accurate).

- **St. John's Laboratory**: At St. John's Laboratory as discussed in the above section, in addition to the medical consultative work derived from L4E model, an extra 40 to 50% will be needed to fulfill its **academic (20-25%) and administrative (20-25%) functions.**

4. Results

The analysis of the information provided indicates that the AP workload in terms of L4E in each centre is as follows

	James Paton	Central West	Western Memorial	Eastern	Rural Avalon	St. John's	Charles S. Curtis
L4E/year	6,239.33	6,349.10	11,822.95	4,015.26	3,063.58	36,236.16	2,860.07

The work volume per FTE for a pathologist doing nothing but Anatomic Pathology medical consults is 3455 L4E.

Using these numbers the number of FTEs needed to perform the AP consultation for each region is calculated.

	James Paton	Central West	Western Memorial	Eastern	Rural Avalon	St. John's	Charles S. Curtis
AP FTE needed	1.81	1.84	3.42	1.16	0.89	10.49	0.83

As described in methods, for the community hospitals, an AP:CP+administration ratio of 2:1 is used to determine the total FTE to perform the necessary medical consultations in AP and CP, and the necessary administrative work. St. John's Laboratory is not included as it is a tertiary academic institution and does only anatomic pathology. ***It is to be noted that each region have unique services and functions that needs additional resources.*** Sessional payments should be considered for these extra functions. For details please see Appendix H.

	James Paton	**Central West**	**Western Memorial**	**Eastern**	**Rural Avalon**	**Charles S. Curtis**
Total Pathology service AP+CP+Administration	2.71	2.76	5.13	1.74	1.33	1.24
Extra Functions						
James Paton	3 regional labs, some teaching and mentoring					
Central West	7 regional labs, infection control and consult, gyne Pap lab					
Western Memorial	5 hospital and 1 D&T labs, provincial gyne cyto program, cancer case reviews, some research activities					
Eastern	1 hospital and 3 D&T labs					

Rural Avalon	3 hospital labs, some mentoring
Charles S. Curtis	6 hospital and 14 D&T labs, site visits and urgent AP service to Goose Bay & Labrador City, some research and teaching activities

For St. John's Laboratory, the following table shows the number of FTEs needed to provide AP medical consultation, academic activities and adequate administrative functions. The department is not involved in Clinical Pathology. In addition, if the department is to take the responsibility of being the consultative centre for difficult cases and act as the overflow centre for the province an additional 2 FTE is needed (see Appendix H). It is to be noted that this ***do not include the Pediatrics and Neuropathology service***, which is a separate service and the workload is not collected or included in the calculations.

	AP consultation	Academic	Administration	Consultation & overflow	Total
FTE needed	10.5	2.1 to 2.6 (20 to 25%)	2.1 to 2.6 (20 to 25%)	2	16.7 to 17.75

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5. Suggestions to improve pathology services

The following are suggestions only. These *must be tailored to the geographical, political, financial and other relevant factors* unique to the different regions of Newfoundland and Labrador.

5.1. Strategies for recruitment and retention of professional staff

Studies done have shown that there is *high turnover* rate of pathologists (provincial average of 32% in the last 4 years) in Newfoundland and Labrador, and has a *high vacancy rate* with *little success in recruiting pathologists* in the recent past. Of the 25 pathologists practicing in Newfoundland and Labrador, 9 are local graduates from Newfoundland, 1 from Ontario and 15 are foreign graduates. Foreign graduates tend to be older but duration of work in the region is much shorter than local graduates (more than 3 times if the median duration is considered). The stats of the lone Ontario graduate are similar to the foreign than to local grads. It indicates that though Newfoundland had been successful in attracting foreign graduates in the past because of much easier licensing and certification requirements for foreign graduates (not recently as other provinces has introduced similar systems), much more efforts are needed to retain them. The preponderance of older pathologists (average age 49 years), makes recruitment and retention of new graduate more urgent.

Description	Local Graduates	Foreign Graduates
age (average)	45.1	51.1
age (median)	45.5	52.0
work period in Newfoundland (average)	18.2	10.0
work period in Newfoundland (median)	22.0	7.0

There is an *international shortage of pathologists* including Canada. During a recent international conference (USCAP meeting), for the first time, there was a recruiting booth from Britain. Advertisements from Australia and New Zealand appear

frequently in Canadian publications. A recent cover of PathWay, a publication from the Royal College of Pathologists of Australasia, the cover headline is "Where are all the Pathologists? Medicine Endangered Species", and the editorial and lead article are related to Pathology workforce[13]. The demographics of the pathologists in Australia and New Zealand are similar to Canada. Stats from Canadian Association of Pathologists (CAP) indicate there is an overall shortage of pathologists in all the provinces and that the present pathologists are close to retirement age. Many provinces are developing various strategies to recruit and retain pathologists, and also encouraging retired pathologists to continue working part time.

Stable work force is essential for many reasons, including the ability to *subspecialize*, *proper QA/QI programs* (the recent problems in ER program is partly related to rotating staff at St. John's), maintaining and transfer of *institutional knowledge*, *proper planning and running of the department*, and *effective communication* with other clinical departments and administration. There are many issues that influence whether an individual chooses to stay or relocate. The changing demographics and attitudes of new pathologists are important to understand so that appropriate strategies can be formulated. As there is no study done for Newfoundland and Labrador specifically, most of the factors discussed will be drawn from a study done for the University of California, San Francisco.

5.1.1. Remuneration:

Although it is not the only reason, it is one of the **most important factors** when an individual decides on a job, especially for new graduates with a high debt load and high financial needs. Recent recruiting efforts have shown that the main reason given by the 16 applicants for declining job offers is the compensation level in Newfoundland and Labrador. The total compensation package in Newfoundland including the retention bonus is the lowest in Canada. The maximum compensation for a pathologist in St. John's is $185,318 (maximum pay scale for 2007 + maximum retention bonus) in contrast to the maximum income which is Ontario where the guaranteed annual income is approximately $325,000 to $330,000 (for 2007) + other income (medicolegal autopsy - $1000 for routine and $1400 for forensic, private consultation, administrative stipends, etc) + subsidized CMPA fees (negotiated by OMA). In the West (BC, Alberta, Manitoba and Saskatchewan) and Nova Scotia, the total compensation package is approximately $300,000, and in the other 2 Maritime Provinces and Quebec is approximately $220,000 (see appendix E).

5.1.2. Medical Students

Medical students are not exposed to and are thus unaware of what a pathologist does and the contribution of pathologists to the care of patients. They usually are exposed to pathology during their residencies in family practice or other medical specialties. Like the public, they think pathologists' main function is to perform autopsies. Grand rounds where medical students are exposed to pathology are usually based on autopsy cases, and thus the misconception. During grand rounds or during problem solving exercises, pathologists must take the opportunity to show other aspects of their work, and how they contribute to the total management of the patient. For example, have some case discussed during grand rounds be based on a oncology case where pathology findings

were interesting and had major contribution to the care of the patient. Other advantages of a pathologist, like life style of pathologists with regular hours, interesting, varied and challenging work, the ability to bridge basic science to clinical work, the opportunity to do basic as well as clinical research, being a doctors' doctor and having a wide breath of knowledge spanning all other medical specialties must be stressed and communicated to the medical students. This is especially important in Newfoundland and Labrador as imported pathologists are not as stable as local graduates.

5.1.3. Flexibility in work schedule:

To permit pathologists to adjust to personal and family demands. This is especially important for female pathologists (who are making a higher percent of new graduates) to meet demands of starting families and also to look after aging parents. Flexibility for sabbatical and other learning / upgrade opportunities must also be considered, which is needed to upgrade skills and subspecilize at St. John's.

5.1.4. Work/life balance:

New physicians unlike physicians of "old" are not willing to sacrifice family and other aspects of life for the unlimited demands of the profession. An elimination of the institutional culture of rewarding unlimited availability for work is needed so that all physicians can maintain a reasonable work-life balance.

5.1.5. Departmental Mentoring:

This is important in recruiting and retaining new pathologists in the department. This should be formalized together with proper orientation of new recruits as to the procedures, opportunities and benefits offered the department and the institution.

5.1.6. Opportunity to sub specialize:

This is important to maintain St. John's centre as the tertiary and reference laboratory for Newfoundland and Labrador. It is especially important for academically oriented pathologists, who like to subspecialize.

5.2. Exclusion list:

It was noted during the categorization of specimens from the regions that there were no exclusion lists in all the regions. Many specimens in which pathological examination has no medical and legal importance can be discarded in the site of the procedure after documenting that the gross appearance of the specimen by the physician. If there is any suspicion by the clinician for any reason, either clinical or gross appearance, these specimens can be forwarded to the laboratory at the discretion of the clinician. The exclusion list is the joint effort of the department of pathology and other relevant clinical departments, and endorsed by the local or regional Medical Advisory Committees (MAC). Enclosed are exclusion lists from 2 institutions in British Columbia (see appendix D). This will reduce the workload of

the pathologists without sacrificing patient care, and thus free pathologist to do more valuable functions.

5.3. Regionalization:

Many of the centres in Newfoundland are small and have 1 to 2 pathologists. Only 2 centres are relatively large with 5 and 18 FTEs respectively. It is important that there is co-ordination between the centres to be able to cover 24/7 for on-call and regular duties so that the pathologists will have reasonable free time. This is important for recruitment as well as retention of pathologists.

5.3.1. For on-call services:

Except in rare occasions will there be a need for physical attendance by the pathologists to cover on-call services. It is understood that physical attendance is required usually for medicolegal autopsy service and not for intraoperative consults. Medicolegal autopsy is not a service that needs attention at once. It may be beneficial to have combined on-call services between the regions so that there will be at least 1 in 4-5 on call rather than the onerous 1 in 1 to 2 on call. This can be arranged on a geographic basis or other more appropriate method.

5.3.2. Support to the smaller regions

Support to the smaller regions by St. John's and possibly by Western Memorial Regional Hospital. These are the two centres are large enough to built in the capacity to absorb additional work when one of the pathologists in the smaller regions is away on vacation, study leave, sick leave or other reasons for an extended period. It is recommended that these 2 centres especially St. John's have built in redundancies to accommodate this function.

5.3.3. Subspecialization

St. John's Hospital being the tertiary and academic centre should be the resource for consultation service to the whole province. This needs subspecialization of the pathologists. The rapid turnover of the pathologists in St. John's makes this difficult. Strategies to retain pathologists in the province are essential.

To accommodate the extra functions, i.e. expert consultation service (free of charge to the other pathologists in the province) and to adsorb work from the smaller centres at times of need, St. John's centre should have additional 2 more FTE.

5.4. Training of technologists to gross the very easy specimens

Biopsies and simple skin ellipses: Most of the institutions in Newfoundland are small with only 1-5 pathologists with only one with 14 pathologists. Pathologists' assistants (PA) are highly trained but also highly specialized. They are trained principally to gross specimens and in instances help with autopsy services. To use PAs efficiently

a critical volume is needed which will allow the PAs to be used gainfully for the whole day. Except for St. John's, the work volumes indicate that the gross time of approximately 1-2 hours in the smaller centres and 2-3 hours at Western Memorial Regional Hospital. In these centres, technologists can be trained to gross the simple specimens – i.e. levels 1, 2, 3 and 4, and some 5 under proper pathologists' supervision. This can be made efficient by having canned statements for many of the gross specimens. It is to be noted that for legal reasons, gross with no microscopic examination should be grossed by the pathologist. Technologists are more flexible than PAs as they can perform other technologist duties when not grossing. If properly implemented, this will reduce pathologists' workload without affecting the quality of work performed in the department.

5.5. Good support services:

Pathologists are highly paid and it is most efficient when they devote their time mostly to functions that cannot be delegated.

5.5.1. Good technical support:

Good technologists are essential for good quality laboratory results which are reliable and medically sound. They can perform many of the technical QA functions with minimal guidance from the pathologists. Good and timely histological slides, quick turnaround time for deeper levels and special studies allow the pathologists to be more productive. Access to newer technologies especially good, reliable and rapid immunohistochemistry through efficient regionalized service will be beneficial to patient care. It is understood that immunohistochemistry (IHC) is performed only at St. John's. Serious consideration must be made to have a second IHC lab in the Western Memorial Regional Hospital laboratory because of geographical conditions of Newfoundland. To have a proper turnaround time and service to the patients, an efficient IHC and special tests service to the smaller centres by St. John's (and Western Memorial Regional Hospital lab) with a 2-3 days turnaround from order to receipt of slides is needed.

5.5.2. Good Secretarial support:

The reports dictated by the pathologist are the principle way that the pathologists communicate their consults to the clinicians. Good transcriptionists help this process by making the process more efficient and effective. There will be less mistakes to correct and less chance of mistakes. Good transcriptions also catch the inconsistencies between the gross and microscopic descriptions to the final reports. They also help with the retrieval of relevant reports and slides for review.

5.5.3. Good IT support:

This is essential for many of the QA/QI reports needed to run and monitor the department effectively and efficiently. For examples:

5.5.3.1. Turnaround time for various laboratory tests and reports. Ability to read and edit transcribed reports and sign it out electronically shortens turnaround of Anatomic Pathology reports by at least 24-48 hours.

5.5.3.2. Correlation reports between frozen section diagnosis and final diagnosis and between cytology and surgicals, etc. This is essential for proper QA/QI activities that are now recommended by the Association of Directors of Anatomic and Surgical Pathology.

5.5.3.3. Ability to create minimal data sets for various malignancies allows the pathologist to meet standards and is the most effective method to produce the "perfect" report.

5.5.3.4. Ability to sort and create reports based on various criteria which can be used for QA/QI function (e.g. a report on the blood bank ordering pattern for a particular clinician(s) is the most effective tool in educating physicians on the efficient use of blood products and transfusion services)

5.5.3.5. Ability to record all internal and external consults and special studies with each specimen.

5.5.3.6. Ability to review past and current patient records.

Appendix A: Time Studies on Various Pathologist duties

Description of service	2002	2000	1998	1996
AP	66%	69%	65%	64%
CP	22%	21%	24%	26%
Academic	5%	4%	5%	6%
Others (? Admin)	7%	6%	6%	4%
AP:CP	3.0:1	3.3:1	2.7:1	2.5:1
AP:CP+Admin	2.3:1	2.6:1	2.2:1	2.1:1

The Royal College of Physicians and Surgeons of Canada Recommendations			
	Population served by 1 FTE	FTE/million	Ratio
Tissue Pathology	25400	39.37	3.13
Clinical Pathology	79450	12.59	1

College of American Pathologist, PathFocus data[14]				
	AP:CP Consult	AP : CP+Adm	OTHER :PD+T+R	PD+T+R% (academic / Education)
hospitals without residents	17.67	1.96	10.11	9.00%
hospitals with residents	10.00	1.54	2.78	26.47%
hospital/clinic hybrids	17.00	1.96	11.38	8.08%
independent or commercial labs	error	2.50	14.33	6.52%
university hospital	20.00	1.48	3.21	23.76%
AP = Anatomic Pathology; CP = Clinical Pathology; PD = professional development; T = teaching; R = research				

Appendix B: Rules for Level 4 Equivalent Model

The first (BCMA guideline – Modified shows how cases are categorized to each level and the second document shows the details for each organ system.

1. BCMA guideline (MODIFIED)

For levels 1 to 4:

Counting of number of levels on a case – Each specimen with a separate medical and legal responsibility will be counted separately. Therefore
- 2 vas for sterilization is level 2 x 2,
- bilateral reduction mammoplasties is level 4 x 2,
- 3 colonic biopsies for adenoma will be level 4 x 3

Exceptions are:

- if the biopsies are from one organ and is for one disease but submitted in single or multiple containers, if the biopsy pieces are 4 or less, they are categorized in the respective level, but if the pieces are 5 or more, it is categorized one level up to account for the work done.
  e.g. multiple biopsies for Barrett's esophagus, if the biopsy fragments are 4 or less, considered to be level 4 x 1, if 5 or more, considered to be level 5 x 1
  - follow up ulcerative colitis biopsies in 4 containers with one biopsy in each container, total biopsy fragments is 4 , considered to be level 4 x 1
  - follow up ulcerative colitis biopsies in 4 containers with 2 biopsies in each container, total biopsy fragments is 8 , considered to be level 5 x 1
  - sextant prostate core biopsies, submitted in 1, 2 or 6 containers, because the biopsy fragments number 6, considered to be level 5 x 1

Levels 5 & 6: although specimens/organs are submitted in multiple container, but are related, they will be counted as one
e.g. Total abdominal hysterectomy and bilateral salpingo-oophorectomy for any malignancy be considered level 6 x 1, whether the specimen/s are submitted in one or more containers.
- Total abdominal hysterectomy and bilateral salpingo-oophorectomy for any benign condition be considered level 5 x 1, whether the specimen/s are submitted in one or more containers
- Two ovaries submitted for neoplastic condition, whether submitted together or separately is considered level 5 x 1

Category 1 : gross only examination, If the pathologist deems that microscopic examination is required, the specimen will not belong here.

- Amputated fingers or toes
- Aneurysm contents,
- Atheromatous plaques
- Bone for identification
- Calculus
- Foreskin from children (<16 yrs)
- Intervertebral disc fragments
- Meniscus
- Nasal cartilage
- Other plastic procedures
- Prosthesis
- Skin from rhitidectomy
- Teeth
- Tonsils under age 16
- Varicose veins
- Etc

Category II - Confirmation of normality Small specimens submitted for confirmation of normality by gross and microscopic examination

- appendix, incidental removal
- fallopian tube, sterilization
- fingers/toes, amputation, traumatic, requiring histology
- hernia sac, any location
- Hydrocele sac
- nerve, vagotomy
- products of conception – therapeutic abortion
- skin: plastic repair
- sympathetic ganglion
- testis, castration for carcinoma prostate
- vaginal mucosa, incidental to vaginal repair
- vas deferens: sterilization
- etc.

Category III - Confirmation of common degenerative and inflammatory conditions and common benign

- Abscess
- aneurysm - arterial/ventricular
- appendix, other than incidental
- artery, atheromatous plaque requiring histoloqv
- bartholin's gland cysts
- bone fragment(s), other than pathologic fracture
- bursa/synovial cysts
- carpal tunnel tissue
- cartilage, shavings
- chotesteatoma
- colon, colostomy stoma
- conjunctiva for pterigium
- cornea
- diverticulum - esophagus/small bowel
- dupuytren's contracture tissue
- femoral head, other than fracture
- fissure/fistula in ano
- foreskin, other than newborn
- ganglion cyst
- hematoma
- hemorrhoids
- hydatid of morgagni
- intervertebral disc
- joint, loose body
- meniscus
- mucocele, salivary
- neuroma - mortons/traumatic
- pilonidal cyst/sinus
- polyps, inflammatory - nasal/sinusoidal
- products of conception –missed /spontaneous abortion
- qall bladder
- **skin (<2cms in size) – all benign skin disorders other than benign skin adenexal tumors and basal cell carcinoma**
- soft tissue, debridement
- soft tissue, lipoma
- spermatocele
- tendon/tendon sheath
- testicular appendage
- thrombus or embolus
- tonsil and/or adenoids
- varicocele
- vein, varicosity

Category IV - Small specimens for diagnosis (Small specimens for diagnosis to include all endoscopic biopsies as well as small organs removed for benign conditions)

- artery, biopsy
- bone marrow biopsy
- bone, exostosis
- brain/meninges, other than for tumour resection
- breast biopsy, needle core; breast, reduction mammoplasty
- bronchus. biopsy
- cell block, any source
- cervix, biopsy
- endocervix, curettings/biopsy
- esophagus, biopsy
- extremity, amputation, traumatic
- fallopian tube, biopsy
- fallopian tube, ectopic pregnancy
- femoral head, fracture
- fingers/toes, amputation, non-traumatic
- **FNA – performing initial screen and reporting to clinician like intraoperative consult**
- **FNA –performing the procedure (procurement)**
- **FNA interpretation**
- GI biopsy
- Gingival/oral mucosa, biopsy
- heart valve
- joint, resection
- larynx, biopsy
- leiomyomas(s), uterine myomectomy - w/o uterus
- lip, biopsy/wedge resection
- lung, transbronchial biopsy
- lymph node, biopsy
- material passed per vagina or through other orifice
- nasal mucosa, biopsy
- omentum, biopsy
- ovary w/wo tube, non-neoplastic
- ovary, biopsy/wedge resection
- parathyroid qland
- peritoneum, biopsy
- placenta, other than third trimester
- pleura/pericardium - biopsy/tissue
- polyp, cervical/endometrial
- polyp, colorectal
- polyp, stomach/small bowel
- prostate, needle biopsy
- prostate, TUR
- salivary gland, biopsy
- sinus, paranasal, biopsy
- **skin (<2 cms) – all malignant and borderline skin tumors (that require assessment for re-excision) other than basal cell carcinoma; and all inflammatory skin disorders**
- **Skin (=>2cms) – all biopsies regardless of diagnosis (other than for plastic surgery)**
- soft tissue, other than tumour/mass/lipoma/debridement
- spleen
- synovium
- testis, other than tumour/biopsy/castration
- thyroglossal duct/branchial cleft cyst
- tongue, biopsy
- trachea. biopsy
- urogenital tract, biopsy
- uterus w/wo tubes and ovaries, for prolapse

- nasopharynx/oropharvnx. Biopsy
- odontogenic/dental cyst
- vagina, biopsy
- vulva/labia, biopsy
- etc.

Category V – Complex biopsies or small whole organs (These specimens include specialized biopsies and excisions. Specimens of category IV that are multiple or that require special studies may be elevated to this category.)

- adrenal, resection
- bone- biopsy/currettings
- bone fragment(s) pathologic fracture
- brain, biopsy
- brain/meninges, tumour resection
- breast, lumpectomy alone;
- cervix, cone biopsy or LEEP
- colon, segmental resection, other than for tumour
- extremity, amputation, non-traumatic
- eye, enucleation
- FNA – performing the procedure and initial stain and screen on the specimen to determine adequacy and provisional diagnosis like an intraoperative consult.
- kidney – biopsy
- kidney, partial/total nephrectomy
- larynx, partial/total resection
- liver, biopsy - needle/wedge
- liver, partial resection
- lung, wedge biopsy or wedge excision
- lymph nodes, regional resection
- mediastinum, mass; muscle, biopsy
- nerve, biopsy
- myocardium, biopsy

Category VI - Large complex organ requiring extensive gross dissection and microscopic assessment (all radical surgeries for malignancies)

- bone, resection
- breast, mastectomy, partial or full, w/wo regional lymph nodes
- colon, segmental resection for tumour
- colon. total resection
- esophagus, partial/total resection
- extremity, disarticulation
- fetus, w/dissection
- larynx, partial/total resection -w/w0 regional lymph nodes
- lung - total/lobe/segment resection
- neoplastic vulva - total/subtotal resection.
- pancreas - total/subtotal resection
- prostate, radical resection
- small intestine resection for tumour
- soft tissue tumour, extensive resection
- stomach - subtotal/total resection tumour
- testis. tumour
- thyroidectomy plus neck dissection
- tongue/tonsil - resection for tumour
- urinary bladder, partial/total resection
- uterus w/wo tubes and ovaries

Specimens in alphabetical order and their levels	
Abscess	3
adrenal, resection	5
Amputated fingers or toes	1
aneurysm - arterial/ventricular	3
Aneurysm contents,	1
appendix, incidental removal	2
appendix, other than incidental	3
artery, atheromatous plaque requiring histology	3
artery, biopsy	4
Atheromatous plaques	1
bartholin's gland cysts	3
bone- biopsy/currettings	5
Bone for identification	1
bone fragment(s) pathologic fracture	5
bone fragment(s), other than pathologic fracture	3
bone marrow biopsy	4
bone, exostosis	4
bone, resection for tumor	6
brain, biopsy	5
brain/meninges, other than for tumour resection	4
brain/meninges, tumour resection	5
breast biopsy, needle core; breast, reduction mammoplasty	4
breast, lumpectomy alone;	5
breast, mastectomy, partial or full, w/wo regional lymph nodes	6
bronchus, biopsy	4
bursa/synovial cysts	3
Calculus	1
carpal tunnel tissue	3
cartilage, shavings	3
cell block, any source	4
cervix, biopsy	4
cervix, cone biopsy or LEEP	5
chotesteatoma	3
colon, colostomy stoma	3
colon, segmental resection for tumour	6
colon, segmental resection, other than for tumour	5
colon, total resection for tumor	6
conjunctiva for pterigium	3
Cornea	3
diverticulum - esophagus/small bowel	3
dupuytren's contracture tissue	3
endocervix, curettings/biopsy	4
esophagus, biopsy	4
esophagus, partial/total resection for tumor	6
extremity, amputation, non-traumatic	5
extremity, amputation, traumatic	4
extremity, disarticulation	6
eye, enucleation	5
fallopian tube, biopsy	4
fallopian tube, ectopic pregnancy	4
fallopian tube, sterilization	2
femoral head, fracture	4
femoral head, other than fracture	3
fetus, w/dissection	6
fingers/toes, amputation, non-traumatic	4

Specimens in alphabetical order and their levels	
fingers/toes, amputation, traumatic, requiring histology	2
fissure/fistula in ano	3
FNA – performing initial screen and reporting to clinician like intraoperative consult	4
FNA – performing the procedure and initial stain and screen on the specimen to determine adequacy and provisional diagnosis like an intraoperative consult.	5
FNA interpretation	4
FNA –performing the procedure (procurement)	4
Foreskin from children (<16 yrs)	1
foreskin, other than newborn	3
ganglion cyst	3
GI biopsy	4
Gingival/oral mucosa, biopsy	4
heart valve	4
Hematoma	3
Hemorrhoids	3
hernia sac, any location	2
hydatid of morgagni	3
Hydrocele sac	2
intervertebral disc	3
Intervertebral disc fragments	1
joint, loose body	3
joint, resection	4
kidney – biopsy	5
kidney, partial/total nephrectomy	5
larynx, biopsy	4
larynx, partial/total resection	5
larynx, partial/total resection -w/w0 regional lymph nodes for tumor	6
leiomyomas(s), uterine myomectomy - w/o uterus	4
lip, biopsy/wedge resection	4
liver, biopsy - needle/wedge	5
liver, partial resection	5
lung - total/lobe/segment resection for tumor	6
lung, transbronchial biopsy	4
lung, wedge biopsy or wedge excision	5
lymph node, biopsy	4
lymph nodes, regional resection	5
material passed per vagina or through other orifice	4
mediastinum, mass; muscle, biopsy	5
Meniscus	1
meniscus	3
mucocele, salivary	3
Nasal cartilage	1
nasal mucosa, biopsy	4
nasopharynx/oropharynx, Biopsy	4
neoplastic vulva - total/subtotal resection for tumor	6
nerve, biopsy myocardium, biopsy	5
nerve, vagotomy	2
neuroma - mortons/traumatic	3
odontogenic/dental cyst	4
omentum, biopsy	4
Other plastic procedures	1
ovary w/wo tube, non-neoplastic	4
ovary, biopsy/wedge resection	4

Specimens in alphabetical order and their levels	
pancreas - total/subtotal resection for tumor	6
parathyroid gland	4
peritoneum, biopsy	4
pilonidal cyst/sinus	3
placenta, other than third trimester	4
pleura/pericardium - biopsy/tissue	4
polyp, cervical/endometrial	4
polyp, colorectal	4
polyp, stomach/small bowel	4
polyps, inflammatory - nasal/sinusoidal	3
products of conception – therapeutic abortion	2
products of conception –missed /spontaneous abortion	3
prostate, needle biopsy	4
prostate, radical resection for tumor	6
prostate, TUR	4
Prosthesis	1
gall bladder	3
salivary gland, biopsy	4
sinus, paranasal, biopsy	4
skin (<2 cms) – all malignant and borderline skin tumors (that require assessment for re-excision) other than basal cell carcinoma; and all inflammatory skin disorders	4
skin (<2cms in size) – all benign skin disorders other than benign skin adenexal tumors and basal cell carcinoma	3
Skin (=>2cms) – all biopsies regardless of diagnosis (other than for plastic surgery)	4
Skin from rhitidectomy	1
skin: plastic repair	2
small intestine resection for tumour	6
soft tissue tumour, extensive resection	6
soft tissue, debridement	3
soft tissue, lipoma	3

Specimens in alphabetical order and their levels	
soft tissue, other than tumour/mass/lipoma/debridement	4
Spermatocele	3
spleen	4
stomach - subtotal/total resection tumour	6
sympathetic ganglion	2
synovium	4
Teeth	1
tendon/tendon sheath	3
testicular appendage	3
testis, castration for carcinoma prostate	2
testis, other than tumour/biopsy/castration	4
testis. tumour	6
thrombus or embolus	3
thyroglossal duct/branchial cleft cyst	4
thyroidectomy plus neck dissection for tumor	6
tongue, biopsy	4
tongue/tonsil - resection for tumour	6
tonsil and/or adenoids	3
Tonsils under age 16	1
trachea. Biopsy	4
urinary bladder, partial/total resection for tumor	6
urogenital tract, biopsy	4
uterus w/wo tubes and ovaries for tumor	6
uterus w/wo tubes and ovaries, for prolapse	4
vagina, biopsy	4
vaginal mucosa, incidental to vaginal repair	2
Varicocele	3
Varicose veins	1
vas deferens: sterilization	2
vein, varicosity	3
vulva/labia, biopsy	4

2. Guidelines to using the L4E Model for workload study

Introduction:

The initial work done in the Fraser Health Authority, Kamloops and Southern VIHA with respect to capturing the Anatomic pathology workloads demonstrated significant variation in the way the workload was captured, especially the way the BCMA fee guide was interpreted and the L4E model of Raymond Maung applied. In order to minimize the variation in interpretation, the representatives from VIHA, FHA and IHA (Kamloops) agreed on certain conventions and assumptions.

The 2002 BCMA guide divides the surgical biopsies into six categories based on case complexity. It also lays down rules regarding multiple specimens, but these are open to inter-observer interpretation bias. An attempt will be made to define these rules and assumptions in greater detail. It must be pointed out that the system of categorization of cases that is proposed and that will be used for workload assessment, although generally based on the 2002 BCMA anatomic fee schedule, has been modified in that each specimen will be given a separate fee assignment. It must be stressed that this categorization and assignment of fee codes for each specimen does not reflect the way various pathology groups are currently billing for AP work.

Conventions and Assumptions:

Dealing with multiple specimens per case: We agreed to assign fee codes to all specimens in any individual case belonging to categories 1 through 4 of the BCMA fee guide. Thus, two vas deferens/ fallopian tubes submitted in one or separate containers will be counted as two fee code 2s. Likewise five nevi submitted in one or multiple containers will be assigned five category 3s.

However, it was agreed that fee categories 5 and 6 are supposed to capture case complexity and that cases be assigned one category 5 or 6 in spite of the presence of multiple specimens. **For example** a case of a breast excisional biopsy/mastectomy submitted with lymph nodes and multiple margins in multiple separate containers is assigned one category 6.

Same for colon/ lung/ bladder/ prostate/ stomach resections. These cases may be submitted in multiple containers with lymph nodes and margins often submitted in separate containers. Such cases would be assigned one category 6 in spite of the presence of multiple containers. There may be exceptions to this rule. One does encounter cases with bilateral mastectomies with lymph node resections. Such a case would count as two category 6s.

Rules for skin biopsies:

1. Each specimen will be assigned a code where there is more than one specimen per case.
2. All malignant lesions, i.e., squamous cell carcinoma, melanoma, etc will be assigned a category 4 with the **exception of basal cell carcinoma which is a category 3.**

3. The codes are assigned on the basis of final pathologic diagnosis and not on the grounds of clinical diagnosis or the type of procedure – punch, incisional or excisional biopsy.
4. Benign nevi are category 3. Dysplastic/atypical nevi are categorized as level 4. The categorization of nevi into the dysplastic or atypical categories may be based on clinical or pathological grounds and these nevi will be categorized as a level 4 irrespective of the grade of atypia/ dysplasia.
5. All benign tumors/lesions (except benign adnexal tumors) are assigned a category 3. Some examples of benign tumors/lesions include hemangioma, pyogenic granuloma, dermatofibroma, seborrheic keratosis, actinic keratosis, lichenoid keratosis, verruca vulgaris, fibroepithelial polyps, etc.
6. All adnexal tumors, benign or malignant, will be assigned a fee code 4.
7. All inflammatory dermatoses will be assigned a fee code 4.
8. Re-excisions to be categorized on the basis of original diagnosis and/or size of the specimen. Thus a re-excision for squamous cell carcinoma or melanoma is a category 4, while that for basal cell carcinoma is a 3. However, re-excisions greater than 2 cm are a category 4, regardless of the original diagnosis.

"and/or" may make if clearer.

9. Size based criterion: All excisional biopsies greater than 2 cm, irrespective of diagnosis, are categorized as 4.

   For Basal cell carcinoma, re-excisions greater than 2 cm are assigned a fee code 4, while as re-excisions less than 2 cm are assigned fee code 3.
10. Non-specific diagnoses including non-specific ulcer; acanthosis; hyperkeratosis; nonspecific inflammation are to be coded as category 4, the rationale being that although non-specific, these cases may require a significant input including deeper levels, etc, before a final non-specific diagnosis is rendered.
11. Scars excised for cosmetic purposes (burn or trauma related) will be coded as a category 3 irrespective of the size of the specimen.

Rules for GI biopsies:

1. An increasing number of patients have biopsies taken from several areas of the GI tract in the same sitting. It is not unusual to have specimens from the same patient submitted from the esophagus, stomach, duodenum, ileum and/or colon. Each of these specimens is assigned a category 4. Thus, for example, in a case where biopsies from GE junction, duodenum and colon are submitted in separate containers, one would assign three category 4s.
2. If five or more tissue fragments are submitted from a site, in one or separate containers, a single category 5 rather than multiple 4s will be assigned. Examples are multiple biopsies taken from the lower esophagus for diagnosis or follow up of patients with Barrett's metaplasia or from the colon in patients with follow up of Ulcerative colitis for dysplasia. It is usual practice to receive more than 5 tissue fragments in these cases, mostly in different containers, but sometimes within one container. Such cases are assigned a single category 5.
3. Colonic polyps will each be assigned a category 4. Thus if four colonic polyps are received on a single patient in different containers, each would count as a

separate category 4 specimen and the case would be assigned four category 4s.
4. Anal canal polyps (FEPs) are a category 4, while as those from the perianal skin are a category3.
5. Core biopsy of liver irrespective of the diagnosis is a category 5.

Rules for female genital tract:

1. Hysterectomy with/ without tubes and ovaries is assigned one category 5, except when performed for prolapse when it is categorized as a 4 or for malignant neoplastic lesions, when a single category 6 is assigned.
2. Uterus and ovary may be submitted in one container and the other ovary with a benign cyst, inflammation or endometriosis in a second container. Such cases should be counted as a single category 5.
3. Borderline ovarian tumor is assigned a single category 5. Bilateral borderline ovarian tumors are assigned a single category 6 for the entire case. This may be accompanied by a uterus as well. It still qualifies for a single Category 6.
4. Two ovaries submitted in separate containers get one category 4, 5 or 6, depending on the disease process. These will not be counted as two separate specimens.
5. Paratubal cysts are counted as a single category 4.
6. Hysterectomy specimens may come with portions of small/ large bowel or urinary bladder. The entire case will be categorized as a single 5, if the final diagnosis is a benign entity such as endometriosis or a single category 6, if a malignant diagnosis is established.
7. Endometrial curettings and endocervical curettings are often submitted from the same patient in two separate containers. Each is assigned a category 4.
8. Cone biopsy or LEEP excision of cervix for dysplasia is a category 5. If an endometrial curetting sampling is submitted as well, this is given a category 4 in addition to the category 5 for cone biopsy. Often cone biopsy, endocervical and endometrial curettings will be submitted in the same case. Such a case would be assigned a category 5 (for the cone and endocervical curettings) and 4 for endometrial curettings. The endocervical curettings in this case do not get a separate categorization.
9. Both endometrial and endocervical polyps are assigned category 4.
10. Endometrial curettings and an endometrial polyp may be submitted in two separate containers. These together account for one category 4.
11. Cases with cervical biopsy and endocervical curettings performed for evaluation for dysplasia and submitted in two separate containers are assigned a single category 4.
12. Vulvar biopsy for Vulvar dystrophies is assigned a category 4. If more than one biopsy is submitted in separate containers, all will be assigned a category 4.
13. Singleton placenta is categorized as a 4, while as twin placentas as a 5.

Rules for breast specimens:

1. Breast needle core biopsies: Category 4. If more than 4 cores in container, the case should be assigned a category 5.
2. Bilateral needle core biopsies of breast: Assign each side a category 4 o5 as per above.
3. Breast lumpectomy alone- benign or malignant is a category 5.

4. Breast – mastectomy partial/full with or without nodes is a category 6.
5. Breast lumpectomies for cancer may have additional margins submitted in separate containers. The entire case gets one category 5.
6. Breast reduction mammoplasty is category 4. Bilateral mammoplasty specimens to be counted as 2 category 4s.
7. Breast implant is a category 1. Bilateral implants to be counted as two category 1s.
8. Breast capsules, where gross and micro have both been done, are assigned category 3. Bilateral capsules will be counted as two 3s.
9. Gynecomastia is categorized as a single 3 if unilateral and in cases where bilateral specimens are examined, these are counted as two categories 3.

Rules for Miscellaneous:

1. Nasal polyps and paranasal sinus curettings for chronic sinusitis are categorized as 3 and two levels 3 in case of bilateral specimens.
2. Products of conception will often be submitted in more than one container. This should be assigned one category 3 rather than multiples 3s, as long as the specimens have been entered as a single accession. **If these are therapeutic abortions, a category 2.**
3. Bilateral tonsils will be counted as two levels 1, 2 or 3 depending on whether or not micro was done and on the age of the patient.
4. Larynx/Vocal cord biopsies from more than one site (say, from rt and left vocal cords) will be counted as a single category 4 or 5 depending on the total number of biopsy fragments. A category 5 if five or more fragments, otherwise a category 4.

Rules for FNA procurement:

1. If FNA is performed by a pathologist and a rapid Diff-Quick assessment for specimen adequacy is not done, the case is assigned a category 4 for procurement.
2. If FNA is performed by a pathologist who also does a quick assessment for specimen adequacy, a category 5 is assigned.
3. If FNA is performed by a radiologist, a category 4 is assigned only if a rapid Diff Quick assessment was performed by the pathologist, otherwise no value is assigned as the specimen is procured by a radiologist.
4. All FNA interpretations will be assigned a category 4.

I have compiled the rules we discussed and agreed upon in a teleconference with Raymond Maung from Kamloops and Doug Sawyer from Victoria. I am sure more rules will be defined and refined as we move on to further iterations of our initial work.

Appendix C: Benefits of Autopsy Service

Benefits of Autopsy services

Family	1) Discovering inherited or familial diseases may help families through early diagnosis and treatment and in family planning. This is usually incidental findings and not symptomatic at the time of death. a) Discovering advanced atherosclerosis in a young motor vehicle accident victim will prompt investigations in the family for hyperlipidemia, diabetes mellitus and other conditions that promote atherosclerosis b) Finding pulmonary emboli in a young individual who died suddenly will initiate investigations for hypercoagulable conditions in the family. 2) Uncovering evidence of work-related disease may lead to compensation for the family 3) Mesothelioma and confirmation of exposure to asbestos at occupation, either current or remote. 4) Providing crucial evidence for the settling of insurance claims or death benefits may result in benefits for the family. 5) Discovering an unexpected infectious condition will initiate screening of all contacts of the deceased, most of which will be family members or close friends. 6) Tuberculosis, HIV, meningococcal infections, etc. will initiate infection control for the family as well as the public. 7) Finding a specific cause of death may simply ease the stress of the unknown. 8) Finding that diagnosis and treatment was appropriate may be comforting to the family. 9) Knowledge that the death of a loved one has helped someone to live longer may ease the profound sense of loss experienced by families.
Society	1) By detecting infectious disease earlier (with widespread world travel and movement of people), plan for infection control earlier and more effectively 2) clustering of pathology according to the micro-geography may give etiological clues (e.g. infections, pollutions, etc)
Long term	1) Can be used as an effective QA for patient care 2) Understand pathogenesis and presentation of disease better 3) Understand the limitation or confirmation of new diagnostic methods 4) Detect "medical error" and complications, and devise systems to prevent future misadventures 5) By being able to document the disease and causes of death more accurately, provide better vital statistic which is widely used for allocation of resources 6) Calculation of sensitivity and specificity for a variety of pre-mortem clinical diagnoses when compared with the autopsy findings 7) A very important resource for research and education if properly managed. 8) Detect and characterize new and emerging diseases. e.g. Legionnaire's disease, AIDS, pulmonary hantavirus, SARS.

Appendix D: Exclusion Lists

List of Exempt Specimens (Vancouver Island Health Authority – South)

- Skin for Skin Bank
- Bone for Bone Bank
- Varicose Veins
- Hernia Sacs
- Tonsils, Adenoids (under 17 years of age)
- Teeth
- Cataracts
- Prosthesis - includes plates, intramedullary nails, screws
  (Exception: All breast implants will be sent to the Lab)
- Drains and Tubes
- Toenails
- Bunions
- Placentas (with some exceptions, eg. cytogenic studies)
- Ureteric Stents
- Pacemakers
- Hemmorrhoidal Tissue
- Meniscus Shavings
- Arthroscopy Shavings
- Bone Chips (eg: arthrodesis)
- Tissue from Septal Reconstruction and Intranasal Antrostomy
- Vaginal Wall Tissues Excised During Repair

Specimen submission to Pathology (Royal Inland Hospital – Kamloops)

Ideally all tissues, cells and other specimens derived from patients should be submitted for pathologic examination. This allows not only documentation of suspected or unsuspected diseases, but also provides independent documentation of procedures for audit purposes.

There are however, a number of specimens where the additional information from routine pathology examination is generally of minimal value. The following list of such specimens has been developed and routine submission to Pathology is not mandatory. However, in all of these exceptions the specimen can still be sent to Pathology if requested by the surgeon. For those specimens not submitted to Pathology a detailed description of these specimens by the appropriate clinician should be included in the patient record.

Tissues exempt from routine submission to Pathology:

General Surgery/Plastic Surgery:

a) Calculi (renal, ureteral, bladder)
b) Clinically normal tissue removed during cosmetic procedures (e.g. blepharoplasty)
c) Fat contents from liposuction
d) Fecaliths
e) Inguinal hernia sacs in adults
f) Mammary Implants – Risk Management says send to lab
g) Medical devices not contributing to patient illness, injury or death (e.g. gastrostomy tubes, stents, sutures)
h) Tissue expander implants
i) Tissue from cosmetic repair from the nose, ear and face
j) Toenails and fingernails that are grossly unremarkable

Gynecology:

a) Intrauterine contraceptive devices without attached soft tissue
b) Placentas delivered by Cesarean Section that appear normal at time of delivery
c) Placentas from routine and uncomplicated pregnancies and deliveries that appear normal at time of delivery
d) Vaginal mucosa and vulvar skin (perineal body) removed during repair of rectocele and cystocele

Ophthalmology:

a) Extraocular muscle and tendon tissue removed during strabismus surgery
b) Iris removed at time of peripheral iridectomy c) Lens cataracts not otherwise specified

Oral Surgery:

a) Bone associated with extracted tooth
b) Dental appliances
c) Dental restorations
d) Hardware (arch bars, wires, bone plates, screws, etc)
e) Impacted teeth
f) Mobile primary teeth

g) Teeth not otherwise specified or removed for dental caries and periodontal disease

Orthopedics:
a) Bone harvested for bone bank (whether submitted or not)
b) Bone from osteotomies
c) Bone segments removed as part of corrective or reconstructive orthopedic procedures (rotator cuff repair synostosis repair, spinal fusion)
d) Bunions
e) Femoral heads for fracture or degenerative acetabular reamings
f) Intervertebral discs
g) Knee joints removed for degenerative joint
h) Menisci and shavings from arthroscopy
i) orthopedic appliances (hardware) and other devices removed at surgery
j) Synovium from reconstruction (e.g. anterio
k) Toes removed for functional deformity (e.g claw toes)
    1) Skin scar (from previous surgery)

Otolaryngology:
a) Cartilage or bone removed during septoplasty, rhinoplasty or septorhinoplasty
b) Middle ear (myringotomy) tubes
c) Nasal turbinates
d) otologic reconstructive or other appliances removed at surgery
e) Tonsils and adenoids in patient of any age
f) Pharyngoplasty (uvula) specimens removed for sleep apnea

Pediatrics:
a) Foreskin from circumcision of children of any age
b) Supernumerary (accessory) digits

Vascular:
a) Atherosclerotic plaques
b) Intravascular catheters
c) Arteries and Veins from peripheral vascular bypass procedures
d) Thrombus from arterial venous fistula
e) Thrombus from vascular grafts or mural thrombi removed during aortic aneurysm repair
f) Varicose veins
g) Vascular graft material

Appendix E: Pathologists' compensation survey

Interprovincial Compensation Comparison for the Specialty of Pathology			
Province	**Range**	**Comments**	**Additional Information**
Newfoundland Labrador	$141,600 to $169,920	5-step salaried scale. Does not include an annual retention bonus that varies based on geography and years of service. 'Range of retention bonus is $4,000 to $36,000. (Majority of Pathologists, in St. John's would top out at $12,000. Current on-call rate of $140.00. No third party billing.)	CME leave 2 weeks, can accumulate up to 5 years – get 120 days Can bill for non-insured services CMPA subsidy Health benefits ??? pension benefits
Quebec			
Prince Edward Island	$181,622 to $210,000	Four class-specialist scale. Pathologists are Class III. Single step. Do not provide on-call services. Salary quoted does not include up to $7000 per annum per Pathologist for Continuing Medical Education expenses. 37.5 hour week with superior after-hours and call payments.	
Nova Scotia	$249,696 to $254,690 $259,784 in 06-07	Rate quoted is for the Alternate Payment plan for Pathologists in Halifax only, per FTE (all inclusive). The Pathology revenue shares reported for 2006/06 ranged from $280,000 to $310,000.Arrangement quoted does not include smaller, regional arrangements.	$7000 relocation expense
New Brunswick	$197,418 to $222,950 (October 2007)	10% in lieu of benefits. Can also bill for autopsies, both during regular work hours ($480 - $670) and after hours (additional 35% premium on rates quoted) . Receive $80.80 per diem on call payment, with a call back fee of $130.68 ($182.95 evening, weekends and stat holidays, $235.22 after midnight). One time location grant of $40,000.	
Ontario	UMLC standard $300,000 to unlimited	As of 2004, a new MOU with the OMA was signed, creating a Uniform Minimum Level of Compensation (UMLC) per FTE, with no maximum and does not limit greater pay. UMLC for the fiscal year 2005/06 was $316,200, and estimated to be $330,000 for April 06/07. Includes compensation received from a hospital or hospitals, which is the value of salary plus benefits, or the value of fees received without benefits. Does not include fees for medico legal work, third party consultations, etc.	Hospital + top up from special fund, in 2007 estimated at total of approximately $330,000 Other sources of income - forensic autopsies ($1000 for simple and $1400 for complicated cases) - private lab work - admin stipends CME subsidy – approximately $200-300 out of pocket Estimated total income is $350,000
Manitoba	2 - step salary scale $228.883 to $256,595 in Winnipeg	Salary range quoted is applicable to Pathologists in the city of Winnipeg. Scale increasing to $228,883 - $256,595 as of April 01, 2007. Outside Winnipeg, salary scales are approximately $5-6,000 higher. Based on 40 hr week.	Other income - CME – up to $5200 (non-taxable), can be carried forward for a year - group benefits plan - basic disability, max 119 days - RRSP $8800

Interprovincial Compensation Comparison for the Specialty of Pathology			
Province	**Range**	**Comments**	**Additional Information**
			- site manager 5% - CMPA subsidy from MMA - bereavement, maternity / paternity leave - medicolegal autopsies income (in Winnepeg is pooled)
Saskatchewan	4-step salary scale $228,485 to $262,758	Department will fund up to a maximum of. $26,423 for benefits per full-time Pathologists.	Income confirmed; benefits $26,423 is non-taxable, has to apply Other income - medicolegal autopsies ($525 – routine, $575 – decomposed, $1000 – forensic) - CME - $2500
Alberta	4 step grid $267,974 to $311,725	Developed in 2001 based on the Vancouver Hospital grid. Includes a $7,000 CME allowance.	Annual pathologist cost to government is $311,725 +, will be updated soon as it is 3-4 years old Other income - medicolegal autopsies 670/case - on call is $80,000/per call group - CMPA subsidy present
British Columbia	$215,553 to $242,492	4 methods of payment, salary and fixed price contract are comparable to NL. This represents 57% of total Pathologists' Salary can be anywhere on the range, i.e.. Not a three-step payment grid.	$294,000 can be taken as contract without benefits or as salary with benefits (same cost to government) Other income (all contract and fee for service full time physicians receive it) - CMPA subsidy (pay about $200 out of pocket(- RRSP contribution (approximately $4000) - Disability pension (approximately $3000) - CME - $1200 - retention allowance for rural centres Most pathologists can have other income - Medicolegal autopsies ($815/case) - private laboratory work (limited to few pathologists only) - cancer case reviews (only at sites with cancer centres) - medical procedures (bone marrow biopsy / aspiration, FNA collecting the specimen, some clinical consults) - on call payment (to get details from Gerry): $18.13 an hour, do not count 8 working hours on working days. Pathologists unlike other physicians do not get procedure payment.

Appendix F: Form used to collect data

1. Name of institution, address - .....
   .....Phone:..... email .....
2. type of laboratory (marked all that is applicable to your laboratory)
   - ☐ tertiary or ☐ community
   - ☐ regional service to other laboratories - number of sites
     - ☐ hospitals with laboratory (no pathologists) - #.....
     - ☐ diagnostic and treatment centres - #.....
     - ☐ bleeding stations - #.....
   - ☐ referral centre (for ....., ..., ...)
   - ☐ other esoteric service (
     - ☐ flow cytometry,
     - ☐ cytogenetics,
     - ☐ molecular pathology,
     - ☐ others .....
   - ☐ others .....
3. academic
   - ☐ undergraduate medical students
   - ☐ residency for pathology
   - ☐ training for laboratory technology
   - ☐ research
   - ☐ others .....
4. Total Accessioned surgicals for the calendar year – also send a representative month (not December or summer holidays) of surgical to include the specimen type, gross description, diagnosis (best send the surgical report without patient demographics) #.....
5. Total Accessioned non-gyne cytology for the calendar year - also send a representative month (not December or summer holidays) of non-gyne cytology to include the specimen type, gross description, diagnosis (best send the cytology report without patient demographics)
   #.....
6. Total number of Intraoperative consults (Frozen section done or not) per year, #.....
7. Performing FNA on patients
   - ☐ FNA only, no immediate evaluation of specimen, #.....
   - ☐ FNA with immediate evaluation of specimen, #.....
   - ☐ Only evaluation of FNA done by other physicians to determine adequacy, #.....
8. Total Accessioned gyne cytology for the calendar year – if possible percentage reviewed by pathologists, #...../ year ; .....% reviewed by pathologist
9. Total Accessioned hospital autopsies for the calendar year – divide them into complete, partial or limited (to an organ) #.....full; #.....partial; #.....limited
10. Total Accessioned coroner/medical examiner autopsies for the calendar year – divide them into complete, partial or external only #.....complete; # .....partial; #.....external
11. Total number of external consults done for the calendar year (if possible divide them into consults for difficult cases and cases which are review routinely e.g. for cancer review for cancer clinic)
    #...../year; if possible .....% difficult cases and .....% routine review
12. Total number of blocks for the year, #.....
13. Total number of slides for the year, #.....
14. Population (for routine AP, not consultation service) served by the department;
    #.....
15. Number of FTE performing the work, use the following worksheet for calculation, ...
16. On call : frequency .....

Initial of pathologist	Service work	Academic work	Administrative work	Total

Service work – all patient related work - surgicals, cytology, autopsies, etc.
Academic work – professional development, teaching, training, research, etc.
Administrative work – laboratory administration, meetings, local provisional and national laboratory related meetings

Appendix G: Detailed analysis of workload and FTE calculation

1. Annual Workload at each centre

	James Paton	Central West	Western Memorial	Eastern	Rural Avalon	St. John's	Charles S. Curtis
accessioned	4,989.00	4,829.00	8,481.00	3,406.00	2,896.00	27,881.00	2,190.00
specimens	6,358.12	5,509.88	10,078.62	4,397.37	3,313.12	33,619.22	2,732.90
L4E	6,239.33	6,349.10	11,822.95	4,015.26	3,063.58	36,236.16	2,860.07
Blocks	14,226.00	15,304.00	18,921.00	8,400.00	5,898.00	95,000.00	4,534.00
Slides	20,318.00	21,299.00	26,524.00	16,000.00	8,472.00	198,000.00	13,600.00
population	53,000.00	65,000.00	82,000.00	51,300.00	50,000.00	200,000.00	40,500.00

2. Workload per Anatomic Pathology FTE

Parameter measurement	Regression analysis
Accessioned surgical cases	2144
Total number of specimens	3040
L4E (Level 4 Equivalent)	3455
Total number of blocks	5986
Total number of slides	11950
Population served	25819

3. Anatomic Pathology FTE for each centre

AP FTE	James Paton	Central West	Western Memorial	Eastern	Rural Avalon	St. John's	Charles S. Curtis
accessioned	2.33	2.25	3.96	1.59	1.35	13.00	1.02
specimens	2.09	1.81	3.32	1.45	1.09	11.06	0.90
L4E	1.81	1.84	3.42	1.16	0.89	10.49	0.83
Blocks	2.38	2.56	3.16	1.40	0.99	15.87	0.76
Slides	1.70	1.78	2.22	1.34	0.71	16.57	1.14
population	2.05	2.52	3.18	1.99	1.94	7.75	1.57

4. Total Pathology FTE for each centre

2AP:1(CP+ADM)	James Paton	Central West	Western Memorial	Eastern	Rural Avalon	Charles S. Curtis
Accessioned	3.49	3.38	5.93	2.38	2.03	1.53
Specimens	3.14	2.72	4.97	2.17	1.63	1.35
L4E	2.71	2.76	5.13	1.74	1.33	1.24
Blocks	3.56	3.83	4.74	2.10	1.48	1.14
Slides	2.55	2.67	3.33	2.01	1.06	1.71
Population	3.08	3.78	4.76	2.98	2.90	2.35

5. Work distribution at St. John's Anatomic Pathology

Pathologist		Service work	Academic work	Administrative work	Total for Hospital Lab	Total
1		50.00%	25.00%	25%	100%	100%
2		60%	30.00%	10.00%	100%	100%
3		70%	30%		100%	100%
4		25.00%	25.00%	50%	100%	100% (1FTE)
5		70%	25%	5%	100%	100% (1FTE)
6		70%	30%	0%	100%	100% (1FTE)
7		20%	20%	40%	80%	100% GFT* (0.8FTE)
8		50.00%	20%	10.00%	80.00%	100% GFT* (0.8FTE)
9		80%	20%	0%	100%	100% (1FTE)
10		60%	15%	5%	80%	100% (0.8FTE)
11		75%	25%	0%	100%	100% (1FTE)
12		50%	25.00%	5.00%	80.00%	100% GFT* (0.8FTE)
13		90%	10%		100%	100% (1FTE)
14		75%	15%	10%	100%	100% (1FTE)
Subtotal (current working) - FTE		**8.5 FTE**	**3.2 FTE**	**1.6 FTE**	**13.2 FTE**	
Approved & funded positions, but unfilled	unpaid leave	1.0			1.0	
	1 unfilled position (GFT)*	0.8			0.8	
	1 unfilled position (GFT)*	0.8			0.8	
TOTAL – FUNDED FTE		**11.1 FTE**	**3.2 FTE**	**1.6 FTE**	**15.8 FTE**	

*1 GFT (0.8FTE) = 20% University. + 80% Hospital
DOES NOT INCLUDE Pediatrics Pathology and Neuropathology which is not part of the study.

Appendix H: Details and unique needs of each centre

The calculation is based on a few assumptions; that there is adequate technical, secretarial and Laboratory Information System Support. It also assumes that all the gross examination is done by the pathologists. Technical support provides the necessary laboratory data, and slides for the pathologists to interpret and value add to guide the clinician's management of his/her patients. Other technical aspect that is important is the local or easy access to critical technology, e.g. immunohistochemistry in a timely fashion. The presence of adequate and good secretarial support cannot be stressed enough. This is often overlooked. Pathology language is very different from other disciplines of medicine and accurate transcription is essential to impart the views of the pathologist (medical consultation) to the clinicians. Studies indicate that this is a critical area where enough attention and standardization has not been made[15],[16],[17]. If not transcribed properly, many mistakes are made, and some mistakes can easily be overlooked when reviewed by the pathologist before finalizing the report. If critical words are missed or added, e.g. "not" is missed in a diagnosis of "not malignant", the implications are obvious. The final read over of the reports before the case is signed out is usually done at the end of the day which makes the close communication and understanding between the pathologists and the secretary/transcriptionist essential. The support staffs are also essential for pulling out related slides and cases for review, tracking and sending out diagnostic material for consultation or review. Most of the material handled are unique and if lost are irreplaceable, e.g. cytology slides. Information technology support (IT) is also essential for an efficient and effective pathology service. IT is needed for proper identification and tracking of laboratory requests, tracking of specimens, procedures, status and in the transmission of laboratory information and knowledge to the clinicians. It is also needed for proper QA/QI activities of the department and pathologists.

1. James Paton:

The workload in James Paton needs approximately 2.71 FTE for both AP and CP. My discussions with Dr. Somers indicate that they can devote only 0.5 hour a day on average to CP. The AP component of the work needs 1.81 FTE and the CP (6.25% of their time) and the 10% administration that they perform, will indicate that they are functioning at approximately 2.1 FTE. In addition, the pathologist mentors residents (1-2 months a year), accept medical technologists training (1month a year) and are involved in publishing articles. Resources are also needed for the supervision of the 3 hospital laboratories.

2. Central West Health Centre:

The work volume is almost identical to that of James Paton. Dr. Dalton is also certified in microbiology and chairs the local infection control committee and does local infectious disease consults. In contrast to James Paton, they also run a gyne cytology lab. To do full attention in AP, CP and administration, the calculated FTE needed is 2.76 FTE. This does not include the sizable regional work done by the centre. It includes 7 hospital labs, 7 treatment and diagnostic centres and 8 bleeding stations.

3. Western Memorial Regional Hospital:

This the largest centre after St. John's. Extra duties performed by this centre includes:
(1) One pathologist spends one day per week as the laboratory representative in the provincial gyne-cytology program.
(2) Approximately 520 case reviews for the local cancer patients. These are usually resected malignancies and are thus level 6. As they are reviews they are calculated at 2/3 of the level 6. This gives a value of 887 L4E (520 x 2.53 x 2/3).
(3) Regional work which includes 5 hospital labs, 1 treatment and diagnostic centre and 1 bleeding station. Although the work collected at these centres will be reflected in the workload collected, the administrative duties to run properly accredited medical laboratories is considerable.
(4) collect specimens for research studies (3-4/month) Though these numbers appear low they have impact on the routine workflow of the pathologists and make them less efficient in their other duties.

Without these extra duties the appropriate FTE for the centre is 5.13. With the added work of cancer case reviews and provincial duties, the FTE count should increase by 0.38 for the review work, 0.2 for the provincial gyne-cytology committee work and the appropriate sessional fees for the regional duties.

4. Eastern Health:

The workload in the region suggests that the appropriate FTE needed is 1.79. This does not include work for the small region of 1 hospital and 3 D&T laboratories.

5. Rural Avalon:

This is the smallest centre. The pathologist does academic work as he mentors surgical residents, nursing and paramedical students. The appropriate FTE for the area is 1.33, but allowances must be made for the small regional administrative duties that he performs (3 hospital and 4 D&T labs, and 4 bleeding stations).

6. Charles S. Curtis Centre:

Dr. K. Dankwa provided a detail workweek which shown below. The calculated FTE needed to run the department properly is 1.24. If a regular workweek is 40 hrs/week, then he is working at 64/40 = 1.64 FTE. There are many unique situations in his region which increases his workload. He travels quarterly to the 2 larger centres (Goose bay and Labrador city) to provide service to the local surgeons, each visit lasting 1 week (total 4 weeks a year). He also provides "urgent" anatomic pathology service (160 surgicals and 16 non-gynecytology) that he provides to 2 larger centres, and the 24/7 on call service that he provides to the region. Academic activities he is involved in included informal training of technologists to multitask to increase flexibility, teach student interns from the local universities, and is involved in a HNPCC study. There is no good technical support as there are no denier, cytotechnologist to prescreen slides and no

grossing assistant. There is also a potential transfer of 1000 cases from St. John's centre to Charles Curtis. I do not believe that this can be accommodated.

Activity	hrs/wk
AP	35
CP	3
med exam	3
Teaching	4
Rounds	3
QA/QI	7.75
Admin	8.25
TOTAL	64

7. St. John's Centre:

This is the tertiary and academic centre for Newfoundland and Labrador. It also serves anatomic pathology service only. For pure anatomic pathology consultation service only, the calculated FTE needed is 10.49. This does not include the resources needed to do the 139 external consults (difficult cases) done by the department.

The total FTE needed for St. John's to meet the mandate of being the only tertiary, academic and tertiary centre of Newfoundland and Labrador, it will need 10.49 FTE for service work, 2 to 2.5 FTE for academic function and 2 to 2.5 for administration. In addition (please see Suggestions to improve services), an additional 2 more FTE to act as the referral site for difficult cases and to adsorb cases from the smaller regions in times of need. The total complement of pathologists to serve St. John's and the province adequately is 17 FTE.

St. John's department is in the early process of using Pathologists' assistant (PA) for grossing. The time saving related to PA depends on the training and qualification of the PA and the comfort level of the pathologists on the PA. Even in the best situation they are not one is to one replacement of a pathologist's time. Although they save grossing time for the pathologists up front, this is modified by many factors. In difficult and complex cases they tend to take more blocks thus creating more work, the pathologist has to read the grossing more carefully so that he/she can picture the gross description and blocks taken in relation to the slides to interpret and diagnose the case properly, and if not clear has to review and reconstruct the gross specimen and take more tissue material for histological review. Finally the pathologist is ultimately responsible for the work done by the PA and thus close supervision is required. At St. John's the introduction of PA is in the early phases and the PAs are at present in the training phase. In this situation, the impact of PA can be negative, neutral or slight positive, depending on the degree of training of the PA and comfort level of the pathologists. PA is not used in any of the other institutions.

How to calculate the impact of well trained PAs? The Canadian Association of Pathologists at the November meeting in Ottawa recognized the importance of this issue and will be coming with a position paper on this.

Appendix I: Demographic Projections in Newfoundland

NEWFOUNDLAND DEMOGRAPHIC PROJECTIONS http://www.economics.gov.nl.ca/pdf/high/popbyagehigh.pdf

	Total	0 - 4	5-9	10-14	15 - 19	20 - 24	25 -29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65- 69	70 - 74	75 - 79	80 - 84	85 - 89	90 +	>65 Absolute	>65 (percent)
2000	528,041	26,245	30,560	36,013	40,782	36,498	34,229	39,008	43,868	44,448	43,667	39,376	28,327	22,404	19,227	16,305	12,357	8,527	4,417	1,785	62,618	12%
2005	515,961	23,538	26,496	30,751	34,694	35,550	31,161	32,762	38,449	43,360	43,483	2,407	38,137	27,428	20,954	16,996	13,455	8,925	5,065	2,350	67,745	13%
2006	514,071	23,292	25,928	29,288	33,813	35,178	30,419	31,443	38,012	42,734	43,421	2,754	39,020	29,850	21,564	17,082	13,485	9,220	5,178	2,390	68,919	13%
2007	512,792	23,049	25,438	28,206	33,064	34,506	30,467	29,633	37,900	41,865	43,297	43,093	39,735	32,158	22,396	17,264	13,576	9,318	5,385	2,442	70,381	14%
2008	512,233	22,835	25,235	27,324	32,341	33,637	31,157	27,962	37,484	41,047	43,023	3,392	40,550	33,959	23,563	17,600	13,815	9,404	5,421	2,484	72,287	14%
2009	512,047	22,595	25,117	26,613	31,442	32,923	31,851	26,784	36,672	40,288	42,827	43,362	41,440	35,667	24,753	18,237	13,902	9,587	5,420	2,567	74,466	15%
2010	511,748	22,359	24,956	26,114	29,874	32,793	32,295	25,965	35,824	39,425	42,576	43,259	42,099	37,525	26,013	18,771	14,018	9,826	5,321	2,735	76,684	15%
2011	511,474	22,165	24,861	25,654	28,609	32,379	32,402	25,587	34,533	39,066	42,049	43,240	42,484	38,429	28,344	19,329	14,126	9,899	5,556	2,762	80,016	16%
2012	510,630	21,965	24,662	25,206	27,600	31,896	32,050	25,744	32,645	38,983	41,232	43,133	42,850	39,161	30,566	20,110	14,313	9,994	5,643	2,877	83,503	16%
2013	509,702	21,770	24,436	25,006	26,712	31,225	31,289	26,330	30,849	38,566	40,458	42,894	43,161	40,016	32,328	21,211	14,629	10,210	5,724	2,888	86,990	17%
2014	508,766	21,575	24,181	24,877	26,004	30,325	30,638	26,893	29,557	37,745	39,694	42,699	43,151	40,906	33,957	22,305	15,197	10,295	5,865	2,902	90,521	18%
2015	507,971	21,381	23,928	24,746	25,545	28,725	30,537	27,250	28,703	36,877	38,870	42,459	43,068	41,614	35,735	23,486	15,678	10,420	6,036	2,913	94,268	19%
2016	507,317	21,165	23,759	24,648	25,097	27,481	30,186	27,338	28,294	35,566	38,536	41,961	43,069	42,018	36,645	25,653	16,194	10,539	6,119	3,049	98,199	19%
2017	506,645	20,928	23,600	24,490	24,710	26,526	29,849	27,121	28,521	33,693	38,488	41,182	42,998	42,436	37,412	27,706	16,887	10,750	6,230	3,118	102,103	20%
2018	506,101	20,678	23,473	24,326	24,596	25,765	29,367	26,590	29,232	31,924	38,135	40,416	42,798	42,769	38,251	29,320	17,857	11,034	6,408	3,162	106,032	21%
2019	505,803	20,443	23,361	24,146	24,555	25,220	28,709	26,181	29,906	30,673	37,351	9,719	42,633	42,833	39,168	30,864	18,822	11,514	6,492	3,213	110,073	22%
2020	505,641	20,194	23,227	23,973	24,543	24,994	27,395	26,198	30,390	29,852	36,566	38,899	42,460	42,783	39,894	32,527	19,875	11,940	6,609	3,322	114,167	23%

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