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Public perceptions on pathology: a fundamental change is required

Gabor Fischer ^{1,2}, Leslie Anderson,¹ Marc Ranson,¹ David Sellen,¹ Eric McArthur³

¹Pathology, University of Manitoba, Winnipeg, Manitoba, Canada

²Shared Health Diagnostic Services, Winnipeg, Manitoba, Canada

³Pathology, Institute for Clinical Evaluative Sciences, London, Ontario, Canada

Correspondence to

Dr Gabor Fischer, Pathology, University of Manitoba, Winnipeg, MB R3T 2N2, Canada; Gabor.Fischer@umanitoba.ca

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ABSTRACT

Pathology has been mostly invisible for the public. The missing recognition affects the pathologists' reputation, and efforts with recruitment and advocacy. Our survey with 387 respondents confirms that the public knowledge on the role of the pathologists has not improved despite campaigns and advocacy efforts. Pathology was identified as a medical specialty by 79.1% of the respondents. Only 34.8% assumed that it takes more than 8 years of post-high school training to become a pathologist. Most commonly, another medical specialist was identified as the ultimate diagnostician on Pap tests (gynaecologist), breast biopsies or malignant surgical excisions (oncologist), gastrointestinal biopsies (gastroenterologist) or prostate biopsies (urologist). The experience gained by undergoing these procedures had minimal impact on understanding the pathologists' role, since they were identified as ultimate diagnosis makers by the minority of these patients (13.8%–36.4%). The integration of pathologist–interactions into patient care may be a potential solution with benefits beyond improved perceptions.

“If the surgeons were gracious enough to tell the patient ‘Our pathologist, Dr. Smith, has concluded that this is...’, maybe they would at least know that there is a pathologist in the hospital.”¹

INTRODUCTION

Pathologists play an integral part in delivering quality care to patients; however, our specialty has been affected by public misconceptions for ages. Pathology has been largely invisible to the general population, only certain subspecialties receive appropriate media and public attention. While forensic pathology has been highlighted in the media extensively, the public knows very little about what pathologists do in general. Our specialty is often only noticed when something goes wrong and pathologists are not always considered physicians. The missing recognition affects our reputation, makes recruiting very challenging and does not help the pathologist community's lobbying and advocating efforts. To address this problem, a number of creative international, national and local campaigns were initiated to make an impact on the recognition of pathology. The International Pathology Day has been launched a few years ago with the intent of organising local events to provide information to the public on the profession. The Canadian Association of Pathologists designed a website (www.mypathologist.ca) with a similar mission, and the College of American Pathologists tirelessly advocates and lobbies for our profession. Efforts have

also been made in medical education to maintain a relevant role for pathology in the medical curriculum through establishing exit competencies for medical students,² using clinicopathological sessions as teaching tools^{3,4} and structuring robust elective rotations.⁵ The long-term impact of these initiatives remains to be seen.

We designed our study to investigate the public perceptions and knowledge of pathology with a focus on the nature of pathologist work, the educational requirements to become a pathologist, and the pathologist's reputation and role in patient care. In addition, we intended to explore whether the analysis of the data suggests taking any specific direction to promote our specialty.

MATERIALS AND METHODS

A questionnaire was constructed as a survey tool to investigate the respondents' perception and understanding of the field of pathology, and approved by the University of Manitoba Research Ethics Board. The collected demographic data targeted age, gender and occupation, other categories (race, income, employment) were not collected. Invitations were distributed online through Survey Monkey with a provided link to access the survey. The targeted population was all adults (>18) within Canada and USA. The survey distribution and analysis had no restriction towards gender, age or occupation.

The investigation focused on the perceptions of anatomical pathologists, particularly surgical pathologists; however, the questions used the term ‘pathologist’ without any modifier. The respondents selected the answers from a provided list and they were allowed to skip questions. A group of questions explored the public knowledge on different aspects of the pathologist's profession, specifically, whether respondents knew that pathology is a medical specialty, how familiar they were with what the pathologist's job entails, their assumptions on the length of training to become a pathologist and their assessment on the reputation of pathologists. A distinct set of questions was developed to identify what medical specialist makes a diagnosis on various specimen types. The respondents were also asked if they had undergone the corresponding procedure to explore whether this was associated with responding correctly. Missing or unknown procedure status values were excluded from that procedure's analysis. We used Pearson's χ^2 test to evaluate the association between a correct response and whether the respondent had previously undergone that specific procedure.⁶ In the case where



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Table 1 The distribution of respondents' choices to the question of "Please indicate which professions below represent a medical specialty"

Which professions represent a medical specialty?	Responses (n=368)
Surgeon	322 (87.5%)
Gynaecologist	320 (86.9%)
Urologist	319 (87.0%)
Gastroenterologist	318 (86.4%)
Oncologist	313 (85.1%)
Radiologist	311 (84.5%)
Podiatrist	292 (79.3%)
Pathologist	291 (79.1%)
Ophthalmologist	286 (77.7%)
Medical laboratory technologist	267 (72.5%)
Anthropologist	63 (17.1%)
Hydrologist	43 (11.7%)
Balneologist	41 (11.1%)

cells in the 2×2 table were ≤10, we used Fisher's exact test.⁷ Two-sided p values <0.05 were considered statistically significant. R V.3.4.3 was used for all analyses.⁸

RESULTS

The survey was filled out by 387 respondents. Their age ranged from 18 to 75 years or older. Of these respondents, 57.6% were 45 years or older, and 63.6% of them were female. From the list of more than 20 different occupations, options 'education, training and library' represented the highest number of respondents (10.1%).

Pathology was identified as a medical specialty by 79.1% of the respondents. This was the second lowest proportion of the eight listed medical specialties (table 1). Only 40.5% thought that pathologists are medical doctors and a combined 43.9% assumed that the term pathologist is used for other occupations related to medicine, laboratory or science (coroner, laboratory technician or scientist). Slightly more than one-third of the answers indicated that diagnosing diseases in living patients is the pathologists' main job, while 58.2% of the responses selected an answer at least somewhat related to pathology (performing autopsies, laboratory tests, research or investigating murders). The majority of the interviewees (65.2%) underestimated the length of the required training to become a pathologist, although this inaccuracy may apply for other medical specialties also. Only a minority (34.8%) thought that it would take more than 8 years after high school graduation (table 2). The pathologists do not have a reputation for making many errors or being sued often, and they are viewed as good investigators (table 3).

The majority of the respondents did not know that samples removed through screening tests, biopsies and surgical excisions are diagnosed by pathologists. In all categories, clinical specialists were chosen most commonly as diagnostic decision makers (gynaecologists for Pap test, gastroenterologists for gastrointestinal biopsies, oncologists for breast biopsies and surgical excisions for malignant diseases, and urologists for prostate biopsies) (table 4). Undergoing any of the examined procedures did not increase the likelihood of understanding the pathologist's role significantly, with the exception of prostate biopsies and surgical excisions. The number of patients who identified the pathologist as the ultimate decision maker remained consistently low for all procedures (13.8%–36.4%) (table 5).

Table 2 The distributions of responses to the question investigating the nature of the pathologist profession, the main job of the pathologists and the length of training. The respondents were asked to select one answer for each question

Pathologists are:	Responses (n=346)
Medical doctors	140 (40.5%)
Laboratory technicians	59 (17.0%)
Coroners	50 (14.5%)
Scientists	43 (12.4%)
Police detectives	8 (2.3%)
Dental assistants	2 (0.6%)
Public servants	1 (0.3%)
Lawyers	0 (0.0%)
I do not know	43 (12.4%)
The main job of most pathologists is to:	Responses (n=344)
Diagnose diseases in living patients	122 (35.5%)
Perform autopsies	90 (26.2%)
Run tests in the laboratory	58 (16.9%)
Do research in the laboratory	38 (11.0%)
Investigate murders	14 (4.1%)
Study humankind	13 (3.8%)
Examine bones	4 (1.1%)
Convict criminals	4 (1.1%)
Examine patients' teeth before they see the dentist	1 (0.3%)
After high school how long do you think the training takes to be a pathologist?	Responses (n=345)
More than 8 years	120 (34.8%)
4–8 years	153 (44.3%)
3 years	18 (5.2%)
2 years	5 (1.5%)
No further training required	1 (0.3%)
I do not know	48 (13.9%)

DISCUSSION

The answers provide substantial support for the contention that the public lacks understanding of pathology as a profession. Only ophthalmology was identified as a medical specialty by fewer respondents than pathology, perhaps because the boundaries between the roles of optometrists, opticians and ophthalmologists are not very clear to the public. While many respondents link pathology to the medical world, they do not necessarily think that a medical degree is required to become a pathologist, let alone residency training. The answers to the reputation question seem to indicate that while the role of pathologists is not clear for the population, most of them at least do not associate the profession with negative labels.

Undergoing a diagnostic procedure as a patient has a remarkably disappointing impact on the recognition of the pathologist's crucial importance in making the final diagnosis. Going through a breast biopsy, endoscopy with gastrointestinal biopsies, prostate

Table 3 The respondents' choices for the statement "Pathologists have a reputation for". The respondents had a chance to select as many answers as applied

Pathologists have a reputation for:	Responses (n=349)
Being good investigators	255 (73.1%)
Having high level of intellectual curiosity	227 (65.0%)
Being good decision makers	185 (53.0%)
Making many errors	26 (7.4%)
Being sued often	21 (5.9%)

Table 4 The most commonly selected medical specialists by the respondents as diagnostic decision makers on samples from the corresponding procedures. This analysis is not restricted to gender or history of the relevant procedure

Procedure type	Most commonly identified specialist as diagnosis maker
Pap test	Gynaecologist: 44.7% (160/358)
Breast biopsy	Oncologist: 19.2% (68/355)
Prostate biopsy	Urologist: 22.5% (80/356)
Gastrointestinal biopsy	Gastroenterologist: 40.7% (143/351)
Surgery for malignant disease	Oncologist: 27.9% (97/347)

biopsy, Pap test or surgical excision for a malignant disease did not have a significant impact on the likelihood of understanding the pathologist's role, the changes were only significant in prostate biopsies and surgical excisions.

Even with the potential benefit of getting more educated on the diagnostic process by the visits to physicians' offices, clinics and hospitals and the discussions with various members of the healthcare team, only the minority of the patients identified the pathologist as the ultimate decision maker (13.8%–36.4%). The numbers were even worse among the respondents who have not undergone these procedures.

These results raise questions about the communications to patients prior to and after the selected diagnostic procedures. The busy and rushed clinical services may not allow sufficient time for the healthcare teams to educate the patients appropriately on the diagnostic decision-making, even when the willingness to inform them would be present. Consequently, most patients do not realise that the samples removed from their bodies are sent away for analysis and the final diagnosis is made by a pathologist.

It is incredibly difficult to break through the circle formed by the limited public knowledge, marginalisation of pathology in the medical school curriculum, limited exposure to pathology in the clinical postgraduate training programmes and lack of

Table 5 Responses selecting pathologists as ultimate diagnostic decision makers of samples between respondents who underwent the corresponding procedures versus not

Procedure status	Thinks diagnosis is made by a pathologist		P value
	No	Yes	
Underwent Pap test*			0.65
No	49 (89.1%)	6 (10.9%)	
Yes	150 (86.2%)	24 (13.8%)	
Underwent breast biopsy*			0.26
No	157 (81.8%)	35 (18.2%)	
Yes	27 (73.0%)	10 (27.0%)	
Underwent prostate biopsy†			0.047
No	98 (88.3%)	13 (11.7%)	
Yes	7 (63.6%)	4 (36.4%)	
Underwent GI biopsy			0.24
No	217 (88.2%)	29 (11.8%)	
Yes	87 (82.9%)	18 (17.1%)	
Underwent cancer procedure			0.046
No	232 (80.6%)	56 (19.4%)	
Yes	40 (67.8%)	19 (32.2%)	

*Analysis restricted to females only.

†Analysis restricted to males only.

GI, gastrointestinal.

proper education of patients about the diagnostic procedures. Since the general population's understanding of the pathologist's work is minimal, very few students would seek admission to medical school in order to be a pathologist. Once they are admitted, the medical students do not get enough exposure to pathology to make the specialty a competitive career choice for their residency.⁹ And the clinical colleagues may not have the drive or motivation to educate the patients on the importance of the pathologist's role and contribute to changing the public perceptions in their rushed clinical services.

The dilemma of how to make improvements needs to be answered because we have not made significant progress in the last decades.¹⁰ Since the encouraging sporadic attempts and campaigns have not delivered a dramatic improvement in our recognition up to this point, we have to think about a fundamental change in positioning our specialty. When the clinician–patient interactions do not lead to a proper understanding of the roles of pathologists in diagnostic decision-making, the integration of pathologist–patient interactions into patient care may be a potential solution. Pathologists should have the opportunity to take ownership of the task of explaining their findings to the patients themselves. This has been suggested by multiple authors and the results are promising in settings where the pathologists stepped up to this role.^{11–13} Including this contact time into the sequence of events and visits related to patient care would have the potential of making a much bigger impact on the public perceptions of our profession than all the other attempts combined. The potential benefit may go well beyond improving the public perceptions. Pathologists would gain more visibility by stepping out from behind the 'paraffin curtain',¹⁴ earn more respect in the healthcare system among clinicians, residents, medical students, administrators and patients, and be in a better position to recruit and lobby for their goals with the broader recognition.

Of course, not every pathology report or clinicopathological scenario would require patient–pathologist conversations. The discussion of the expected pathological findings on routine minor procedures (simple cholecystectomies, appendectomies, gynaecologic, genitourinary, gastrointestinal, skin biopsies and other trivial routine samples) may be a waste of time for both the patients and the pathologists. However, the pathologists can play an important role in explaining the histological findings of excisions of malignant lesions, selected biopsies, major unexpected findings or pathological diagnoses contradicting the clinical and radiological impression.

Different methods have been suggested to expand the role of pathologists by providing an explanation of the pathology report to the patients including written explanatory materials¹⁵ or participation in social media patient group discussions,¹⁶ and were well received by the patients. However, face-to-face meetings with the patients have the biggest potential to put an end to the pathologists' invisibility in the healthcare system. Pathologists can develop a pathology explanatory clinic and may focus on the pathology findings, or they may choose to embed their discussions with the patient in a multidisciplinary setting along with other specialists (oncologist, radiologist, surgeon or other clinicians).^{17,18}

Pathologists should be aware of the limitations of their roles and respect the boundaries of other specialists' territory. Some clinicians have been encouraging pathologists to meet the patients, although this mostly applies to scenarios of communicating diagnostic errors.¹⁹ However, the introduction of patient–pathologist interactions may not be received enthusiastically by certain clinicians and the territories of practices

should be respected mutually. Some pathologists may not feel ready to interact with patients either and this may be due to the lack of training opportunities in communication with patients. To address this concern, the development of a specific training route was suggested for the pathologists interested to become Certified Pathology Navigators.¹⁷ Another important consideration is the time the meetings and the necessary preparation require, since this process is currently not factored in to the pathologist's workload, daily routine and billing.

Since the process of implementing patient–pathologist discussions would certainly improve the quality of patient care, help the patients understand their disease, assist them to make more informed decisions and provide an opportunity to change the image of our specialty, we feel that it would be worth investing into this progress. There is no doubt that this is a huge undertaking because many details have to be worked out with pathologists, clinicians, administrators, insurance companies, regulatory bodies and professional organisations to ensure the success of the initiative. However, exploring new territories and challenging the conventional approaches have tremendous potential benefits.

We acknowledge the limitations of our study. Due to the survey methodology and the sample size, the respondents and the findings may not be representative of the entire population, and the possibility of sampling errors should be considered. Our questions mostly focused on surgical pathology and that limited the scope of our investigation. Overall, we feel our findings are sufficient to highlight an existing real problem, and the shortcomings can be addressed by more stratified and comprehensive future studies with expanded scope targeting different focus groups.

Correction notice This article has been corrected since it was published Online First. Author name has been corrected to Eric McArthur.

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ORCID iD

Gabor Fischer <http://orcid.org/0000-0002-9382-5815>

REFERENCES

- 1 The Pathology Society of Great Britain and England. Conversation with pathologists. Juan Rosai, section 6, 2018. Available: <https://www.pathsoc.org/conversations>
- 2 Ford J, Pambrun C. Exit competencies in pathology and laboratory medicine for graduating medical students: the Canadian approach. *Hum Pathol* 2015;46:637–42.
- 3 Hajar R. The clinicopathologic conference. *Heart Views* 2015;16:170–3.
- 4 Hohmann EL, Ananthakrishnan AN, Deshpande V. Case 25-2014: a 37-year-old man with ulcerative colitis and bloody diarrhea. *N Engl J Med* 2014;371:668–75.
- 5 Van Es SL, Grassi T, Velan GM, et al. Inspiring medical students to love pathology. *Hum Pathol* 2015;46:1408.
- 6 Pearson K. X. On the criterion that a given system of deviations from the probable in the case of a correlated system of variables is such that it can be reasonably supposed to have arisen from random sampling. *London, Edinburgh Dublin Philos Mag J Sci* 1900;50:157–75.
- 7 Fisher RA. On the interpretation of χ^2 from contingency tables, and the calculation of P. *J Royal Stat Soc* 1922;85:87–94.
- 8 R Core Team. *R: a language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing, 2017. <https://www.R-project.org/>
- 9 Hung T, Jarvis-Selinger S, Ford JC. Residency choices by graduating medical students: why not pathology? *Hum Pathol* 2011;42:802–7.
- 10 Start RD, Saul CA, Cotton DW, et al. Public perception of histopathology. *J Clin Pathol* 1995;48:398–401.
- 11 Manek S. The pathology clinic - pathologists should see patients. *Cytopathology* 2012;23:146–9.
- 12 Titus K. *Face value – pathologists one on one with patients*, 2010.
- 13 Gutmann EJ. Pathologists and patients: can we talk? *Mod Pathol* 2003;16:515–8.
- 14 Uthman EO. Getting out from behind the paraffin curtain. *Arch Pathol Lab Med* 2014;138:12–13.
- 15 Epstein JI. The FAQ initiative explaining pathology reports to patients. *Mod Pathol* 2017;34:1058–60.
- 16 Haller J, David MP, Lee NE, et al. Impact of pathologist involvement in sarcoma and rare tumor patient support groups on Facebook: a survey of 542 patients and family members. *Arch Pathol Lab Med* 2018;142:1113–9.
- 17 Gibson B, Bracamonte E, Krupinski EA, et al. A "Pathology explanation clinic (PEC)" for patient-centered laboratory medicine test results. *Acad Pathol* 2018;5:237428951875630.
- 18 Fiscella J. Introducing patients to their pathology reports. *CAP Today* 2014;28:54–5.
- 19 Dewar R, Parkash V, Forrow L, et al. "Apologies" from pathologists: why, when, and how to say "sorry" after committing a medical error. *Int J Surg Pathol* 2014;22:242–6.