

Creating meaning through small doses of actionable learning: a Mixed Methods analysis of CAP-ACP's virtual CME activities

ABSTRACT

Background

The COVID-19 pandemic overwhelmed pathology services, halting routine case reviews and disrupting resident training. In response, the CAP-ACP launched virtual one-hour webinars, allowing pathologists to learn while working and ensuring residents remained exposed to essential cases despite pandemic constraints.

Methods

Using a convergent mixed-methods design, data from 115 post-session CME evaluation surveys were analyzed. Participants included pathologists and pathologists' assistants, with 93% of responses from Canada. Quantitative and qualitative data were analyzed separately. Qualitative analysis employed an inductive thematic approach using a codebook, with member checking completed by two pathologists.

Results

High satisfaction with the learning activities was reported. Three main themes emerged: [1] participants viewed the webinars as accessible, engaging, and impactful; [2] the learning was actionable and relevant to daily practice—improving report writing, data interpretation, diagnostic accuracy, and tissue handling—while also equipping lecturers to teach effectively online; and [3] pathology at a crossroads. Quantitative responses showed that 80% felt the webinar enhanced their competence, but only 66% believed it would impact patient outcomes, suggesting a disconnect between their work and its perceived clinical impact. The webinars reminded pathologists of the clinical significance of their work and reflected a desire to connect more with colleagues through multidisciplinary collaboration. There was also a strong call to engage leadership in addressing burnout as a shared responsibility. Webinar platforms can support both skill-building and meaningful professional dialogue.

Discussion

The results highlight the multifaceted value of virtual CME—enhancing diagnostic, teaching, and leadership skills while helping pathologists reconnect with meaning and purpose in their work. As the profession navigates post-pandemic challenges, webinar platforms offer a scalable tool to support clinical competence, collaboration, and engagement with systemic issues such as burnout and professional identity.

Creating meaning through small doses of actionable learning: a Mixed Methods analysis of CAP-ACP's virtual CME activities

Founded in 1949, the Canadian Association of Pathologists (CAP-ACP) is a voluntary professional organization which aims to advance the interests of the profession and promote high-quality standards for patient care by providing national leadership and promoting excellence in pathology and laboratory medicine practice, education, and research (Quinonez & Geldenhuys, 2011). Since its inception, the organization has expanded to boast over 2000 members, 11 special interest groups, nine standing committees, four sections and seven subsections.

The unprecedented nature of the COVID-19 pandemic overwhelmed medical care. In particular, COVID-19-related examinations had increased to a point where the workload paralyzed pathologists. To maximize efforts in combatting the pandemic, routinely tested cases were no longer reviewed as the government put them on hold. Due to these demands, a generation of residents went years without seeing certain cases, reporting detrimental impacts on their training and diagnostic abilities (Carretero-Barrio et al., 2022). The CAP-ACP Virtual Education Series emerged from a need to offer education during the pandemic, when the demands on pathologists made it impossible to leave the lab. Giving small one-hour doses of virtual education became a way for pathologists to listen and work simultaneously, and provided a consistent platform to expose residents to cases that would see again after the pandemic.

To date, CAP-ACP has hosted 115 virtual education webinars accredited as section 1 activities by the Royal College of Physicians and Surgeons of Canada. Using a mixed methods analysis of the results of post-activity surveys of these webinars, this paper aimed to [1] examine pathologists' perceptions of the webinars and [2] explore significant themes in qualitative responses.

METHOD

Study Design

Using a convergent mixed-methods design, data from 115 post-session CME evaluation surveys were analyzed. The quantitative and qualitative results were analyzed separately. Integration occurred during initial data collection, interpretation, reporting, and discussion levels using a weaving approach (Fetters et al., 2013). The study methods were entered into the ARECCI Ethics Screening tool and earned a score of 0. Therefore, Research Ethics Board approval was not required.

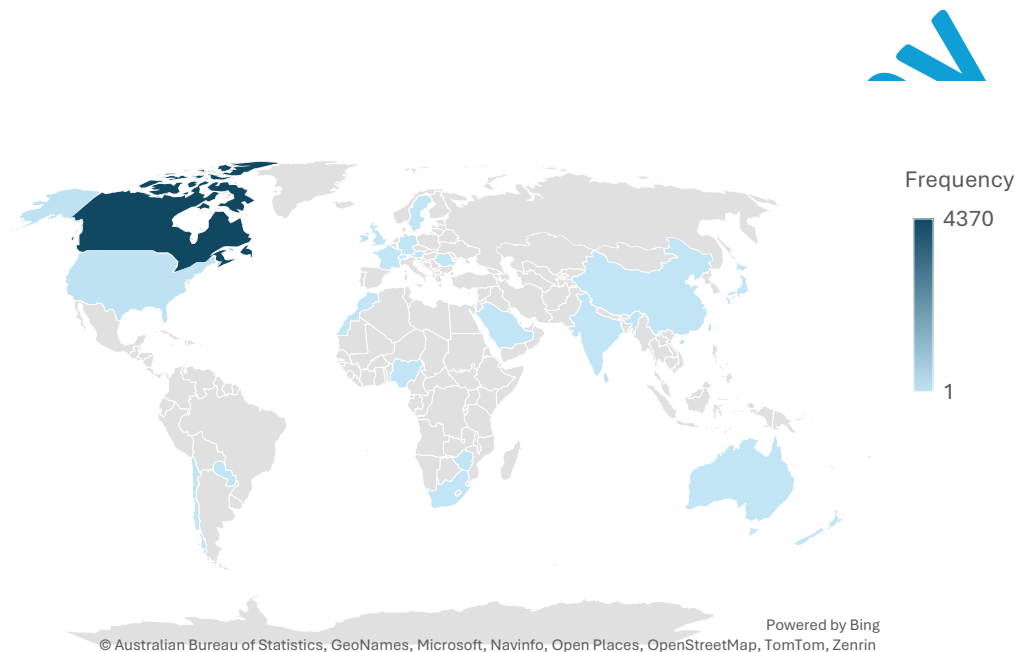
Study Participants

Participants included CAP-ACP webinar attendees. While the surveys did not collect demographic information from attendees, the qualitative responses suggest that pathologists and pathologists' assistants were the primary demographic. During the pandemic, CAP-ACP membership increased, as did attendance of the webinars.

The online webinars reached participants across the globe globally, including Africa, Asia, Saudi Arabia, and Europe (see Figure 1a). Canadians comprised 93% of participants, with significant representation from other countries: 1.7% from the United States, 1.2% from Qatar, and 1.5% from Taiwan.

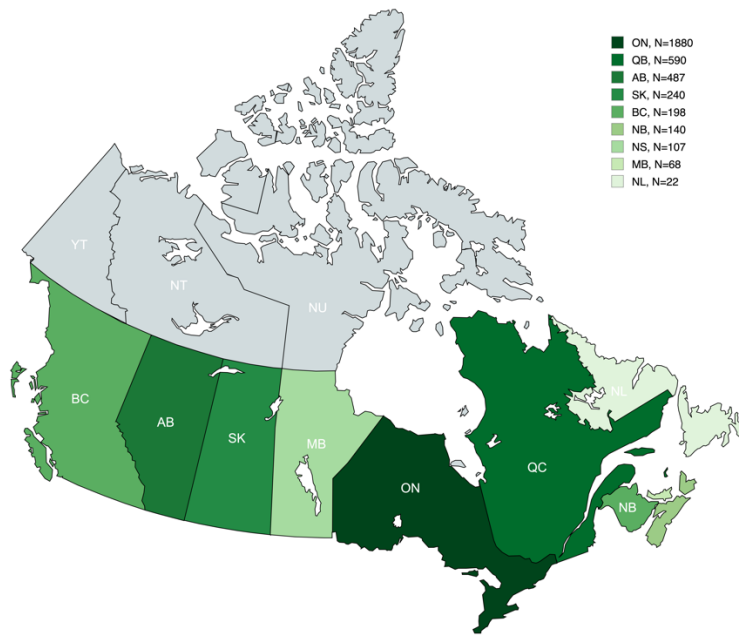
Among Canadian participants, 96% provided their city information, resulting in a list of 172 different Canadian cities. The most frequently reported cities were Toronto (11.8%), followed by Edmonton (6.7%), Montreal (6.1%), Saskatoon (4.7%), Calgary (4.5%), and Hamilton (4.3%) (see Figure 1b).

Figure 1a



Showing the frequency of responses that were recorded globally.

Figure 1b.



Created with mapchart.net

Showing the frequency of responses recorded within each Canadian province.

Survey Tool and Data Collection

An anonymous online survey tool (i.e., Alchemer) was used to assess the quality of the CME activities as per CAP-ACP's requirements for section 1 activities. Questions included both quantitative and qualitative responses assessing participant perceptions of the CME activity, such as whether it met the learning objectives, how it will impact competency and practice, and suggestions for the future.

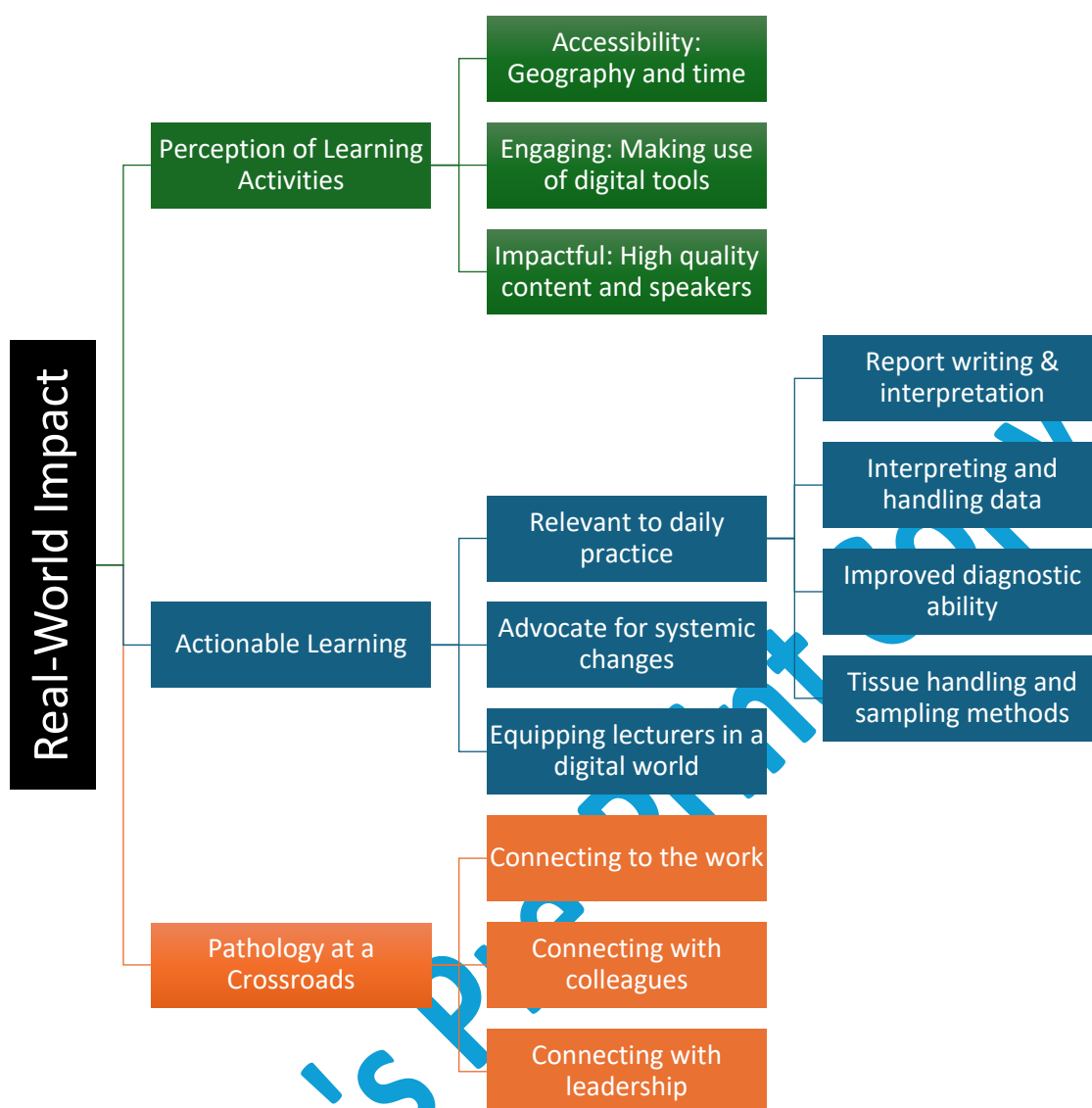
Data Analysis

Quantitative data analysis was analyzed using descriptive statistics in Microsoft Excel.

Qualitative data was analyzed using an inductive thematic analysis was completed using a codebook approach. All narrative comments were independently coded by two authors (BS, HD). Codes were discussed as a group with the coding authors. The manuscript was given to two pathologists for feedback for member checking and edited in light of their responses. The codebook was subsequently revisited and re-evaluated, considering these discussions to produce a final thematic map (Figure 2).

RESULTS

Figure 2.



The hierarchy of central themes and codes of the thematic analysis.

Perception of Learning Activities

Accessible

Despite its beginnings as a safety measure during the COVID-19 pandemic, the accessibility of virtual education continues to minimize geographical and financial barriers.

Just to say thank you for an excellent series of educational seminars. This format is so much more accessible to the membership for whom travel is a burden and I really hope it continues even after it is safe to have large meetings. Different types of learning activities make this a very inclusive organization. Kudos again

In an era of rapid advances and a field in which time constraints hinder keeping current with new information, pathologists value the convenience and quick access to learning:

The world of oncology is progressing at a breakneck speed and (we) pathologists have to keep up with this advancement to have meaningful conversations with our oncology colleagues. This is especially important to those of us in community/general practice. These days it is very challenging to keep up to date with all information. So, webinars such as this one is very helpful in giving background and distilling essences of the various taskforce recommendations.

Engaging

Lecturing online included new developments in enhancing engagement in webinars. Participants, "love the interactive format of the breakout rooms, working through cases as a team." Another participant enjoyed the "voting for answers. Kept us involved" through the polling feature.

Question and answer components are a highly valued aspect of webinars. Some enjoyed technical discussions, "the thorough discussion of common lesions and their clinical significance," while others felt encouraged to engage in difficult conversations:

This talk was extremely insightful and provided a framework in which to process the multitude of moral dilemmas encountered on a regular basis. I appreciated the encouragement to speak openly with others rather than keep silent in shame/guilt. Great topic, thanks!

Impactful

Participant responses consistently reflected being inspired, excited, and engaged by the lecturers. One participant expressed, "This was one of the best educational sessions I have ever attended." A second agreed:

Excellent speaker. Very clear. Points well emphasized and well-illustrated. Allowed time for the information to soak into my head. Simplified complex area.

Despite their short, bite-sized length, the doses were potent, "I learned more about dermpath in the last 1.5 hours than in my entire career."

Often a solitary profession, participating pathologists felt connected to a broader community of peers through the webinars.

Big thank you for your leadership and collegiality at all levels. As always comprehensive, practical and useful presentation - as you can read our minds.

Participants expressed an appreciation for feeling connected to the lecturer and a desire for the spirit of belonging among peers. Competent lecturers were able to establish rapport and effectively engage with participants online.

Very effective - loved his style and connection to the audience

Webinars remove many attendance barriers and can rapidly disseminate information without detrimental impacts on learning. The overarching consensus from participants was that these sessions should be hosted regularly.

Table 1. Sample quotes from the theme “perceptions of learning activities”

Very enjoyable and educational presentation. I came to this talk from a position of complete ignorance, and I could understand and follow everything along.
It so great to be able to participate in such online events. It would be nice to have these events at least once a week or even twice a month would be great! Looking forward to more! A big thank you to the organizers!
Thank you for organizing this online conference. It was practical and accessible!
Excellent initiative. Being a new test and sometimes subjective to interpret, I would appreciate regular sessions like this.
 [Loved the] interactive format of the case studies in small group discussion

Satisfaction with learning activities was reflected in quantitative ratings of the learning activities which were rated on a five-star scale (see Figure 1). The results showed median and modal scores of 5 across all categories, indicating that webinars met stated learning objectives and fulfilled participant expectations.

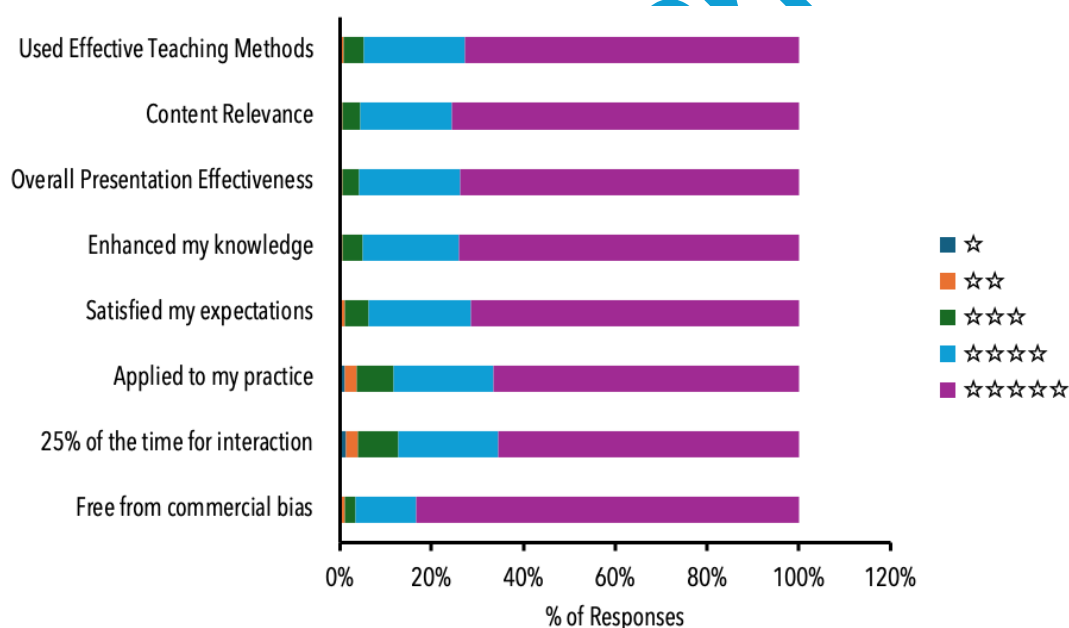


Figure 2. Participant ratings (1 to 5 stars) of the quality of the CME activity.

Small Doses of Actionable Learning

Relevant to daily practice

The theme "small doses of actionable learning" underscores the importance of practical, implementable knowledge directly tied to daily practice—a quality participants consistently valued in the webinars.

We appreciate having more webinars like this, which are closely aligned with our day-to-day work.

Key outcomes included “improved reporting,” and better accuracy, clarity, and consistency in communicating prognosis and uncertainty to physicians.

My report may be more complete now that I know some more tools to guide my reporting.

These small doses of learning boosted confidence in challenging areas such as handling molecular data. Webinar insights enhanced understanding of “variance nomenclature” and the ability to “interpret molecular reports more quickly.” One participant highlighted the value of reviewing specific conditions:

I learned how to approach to inflammatory skin lesions, how to differentiate them depends on what features I see, how to report - I learned everything that I need to know to improve my diagnostic skills.

This participant emphasized actionable knowledge that improved diagnostic accuracy and reporting skills, reflecting the webinar’s impact on participants as medical experts and communicators.

Many participants responded that they valued lectures that taught about the nuances and pitfalls when diagnosing certain conditions:

The update on the association of HPV with neuroendocrine carcinomas of the head and neck. I found this interesting as a pitfall that I have seen during my training and my practice is that p16-positive immunophenotype does not always confirm that a malignancy is a squamous cell carcinoma.

The topic-specific focus of the webinars highlighted practical and nuanced learning opportunities that often extend beyond the scope of a traditional university education.

Supporting systemic changes

Practical applications of webinar learning extended beyond the lab to enhancing participants’ skills in leadership and decision-making:

Helps me be more effective as a medical leader by providing ideas for improving lab service through data analysis and utilization.

Following webinars, participants indicated their intention to re-evaluate current, system-wide approaches, refine their techniques, or explore alternative ways of accomplishing laboratory objectives. One participant highlighted how the learning experience inspired them to reconsider institutional practices, potentially leading to more comprehensive diagnostics:

Entities to be aware of in gynecological frozen sections that I may not have considered. In our institution, we only take 1 section on ovarian tumors, and I think this session will open a discussion on whether we should be taking 3 sections upfront on all ovarian masses.

These system-wide changes could profoundly impact patient outcomes. For example:

Improving biospecimen quality and tumour sampling for molecular analysis will maximize testing efficacy which will benefit subsequent patient management.

By leveraging data insights, participants aimed to enhance diagnostics and advocate for personalized care:

Conducting a more thorough investigation into the patient's prior medical history before I do the gross dissection

This data highlights that the role of pathologists is expanding in driving systemic improvements for better patient outcomes.

Equipping lecturers in a digital world

Participants highlighted the value of leveraging technology and online platforms to enhance learning:

The challenges of virtual learning and how to overcome them. Also to take advantage of these new platforms to enhance learner's experience compared to in person learning

Another participant emphasized the importance of online as a lecturer operating in a digital world:

Online and technical info which is very important especially during these times. Glad that we have experts helping to move the profession forward when things have to be from a distance.

The webinars foster a desire for continuous improvement. By embracing these opportunities, participants are better equipped to navigate evolving conditions and inspire innovation within their institutions.

Table 2. Sample quotes from the theme “small doses of actionable learning”

We appreciate having more webinars like this, which are closely aligned with our day-to-day work.

The review of nomenclature helps me interpret molecular reports more quickly than in the past.

The presenter was successful in conveying key messages that would prevent pitfalls. He had a very practical approach that was certainly useful for me as a practicing general surgical pathologist.

I learned that histotype is not always correlated with molecular phenotype in endometrial carcinomas. This reinforced my impression that, particularly for high-grade endometrial carcinomas, it is important to order ancillary IHC (such as p53 and MMR IHC) for accurate subtyping. I wish there were an easier way to look for POLE mutations. Thank you!

Pathology at a Crossroads

Connecting to the Work

Responses revealed a strong desire for pathologists to reconnect with the clinical significance of their work. Quantitative responses (Table 3) show that 80% felt the webinar enhanced competence, but only 66% believed it would impact patient outcomes, indicating a disconnect between pathologists' work and its perceived effect on patient care. One participant noted, "[The webinar put into perspective] why I order these tests." Another writes:

As a path assistant at a hospital that specializes in high-risk pregnancies, I gross an exorbitant amount of placentas. Because of the high volume, grossing them becomes very routine and redundant so this session was a good reminder of the clinical relevance in placental examination.

The repetitive nature of a pathologists' assistant's (PA's) work becomes monotonous without the context of patient care. For this PA, the webinar invoked a broader meaning – that each placenta is not routine, but critical to a mother and a child. They are part of something beyond the lab.

Table 3. Number of surveys including each question and percentage of respondents that selected "yes"

	N Surveys	% YES
Did this course enhance your competence?	46	80%
Did this course influence your practice?	46	70%
Did this course impact your patient outcomes?	46	66%

Connecting with Colleagues

Certain participants expressed that they are increasingly viewed as technicians rather than medical doctors.

Pathologists are losing ground to other specialties. They are losing their name and role as doctors. [...] Pathology practice should be patient-oriented, like sample collection and talking to the patient, as the radiologist does.

This participant expressed a need to reaffirm their role as integral members of the medical team through recognition of their contributions by colleagues and patients. While patient contact is one way of enhancing their sense of meaning, survey results support the integration of pathologists into multi-disciplinary teams. Following the webinars, participants acknowledged the need for "clear[er] language and communication in

pathologic diagnosis.” One participant remarked, “I was not aware of 30% misinterpretation from Pathologist to Surgeon.” High misinterpretation rates suggest systemic communication issues that may stem from insufficient dialogue within multidisciplinary meetings. Including pathologists in these meetings could reduce these errors.

Demonstrating their desire for interdisciplinary collaboration, pathologists valued insights into clinicians’ diagnostic approaches:

I really appreciate the comments about learning what our oncologists are thinking and how they will incorporate PD-L1 assessment in the management of their upper GI tract cancer patients.

Including pathologists within the clinical team may, therefore, combat the growing sense of devaluation and depersonalization within the profession and improve clinical decision-making, with patients being the ultimate beneficiaries. CME webinars promoted and facilitated skills required for multi-disciplinary collaboration.

Connecting with Leadership: Burnout as Shared Responsibility

Many participants praised wellness webinars: “I loved the presentation. Very practical. I already rearranged my working environment and thank you for affirming this change.” Others raised concerns with the feasibility of these interventions, “I’ll try to start moving more during the day, rearranging my office as demonstrated, if possible.” Certain participants highlighted the need for wellness interventions to engage both pathologists and leadership teams, “low hanging fruit—rearrange the office. Pressure leadership to make wellness a priority.” The conditions engendering burnout are a shared responsibility.

Pathologists want to implement wellness initiatives in departments:

It was really cool that she talked about the financial calculator tool to justify hiring more. Huge problem here in Qc, depts are hugely understaffed. I'm always told decisions (of any kind) come down to money. I've been trying to bring more wellness initiatives in my dept, especially for residents as I'm one myself, and it's been met by a lot of push back. Having data, especially pathology-specific data will help out a lot.

Willingness from pathologists is not enough for the implementation of programs, and support is required from administrative teams. There is an overarching consensus that, “We need more talks like these. More open discussion about what is plaguing the system.”

One participant voiced frustration:

Is there someway through CAP to mandate that departments take this seriously? A colleague in our department killed himself a couple years ago and it was hidden and covered up and either completely forgotten or just ignored (not sure which is worse) and I feel like a strong statement from the national body may help some of us lowly worker bees to make this of importance for our departments.

This quote expresses a sense of helplessness. The phrase, “lowly worker bees” illustrates this participants’ perception of being undervalued and crises ignored. Another participant criticized the gap between rhetoric and action from governing bodies:

Organizations talk burnout but they don’t do anything about it. [...] In the eyes of the government and our lab leaders, physicians are a liability and not an asset. As such topics like burnout are considered “whining”. When organizations talk about “how important physician health is” then we expect to see meaningful action - but there is none.

Referring to physicians as “liabilities” reflects this participant’s perception that authorities consider them as dispensable. Certain pathologists are disillusioned by what they identify as systemic inaction. There is a deep-rooted sense of mistrust between many pathologists and their leadership teams, which creates barriers to their engagement in wellness initiatives and peer-based support.

Table 4. Sample quotes from the theme “pathology at a crossroads”

At long last gave me a way to approach someone who might need help... Very good, for the subject is not an easy one and was well rendered.

I am pending retirement, but I wish I'd had access to this information earlier in my career. Bravo to Dr. ANONYMISED and others who are trying to understand the root and uniqueness of pathologist burnout.

I hope is leads to more engagement via the CAP-ACP to counteract negative 'side-effects' of our profession.

The guidelines for use of molecular testing in metastatic carcinomas were discussed in many presentations before, BUT this presentation put all of that in prospect with clear description of how different tests and results impact the patient care. Both speakers did a great job on that. Thank you

The IHC stains I use are further utilized in patient care beyond my office!

DISCUSSION

The analysis developed three main themes: [1] Perception of Learning Activities, [2] Small Doses of Actionable Learning, [3] Pathology at a Crossroads.

Webinars: Transforming CME Engagement?

Participants expressed high satisfaction with learning content, praising the impactful speakers, high quality of the content, accessible delivery, and use of online learning tools to increase engagement during lectures. Other studies similarly show high satisfaction with online CME programs (Jang et al., 2023; Removed to maintain author anonymity, 2025). In agreement with our findings, the literature indicates that interactive discussion is a powerful learning tool (Waltemeyer & Cranemore, 2020). Use of breakout rooms and polls facilitates

concurrent interaction from the entire audience and allows instructors to provide prompt feedback to participants. Classroom learning is no longer unilateral but supports audience-wide participation. In this way, Waltemeyer and Cranemore argue that online education may surpass traditional learning opportunities.

Consistent with the literature, participants valued learning that applied to their daily practice, including improved report writing, interpretation and handling of data, improved diagnostic ability, and tissue handling and sampling methods. Reis et al. (2022) report that barriers to participation in CME included a lack of time, perception of work overload, lack of digital competence, and motivational and emotional factors. Conversely, they report that practical and pragmatic characteristics of online CME facilitated participation. The convenience of short, targeted learning opportunities that mitigate travel challenges, financial constraints, and the guilt associated with prolonged absences from work facilitate increased engagement (Lugtenberg et al., 2011; Price et al., 2021; Reis et al., 2022). Online teaching tools can significantly enhance instructors' teaching abilities. Cho et al. (2012) found that while lecturers recognize questioning techniques as critical for engaging participants, 40.4% did not use these techniques. Additionally, lack of interaction is the most cited reason for dissatisfaction among online learners (Dailey-Herbert, 2018). Our results indicated that lecturers valued webinars that taught them how to use engagement tools in online teaching to facilitate rapid and continuous audience interaction. This approach allows for class-wide engagement beyond the traditional didactic question-and-answer format. As a result, the enhanced engagement in online learning benefits both students and instructors, making webinars profoundly effective and pragmatic for CME engagement.

A Need to Reconnect

A central theme which emerged from the qualitative analysis indicated that, to many, the webinars held meaning beyond the bounds of academic learning and CME requirements. Consistent with recent studies, the qualitative data indicated that burnout among pathologists is a concerning issue. Dr. Julia Keith's (2022) study reported that 58% of Canadian pathologists experience burnout, and Cohen et al. (2022) found a burnout rate of over 47% among American pathologists. The current analysis suggests that certain pathologists perceive burnout as a systemic issue in which they are undervalued by the system. In addition, a lack of interaction within multi-disciplinary teams reduces their profession to diagnostic tasks, and there is a sentiment of loss of meaning in their work. Supporting these findings, a recent survey, including 2,363 pathologists, pathologists' assistants, and pathology and laboratory professionals, echoed these findings, identifying workload overload and loss of meaning in work as the most common causes of burnout (Smith et al., 2023). These findings require further investigation and suggest systemic reforms to address the psychological and professional challenges faced by pathologists. Phenomenological and social constructionist investigations may offer deeper insights into the lived experience of pathologists and how workplace culture and systemic issues contribute to loss of meaning, respectively.

Humans possess an intrinsic need to believe that our lives hold meaning and that our actions are meaningful; when we fail to find meaning in our work, the result is burnout (Pines, 1993). According to Maslach and Jackson (1981), the primary causes of burnout are

emotional exhaustion, depersonalization, and discontent with achievement. The qualitative analysis indicated that the webinars reminded pathologists of the clinical significance of their work and the critical importance of their work to each patient and family. To pathologists working behind the scenes, the webinars reconnected pathologists with the meaning of their work.

Furthermore, the literature has well-established that strong social relationships protect against burnout, with workplace loneliness leading to psychological detachment and emotional exhaustion (Jung et al., 2022; Wood et al., 2022). Highlighting the solitary nature of many pathologists' workdays, Roboy et al.'s (2015) study indicated that 52% of a pathologist's work time is spent in anatomical pathology and 14% in the clinical laboratory, with the remainder typically spent in teaching, research, and administration. The importance of increasing social interactions among pathologists is supported by Keith's study (2022), which showed that the more time pathologists spent alone each workday, the greater their experiences of emotional exhaustion and depersonalization. Conversely, having a common area to informally converse with colleagues improved scores on the same domains. The results showed that pathologists appreciated insights into clinicians' diagnostic processes and sparked a desire to connect within multi-disciplinary teams. The responses indicate a loss of meaning in work and a desire for increased social interactions and recognition of the clinical significance of pathologists' work. Webinars reminded certain pathologists of their critical impact on patients. National organizations such as the CAP may be able to facilitate the destigmatization of mental health issues through open discussions and encourage increased engagement with peers and wellness initiatives. In doing so, they may rebuild trust between individual pathologists and their leadership teams.

Conclusion

The present study highlights the high level of satisfaction with CME webinars, particularly those that successfully broke traditional barriers to learning and facilitated widespread engagement. Participants valued the interactive and inclusive nature of webinars, which supported audience-wide learning. Moreover, the ability to access content that had immediate applicability to their clinical practice was especially appreciated. Actionable learning, which could be implemented quickly in daily tasks, significantly enhanced the overall impact of the sessions.

Using online tools, such as breakout rooms, polls, and continuous audience interaction features, boosted engagement and enhanced instructors' teaching abilities. The rapid feedback loops and class-wide participation created a dynamic learning environment, fostering an experience beyond passive information consumption. Both learners and instructors benefited from this collaborative and interactive format.

However, burnout emerged as a significant concern. Participants expressed feelings of emotional exhaustion and depersonalization, underscoring a troubling loss of meaning in their work. This finding warrants further investigation, primarily through in-depth qualitative analyses of the lived experiences of pathologists. By focusing on fewer participants but

conducting a deeper exploration, future studies may uncover the complex psychological and systemic factors contributing to burnout in the pathology field.

Strengths and Limitations

A notable strength of this study was the immediate collection of data following each webinar, ensuring that participant feedback and interactions were captured while the CME session was still fresh in their minds. We believe this allowed for a more accurate recollection and representation of the participants' experiences. Additionally, the broad scope of participants from across the pathology fraternity ensured that the findings reflected a diverse set of perspectives.

Nevertheless, there were limitations. As the study relied solely on survey responses, the depth of the analysis was limited compared to more comprehensive qualitative approaches. Additionally, participant responses may have been biased toward the specific topics of each webinar, potentially skewing the feedback to favor subjects that were more engaging or directly applicable to their preferred practice areas.

While the study provides valuable insights into the success of CME webinars in enhancing learning and engagement, it also opens the door for further, more nuanced investigations into the critical issue of burnout in the field of pathology.

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