






## Brief Communication

# Fostering Education in Epilepsy: A Canadian League Against Epilepsy Teaching Initiative

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**ABSTRACT:** The Canadian League Against Epilepsy initiated a virtual epilepsy education program, conducting 29 webinars from March 2021 to September 2023. We report our experience, with the goal to inspire other groups to develop inclusive, equitable, and free educational spaces with a worldwide reach. Monthly sessions drew a median attendance of 118 participants, predominantly Canadian but also international, including physicians (58.9%) and trainees (22.8%). Post-webinar surveys (average 40% response rate) noted high satisfaction, a strong inclination to recommend the sessions, and an interest in clinical case-based topics. We plan to consider integrating a self-assessment section evaluating knowledge gained after each seminar.

**RÉSUMÉ :** Favoriser l’éducation en matière d’épilepsie : une initiative d’enseignement de la Ligue canadienne contre l’épilepsie. La Ligue canadienne contre l’épilepsie (LCCE) a lancé un programme d’enseignement virtuel portant sur l’épilepsie. À cette fin, elle a organisé 29 webinaires de mars 2021 à septembre 2023. Nous souhaitons ici rapporter notre expérience afin d’inspirer d’autres groupes à élaborer des espaces éducatifs inclusifs, équitables et gratuits ayant une portée mondiale. Les sessions mensuelles de LCCE ont attiré une participation médiane de 118 participants, majoritairement canadiens mais aussi internationaux, dont des médecins (58,9 %) et des stagiaires en médecine (22,8 %). Les enquêtes post-webinaires (taux de réponse moyen de 40 %) ont fait état d’une grande satisfaction, d’une forte propension à recommander les sessions et d’un intérêt pour les sujets basés sur des cas cliniques. Nous envisageons par ailleurs d’intégrer une section d’auto-évaluation des connaissances acquises après chaque webinaire.

**Keywords:** epilepsy; education; feedback; learning; online; teaching; webinars

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The objective of the International League Against Epilepsy (ILAE) is to guarantee that stakeholders worldwide, including but not limited to healthcare professionals, patients and their caregivers, policy makers, and the public, have access to the necessary educational and research materials to comprehend, diagnose, and provide care for individuals living with epilepsy.<sup>1</sup> To achieve this goal, a proficiency-based curriculum has been designed for epileptologists to cover expected learning objectives divided into seven domains of competencies and three levels of proficiency.<sup>1</sup> Several teaching initiatives have been established to address these educational needs. Most of them involve the utilization of online, distance-learning platforms;<sup>2,3</sup> although, these are not free of charge.

Herein, we report our experience, with the goal to inspire other groups in neurology, on how to develop and hold an inclusive, equitable, and free-of-charge educational space with a worldwide reach.

### How we did it

Further fueled by the needs to create inclusive learning opportunities during Covid-19 pandemic, in early 2021, the Canadian League Against Epilepsy (CLAE) launched a free-of-charge accredited virtual continuous education program in epilepsy under the direction of the Canadian Epilepsy Teaching Network (CETN). The CETN is composed of CLAE members, including the director of education, and embraces pediatric and

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**Table 1.** Monthly webinars presented by Canadian Epilepsy Teaching Network from 2021 to September 2023

Date	Title	Presenter
March 2021	Epileptic encephalopathy: Emerging concepts	Dr Mary Connolly, Vancouver
April 2021	Rationale polypharmacy in the era of newer ASDs	Dr Emilio Perucca, Pavia
May 2021	Precision medicine: Are we ready for prime time?	Dr Ingrid Scheffer, Melbourne
June 2021	CBD in Epilepsy: Current practice	Dr Elizabeth Thiele, Boston
July 2021	Novel surgical approaches in Epilepsy	Dr George Ibrahim, Toronto
August 2021	Ketogenic diet: A call for individualized therapy!	Dr Elaine Wirrell, Rochester
September 2021	SUDEP: Knowns and unknowns influencing discussion	Dr Elizabeth Donner, Toronto
October 2021	Comorbidity in Epilepsy: Practical aspects of management	Dr Mark Keezer, Montreal
November 2021	Status Epilepticus: Any change in concepts and management?	Dr Teneille Gofton, London
December 2021	Epilepsy in Women: Pregnancy, lactation and menopause	Dr Esther Bui, Toronto
January 2022	From Insula to Precuneus	Dr Dang Ngyuen, Montreal
February 2022	EEG Patterns in the ICU	Dr Lawrence Hirsch, New Haven
March 2022	Multimodal Neuroimaging in Epilepsy	Dr Paolo Federico, Calgary
April 2022	Role of Neuropsychological Assessment in Epilepsy Surgery	Dr Mary Lou Smith, Toronto
May 2022	Epilepsy and Sleep	Dr Marcus Ng, Winnipeg
June 2022	Epilepsy Surgery Failures: Lessons learned	Dr Robert Knowlton, San Francisco
July 2022	Epilepsy in the Elderly	Dr Kristin Ikeda, Halifax
August 2022	Neonatal Epilepsy: Myths & Mysteries	Dr Renee Sellhaas, Ann Arbor
October 2022	Neuromodulation: VNS vs DBT vs RNS	Dr Tina Go, Vancouver
November 2022	Pregnancy Registry in Epilepsy: Lessons learned	Dr Torbjorn Tomson, Stockholm
December 2022	EEG Source Imaging in Epilepsy	Dr Kevin Jones, Hamilton
January 2023	Autoimmune Epilepsy	Dr Claude Steriade, New York
February 2023	MRI Brain in Epilepsy	Dr Kish Mankad, London
March 2023	Ketogenic diet, Epilepsy & Gut Microbiome: What is the connection?	Dr Stefanie Prast-Nielsen, Sweden
April 2023	Psychogenic Non-Epileptic Seizures	Dr Benjamin Tolchin, Yale, USA
May 2023	ILAE Classification- Concept Changes	Prof Solomon Moshe, NY
June 2023	SUDEP: From Mechanism to Prevention	Dr R Ramachandran Nair, Hamilton
August 2023	Interesting Pediatric Epilepsy Surgery Cases	Dr David Dufresne, Sherbrooke
September 2023	Lessons Learned from Non-surgical Cases	Drs. L Huh, BC/JP Appendino, AB/G Winston, ON

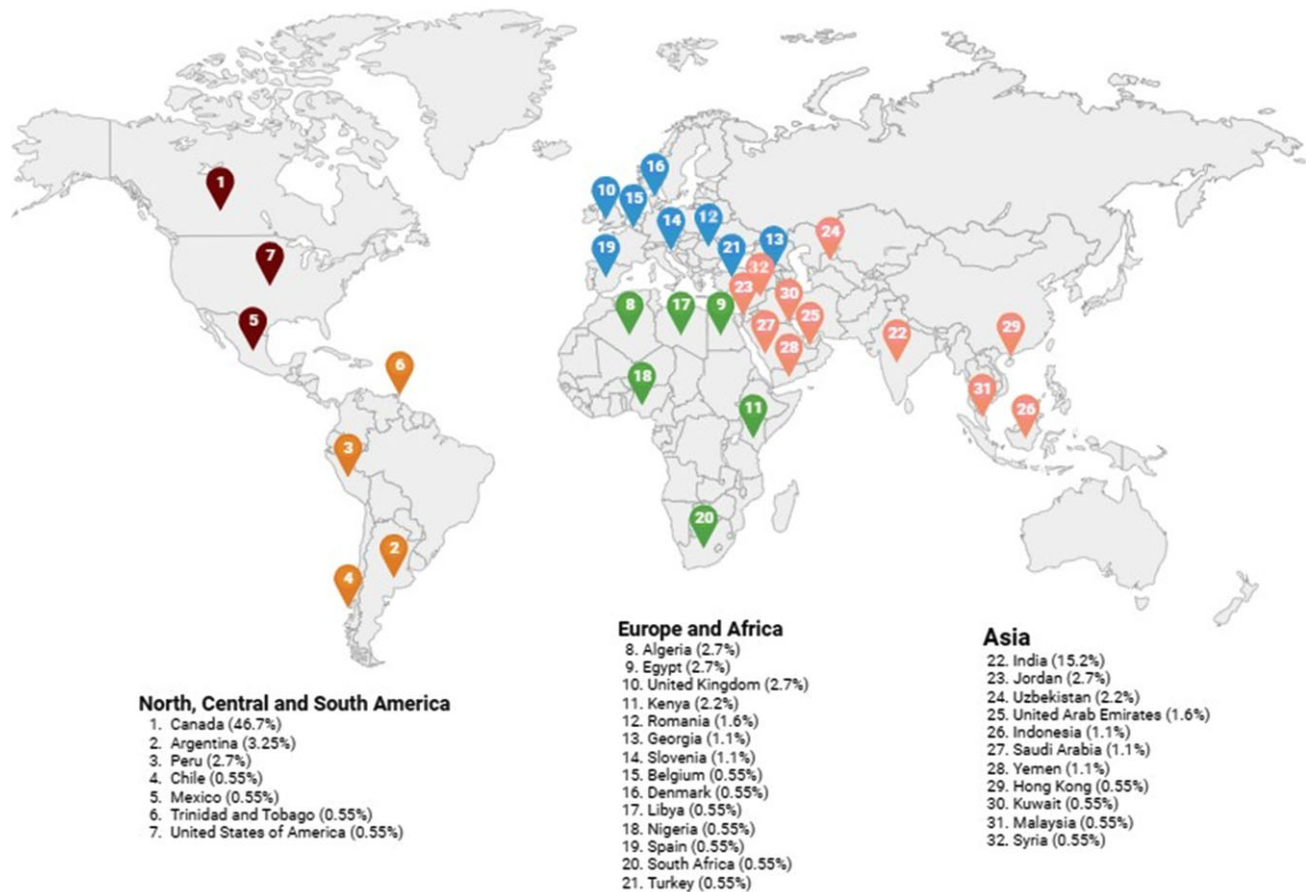
AB = Alberta; ASDs = anti-seizure drugs; BC = British Columbia; CBD = cannabidiol; DBT = deep brain stimulation; EEG = electroencephalography; ICU = intensive care unit; ILAE = International League Against Epilepsy; MRI = magnetic resonance imaging; ON = Ontario; RNS = responsive neurostimulation; SUDEP = sudden unexpected death in epilepsy; VNS = vagus nerve stimulation.

adult epileptologists and neurophysiologists, with a wide range of interests within epilepsy education. Monthly virtual rounds, given by national and international experts, were offered. These targeted healthcare professionals involved in or working with epilepsy.

Since March 2021, monthly webinars have been held on the virtual platform Zoom<sup>®</sup>. The invitations were open and free of charge. The link to participate was regularly posted on the CLAE website (<https://clae.org/CETN-Program>) and sent via email to all registered members. The topics were initially selected based on the ILAE curriculum<sup>1</sup> and, starting from the second year, tailored to the audience's expressed interests. National and international experts were chosen through internal discussions within the CETN. Each webinar had a duration of 60 minutes, with at least 10 minutes reserved for an interactive "question and answer" session with the audience via the chat. Every webinar was recorded and shared on the CLAE website, if consented by the presenter. The list of all the topics and their respective presenters is shown in Table 1.

At the end of each meeting, a survey questionnaire (performed using Google Forms<sup>®</sup>) was sent to the participants. The meeting organizers provided the link in the Zoom<sup>®</sup> meeting's chat. In the initial part of the survey, participants were required to identify their role (physicians, trainees, basic scientists, nurses, etc.) and specify whether they were first-time attendees or returning participants to the CETN rounds. Since May 2023, attendees were asked to document the current country of practice. Afterward, participants were asked to rate their satisfaction on a 5-point Likert scale (from 1 for "strongly disagree" to 5 for "strongly agree") regarding the content, the presentation format, and the overall presenter's performance and the CETN program. The concluding part of the survey included gathering open-ended comments regarding the impact of the session on participants' knowledge and clinical practice, suggestions for future webinar topics, and any feedback to improve the program. Participants who completed the survey were identified as "responders". Responders were entitled to

## CETN Responders' country of origin (May-September 2023)



**Figure 1.** Country of practice of those who attended the Canadian Epilepsy Teaching Network monthly rounds held between May 2023–September 2023 and who responded to the survey.

receive a certificate of participation by email with continuing medical education credits.

### What we found

A total of 29 webinars were conducted from March 2021 to September 2023. A median of 118 [25<sup>th</sup> percentile: 112–75<sup>th</sup> percentile: 134] participants (responders and non-responders) were recorded to have connected to the Zoom<sup>®</sup> platform during the monthly webinars. Of these, a median of 46 [34–51] responders completed the survey. They were mostly physicians (58.9%) or trainees (22.8%). Basic scientists accounted for 2.2% of the total, nurses for 2.4%, while 13.7% identified themselves as another type of professional. The average rate of returning registrants was 82%. Since May 2023, international responders' country of practice was also recorded (Fig. 1).

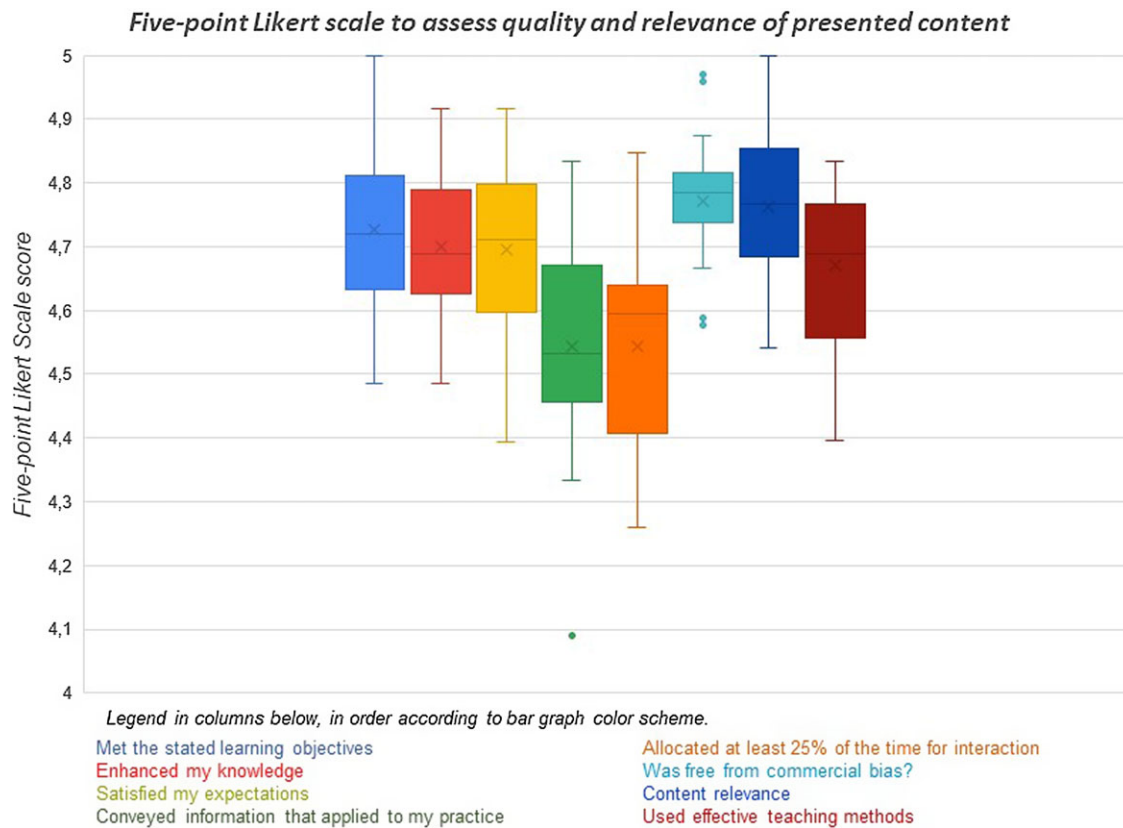
Responders rated the quality of the webinar content very positively. In particular, the median scores were 4.71 [4.64–4.78] for attainment of learning objectives, 4.68 [4.63–4.76] for knowledge enhancement, 4.67 [4.61–4.78] for meeting expectations, and 4.53 [4.47–4.64] for provision of relevant information in clinical practice (Fig. 2).

Regarding the presentation format and conveyed information, median scores were 4.79 [4.74–4.83] for being free from

commercial bias, 4.76 [4.68–4.78] for content relevance, 4.67 [4.56–4.76] for using effective teaching methods, and 4.59 [4.46–4.63] for allocation of adequate time to discussion.

The main areas in which responders reported feeling significantly improved were therapeutic (26.8%) and diagnostic (22.3%) management of their patients. In addition, they showed increased confidence in the pre-surgical work-up (9.2%), as well as a better understanding of genetic etiologies (6.5%). Other major areas of improvement were identified in the management of the transition from paediatric to adult (6%), in the definition and classification of epileptic syndromes (5.6%), as well as in handling anti-seizure medications (ASMs) (5%). The remainder answers individually accounted for less than 5%, for a total of 18.6%.

In Table 2, the main topics requested-suggested by the responders for the upcoming webinars are listed. The top ten suggested topics were: surgical work-up (7.7%), EEG graphoelements (7.1%), pediatric epilepsies (6.5%), pharmacology of ASMs (5.9%), neonatal epilepsies (5.5%), invasive monitoring (5.1%), neuroradiology (4.7%), genetic epilepsies (4.5%), clinical cases (3.9%), neuroinflammation (3.3%). As observed in Table 1, 100% of the presented topics starting from the second year were chosen based on the desires and needs expressed by the audience.



**Figure 2.** Results from the satisfaction questionnaire answered by responders.

We also collected suggestions to improve our sessions. Most responders requested increased interaction during the webinars (i.e. live polls, open Q&A, enabling microphones) (59.6%), the option for offline access to educational materials after the session (19.2%), and a major utilization of clinical cases (13.1%). Additionally, there were suggestions for incorporating more videos (3.5%) or clinical synopses at the end of the webinar (1.7%). Respectively 1.7 and 1% advised improved organization of the webinars and focusing on topics of greater clinical relevance.

### What we learned

There is a dearth of research in the medical field when it comes to “Epilepsy Education”, and it is uncommon to find publications discussing initiatives in this area in scientific journals.<sup>4</sup> An increase in such educational initiatives and subsequent literature has been observed with the outbreak of the pandemic, with a net rise in the use of virtual strategies estimated to be between 300% and over 3000%.<sup>5</sup> The application of surveys is a commonly used methodology in the field of epilepsy, both to measure patient satisfaction with the treatments received and to evaluate the quality of education programs targeted to patients and healthcare personnel.<sup>6,7</sup>

One of the main advantages of technology is the possibility to simultaneously connect regions of the globe that are far apart from each other. This tool could enable the development of an education that is inclusive and equitable and spanning across different domains, promoting equal opportunities for all.<sup>8,9</sup> Low- and low-to-middle-income countries lack epilepsy specialists, and often primary healthcare providers take care directly of people with epilepsy.<sup>10</sup> It is, therefore, crucial that the enormous strides in knowledge about

epilepsy made in recent years can also be disseminated to obtain a tangible improvement in the care of people with epilepsy worldwide. We believe our program reflects such spirit as shown in the long list of countries that have accessed to the seminars (Fig. 1). Other fee-based international platforms for e-learning exist; however, the access cost may limit the much-needed learning from some regions in the Globe making the Canadian offer quite unique for those learners from limited resources regions.

A recent meta-analysis argued that acquiring knowledge through reading a physical paper text leads to a deeper understanding compared to reading a virtual text.<sup>11</sup> While current virtual communication platforms allow for a high simulation of a conference, the potential for face-to-face interaction is probably not attainable, and future studies will need to evaluate this aspect.

Our program was free and open to anyone who expressed an interest in epilepsy, regardless of their role. Most attendees were physicians or trainees, but allied healthcare providers also participated. Through their survey responses, we unexpectedly learned about their interest in clinical cases-based topics; therefore, these were considered and incorporated as the next iterations of the program during the second year where more clinical cases and Q&A interactions were included. This approach was aimed to support our educational philosophy of inclusion and equity.

Unfortunately, the data reflects the responses provided by almost half of the participants who answered the survey. We can speculate that most of those who completed the survey may be Canadian, as completing the survey was a necessary requirement for obtaining continuing medical education credits. Despite knowing this limitation, as mentioned above, we know that there are colleagues from countries other than Canada attending and

**Table 2.** Suggested topics by the responders during Canadian Epilepsy Teaching Network monthly rounds

Topic	% of responders
Surgical work-up	7.7
EEG grapho-elements	7.1
Pediatric	6.5
Anti-seizure medications	5.9
Neonatal	5.5
Invasive monitoring	5.1
Neuroradiology	4.7
Genetic	4.5
Clinical cases	3.9
Neuroinflammation	3.3
Status Epilepticus/NORSE/FIRES	3.3
Focal epilepsy	3.1
Developmental Epileptic Encephalopathies	3.1
SUDEP	2.8
MEG, fMRI	2.4
Comorbidity	2.2
Psychogenic nonepileptic seizure	2.2
International League Against Epilepsy classification	2
Neuropsychological tests	1.8
Neurocritical care	1.8
Stroke	1.6
Continuous spikes and waves during sleep	1.4
Women	1.4
Long term monitoring-EEG	1.4
Seizure semiology	1.4
Drug-resistant epilepsy	1.2
Neurostimulation	1.2
Infantile spasms	1.2
Ketogenic diet	0.9
Metabolic epilepsies	0.8
Epilepsy in low-resource setting	0.8
Autism Spectrum Disorder	0.8
New treatments	0.8
Stigma	0.8
Evoked potentials	0.6
Migraine	0.6
Non convulsive status epilepticus	0.6
Epileptogenesis	0.4
Elderly	0.4
Driving	0.4
Transition	0.4
Research model	0.4
Precision therapy	0.4

(Continued)

**Table 2.** Suggested topics by the responders during Canadian Epilepsy Teaching Network monthly rounds (Continued)

Topic	% of responders
Head injury	0.2
COVID	0.2
Ethics	0.2
Sleep	0.2
Nursing care	0.2
Brain tumors	0.2
Non epileptic paroxysmal events	0.2

EEG = electroencephalography; FIRES = Febrile infection-related epilepsy syndrome; fMRI = functional magnetic resonance imaging; MEG = magnetoencephalography; NORSE = new-onset refractory status epilepticus; SUDEP = sudden unexpected death in epilepsy.

responding to the feedback forms confirming the broad reach of these seminars.

We also learned during this project that including a self-assessment section on the knowledge acquired following a seminar may be a logical next step. This will allow an objective assessment of the role of the seminar and its impact of the imparted content in the knowledge consolidation of the attendee. In addition, this can further provide information to the CETN webinars organizers on the background knowledge of the audience and where to emphasize further educational efforts.

Consistently, almost 20% of the audience was comprised of first-time attendees, suggesting our educational activity sparked interest in the field of epilepsy and is perhaps attracting future leaders to the area. The second year of the program compiled the attendees' request which seemed to have appealed to the broader audience as it shows a high level of appreciation, a high level of returning learners and a high rate of willingness to recommend our sessions.

To conclude, the CETN group, is extremely curious about assessing the educational impact of utilizing more clinical cases and educational videos, exploring the potential for live interaction during sessions via both chat and webcam/microphone, and implementing self-assessment measures before and after sessions, as suggested by our audience. These improvements are to be included in our seminars as future steps.

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**Author contributions.** TAF and JPA co-conceived and supervised the development of the study. GDO interpreted the data and wrote the first draft of the manuscript. All the authors have critically revised the final version of the manuscript.

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**Competing interests.** None.

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