



# CANADIAN IONM NEWS

Official Newsletter of CANM

## Message from the Editor

Dear Readers,

In 2008, the inaugural Canadian symposium on Intraoperative Neurophysiological Monitoring took place in Toronto, Ontario. The meeting was not only the first of its kind in Canada but it also launched the establishment of CANM, our national association committed to advancing the field and profession of IONM.

Over the years, CANM has worked tirelessly to develop new educational initiatives to foster our profession and improve patient care. *The Canadian IONM News* is one of these initiatives and it has grown considerably through our partnership with Andrew John Publishing Inc.

Since our first issue in 2012, the *Canadian IONM News* has evolved into a regular publication within the Canadian IONM community, accumulating a readership base of over a thousand health care professionals across Canada and the United States. A total of 10 issues have been released to date. Every issue is available for download on the CANM website (<http://www.canm.ca/canmnewsletter.html>) and each contains association updates as well as content relevant to the field of IONM today.

CANM has always strived to incorporate articles related to “hot button” topics in IONM. Listed below are just a few examples of previous articles that have generated great interest among our readers:

- Elimination of IOM Billing Codes in Ontario (Vol. 1, Issue 2)
- IONM in Canada versus the United States (Vol. 1, Issue 3)
- Review: IONM and Anesthetic Related Issues (Vol. 2, Issue 2)
- Encouragement to CANM for the Education Initiative (Vol. 2, Issue 3)
- Interview with Dr. Fehlings (Vol. 3, Issue 1)
- Electrical Stimulation of the Nervous System: Safety Factors (Vol. 3, Issue 3)

Of course, it should be noted that the success of the Canadian IONM News would not be possible without the contributions of our esteemed authors who represent a wide array of health care professionals including IONM practitioners, physicians, and researchers. Their informative submissions are the core of this publication and I thank them for their activism within our community. While our list of authors is continuously expanding CANM certainly welcomes more contributors. If you are interested in submitting an article related to IONM, please free to contact CANM at [info@canm.ca](mailto:info@canm.ca)

In addition to expressing gratitude to our authors I would also like to convey my deepest appreciation to our corporate sponsors whose patronage from the very start helped CANM launch this publication. On behalf of the CANM Executive Board, I thank them for their support and I look forward to our continued alliance.

This issue (Volume 4, Issue 2) marks the 11th edition of the *Canadian IONM News* and it is no surprise that CANM is extremely proud of our popular publication. I hope you join us in celebrating this milestone and how much CANM has accomplished thus far with our official e-newsletter.



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8<sup>TH</sup> ANNUAL Canadian Association of  
Neurophysiological Monitoring

# S CANM IONM Symposium

September 25 - 26, 2015  
Montreal, Quebec



Please join us for the 8th Annual CANM IONM Symposium.

This year's meeting will be held in Montreal, Quebec on September 25–26, 2015 at the Marriott SpringHill Suites Hotel. Located along the St. Lawrence river in Old Montreal, the hotel is steps away from the Notre-Dame Basilica, Palais des Congrès, museums, and many other wonderful attractions.

With this upcoming symposium, CANM is proud to continue the tradition of hosting interactive and highly educational events with many esteemed speakers. We are pleased to have the distinguished Dr. Daniel Schwartz as this year's Keynote Speaker. This celebrated icon will be presenting a "Historical Perspective on IONM" as his keynote address. Among the early pioneers of intraoperative neuromonitoring Dr. Schwartz first developed the intraoperative neuromonitoring program at the Hospital of the University of Pennsylvania and later founded Surgical Monitoring Associates, Philadelphia, PA. He has authored or coauthored more than 75 articles and book chapters related to neuromonitoring and is considered one of the foremost experts in the field.

In addition to our keynote address, this year's program will include lectures in anesthesia, spine surgery and many other topics along with technical presentations on mapping the brainstem and cerebral cortex. You can view the preliminary program for the 8th Annual CANM IONM Symposium at: [www.canm.ca/2015\\_program.pdf](http://www.canm.ca/2015_program.pdf)

This is a University of Toronto accredited Continuing Medical Education (CME) event. Attendees will receive 14 CME credits for their participation in this 2 day symposium.

For registration details, payment options and further information about the symposium please visit the CANM website at: [www.canm.ca/symposium.html](http://www.canm.ca/symposium.html)

We look forward to seeing you in Montreal!

Sincerely,  
Nancy Lu

CANM Symposium  
Organizing Committee 2015



# Practice Models within the Field of IONM

This has caused issues both in staffing, billing, insurance reimbursement, and the political environment. If one was to look at only staffing, the controversy of practice models is brought up. In the United States, there are a number of different practice models that currently exist. Historically the practice model consisted of a professional in the operating room performing both the technical and professional interpretation of neuromonitoring data.

These professionals were some of the founding fathers of the profession and they came from many different educational backgrounds. Some of their backgrounds were neurologists, surgeons, anesthesiologists, audiologists, PhDs, chiropractors, physical therapists, and various other backgrounds. These individuals laid the initial ground work in software and hardware development, as well as forming the initial neuromonitoring policies and procedures. Initially, this model continued into the early 1990s, until they started to look towards developing reimbursement codes.

They modeled the reimbursement codes from the electrodiagnostic field, where there was both a technical and professional component. Also, this laid the new groundwork where remote/ telemedicine would be used. Additionally, this led to a sharp rise in vendor/contract models where they could generate large profits by having remote professionals monitor multiple cases at a time. This also firmly established the technician/remote professional model as the predominant model in the United States. Moreover, this led to financial and political turf wars between the non-physicians versus the physicians.

In 2008, the American Medical Association House of Delegates voted to define IONM as the practice of medicine. This established that insurance companies would only reimburse medical physicians for the professional codes. However, vendor/contract companies were still able to bill by hiring Medical doctors to remote monitor the procedures. Unfortunately, this was abused by some companies that would hire any medical doctor to monitor multiple cases at a time and just rubber stamp the bills. In turn there was an increase in scrutiny from insurance companies and government insurance regulators, hence leading to an increase number of fraud investigations and eventual establishment of the new coding structure we have today.

Current IONM practice models that exist in the field today are: technician/remote physician, technician/onsite physician, just a technician, and technician/ onsite professional, or just a professional in the room. The most financially reimbursable model is the first model

mentioned. Unfortunately, none of these models have ever been researched or compared to see which the best model is for the patient. These models need to be examined to determine which has the best outcomes data in addition to being cost effective. I have only seen one pilot study performing a comparison and this was done in the United Kingdom. They compared highly specialized clinical physiologists (in the US a well trained and educated CNIM) versus consultant clinical neurophysiologists (in the US a Neurologist). The limited pilot study demonstrated that highly specialized clinical physiologists were comparable to the consultant clinical neurophysiologists in level of care and interpretation. This study was performed because there is a shortage of consultant clinical neurophysiologists in the UK. This is the only study I have seen looking at practice models and comparing outcome data. Currently, the US models are based on profit generating capability, not on patient care.

Recently, The American Society for Neurophysiological Monitoring (ASNM) addressed the topic of practice models in their past two newsletter publications. The first article written by Richard Vogel, PhD, D.ABNM, appearing in June's newsletter looked at non-physicians performing professional oversight in neuromonitoring. He still emphasized a technician/professional model, but that the professional can be non-physician providers. He emphasized that non-physicians should establish clinical rotations and work towards the process of licensing. In July's newsletter, written by Douglas Porter, MD, he addressed the value of physician oversight models. Dr. Porter stated that neuromonitoring is the practice of medicine and that non-physicians lack the appropriate clinical knowledge and exposure. He further stated that remote neurologists can "guide the in-OR team to what should be evaluated and directing the surgical team through interactive consultation." He goes on to suggest that the physician model is essential to performing neuromonitoring in surgical cases. Lastly, he also emphasized that the better option for the future would be to encourage more medical physicians into neuromonitoring.

Interestingly both of these newsletters were commentaries based on an article written by Norton et al appearing in the *Canadian Journal of Surgery*. The article summarizes the results of a survey in which Canadian surgeons were asked about qualification for supervision and interpretation of IONM. My professional opinion is that interpretation of IONM data needs to be performed in the operating room. In the past when IONM data only consisted of simple monitoring, the practice model of remote supervision and a technologist was sufficient for patient care. Currently,

neuromonitoring is intricately involved during complex surgical procedures utilizing multimodality monitoring. Also, the addition of motor evoked potentials requires immediate interpretation and communication with the surgical team. This requires a neuromonitoring professional in the operating room. In comparison, if a medical professional was performing remote supervision, a delay in interpretation and communication would occur. In addition, the remote professional does not have access to the clinical chart, medical history, anesthesia details, and what is going on during the surgical procedure. They can obtain this information from the technologist in the room, but this relies on the technologist's clinical knowledge and a delay in relaying the information. In addition, most remote professionals supervise more than one case at a time. Ultimately this is poor patient care and can lead to poor outcomes. In my professional experience working in this model, the remote professional added no clinical benefit with the exception of cost to the patient. It serves essentially as a rubber stamp for billing and profit generation. If the neurologist is on site and actually performing neuromonitoring, then it would be better care. My issue is that remote/not in the operating room interpretation leads to poor patient care and increased cost.

Currently I serve as director of intraoperative monitoring at Shriners Hospital for Children. The hospital previously utilized a vendor company that utilized a remote physician/technologist model. The reason that the hospital wanted to have an IONM department was to reduce cost. Once I started, I had to develop policies, procedure manuals, credentialing, and hiring of staff. The practice model that we use is professional interpretation in the operating room. I do communicate with each operating room, only for purposes of breaks and for consultations. I also monitor my own cases as well. Each staff member went through a hospital based credentialing process to qualify them to monitor specific types of cases and IONM modalities. This credentialing is based on clinical experience in neuromonitoring and case modalities. It is also based on educational degree attainment as well as graduate level neurophysiology and neuroanatomy course work. The credentialing establishes a tier system in which individuals are placed and this determines what types of cases they can monitor independently. Individuals can elevate in the tier structures by obtaining more experience and/or education. After only 1 year, we were able to reduce hospital expense by over 60%, improve patient outcomes, provide more reliable IONM data, and no longer performing wake up tests. Also, because of the success of our department the hospital started to do more complex cases and our hospital became the corporate

complex spine center. Our policies, procedures, and practice model is currently being reviewed to be implemented in the other 22 hospitals that are part of Shriners network.

We are currently working on research for both patient outcomes data and a comparison study to hospital's previous practice model. Current data from the Scoliosis Research Society (SRS) indicates a neurologic injury rate of 1-8% for pediatric deformity surgery and up to 60% for vertebral column resections (VCR). At our facility, our practice's neurologic injury rate for deformity surgery is 0% and for VCRs at less than 5%. We are able to obtain stable neuromonitoring data on 99% of our patients which allows the surgeons to perform safe operations and achieve greater corrections. If we were to compare our practice model with the previous remote physician model, we no longer perform wake up tests, are monitoring more complex surgeries such as VCRs, achieve greater corrections, obtain stable IONM data on virtually all patients, reduce costs significantly, and greatly reduce neurologic injury rate. This is mainly due to interpretation being performed onsite and in the room.

The Canadian Association of Neurophysiological Monitoring (CANM) is currently in the process of developing recommendations for interpretation in the operating room by a professional. They do not have the same political and financial issues that we have in the United States; hence they can focus on patient care and not on profits. CANM has also developed a professional education program that will serve to create a uniform workforce with similar skills and training. In the United States we only have technologist training schools and a handful of neurology fellowship programs only open to medical physicians. Unfortunately, this leaves out any educational route for non-physicians to perform professional interpretation. Finally, I hope in the future The US can develop an education program that works for both medical physicians and non-physicians. Until then we will just have to watch and be envious of how CANM developed a patient centered practice model.

**By James Zuccaro, DC, DABNM, CNIM**  
**Director of Intraoperative Monitoring**  
**Shriners Hospitals for Children**  
**Philadelphia, PA**

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## New 2015 CANM Members

**FULL MEMBER**

Leanne Alfaro - Calgary, AB



**Dr. Ron El-Hawary, MD, MSc, FRCS(C)**  
**Chief of Orthopaedics, IWK Health Centre**  
**Associate Professor of Surgery (Orthopaedics)**  
**Associate Professor of Surgery (Neurosurgery)**  
**Associate Professor School of**  
**Biomedical Engineering**  
**IONM Advocate**

Dr. El-Hawary is chief of orthopaedics at the IWK Health Centre and is associate professor, Department of Surgery, Dalhousie University (Cross-appointments with the School of Biomedical Engineering and with the Division of Neurosurgery). He is the paediatric chair of the Royal College of Physicians

and Surgeons of Canada Orthopaedic Examination Committee, executive committee member of the Chest Wall and Spine Deformity Study Group, board member of the Chest Wall and Spine Deformity Foundation, secretary of the Canadian Paediatric Orthopaedic Group, and is past president of the Canadian Paediatric Spine Society. Dr. El-Hawary also serves on the Growing Spine Committee of the Scoliosis Research Society and on the Research Committee of the Paediatric Orthopaedic Society of North America.

**Interview conducted by Susan Morris, PhD**

**SM: Aside from a shortage of funding and training, what additional barriers may be responsible for the lack of neuromonitoring facing several Canadian hospitals today?**

RE: In the past, a lack of understanding and awareness by surgeons about neuromonitoring was a barrier. Thanks in large part to organizations, such as CANM, CPSS, and SRS our awareness has increased tremendously. By having surgeons (i.e., “end users”) engaged, we can help advocate for the use of neuromonitoring in Canadian hospitals.

**SM: There has been considerable debate within the IONM community regarding the practice of “Remote Monitoring.” Some have expressed apprehension with a practice that allocates oversight of neuromonitoring to an individual who is not physically in the operating room. Do you share in these concerns?**

RE: I do not necessarily share these concerns as I feel that highly trained, highly motivated neurophysiologists can make remote monitoring work. This must be done in a controlled setting and care must be taken to ensure appropriate communication with the remote team. This may be difficult if the neurophysiologist is responsible for monitoring several locations at one time, therefore, there should be a limit to the number of sites that are monitored at any given time.

**SM: You are an avid supporter of IONM and successfully procured the resources to maintain an IONM program at your hospital. What recommendations do you have for staff and physicians at other Canadian health care institutions who are struggling to introduce IONM into their hospital?**

RE: The key is to advocate for IONM through educational rounds with other clinicians, including anesthesia and nursing. Engagement of administration through a series of meetings that includes clinical vignettes has also proven to be very helpful.

**SM: Do you believe that physicians currently enrolled in Canadian neurosurgical residency programs are receiving sufficient education in IONM?**

RE: Currently residents mainly learn about IONM as part of their intra-operative experience. Further efforts should be taken to provide more formal teaching about IONM within their residency training programs. This can include lectures, case presentations, and even interactive workshops.

**SM: The Stagnara Wake-Up Test was once considered the “gold standard” for assessing neural function during spine surgery. With today’s multi-modality IONM, do you see any role for continued use of the wake-up test?**

RE: I would view the Stagnara Wake-Up Test as a secondary check in the system if needed. We count on our reliable IONM to detect neurological compromise but, with stakes so high, there should be another check in the system if there is any doubt. This will likely change over time as more evidence related to thresholds for IONM alerts is published.

**SM: What role, if any, do you see for surgeons advocating for IONM use?**

RE: By having surgeons advocate for IONM use, we make it clear that we are aligned with neurophysiologist and that we represent one voice that can be very powerful.

**SM: Lack of trained IONM professionals presents a barrier for accessible IONM services. CANM is working to resolve this issue with the launch of our recent Graduate Certificate in IONM, in collaboration with the Michener Institute. However, some centres have chosen to resolve staffing issues by using what is commonly known as the “surgeon-driven IONM machine” (i.e., no neurophysiologist present and surgeon interprets the data that is restricted to free run EMG and TcMEPs). What are your thoughts on this?**

RE: I would be very cautious with surgeons driving the IONM machines. It has been demonstrated in the literature that multi-modal IONM is quite reliable as compared to single modality. Plus, if there is an alert, the surgeon should be very focused on the surgical factors (rather than potential technical factors) that may have caused the alert.

**SM: What factors do you believe contribute to developing a good working relationship between the anesthesia, surgical, and IONM teams?**

RE: Good communication is essential. This includes pre-operative discussions surrounding high risk cases, open dialogue intra-operatively, and post-operative debriefs if there were any IONM alerts. A culture of “no fault, no blame” also helps to ensure openness in our communication.

**SM: The field of IONM remains relatively unknown to many Canadians. In your opinion, what will change this?**

RE: The new Graduate Certificate in IONM, in collaboration with the Michener Institute, will help raise awareness of IONM and of the profession. Surgeons discussing IONM with patients and their families has also raised awareness more recently. Web-based resources through societies such as SRS and CSS and through patients such as curvy girls scoliosis will also raise awareness of IONM.

**Susan Morris, PhD**  
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**CDHA Division of Neurosurgery,**  
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3	IONM Modalities I	MAY 2016	6	Advanced Topics in IONM	MAY 2016

For program details, admission requirements and to register visit [michener.ca/ce](http://michener.ca/ce)

CANM thanks Medtronic of Canada for their generous support of this education.





# Do We Know How To Communicate with Patients Prior to Surgery?



Recently, the Neurophysiology Department at Sunnybrook Hospital created patient and family education material regarding Somatosensory Evoked Potentials (SSEP) testing in coma patients for prognostication purposes. The department, together with the Critical Care Unit (CrCU) doctors, thought it would be a useful tool to educate the Substitute Decision Makers about the tests results, which would ultimately help in the decision whether to continue or withdraw life support.

While working with Sunnybrook Patient Education Department to develop the material, several statistics regarding Canadian health literacy were brought to light, which made the Neurophysiology Department expand the concepts that were learned into the operating room environment as well.

It has been the experience of this department that patients coming in for surgery are frequently under stress caused by anxiety about the upcoming procedure. Following introduction and explanation of our role in the operating room and the preparation to be done prior to the surgery (scrubbing the skin with the scrub and applying stickers and wires), the patients frequently ask to repeat information that was just given to them or ask for clarification.

Patients usually forget 40–80% of medical information immediately.<sup>1</sup> There are three factors that promote forgetfulness:

1. Patient factors, such as low literacy rate and amount of stress the patient is under

2. Difficult medical terminology

3. Mode of presentation of information (written is often retained better than verbal)<sup>1</sup>

## 1. Patient Factors

Poor literacy skills are associated with poor health outcome, so it is important to use clear communication and ensure that the patients understand the information given. Recent literacy research and statistics show that:

- 48% of Canadians 16 years of age and older do not reach Level 3 literacy level (Level 3: The individual is able to meet the demands of everyday life and perform work-related tasks (often associated with earning a secondary school diploma).<sup>2</sup>
- Regarding health literacy, Public Health Agency of Canada states that 60% of adults and 88% of seniors are not health literate (In Canada health literacy is defined as “the ability to access, comprehend, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life-course.”)<sup>3</sup>
- In Ontario, health literacy rates are lower in rural compared to urban areas.<sup>4</sup>

Under the stress of an upcoming procedure, patients may experience a phenomenon called “attention narrowing.” In this case, the patient’s primary focus becomes the stressful event, the surgery, so their attention to peripheral information is limited. Factors like language barriers play an important role as well. This must be taken into account when communicating with the patient and strategies to simplify communication should be used.

## 2. Medical Terminology and 3. Mode of Presentation

When communicating with the patient, verbally given information is more difficult to retain greater clarity and comprehension is best achieved by speaking slowly and avoiding medical terminology. It is recommended to use analogies for information that is more difficult to explain – for example giving common symptoms of seizure activity when asking about the history of seizures- may also help to get a better understanding of patient’s health history.

When using written or visual material – for example sentences or pictures used during awake craniotomy –

simple pictures and short sentences should be used when possible, with lots of white space and once again, difficult medical terminology should be avoided.<sup>5</sup>

Stressful state prior to the procedure, potentially low literacy level, verbally given information combined with difficult medical terminology all may contribute to the patient's decreased understanding of the role of and preparation procedure for intraoperative monitoring. To ensure quality patient care, it is important to take into account the underlying factors that affect patient's understanding and processing of information when interacting with patients in preparation for operation.

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