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**VOLUME 21, N° 4, AUTOMNE 2016**

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**MoCa Cutoff Score for Rural Seniors**

**Minimum-volume Credentialling**

**The Occasional Wound “Gluing”**



Lolo™

## A low-dose combined oral contraceptive with 10 mcg of ethinyl estradiol<sup>1\*</sup>

\*Any benefits from the lower estrogen exposure provided by Lolo™ have not been evaluated.

Lolo™ offers the lowest ethinyl estradiol dose of any combined oral contraceptive in Canada<sup>2\*</sup>



### Indication and clinical use:

Lolo™ is indicated for the prevention of pregnancy. The safety and efficacy of Lolo™ have not been evaluated in women with a body mass index >35 kg/m<sup>2</sup> or in women <18 years of age. Lolo™ is not indicated for use before menarche or postmenopause. Any benefits from the lower estrogen exposure provided by Lolo™ have not been evaluated.

### Contraindications:

Women with:

- History of (or actual) thrombophlebitis or thromboembolic disorders
- History of (or actual) cerebrovascular disorders
- History of (or actual) myocardial infarction or coronary artery disease
- Valvular heart disease with complications
- History of (or actual) prodromi of a thrombosis
- Active liver disease, or history of (or actual) benign or malignant liver tumours
- Known or suspected carcinoma of the breast
- Carcinoma of the endometrium or other known or suspected estrogen-dependent neoplasia
- Undiagnosed abnormal vaginal bleeding
- Steroid-dependent jaundice, cholestatic jaundice, history of jaundice of pregnancy
- Any ocular lesion arising from ophthalmic vascular disease
- Known or suspected pregnancy
- Current (or history of) migraine with focal aura
- History of (or actual) pancreatitis if associated with severe hypertriglyceridaemia
- Presence of severe/multiple risk factor(s) for arterial or venous thrombosis

### Most serious warnings and precautions:

**Smoking:** Cigarette smoking increases the risk of serious cardiovascular events associated with the use of hormonal contraceptives. This risk increases with age, particularly in women over 35 years of age, and with the number of cigarettes smoked. For this reason, Lolo™ should not be used by women over the age of 35 who smoke.

**Sexually Transmitted Infections (STIs):** Patients should be counselled that birth control pills DO NOT PROTECT against sexually transmitted infections (STIs) including HIV/AIDS. For protection against STIs, it is advisable to use latex or polyurethane condoms IN COMBINATION WITH birth control pills.

**General:** Patients should discontinue medication at the earliest manifestation of thromboembolic and cardiovascular disorders, conditions which predispose to venous stasis and vascular thrombosis, visual defects (partial or complete), papilledema or ophthalmic vascular lesions, severe headache of unknown etiology or worsening of pre-existing migraine headache, or increase in epileptic seizures.

### Other relevant warnings and precautions:

- Potential increased risk of breast cancer, cervical cancer, hepatocellular carcinoma
- Predisposing factors for coronary artery disease
- Hypertension
- Diabetes
- Adverse lipid changes
- Crohn's disease, ulcerative colitis
- Vaginal bleeding
- Fibroids
- Increased risk of arterial and venous thrombotic and thromboembolic diseases
- Jaundice, gallbladder disease, hepatic nodules

- Angioedema, fluid retention
- Risk of thromboembolic complications after major surgery
- History of emotional disturbances
- Amenorrhea
- Reduced efficacy (due to missed dose, gastrointestinal disturbances or concomitant medication)
- Chloasma
- Pregnant or nursing women
- Physical examination and follow-up

### For more information:

Consult the Product Monograph at [www.lolocanada.ca/lolo/pm](http://www.lolocanada.ca/lolo/pm) for important information regarding adverse reactions, drug interactions and dosing information (particularly in regards to dose intervals not exceeding 24 hours) not discussed in this piece. The Product Monograph is also available by calling Actavis Specialty Pharmaceuticals Co. at 1-855-892-8766.

**References:** 1. Lolo™ Product Monograph. Warner Chilcott Canada Co. December 10, 2013. 2. 2012 Hormonal Contraception Available in Canada. The Society of Obstetricians and Gynaecologists of Canada. [http://sogc.org/news\\_items/hormonal-contraception-comparative-chart-now-available-2/](http://sogc.org/news_items/hormonal-contraception-comparative-chart-now-available-2/). Accessed May 13, 2014.



ethinyl estradiol 10 mcg/  
norethindrone acetate 1 mg  
and ethinyl estradiol 10 mcg



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**ethinyl estradiol 10 mcg/  
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**VOL. 21, No. 4, FALL / AUTOMNE 2016**

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*The painting was photographed by  
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### ADVANCED MINOR PROCEDURES AND EXTENSOR TENDON REPAIRS FOR RURAL AND EMERGENCY PHYSICIANS

DEC. 15, 2016

MONTRÉAL, QUE.

AND

JAN. 19, 2017

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### RURAL AND REMOTE 2017

APR. 6-8, 2017

CALGARY, ALTA.

# iPhone purgatory and other technological challenges

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I recently broke my Android's screen and switched my SIM card to an older iPhone. Now I am in iPhone purgatory. All my settings need to be converted with my fat fingers. Data need to be migrated, and the thing still does not ring no matter where I wander in a maze of unfamiliar settings!

The problem is easily addressed by humbling yourself (if you think you are tech-savvy). Merely ask any of your hundreds of iPhone-using patients. If they don't know, ask for the advanced-level support that their kids can give you. (WHAT? ... There is a hardware button to turn the ringer on!)

OK, having to change phones does sound like a first-world problem. I defend my complaint by pointing out that my phone is a point-of-care device with medication and patient information on it, my schedule and contacts, and the ability to phone, message and email, and that is how I and many doctors operate.

The problems associated with the computer in my hand are not that far removed from the challenges of keeping on top of the electronic medical record (EMR) at the hospital or clinic.

Rural doctors are more isolated while wrestling with an EMR glitch than when we are grumbling about our cell phones. Google won't help with those types of problems, and our only source of help may be a vendor in a distant city. It may not be an

issue if support quickly fixes the problem, but by no means is that always the case.

The following are possible issues you may encounter.

**Data migration.** Sure, you are happy ... enough ... with the system(s) you have now, and change is painful, so why would you want to change? Actually, there are a lot of reasons, and, according to a US study,<sup>1</sup> a substantial percentage of physicians' clinics and hospitals change EMRs. I have used 3 EMR systems in the clinic (so far).

**Catastrophic failures.** You need a disaster recovery plan. Furthermore, if you have not tested your backup to prove it works, you should not be sleeping well. When you depend on an EMR that is not dependable, that can be reason enough to migrate data to another EMR!

**Connectivity.** There is little more frustrating than when your EMR support and your laboratory point fingers at each other about who is to blame, while you are stuck with a growing avalanche of paper results.

Welcome to rural generalist medicine in 2016. We may not need to become IT specialists, but we are not yet to the point where we can ignore the technology and it will work.

### REFERENCE

1. Pending upheaval in "the year of the great EHR switch" shifts spotlight to e-health industry's best, Black Book reveals 2013 top scoring vendors. New Orleans (LA): prweb; 2013 Mar. 4. Available: [www.prweb.com/releases/2013/3/prweb10460471.htm](http://www.prweb.com/releases/2013/3/prweb10460471.htm) (accessed 2016 Aug. 6).

# Le purgatoire de l'iPhone et autres défis technologiques

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**A**yant récemment brisé l'écran de mon appareil Android, j'ai transféré ma carte SIM sur un iPhone moins récent. Je suis maintenant dans le purgatoire de l'iPhone. Je dois convertir tous mes paramètres avec mes gros doigts et migrer mes données. Et peu importe où je vais dans ce labyrinthe de paramètres inconnus, ce bidule ne sonne toujours pas!

Le problème est facile à régler si vous êtes prêt à faire acte d'humilité (si vous vous pensez bon en informatique). Vous n'avez qu'à demander de l'aide à 1 ou 2 de vos patients qui utilisent un iPhone. Et s'ils ne peuvent pas vous aider, faites appel au soutien technique avancé que peuvent vous offrir leurs enfants. (QUOI? ... Il y a un bouton physique pour activer la sonnerie de mon téléphone!!!)

C'est sûr, devoir changer de téléphone semble un problème de pays industrialisé. Je m'empresse de préciser que mon téléphone est un outil clinique et qu'il contient de l'information sur les médicaments et mes patients, ainsi que mon horaire et mes contacts. Le téléphone me permet aussi de faire des appels et d'envoyer des textos ou des courriels. C'est ainsi que moi-même et de nombreux autres médecins fonctionnons.

Les problèmes liés à ce mini-ordinateur ne sont pas très différents des défis que présente le dossier médical électronique (DME) que vous utilisez à l'hôpital ou à la clinique, si vous ne voulez pas être dépassés par la situation.

Les médecins ruraux sont plus isolés lorsqu'ils tentent de régler un pépin avec le DME que nous lorsque nous nous plaignons de notre téléphone cellulaire. Google n'est pas utile pour ces types de problèmes, et notre seule source d'aide peut être un fournisseur situé dans une ville lointaine. Cela n'occasionnera peut-être pas de contretemps si le technicien règle le problème

rapidement, mais c'est loin d'être toujours le cas.

Voici les problèmes que vous pourriez affronter.

**Migration de données.** Bien sûr, vous êtes satisfait ... du moins relativement ... du ou des systèmes que vous avez présentement, et dieu sait que le changement est pénible, alors pourquoi voudriez-vous changer? En fait, les raisons sont nombreuses et, selon une étude américaine<sup>1</sup>, un pourcentage considérable de cliniques et d'hôpitaux change de DME. Personnellement, j'ai utilisé 3 systèmes de DME à la clinique (jusqu'à présent).

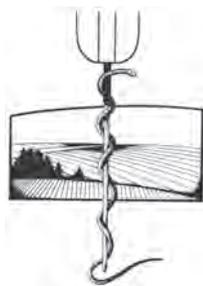
**Défaillances catastrophiques.** Vous avez besoin d'un plan de reprise après catastrophe. De plus, si vous n'avez pas encore testé votre système de sauvegarde pour vous assurer qu'il fonctionne, il y a certes de quoi vous inquiéter. Lorsque vous comptez sur un DME qui n'est pas fiable, c'est une raison suffisante pour migrer des données vers un autre DME!

**Connectivité.** Peu de choses sont plus frustrantes que lorsque votre soutien technique pour le DME et votre laboratoire s'accusent mutuellement de la responsabilité du problème, alors que vous êtes aux prises avec une montagne de plus en plus volumineuse de résultats sur support papier.

Bienvenue à la médecine généraliste en milieu rural en 2016! Cela ne veut pas dire que nous devons devenir un spécialiste en informatique, mais nous n'en sommes pas encore au point où nous pouvons tout ignorer de la technologie en comptant sur son perpétuel bon fonctionnement.

## RÉFÉRENCE

1. Pending upheaval in "the year of the great EHR switch" shifts spotlight to e-health industry's best, Black Book reveals 2013 top scoring vendors. Nouvelle-Orléans (LA) : prweb; 4 mars 2013. Accessible ici en anglais : [www.prweb.com/releases/2013/3/prweb10460471.htm](http://www.prweb.com/releases/2013/3/prweb10460471.htm) (consulté le 6 août 2016).



# President's message. Cradle to grave

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**A**s a regular reader (and sometimes contributor) of the SRPC listserv RuralMed, I was struck by a recent posting about “Community appreciation from a rural perspective.” The commentary resonated with me because I have just resigned from my clinical practice after 25 years of caring for patients and their families. It was time to say goodbye (and I hate goodbyes).

The common message that I read in RuralMed is that not only do we care for our patients, they also care for us, and in a way that is unique to general practice. It seems cliché to say that we become part of the family, but in a sense we do. We are not only caregivers, but often serve as counsel for some of their very difficult challenges. I am sure that we all have stories of making a significant difference in a family's life — not just in delivering their babies, helping them through an illness or providing palliative care at the end of life, but providing an impartial and hopefully “wise” bit of guidance that helped them to deal with a troubling issue.

This all-inclusive aspect of care is common to rural medicine but is becoming much less common to family medicine in general. It does not exist in the emergency departments or walk-in

clinics of our world, nor in most specialists' offices. Generalist medicine is a concept that is largely foreign to the big-city hospitals, even though it is a role that patients would seek from their doctors if they had the opportunity to establish meaningful relationships. Degner and Sloan<sup>1</sup> found that 59% of patients wanted their physicians to make decisions about treatment of their serious illnesses, and 46% wanted their physicians and families involved in such decisions.

This sort of trust does not come from an incidental visit, nor from a once-a-year follow-up for a heart condition. It is built through repeated encounters, personal exchanges and a common sense of caring.

It is this sort of relationship that is reflected in the contributions to RuralMed, and it is these relationships that are difficult to say goodbye to when retiring from practice. It makes me wonder, would there be such a demand for medical assistance in dying if more of our population had the benefits of rural medicine?

### REFERENCE

1. Degner LF, Sloan JA. Decision making during serious illness: What role do patients really want to play? *J Clin Epidemiol* 1992;45:941-50.

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## Message du président. Du berceau au tombeau

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**F**idèle lecteur et occasionnel contributeur de RuralMed, une liste de diffusion de la Société de la médecine rurale du Canada (SMRC), j'ai été frappé par une récente publication, qui portait sur la reconnaissance dans les communautés rurales. Le texte m'a interpellé parce que je viens tout juste de quitter la pratique clinique, après 25 ans à veiller sur mes patients et leur famille. Le temps était venu de faire mes adieux (ce que j'abhorre).

Je lis souvent dans RuralMed que si nous avons à cœur le bien-être de nos patients, ceux-ci tiennent aussi à nous, et ce, d'une façon propre aux médecins de famille. Il serait cliché de dire que nous devenons comme un membre de la famille, mais d'un certain point de vue, c'est vrai. Notre rôle ne consiste pas seulement à prendre soin des patients; bien souvent, nous les conseillons alors qu'ils vivent des épreuves très difficiles. Nous pouvons certainement tous dire que nous avons occupé une place importante auprès des membres d'une famille — en mettant au monde leurs enfants, en les aidant à combattre une maladie ou en dispensant des soins palliatifs en fin de vie, certes, mais aussi en les éclairant de façon objective et — souhaitons-le — judicieuse dans les moments difficiles.

Cette approche globale des soins est monnaie courante en médecine rurale, mais se fait de plus en plus rare dans la médecine familiale en général.

Elle est absente de tous les services d'urgence et de toutes les cliniques sans rendez-vous de ce monde, ainsi que chez la plupart des spécialistes. En effet, cette démarche médicale est largement absente des hôpitaux des grandes villes, même si les patients souhaiteraient que leur médecin l'adopte, s'ils avaient la possibilité d'établir une relation significative avec eux. Dans le même ordre d'idées, selon une étude de Degner et Sloan<sup>1</sup>, 59 % des patients voudraient que leur médecin prenne des décisions relatives au traitement de leurs maladies graves, tandis que 46 % feraient participer et le médecin et la famille.

La confiance qu'on nous accorde n'est pas le fruit d'une visite fortuite ou d'un suivi annuel pour un problème cardiaque; elle grandit plutôt au fil des rendez-vous, nourrie par des discussions à caractère personnel et la réciprocité du sentiment d'empathie.

Voilà le type de relations qui ressort à la lecture de RuralMed. Ce sont précisément ces liens auxquels il est difficile de renoncer au moment de prendre sa retraite. Je me suis donc demandé : si plus de gens pouvaient profiter des avantages de la médecine rurale, y aurait-il autant de demandes d'aide médicale à mourir?

### RÉFÉRENCE

1. Degner LF, Sloan JA. Decision making during serious illness: What role do patients really want to play? *J Clin Epidemiol* 1992;45:941-50.

## Interlaminar epidural steroid injections for low back pain in rural Ontario

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**Introduction:** We sought to document the efficacy of interlaminar epidural steroid injections (ESIs) for the relief of low back pain in a rural population.

**Methods:** We conducted a prospective observational cohort study with brief follow-up telephone interviews at 1, 3 and 6 months after interlaminar ESI.

**Results:** A total of 47 ESIs were administered to the 24 participants. In an intention-to-treat analysis, pain relief was achieved in 78.7%, 55.3% and 27.7% of participants at 1, 3 and 6 months.

**Conclusion:** Interlaminar ESIs, without fluoroscopic guidance, were effective for up to 3 months of symptom relief.

**Introduction :** Nous avons cherché à déterminer l'efficacité des infiltrations épidurales interlaminaires de stéroïdes pour réduire la lombalgie chez une population rurale.

**Méthodes :** Pour ce faire, nous avons mené une étude de cohorte observationnelle prospective au moyen de brèves entrevues téléphoniques de suivi après 1, 3 et 6 mois.

**Résultats :** Au total, 47 infiltrations épidurales ont été administrées à 24 participants. Dans le cadre d'une analyse par intention de traiter, 78,7 %, 55,3 % et 27,7 % des participants ont rapporté un soulagement de la douleur à 1, 3 et 6 mois, respectivement.

**Conclusion :** Les infiltrations épidurales interlaminaires sans guidage fluoroscopique peuvent procurer un soulagement des symptômes pendant jusqu'à 3 mois.

### INTRODUCTION

Radicular low back pain (lumbar pain with neurologic signs and symptoms) constitutes 4%–5% of cases of back pain seen by general practitioners.<sup>1</sup> Because this subgroup of patients with low back pain includes those who may need surgical referral or intervention, they merit a particular focus.

Clinical findings and radiographic imaging allow us to categorize these patients into those with lumbar disc herniation (LDH) and/or lumbar spinal stenosis (LSS). Degree of pain does not consistently correlate with severity of imaging-detected spinal pathologies, and most initial episodes resolve with conservative treatment.<sup>2,3</sup> The frequency of spontaneous resolution varies according to diagnosis, with symptoms

improving without operative intervention in 80% of patients with LDH and up to 45% of patients with LSS.<sup>4</sup>

Lumbar disc herniation involves mechanical compression from herniated disc material, whereas LSS encompasses the degenerative narrowing of the central canal, lateral recess or neural foramen.<sup>4</sup> In both cases, inflammation is widely believed to play a causal role in instigating radiculopathy.<sup>2,3,5–9</sup> Epidural steroid injections (ESIs) may therefore have a role in the treatment of radicular low back pain, after the failure of conservative management.<sup>3,4,6–8</sup>

There are 3 primary methods for the injection of corticosteroids into the epidural space: caudal, transforaminal and interlaminar ESI.<sup>7,10–12</sup> Caudal ESI involves the injection of medication through the sacral hiatus, transforaminal

ESI uses the neural foramen to target a specific nerve root and interlaminar ESI enters the epidural space between the laminae.<sup>6,7,10,11,15</sup> Although transforaminal ESI is generally considered the most effective, its safety profile mandates the use of fluoroscopic guidance, which may not be feasible in a rural setting.<sup>4,6,7,12,14,15</sup> Interlaminar ESI, on the other hand, is also considered effective and can be administered without real-time imaging guidance.<sup>6,11,12,16–22</sup> The technique is similar to that used by rural generalists performing lumbar punctures and by rural general practitioners and anesthesiologists for epidural analgesia during labour.<sup>11,15</sup>

Although widely considered safe,<sup>15,22,23</sup> the value of ESI as a clinical practice remains a subject of debate. Some literature supports the efficacy of ESI for short-term pain reduction,<sup>23,24</sup> other publications point out important flaws, such as a lack of cost-effectiveness, the absence of substantial improvement and — in 1 case — the worsening of outcomes.<sup>9,25–27</sup> Most research findings fall in between these 2 conclusions.<sup>28–31</sup>

This prospective study investigates the efficacy of interlaminar ESIs in treating low back pain in a rural population. It is a follow-up to a previous 5-year retrospective study that demonstrated substantial improvement of symptoms following interlaminar ESIs.<sup>15</sup>

## METHODS

### Setting

The Sioux Lookout Meno Ya Win Heath Centre serves a population of 30 000 in northwestern Ontario.

### Data collection and analysis

This research was approved by the Sioux Lookout Meno Ya Win Research Review and Ethics Committee.

Patients who presented for ESI at an outpatient clinic at the Sioux Lookout Meno Ya Win Heath Centre between October 2011 and December 2014 were invited to participate in this study. Exclusion criteria were local infection or full anticoagulation therapy with warfarin. After informed consent, key demographic characteristics for each participant, as well as the number of previous injections, analgesic usage, history of back surgery and current level of pain using numeric pain scale measures were recorded. Patients were contacted by telephone 1, 3 and 6 months postinjection and asked to rate their

current level of pain as less, greater or the same as it had been preinjection. Patients were able to receive subsequent injections if medically indicated.

Data were collected in Microsoft Excel, and analysis was completed with Excel and IBM SPSS (version 20.0 for Windows). Means and frequencies were calculated as appropriate.

### Method of injection

Epidural steroid injections were performed by 2 experienced general practitioners/anesthesiologists. Before injection, patients were briefed on the potential risks and benefits associated with the procedure. The interlaminar approach was used without real-time imaging guidance. The patient was seated in lumbar flexion, and the correct level was identified using the iliac crest as indicative of the L3–L4 level. In the case of patients with a history of back surgery, the location of injection was raised or lowered a level accordingly. The subcutaneous injection of 4 mL of 1% lidocaine was followed by the interlaminar advancement of a 17-gauge Tuohy needle and the identification of the epidural space using the loss-of-resistance technique. Then, 1 mL of 80 mg/mL methylprednisolone acetate with 4 mL of normal saline was injected. Instructions for postinjection care were provided.

## RESULTS

### Study population

Twenty-four patients gave informed consent and were enrolled in the study. Patient characteristics are provided in Table 1. Thirteen (54.2%) were women, and the mean age was 50.4 (standard deviation [SD] 13.3) years. Lumbar disc herniation was the most common diagnosis, occurring in 17 (70.8%) participants, followed by LSS, which affected 16 (66.7%). Eleven (45.8%) patients were diagnosed with both LDH and LSS. On average, each participant had received about 1 ESI before the commencement of the study (mean 0.9, range 0–6 injections). All patients were taking oral analgesics for low back pain at the beginning of the study. Fourteen (58.3%) used narcotics, 10 (41.7%) used acetaminophen and 9 (37.5%) used NSAIDs, with 8 (33.3%) using a combination therapy. Hypertension and diabetes were the most common comorbidities, with each affecting 9 (37.5%) participants. Other observed comorbidities included psychosocial factors (16.7%), coronary artery disease (8.3%) and peripheral vascular disease (4.2%) (Table 1).

## Pain relief

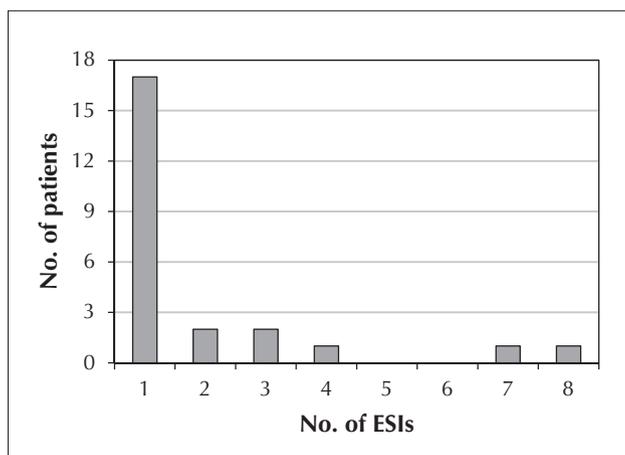
A total of 47 ESIs were administered to the 24 participants, with 17 (70.8%) receiving a single injection and 3 (12.5%) receiving 4 or more injections (Fig. 1). The mean score on the numeric pain rating

**Table 1: Characteristics of participants receiving interlaminar epidural steroid injections, *n* = 24**

Characteristic	No. (%)*
Age, yr, mean $\pm$ SD	50.4 $\pm$ 13.3
Sex	
Male	11 (45.8)
Female	13 (54.2)
Radiographic diagnosis	
LDH	17 (70.8)
LSS	16 (66.7)
LDH and LSS	11 (45.8)
Spondylolisthesis	3 (12.5)
Osteoarthritis	3 (12.5)
Back surgery	6 (25.0)
Analgesic use	
Narcotics	14 (58.3)
NSAIDs	9 (37.5)
Acetaminophen	10 (41.7)
Other analgesics	3 (12.5)
Combination therapy	8 (33.3)
No. of previous injections, mean $\pm$ SD	0.9 $\pm$ 1.5
Comorbidities	
Hypertension	9 (37.5)
Type II diabetes	9 (37.5)
Psychosocial factors (anxiety, depression, drug use)	4 (16.7)
Coronary artery disease	2 (8.3)
Peripheral vascular disease	1 (4.2)

LDH = lumbar disc herniation; LSS = lumbar spinal stenosis; NSAID = nonsteroidal anti-inflammatory drug; SD = standard deviation.

\*Unless stated otherwise.



**Fig. 1.** Number of epidural steroid injections (ESIs) administered per patient during the course of the study (47 ESIs in 24 patients).

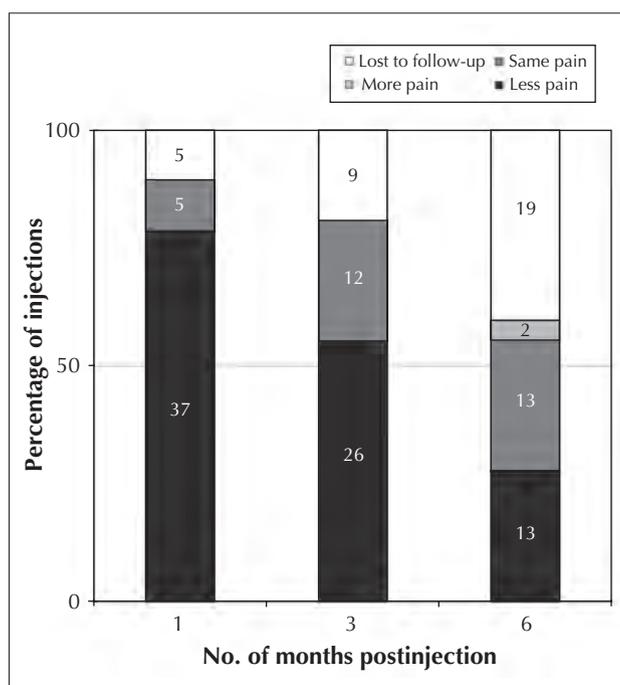
scale before interlaminar ESI was 6.48 (SD 1.94) out of 10. Adverse reactions to treatment were reported after 3 injections; 2 were headaches and 1 was new bilateral radicular pain.

Of those who received a single injection, 3 were lost to follow-up within a month and were excluded from further analysis. Two patients receiving multiple injections were lost to follow-up within a month of receiving a subsequent injection. Of the 42 injections with follow-up data, 37 (88.1%) were associated with reduced pain from baseline after 1 month, and the remainder were associated with no change in level of pain. The number of injections associated with pain relief fell to 26 (68.4%) of the 38 injections with follow-up data after 3 months; again, all remaining injections were associated with no change in pain level. After 6 months, of the 28 injections with follow-up data, 13 (46.4%) were associated with continued pain relief and 2 (7.1%) with increased pain relative to baseline.

In an intention-to-treat analysis (including those lost to follow-up), pain relief occurred in 78.7%, 55.3% and 27.7% at 1, 3, and 6 months (Fig. 2).

## DISCUSSION

Our results show that interlaminar ESI, without fluoroscopic guidance, can effectively decrease low back pain for up to 3 months.



**Fig. 2.** Outcomes at 1, 3 and 6 months after epidural steroid injection as a proportion of the number of injections (*n* = 47).

Although the analgesic effects of interlaminar ESIs are only short term, there is a lack of consensus in the literature on exactly how short this term is. At one end of the spectrum, Brown<sup>32</sup> found that only 35.3% of patients who received a standard interlaminar ESI experienced effective pain relief after 6 weeks, and Ghai and colleagues<sup>14</sup> reported this percentage to be 16.7% after 6 months.<sup>14,32</sup> Other researchers have found that the effects of interlaminar ESI last at least 6 months,<sup>5,21,22</sup> 3 months,<sup>19</sup> 35 days<sup>16</sup> or 10 days.<sup>20</sup> In a previous retrospective study at our hospital, Mashari and colleagues<sup>15</sup> found that 80% of the 88 patients with follow-up data experienced improvement after receiving an interlaminar ESI. The present study reports a reduction of symptoms for up to 3 months after injection in 55% of patients.

Of the prospective studies found in our literature search, only Rivest and colleagues<sup>17</sup> explicitly described administering interlaminar ESIs in the absence of real-time imaging guidance, making this study of particular interest to the present study.<sup>16–22</sup> The rates of pain relief reported by Rivest and colleagues<sup>17</sup> — with 61% of patients with LDH reporting improvement after 2 weeks compared with only 38% of patients with LSS — are lower than the rates found in both of the studies carried out at our institution.<sup>15,17</sup> This difference could be due to the exclusion of patients who had experienced low back pain for less than 6 months in the study by Rivest and colleagues,<sup>17</sup> given that the effectiveness of ESI diminishes with increasing duration of symptoms.<sup>6,7,17</sup>

Two patients in this study experienced headaches after receiving an interlaminar ESI. This is noteworthy because needle misplacement, which is associated with post-dural puncture headache, is estimated to occur in 8%–40% of interlaminar ESIs administered without real-time imaging guidance.<sup>4,7,23,31,33</sup>

## Limitations

This study has a number of limitations, including a small sample and the absence of a control group. Spontaneous improvement of symptoms often happens with LDH and LSS, and this can be erroneously attributed to interlaminar ESI.<sup>4</sup> Also, initial pain assessment was done using numeric pain scale measures, but subsequent telephone follow-up used categorical measures (i.e., pain better, worse or the same). This was done to simplify the nature of the often long-distance follow-up telephone interviews but limited the statistical analysis that could be performed on the data.

## CONCLUSION

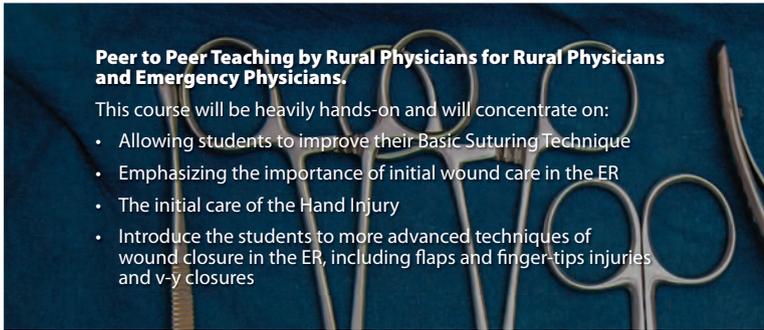
Interlaminar ESI was associated with pain reduction for up to 3 months for most patients. Interlaminar ESI can be administered in a context where fluoroscopic guidance is not available, such as in remote and rural communities.

## REFERENCES

1. Jackson MA, Simpson KH. Chronic back pain. *Contin Educ Anaesth Crit Care Pain* 2006;6:152-5.
2. Manchikanti L, Boswell M, Datta S, et al. Comprehensive review of therapeutic interventions in managing chronic spinal pain. *Pain Physician* 2009;12:E123-98.
3. Weinstein SM, Herring SA; NASS. Lumbar epidural steroid injections. *Spine J* 2003;3:375-44S.
4. Friedrich JM, Harrast MA. Lumbar epidural steroid injections: indications, contraindications, risks, and benefits. *Curr Sports Med Rep* 2010;9:43-9.
5. Rados I, Sakic K, Hrgovic Z. PainDETECT questionnaire and lumbar epidural steroid injection for chronic radiculopathy. *Eur Neurol* 2013;69:27-32.
6. Cannon DT, Aprill CN. Lumbosacral epidural injections. *Arch Phys Med Rehabil* 2000;81:S87-98.
7. DePalma MJ, Slipman CW. Evidence-informed management of chronic low back pain with epidural steroid injections. *Spine J* 2008;8:45-55.
8. Golish SR, Hanna LS, Bowser RP, et al. Outcome of lumbar epidural steroid injection is predicted by an assay of a complex of fibronectin and aggrecan from epidural lavage. *Spine* 2011;36:1464-9.
9. Price C, Arden N, Coglean L, et al. Cost-effectiveness and safety of epidural steroids in the management of sciatica. *Health Technol Assess* 2005;9:1-58.
10. Howe D. Caudal epidural injection. *Can J Rural Med* 2012;17:145-7.
11. Minty R, Kelly L. The occasional epidural steroid injection. *Can J Rural Med* 2012;17:148-50.
12. Andreisek G, Jenni M, Klingler D, et al. Access routes and reported decision criteria for lumbar epidural drug injections: a systematic literature review. *Skeletal Radiol* 2013;42:1683-92.
13. Candido KD, Raghavendra MS, Chinthagada M, et al. A prospective evaluation of iodinated contrast flow patterns with fluoroscopically guided lumbar epidural steroid injections: the lateral parasagittal interlaminar epidural approach versus the transforaminal epidural approach. *Anesth Analg* 2008;106:638-44.
14. Ghai B, Bansal D, Kay J, et al. Transforaminal versus parasagittal interlaminar epidural steroid injection in low back pain with radicular pain: a randomized, double-blind, active-control trial. *Pain Physician* 2014;17:277-90.
15. Mashari A, Minty R, Minty L, et al. Epidural steroid injections for low back pain in rural practice: a 5-year retrospective study. *Can J Rural Med* 2012;17:127-34.
16. Wilson-MacDonald J, Burt G, Griffin D, et al. Epidural steroid injection for nerve root compression. A randomised, controlled trial. *J Bone Joint Surg Br* 2005;87:352-5.
17. Rivest C, Katz J, Ferrante F, et al. Effects of epidural steroid injection on pain due to lumbar spinal stenosis or herniated disks: a prospective study. *Arthritis Care Res* 1998;11:291-7.
18. Rados I, Sakic K, Fingler M, et al. Efficacy of interlaminar vs transforaminal epidural steroid injection for the treatment of chronic unilateral radicular pain: prospective, randomized study. *Pain Med* 2011;12:1316-21.
19. Furman MB, Kothari G, Parikh T, et al. Efficacy of fluoroscopically guided, contrast-enhanced lumbosacral interlaminar epidural steroid injections: a pilot study. *Pain Med* 2010;11:1328-34.
20. Gharibo CG, Varlotta GP, Rhame EE, et al. Interlaminar versus transforaminal epidural steroids for the treatment of subacute lumbar radicular pain: a randomized, blinded, prospective outcome study. *Pain Physician* 2011;14:499-511.

21. Candido KD, Rana MV, Sauer R, et al. Concordant pressure paresthesia during interlaminar lumbar epidural steroid injections correlates with pain relief in patients with unilateral radicular pain. *Pain Physician* 2013;16:497-511.
22. Baral BK, Shrestha RR, Shrestha AB, et al. Effectiveness of epidural steroid injection for the management of symptomatic herniated lumbar disc. *Nepal Med Coll J* 2011;13:303-7.
23. Landa J, Yong K. Outcomes of interlaminar and transforaminal spinal injections. *Bull NYU Hosp Jt Dis* 2012;70:6-10.
24. Lewis R, Williams N, Matar H, et al. The clinical effectiveness and cost-effectiveness of management strategies for sciatica: systematic review and economic model. *Health Technol Assess* 2011;15:1-578.
25. Power RA, Taylor GJ, Fyfe IS. Lumbar epidural injection of steroid in acute prolapsed intervertebral discs. A prospective study. *Spine* 1992;17:453-5.
26. Radcliff K, Hilibrand A, Lurie J, et al. The impact of epidural steroid injections on the outcomes of patients treated for lumbar disc herniation: a subgroup analysis of the SPORT trial. *J Bone Joint Surg Am* 2012;94:1353-8.
27. Radcliff K, Kepler C, Hilibrand A, et al. Epidural steroid injections are associated with less improvement in patients with lumbar spinal stenosis: a subgroup analysis of the Spine Patient Outcomes Research Trial. *Spine* 2013;38:279-91.
28. Argoff CE, Sims-O'Neil C. Epidural steroid injections are useful for the treatment of low back pain and radicular symptoms: con. *Curr Pain Headache Rep* 2009;13:35-8.
29. Bellini M, Barbieri M. Systemic effects of epidural steroid injections. *Anaesthesiol Intensive Ther* 2013;45:93-8.
30. Bresnahan BW, Rundell SD, Dagadakis MC, et al. A systematic review to assess comparative effectiveness studies in epidural steroid injections for lumbar spinal stenosis and to estimate reimbursement amounts. *PM R* 2013;5:705-14.
31. Mulligan KA, Rowlingson JC. Epidural steroids. *Curr Pain Headache Rep* 2001;5:495-502.
32. Brown LL. A double-blind, randomized, prospective study of epidural steroid injection vs. the mild procedure in patients with symptomatic lumbar spinal stenosis. *Pain Pract* 2012;12:333-41.
33. Snarr J. Risk, benefits and complications of epidural steroid injections: a case report. *AANA J* 2007;75:183-8.

**Competing interests:** None declared.

 <p><b>Peer to Peer Teaching by Rural Physicians for Rural Physicians and Emergency Physicians.</b></p> <p>This course will be heavily hands-on and will concentrate on:</p> <ul style="list-style-type: none"> <li>• Allowing students to improve their Basic Suturing Technique</li> <li>• Emphasizing the importance of initial wound care in the ER</li> <li>• The initial care of the Hand Injury</li> <li>• Introduce the students to more advanced techniques of wound closure in the ER, including flaps and finger-tips injuries and v-y closures</li> </ul>	<p style="text-align: center; font-size: 1.2em; font-weight: bold;">December 15th, 2016</p> <p style="text-align: center; font-size: 0.8em;">In conjunction with</p> <p style="text-align: center; font-size: 1.5em; font-weight: bold;">McGill's Emergency Week in Montréal</p> <p style="text-align: center; font-size: 1.2em; font-weight: bold;">at Hôtel Delta Montréal</p>
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<p style="font-size: 1.1em; font-weight: bold;">for Rural and Emergency Physicians</p>	<p style="font-size: 0.8em;">In conjunction with</p> <p style="font-size: 1.2em; font-weight: bold;">University of Calgary's Emergency Medicine for Rural Hospitals</p>
<p>This course is run by Family Physicians for Family Physicians and is designed for the Rural and Emergency Room Physician who must deal with lacerations and hand injuries on an intermittent basis with little immediate Surgical Support.</p> <div style="display: flex; align-items: center; margin-top: 10px;">  <p style="font-size: 0.8em;">Society of Rural Physicians of Canada Société de la Médecine Rurale du Canada</p> </div>	<p style="font-size: 1.2em; font-weight: bold;">January 19th, 2017</p>
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## MoCA cutoff score in relation to the functional assessment of seniors living in a rural Canadian community

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reviewed.

**Introduction:** Research suggests that the Montreal Cognitive Assessment (MoCA) normal cutoff score of 26 may not be appropriate for all populations and ages. We sought to determine an appropriate MoCA cutoff score for community-dwelling seniors living in a rural Canadian community.

**Methods:** We conducted a retrospective chart review at a health centre in rural northern Ontario. The sample included community-dwelling seniors presenting between Dec. 1, 2013, and July 31, 2015. We generated a receiver operating characteristic curve to evaluate MoCA cutoff scores in relation to functional assessment, using the dichotomous categories of “no deficiencies in activities of daily living/instrumental activities of daily living (ADL/IADL) and “deficiencies in ADL/IADL.”

**Results:** A total of 95 charts were included in the chart review. We identified MoCA scores of 20 (sensitivity 85%, specificity 62%) and 21 (sensitivity 77%, specificity 77%) as cutoff scores for the identification of impairment in this rural population.

**Conclusion:** Our results suggest the normal range in MoCA score for the community-dwelling rural senior to be between 22 and 30. Although the MoCA demonstrated satisfactory performance as a screening measure, the importance of including ADL and IADL functional assessments before making clinical decisions cannot be overemphasized.

**Introduction :** Des études semblent indiquer que le seuil habituellement utilisé dans la Montreal Cognitive Assessment (MoCA), soit un score de 26, pourrait ne pas convenir à tous les groupes et à toutes les tranches d'âges. Nous avons cherché à déterminer un seuil approprié pour l'évaluation des personnes âgées habitant dans la communauté d'une région rurale canadienne.

**Méthodes :** Nous avons mené un examen rétrospectif des dossiers dans un centre de santé d'une région rurale du Nord de l'Ontario. Notre échantillon était composé des personnes âgées habitant dans la communauté qui se sont présentées au centre entre le 1<sup>er</sup> décembre 2013 et le 31 juillet 2015. Nous avons généré une courbe caractéristique de la performance afin d'évaluer la validité des scores MoCA par rapport à une évaluation fonctionnelle reposant sur des catégories dichotomiques, soit « aucune déficience dans les activités de la vie quotidienne (AVQ)/activités instrumentales de la vie quotidienne (AIVQ) » et « déficiences dans les AVQ/AIVQ ».

**Résultats :** En tout, 95 dossiers ont été examinés. Nous avons conclu que des scores MoCA de 20 (sensibilité de 85 %, spécificité de 62 %) et de 21 (sensibilité de 77 %, spécificité de 77 %) seraient des seuils appropriés pour détecter la déficience chez cette population rurale.

**Conclusion :** Nos résultats indiquent que la plage normale de scores MoCA chez les personnes âgées habitant dans la communauté en milieu rural est de 22 à 30. Bien que la MoCA se soit révélée d'une efficacité satisfaisante comme outil de dépistage, nous devons d'insister sur l'importance capitale de tenir compte de l'évaluation fonctionnelle des AVQ et des AIVQ dans la prise de décisions cliniques.

## INTRODUCTION

The Montreal Cognitive Assessment (MoCA) is a screening instrument designed to assist primary care providers in the detection of mild cognitive impairment. There is evidence to suggest that diminished cognitive ability can be a predictor of functional deficiencies in activities of daily living (ADL) and instrumental activities of daily living (IADL).<sup>1,2</sup> Thus, the assessment of cognitive impairment has a role to play when appraising the functional ability of older adults to meet self-care needs and handle tasks involved in independent living. This is especially important for older adults living in rural communities, as they may live farther away from services and may have transportation issues. This study examines the association between MoCA scores and the presence of any or no functional deficiencies in ADL and IADL in a sample population of community-dwelling seniors in northern rural Ontario.

The MoCA was designed by Nasreddine and colleagues<sup>3</sup> as a rapid screening instrument for mild cognitive impairment; it assesses multiple cognitive domains, including attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculation and orientation.<sup>4</sup> Julayanont and colleagues<sup>4</sup> further emphasize that the MoCA should be used as a cognitive screening instrument and not a diagnostic tool; hence, clinical judgment, based on thorough clinical evaluation, is important in interpreting MoCA results. The original normative sample involved a healthy control group ( $n = 90$ ), recruited from an urban sample, compared with a group of individuals who met the clinical criteria for mild cognitive impairment ( $n = 94$ ) and a group with mild Alzheimer disease ( $n = 93$ ) diagnosed using gold standard neuropsychological testing. The control group achieved an average MoCA score of 27.4 (range 25.2–29.6), and Nasreddine and colleagues<sup>5</sup>

used a receiver operating characteristic (ROC) curve to illustrate that the optimal cutoff score for identifying cognitive impairment was 26 for this population (i.e., urban-dwelling seniors).

The MoCA cutoff score of 26 may not be appropriate for every community owing to differences in settings. To allow for cultural differences, the MoCA has been translated into more than 36 languages. The test is freely available at [www.mocatest.org](http://www.mocatest.org), and no permissions are needed for clinical or educational use.<sup>4</sup>

Functional assessment of ADL (Box 1) has been used as a framework for assessing daily function in the aging population and for evaluating rehabilitation and recovery from illness,<sup>7</sup> and provides an overview of a person's ability to meet self-care needs. Healthy aging requires a balance of accessing external resources, such as family and friends, health care providers, health centres and community services.

The Lawton IADL Scale includes domains of function that reflect a person's ability to live independently.<sup>6</sup> The IADL assessment reflects the moment-in-time functioning and can be used to track progress or deterioration over time. The 8 domains of function are listed in Box 1. Historically, men were not scored on food preparation, housekeeping and laundering, but it is now recommended that all 8 domains be assessed for both sexes.<sup>8</sup>

Waldron-Perrine and Axelrod<sup>9</sup> studied the results of the MoCA, alongside neurologic testing of veterans, and found that the optimal cutoff score for detecting mild cognitive impairment was 20 or less, which is substantively lower than the suggested cutoff score of less than 26. Waldron-Perrine and Axelrod<sup>9</sup> also note that the higher cutoff score "may overpathologize neurologically intact individuals," causing anxiety and distress to the individual and family, and placing an undue burden on the health care system. These authors recommended further research aimed at identifying cutoff scores in other populations.

To date, few studies have evaluated the MoCA in a rural setting. Zhou and colleagues<sup>10</sup> investigated the performance of the Chinese MoCA (C-MoCA) in relation to education. The authors stated that more than 38% of the population of China lives in rural areas. They found that the C-MoCA was better suited for individuals with 7–12 years of education (area under the ROC curve [AUC] 0.79; sensitivity 0.89, specificity 0.64 at cutoff 22/23), and was poorer for individuals with 0–6 years of education (AUC 0.60; sensitivity 67%, specificity 49% at cutoff 18/19).

### Box 1. Activities included in the functional assessment of activities of daily living and instrumental activities of daily living

#### Activities of daily living<sup>5</sup>

- Bathing, dressing, grooming, mouth care, toileting, transferring in and out of a bed/chair, walking/walking outside, climbing stairs, eating

#### Instrumental activities of daily living<sup>6</sup>

- Shopping, cooking, managing medications, using the phone/looking up numbers, doing housework, doing laundry, driving/using public transportation, managing finances

Freitas and colleagues<sup>11</sup> examined MoCA performance within a Portuguese sample and found that the mean educational level of their sample was 8.16 (standard deviation [SD] 4.72) years. This is much lower than the mean of 13.33 (SD 3.40) years identified by Nasreddine and colleagues.<sup>5</sup> Freitas and coauthors<sup>11</sup> found that the correction point for education was not applicable because of these educational differences between the 2 samples. They found that, for all educational levels, a MoCA cutoff score of 22.71 (SD 3.60) was appropriate for identifying cognitive impairment in a sample ( $n = 650$ , age range 25 to > 65 yr) from a population of rural and urban Portuguese individuals.<sup>11</sup>

Health care providers in rural communities of northern Ontario have used the MoCA and functional assessments of ADL and IADL as part of health assessments of seniors. There is, however, substantial equivocation as to how these measures should be integrated within assessments of this population — specifically with regard to an appropriate cutoff score that may be used to guide interpretation of the MoCA. The purpose of this study was to determine an appropriate MoCA cutoff score for community-dwelling seniors living in a rural Canadian community.

## METHODS

We conducted a retrospective chart review at the health centre of a rural small town with a population of about 5000 (2011 Census of Canada). This northern Ontario town is located within 70 km of a metropolitan area with a population of more than 100 000, which defines this rural community as a moderate metropolitan-influenced zone.<sup>12</sup> The main industry of the rural community is a pulp and paper mill.

The review of our consecutively sampled charts (representing all individuals with a MoCA assessment [version 7.1] between Dec. 1, 2013, and July 31, 2015) was done in 2 separate data-collection events. All data were coded by the hospital staff clinician, and no identifiable data were recorded or retained. In the first data-collection event, the same nurse practitioner (B.A.P.) extracted MoCA scores from the charts, adhering to the administration of the MoCA ([www.mocatest.org](http://www.mocatest.org)). For individuals with 12 or fewer years of education, the MoCA scores were adjusted by adding 1 point.<sup>5</sup> Screening with the MoCA was for cognitive impairment solely and independently from functional assessment.

After 1 week, the same nurse practitioner, who was unaware of the MoCA scores, categorized functional assessments of ADL<sup>5</sup> and IADL<sup>6</sup> by levels of

deficiencies (no deficiencies, mild deficiencies, moderate deficiencies and severe deficiencies). Box 1 summarizes the ADL and IADL criteria used in these assessments.

All charts were reviewed by the same nurse practitioner, who knew each of the individuals through clinic visits, home visits and chart reviews. All charts were reviewed in the same manner to determine whether or not each individual could safely complete each of the 9 ADL tasks and the 8 IADL tasks. Each task was evaluated as “independent” (i.e., able to perform the task) or “not independent” (i.e., not able to perform the task).

The functional assessment of ADL and IADL for each chart was separately categorized by level of deficiencies. Individuals at level 1 demonstrated no functional limitations in ADL and IADL. Functional deficiencies were defined as mild (level 2), moderate (level 3) and severe (level 4).

## Data analysis

We plotted an ROC curve to compare cutoff scores for MoCA total scores with levels of functional deficiency on measures of ADL and IADL. We used a 95% confidence interval (CI) for the AUC calculation. All data were analyzed using SPSS (version 23), and NCSS (version 10).

Sample size calculations using an  $\alpha$  level of 0.05 and  $\beta$  level of 0.20 determined that a sample size of at least 30 per group was sufficient to conduct ROC comparison analyses (NCSS version 10, PASS version 14). We considered  $p < 0.05$  significant for all analyses.

This study was approved by the Health Sciences Research Ethics Board at Western University.

## RESULTS

One hundred charts were reviewed; 3 charts were excluded because the MoCAs were performed by another health care provider, 1 MoCA used a version other than 7.1 and 1 MoCA was a duplicate. A total of 95 charts were included in the retrospective chart review.

The sample had good representation from both sexes and had a wide age range. Relevant characteristics are summarized in Table 1. In terms of age and sex, this sample is representative of the region in which the data were collected: data for this community from the 2011 Census of Canada report a senior population of 435 men and 520 women, which suggests that the study sample (37 men and

58 women) has a similar sex composition and includes 9.5% of the population. The age distribution is presented in Figure 1.

The mean educational level was 10.33 (SD 2.99) years, with values ranging from 5 to 18 years. Of the participants, 17.9% completed more than 12 years of education (Fig. 2). Per the MoCA instructions, an additional point was added to the score of individuals who had 12 or fewer years of education.

The mean MoCA score for the sample was 21.25 (SD 4.57), with a wide range of scores (4–30). In terms of the impact of demographic variables and

performance on the screening instrument, sex was not associated. Age was found to be weakly associated (Pearson  $r = -0.22$ ,  $p = 0.03$ ), and education was not significantly correlated (Pearson  $r = 0.19$ ,  $p = 0.07$ ).

Sixty-one participants (64%) showed no deficiencies in ADL and IADL (level 1), 16 (17%) showed mild functional deficiencies (level 2), and 18 (19%) showed moderate (level 3) or severe (level 4) functional deficiencies. The deficiency categories were split into 2 groups, level 1 (64%) with no deficiencies and levels 2, 3 and 4 (total of 36%) with deficiencies in ADL and/or IADL. The AUC was 0.81 (95% CI 0.72–0.91). Evaluation of the coordinates of this curve suggests 2 cutoff scores that would be useful adjuncts to clinical assessment. A cutoff score of 20 showed a sensitivity of 85% and a specificity of 62% within this sample, whereas a cutoff score of 21 suggested a sensitivity and specificity of 77%. This ROC curve is depicted in Figure 3.

**Table 1: Characteristics of patients included in the chart review (n = 95)**

Characteristic	No. (%)*
<b>Age, yr</b>	
Mean (± SD)	80.59 ± 7.50
Range	62–94
<b>Sex</b>	
Female	58 (61.1)
Male	37 (38.9)
<b>Years of education</b>	
Range	5–18
5–8	32 (33.7)
9–12	46 (48.4)
> 12	17 (17.9)
<b>Living alone or with others</b>	
Alone	38 (40.0)
With others	57 (60.0)

SD = standard deviation.  
\*Unless stated otherwise.

## DISCUSSION

We evaluated cutoff scores for the identification of mild cognitive impairment (in relation to functional deficiencies in ADL and IADL) using the MoCA within a rural sample. A large representative sample was employed within a retrospective chart review, and evaluators were unaware of MoCA scores when evaluating functional deficiency levels based on chart information. Our results suggest that the normal

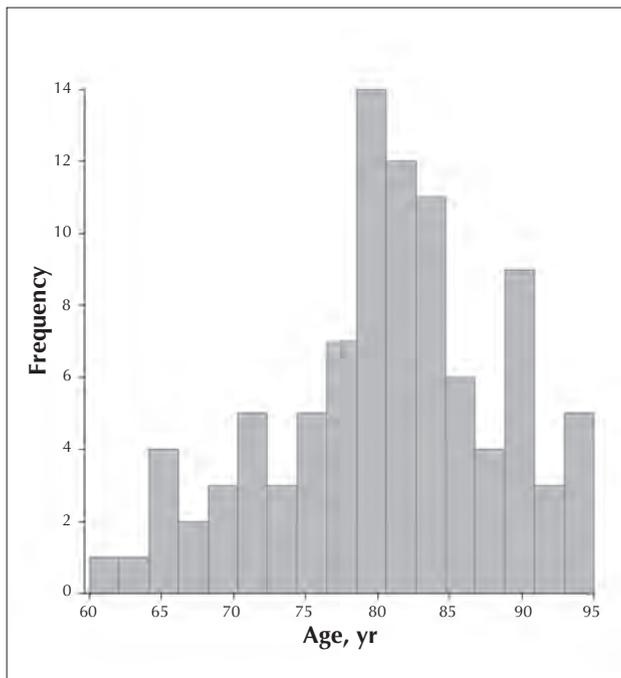


Fig. 1. Age distribution of the study sample (n = 95).

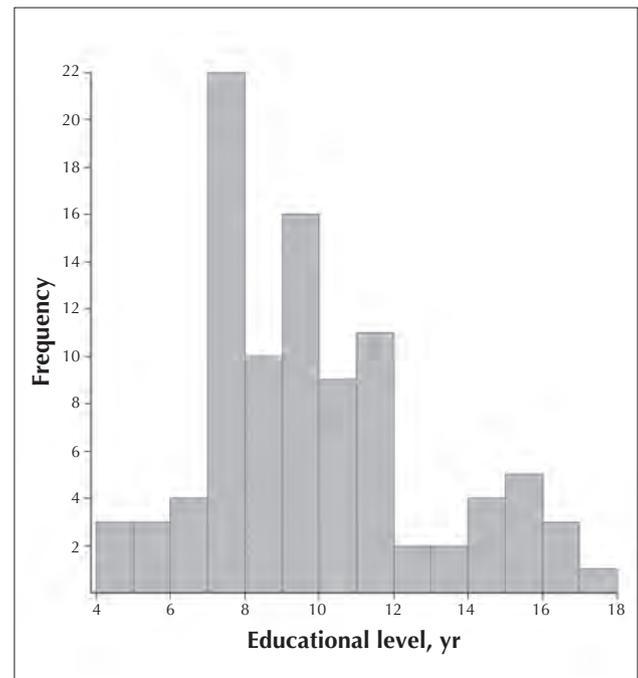


Fig. 2. Education distribution of the study sample (n = 95).

range of MoCA scores based on functional assessment within a rural population is likely 22 to 30.

Nasreddine and colleagues<sup>5</sup> identified a MoCA cutoff score of 26 based on an urban sample ( $n = 90$ ) with a mean age 72.84 (SD 7.03) and an average of 13.33 (SD 3.40) years of education, and a reference measurement that was based on neuropsychiatric evaluation and the Mini Mental State Examination. Since this initial publication, there have been a number of studies that have suggested alternative cutoff scores: Rossetti and colleagues<sup>13</sup> reported a MoCA cutoff score of 23, again based on an urban sample; Freitas and coauthors<sup>11</sup> included individuals from Portuguese rural and urban samples, and suggested a cutoff score of 22; and Waldron-Perrine and colleagues<sup>9</sup> reported a cutoff of 21 based on a ROC analysis of an American urban sample. There is, therefore, substantial agreement within the literature about the need for population-specific determination of MoCA cutoff scores. Furthermore, the specific cutoff scores identified within these studies support the cutoff score of 20 or 21, which is consistent with our findings.

Few studies have analyzed MoCA scores in relation to functional assessments of ADL and IADL, and so the inclusion of this mode of assessment is a critical strength of our study. In rural northern Ontario, there are limited resources and limited access to occupational therapists, and so nurse practitioners in small communities frequently become experts in performing these assessments.

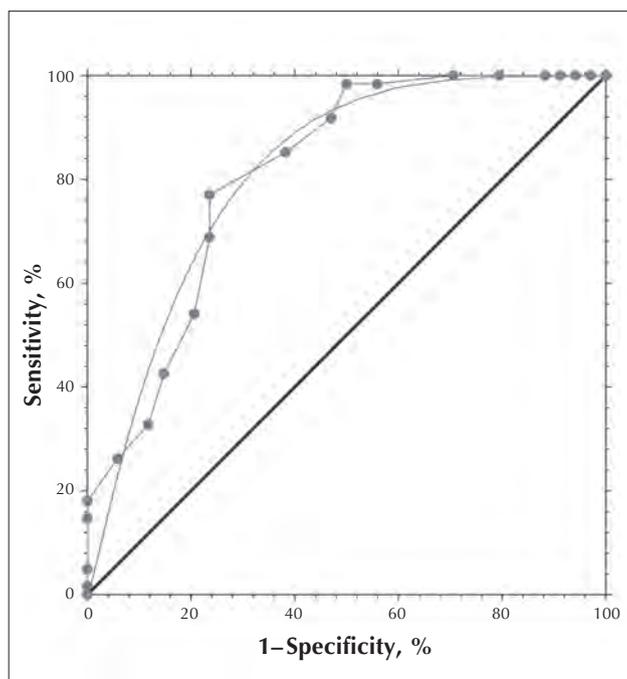


Fig. 3. Receiver operating characteristic curve.

Thus, the present research has substantial ecological validity with regard to the manner in which functional assessments are typically done within rural communities.

A recent study in a Turkish rural community included participants with fewer than 5 years of education, and the results emphasized the need to adapt the language sections of the MoCA.<sup>14</sup> Participants in the current retrospective chart review had between 5 and 18 years of education (mean 10 yr). Although the demonstrated association between years of education and MoCA score was very small in the present study, further investigation of MoCA items in relation to total score is needed. In particular, detailed item response theory analyses would substantially add to the growing literature surrounding implementation of the MoCA.

### Limitations

It is important to consider several limitations of the present research. Although the sampling frame included a wide variety of educational backgrounds and a reasonable balance of men and women, and demonstrated good ecological validity, it was conducted in a single health centre. Furthermore, we did not have detailed information on lifestyle habits that have been implicated in cognitive impairment (e.g., smoking and alcohol use), and so it is impossible to draw conclusions about the extent to which these precipitating factors are related to participants' scores on the MoCA. Future research might consider additional demographic factors that may affect MoCA scores.

### CONCLUSION

A cutoff score of 20 produces a sensitivity of 85% and a specificity of 62%, and a cutoff score of 21 produces a sensitivity of 77% and an improved specificity of 77%. This indicates that mild cognitive impairment, in relation to functional performance of ADL and IADL, is suggested for individuals within a rural population who score 21 or lower.

These results support the use of the MoCA as an assessment tool for screening for mild cognitive impairment and underscore the potential for over-pathologizing rural individuals with the cutoff score of 26 suggested by Nasreddine and colleagues.<sup>3</sup> Furthermore, although the MoCA demonstrated satisfactory performance as a screening measure, the importance of including functional assessments of ADLs and IADLs before making clinical decisions cannot be overemphasized.

## REFERENCES

1. Dodge HH, Du Y, Saxton JA, et al. Cognitive domains and trajectories of functional independence in nondemented elderly persons. *J Gerontol A Biol Sci Med Sci* 2006;61:1330-7.
2. Rosenthal E, Brennan L, Xie S, et al. Association between cognition and function in patients with Parkinson disease with and without dementia. *Mov Disord* 2010;25:1170-6.
3. Nasreddine ZS, Phillips NA, Bédirian V, et al. The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. *J Am Geriatr Soc* 2005;53:695-9.
4. Julayanont P, Phillips N, Howard C, et al. Montreal Cognitive Assessment (MoCA): concept and clinical review. In: Larner AJ, editor. *Cognitive screening instruments: a practical approach*. London (UK): Springer; 2013: 111-51.
5. Katz S, Ford AB, Moskowitz RW, et al. Studies of illness in the aged. The Index of ADL: a standardized measure of biological and psychosocial function. *JAMA* 1963;185:914-9.
6. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist* 1969;9:179-86.
7. Katz S, Downs TD, Cash HR, et al. Progress in development of the Index of ADL. *Gerontologist* 1970;10:20-30.
8. Graf C. The Lawton Instrumental Activities of Daily Living Scale. *Am J Nurs* 2008;108:52-62.
9. Waldron-Perrine B, Axelrod BN. Determining an appropriate cutting score for indication of impairment on the Montreal Cognitive Assessment. *Int J Geriatr Psychiatry* 2012;27:1189-94.
10. Zhou S, Zhu J, Zhang N, et al. The influence of education on Chinese version of Montreal Cognitive Assessment in detecting amnesic mild cognitive impairment among older people in a Beijing rural community. *ScientificWorldJournal* 2014;2014:1-7.
11. Freitas S, Simões MR, Alves L, et al. Montreal Cognitive Assessment (MoCA): normative study for the Portuguese population. *J Clin Exp Neuropsychol* 2011;33:989-96.
12. McNiven C, Puderer H, Janes D. *Geography working paper series census metropolitan area and census agglomeration influenced zones (MIZ): a description of the methodology*. Ottawa (ON): Statistics Canada; 2000. Available: [www5.statcan.gc.ca/olc-cel/olc.action?ObjId=92F0138M2000002&ObjType=46&lang=en](http://www5.statcan.gc.ca/olc-cel/olc.action?ObjId=92F0138M2000002&ObjType=46&lang=en) (accessed 2016 Aug. 23).
13. Rossetti HC, Lacritz LH, Cullum CM, et al. Normative data for the Montreal Cognitive Assessment (MoCA) in a population-based sample. *Neurology* 2011;77:1272-5.
14. Yancar Demir E, Özcan T. Evaluating the relationship between education level and cognitive impairment with the Montreal Cognitive Assessment Test. *Psychogeriatrics* 2015;15:186-90.

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## SRPC position statement on minimum-volume credentialling

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Council December 2015

### INTRODUCTION

Health-policy initiatives are becoming increasingly focused on improving patient safety and quality of care.<sup>1-3</sup> One method by which this is accomplished is through implementation of mechanisms aimed at improving physician accountability and continually monitoring the standard of care that individual physicians provide.<sup>1-3</sup> In Canada the province with the most developed plan (the Provincial Privileging Project [PPP]) is British Columbia, where the process is currently being implemented. As such, this paper will specifically analyze the process in BC, although there are similar programs under development, both nationally and internationally.

Announced in November 2012, the PPP introduces recommendations for the minimal volume of a given procedure a physician must perform over a given period to be considered current in his or her ability to continue performing that procedure.<sup>4</sup> Unfortunately, no rationale is given for the specific volume requirements, and many of the cutoffs appear to be completely arbitrary. Specific “privileging dictionaries” have been developed for each specialty, as well as for general and family practice.<sup>4</sup> Although failure to meet the set standard does not automatically remove a physician’s privilege to continue performing a specific procedure, it does trigger a review,<sup>4</sup> which inherently removes the incentive for physicians to continue to perform the procedure in question if they are unsure of their ability to maintain the necessary volume.

Not only is the potential inability of failing to meet a professional standard a concern in and of itself, the increased vulnerability to litigation cannot be ignored. Irrespective of whether an outcome was reasonable in the circumstances, litigation is an ongoing risk for any physician, and the PPP provides an easy mechanism through which any blame can be entirely passed on to the physician. It essentially deems a physician incompetent unless he or she can demonstrate otherwise. The PPP is explicitly stated to be a measurement of a physician’s “current experience,”<sup>4</sup> that is, an evaluation of whether the physician’s abilities remain up to date, not an evaluation of his or her competency or a direct method for maintenance of credentials. Unfortunately, in both its goal and in its design, the PPP is fundamentally flawed: not only does it fail to provide a workable mechanism to improve physician accountability and the quality of care provided, but the recommendations lack a sound foundation and have the potential to substantially limit many physicians’ ability to provide services, particularly in rural areas.

### DISCUSSION

The PPP was proposed following the publication of 3 major papers in BC: the *Investigation into Medical Imaging, Credentialing and Quality Assurance: Phase 1 Report*,<sup>3</sup> the *Investigation into Medical Imaging, Credentialing and Quality Assurance: Phase 2 Report* (collectively, the “Cochrane report”)<sup>1</sup> and the *British Columbia Ministry of Health Provincial Review of Licensure, Credentialing,*

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*Privileging, Monitoring and Enhancement of Performance* (the “provincial review”).<sup>2</sup> The Cochrane report primarily focused on radiology,<sup>3</sup> but inasmuch as it made recommendations for the health system in general, it suggested that the health authorities, their affiliates and the College of Physicians and Surgeons of British Columbia (CPSBC) undertake to improve information-sharing among themselves and with other jurisdictions, develop comprehensive retrospective and peer-review processes to be used within the health system, and develop standardized measures to review both credentialing and physician performance.<sup>1</sup> Overall, the recommendations focused on the need for clearer expectations and communication processes throughout the medical system. Similarly, the provincial review focused on the need for improved communication within the health system, particularly among the health authorities, among jurisdictions and with the CPSBC.<sup>2</sup> Although it recommended that the CPSBC implement a process for comprehensive physician revalidation, it did not make any specific recommendations for the inner mechanics of such a system.<sup>2</sup> Considering the above points as a whole, it is clear that, other than in acting as an ostensible ongoing measure for physician currency, the PPP fails to be the culmination of a process of ongoing policy development. It is not in line with the BC Ministry of Health’s own recommendations, and although it could be considered a crude system for physician revalidation, no evidence has been provided that suggests its mechanisms are at all useful as a measure of physician capability.

The structure of the PPP seems to be based on one particular underlying assumption: that the volume of medical procedures a physician performs is connected to the quality of the outcomes of those procedures. This is derived from a specialist perspective in which physicians spend their professional careers focusing on one particular area of practice and perform a specific set of associated procedures. It fails to recognize the existence of generalists who perform a wider range of more basic procedures. This demonstrates an underlying problem in the very foundation of the PPP: its failure to account for a broad range of functional patterns of practice. The stated goal of the project is to evaluate whether a physician’s ability to perform a given procedure remains current. This is fundamentally flawed. Measuring whether a physician has performed a procedure enough times recently is of little use if that recent performance has not been adequate. It is surely not enough that procedures

have been performed, unless that performance demonstrated a reasonable degree of competence. Therefore, the PPP must be at least indirectly concerned with competency, even if measured only through the proxy of frequency. In fact, any credentialing or revalidation program that does not consider competency or, equivalently, outcomes, inherently lacks a reasonable foundation. Regardless, the PPP is clearly attempting to use a measure of volume to render judgment on a physician’s abilities. Otherwise it would be meaningless. This reasoning — that volume of procedures performed is somehow reflective of a physician’s ability to continue performing procedures — has a simplistic sort of appeal. It also lacks any evidentiary foundation for most medical procedures, despite its basic appeal to many administrators.

An abundance of research has been produced on whether the annual volume of procedures performed by a medical practitioner, or within a hospital, can be correlated with the outcome of the procedures.<sup>5,6</sup> Although the literature has produced highly variable results, there is strong evidence that, for highly complex surgical procedures, surgeons who perform a given procedure more frequently will have better outcomes for that procedure.<sup>7–13</sup> Even within this group of procedures, however, there is evidence suggesting that this correlation does not necessarily hold true in a Canadian context.<sup>15</sup> An interesting trend in this research is that the more unusual a procedure is, the stronger the volume–outcome correlation appears to be; but these procedures are often so rare that it is nearly impossible to examine enough to produce significant results.<sup>14–16</sup> Some of the research in this area also indicates a correlation between volume and outcome for more common procedures, such as cesarean deliveries,<sup>17,18</sup> but most of this research is either not well designed or of dubious applicability to BC physicians. For instance, Snowden and colleagues<sup>19</sup> found a correlation between provider volume and lower risk of postpartum hemorrhage in low-risk deliveries, but the study failed to identify the relative qualifications of different providers, failed to identify in which cases complications would have been preventable and was based on administrative data instead of more reliable clinical data. As a counterpoint, Khuri and Henderson<sup>20</sup> found that volume–outcome research based on administrative data was much more likely to find a correlation than if it were based on clinical data. Finally, almost all of the research in this area is based in the US and thus describes an entirely different health care

environment: one where many low-density hospital areas are extremely close to high-density hospitals that provide viable alternatives for service, and one where most outcome analyses are motivated by the needs of insurers. In fact, Urbach and colleagues<sup>21</sup> suggest that volume–outcome correlations are inherently higher in the US than in Canada owing to differences in health-system organization. Overall, the foundation of the PPP — an assumed overall correlation between physician volume and better outcomes — has no evidentiary basis, which makes the entire initiative lack utility.

Even if the evidence did suggest that volume and outcome were correlated for most medical procedures performed by physicians within the health system, the PPP would still have a glaring flaw: a failure to consider the causal aspects of an alleged relation. It is not sufficient to consider outcomes if the manner of analysis does not also suggest means of improvement. That is, it is less important to know that volume and outcome are correlated in some circumstances than it is to know why they are correlated. If there is no causal element to the relation (none has been found<sup>22</sup>), aiming at improving volume rather than quality is treating the symptom rather than the disease. This is not helped by the fact that even where a volume–outcome correlation is indicated, the volume of what is frequently unclear. Evidence is divided on whether practitioner<sup>23</sup> or hospital volume,<sup>24</sup> and specific procedure or overall procedure volume<sup>25</sup> are better indicators. Reliance on volume–outcome studies, even for those procedures where a correlation is indicated, is thus logically unsound, because its use of volume as a proxy measurement for competence fails to give meaningful information that can be used for actual systemic improvement.

Besides being of dubious utility to the health system, the PPP also has the potential to have a severe impact on physicians practising in rural areas. It is a program that fails to account for the generalist nature of rural practice,<sup>26</sup> wherein physicians develop broad skill sets by performing a wide variety of complementary procedures. Physicians who find themselves unable — or who expect to be unable — to meet required volumes are unlikely to continue performing certain procedures. This result is particularly absurd given the abundant evidence that the volume–outcome correlation is weakest for the less-complex procedures that rural physicians are usually called on to perform.<sup>16</sup> It remains unclear what actual consequences will follow from failure to meet these benchmarks, and therefore it is likely phys-

icians will prefer to give up procedures rather than risk having them revoked. Even if removal of privileges will not necessarily follow from insufficient volumes, the fear of condemnation, censure or litigation is sufficient to dissuade many low-volume physicians from continuing to practise. The adverse effect of this on patients living in rural areas should be obvious. The unavailability of local care will force patients to travel to receive necessary treatment and consequently interrupt their continuity of care, remove them from local support networks and subject them to greater financial challenges.<sup>27–29</sup> For rural patients and physicians alike, the PPP has the potential to cause substantial and long-lasting harm.

A similar program was imposed in 1998 in Saskatchewan by the College of Physicians and Surgeons of Saskatchewan, requiring all obstetric practitioners to complete a minimum of 25 deliveries per year.<sup>30</sup> Rural and family physicians left maternity care in droves,<sup>30</sup> and although the requirement was removed in 2002 following evidence showing no difference in outcomes between low- and high-volume urban physicians,<sup>31,32</sup> the number of family physicians providing maternity care in Saskatchewan has never recovered.<sup>30</sup> Furthermore, the existence of stable medical infrastructure is often of great importance to the sustainability and cohesiveness of rural communities.<sup>33,34</sup> Forcing rural practitioners out of providing a comprehensive range of services poses a grave threat to both rural physicians and their communities.

Rural and urban physicians alike would benefit from a comprehensive system of credential revalidation. The inadequacy of the PPP only demonstrates the need for a better program. In the absence of Canadian research that supports the assumption of a volume–outcome correlation, other factors must be considered. In fact, even if such research were undertaken, it would not be especially useful to the question of revalidation unless the causal aspects of any relation were considered. A better way to develop a credentialing program is to look at already-established research and programs with good results. For instance, in many parts of Europe, revalidation done through a combination of continuing medical education and peer-review programs, and regulation is generally done by professional medical bodies.<sup>35</sup> In the US, continuing medical education and assessments are used to achieve certification through the American Board of Physician Specialists.<sup>34</sup> In the Canadian context, programs such as the Managing Obstetrical Risk Efficiently Program (MORE<sup>OB</sup>) are already being used by hospitals to improve internal communication and

teamwork abilities and thereby improve obstetric outcomes.<sup>36</sup> Ideally, all physician-revalidation processes should emulate this example by focusing on continuous quality improvement. It is important to consider the applicability of pre-existing programs to both the Canadian context and the general medical context. Through consideration of already-demonstrated outcomes, a program that has a soundly logical foundation and meets the needs of all BC physicians can best be constructed.

The PPP's grave flaws and inadequate policy background make it a poor initiative for the provincial health system. It fails to consider physicians in a holistic sense, that is, as practitioners with diverse training and backgrounds, who practise within a specific community environment and are supported by a range of differently qualified team members. Rural practice is a context in which this error is of particular concern. Rural physicians, by their very nature, are called on to handle a greater diversity of procedures, often with lower volumes for specific procedures, than their urban counterparts. This broad range of practice can hardly be considered to reduce their capabilities, given that their ability to cross-train allows for development of a varied skill set and wide-ranging competencies. As stated in the provincial review itself, "If minimum standards are to be established for credentialing, the standards need to take into account the different levels of care provided in the Province. It simply is not possible to provide the same service in rural areas ... ."<sup>2</sup>

## RECOMMENDATIONS

Although BC's PPP is an inadequate initiative to improve physician accountability and the quality of care that patients receive, this does not mean that an appropriate process should not be developed. As established by the Cochrane report<sup>3</sup> and the provincial review,<sup>2</sup> there is a need for improvement in physician-review processes and in revalidation methods. In light of this goal, the Society of Rural Physicians of Canada makes the following recommendations:

**Recommendation 1:** Any health-system initiative affecting privileging implemented by the provincial health ministries should be evidence-based. In the absence of evidence, arbitrary standards are inappropriate.

**Recommendation 2:** Any revalidation process must carefully consider (a) the importance of appropriate peer review when measuring quality, (b) the need to consider Canada's diverse geogra-

phy and the commensurate range of varied community medical practice that exists and (c) the different nature of generalist and specialist practices.

**Recommendation 3:** Annual physician procedure volume should not be used as a surrogate measure for currency, competency or outcomes.

**Recommendation 4:** A comprehensive and balanced system should be implemented and used for credential revalidation that focuses on and considers (a) the actual quality of care provided by a physician, (b) the particulars of specific continuing medical education completed by a physician and (c) the impact on the health outcomes of the patients in the community that arise from changes in health care delivery.

## CONCLUSION

It is illogical to impose the PPP standards in rural areas when the very nature of rural practice is so diverse as to make specific procedure volume irrelevant. Any health-system initiative must consider the wide range of well-functioning practice styles and groups that operate across the province, and should support rather than undermine doctors with wide-ranging skill sets. The PPP fails to do this. Furthermore, as other provinces move to develop similar programs, there is a grave danger of an untested and inadequate process spreading to affect other provinces beyond BC.

## REFERENCES

1. Cochrane DD. *Investigation into medical imaging, credentialing and quality assurance: phase 2 report*. Vancouver (BC): BC Patient Safety & Quality Council; 2011. Available: [www.health.gov.bc.ca/library/publications/year/2011/cochrane-phase2-report.pdf](http://www.health.gov.bc.ca/library/publications/year/2011/cochrane-phase2-report.pdf) (accessed 2015 June 8).
2. *British Columbia Ministry of Health: provincial review of licensure, credentialing, privileging, monitoring and enhancement of performance*. BC Ministry of Health; 2012. Available: [www.health.gov.bc.ca/library/publications/year/2012/provincial-review-physician-licensing.pdf](http://www.health.gov.bc.ca/library/publications/year/2012/provincial-review-physician-licensing.pdf) (accessed 2015 Sept. 14).
3. Cochrane DD. *Investigation into medical imaging, credentialing and quality assurance: phase 1 report*. Vancouver (BC): BC Patient Safety & Quality Council; 2011. Available: [www.health.gov.bc.ca/library/publications/year/2011/cochrane-phase1-report.pdf](http://www.health.gov.bc.ca/library/publications/year/2011/cochrane-phase1-report.pdf) (accessed 2015 June 8).
4. Slater J. Privileging project: an initiative of British Columbia's Medical Performance Enhancement Framework. Updated 2015. Available: [http://privileging.typepad.com/privileging\\_project](http://privileging.typepad.com/privileging_project) (accessed 2015 Sept. 14).
5. Luft HS. The relation between surgical volume and mortality: an exploration of causal factors and alternative models. *Med Care* 1980;18:940-59.
6. Murray GD, Teasdale GM. The relationship between volume and health outcomes — a review. *Scott Med J* 2006;51:17-22.
7. Halm EA, Lee C, Chassin MR. Is volume related to outcome in health care? A systematic review and methodologic critique of the literature. *Ann Intern Med* 2002;137:511-20.

8. Birkmeyer JD, Stukel TA, Siewers AE, et al. Surgical volume and operative mortality in the United States. *N Engl J Med* 2003;349:2117-27.
9. Richardson DP, Porter GA, Johnson PM. Surgeon knowledge contributes to the relationship between surgeon volume and patient outcomes in rectal cancer. *Ann Surg* 2013;257:295-301.
10. Browne JA, Pietrobon R, Olson SA. Hip fracture outcomes: does surgeon or hospital volume really matter? *J Trauma* 2009;66:809-14.
11. Hentschker C, Mennicken R. The volume-outcome relationship and minimum volume standards — empirical evidence for Germany. *Health Econ* 2015;24:644-58 10.1002/hec.3051.
12. Gooiker GA, van Gijn W, Post PN, et al. A systematic review and meta-analysis of the volume-outcome relationship in the surgical treatment of breast cancer. Are breast cancer patients better off with a high volume provider? *Eur J Surg Oncol* 2010;36:S27-35.
13. *Health care in Canada*. Ottawa (ON): Canadian Institute for Health Information; 2005: 49-68. Available: [https://secure.cihi.ca/free\\_products/hcic2005\\_e.pdf](https://secure.cihi.ca/free_products/hcic2005_e.pdf) (accessed 2015 Sept. 14).
14. Dimick JB, Welch HG, Birkmeyer JD. Surgical mortality as an indicator of hospital quality: the problem with small sample size. *JAMA* 2004;292:847-51.
15. Raval MV, Dean KJ, Rangel S, et al. Assessing quality in pediatric surgery — the limited role of appendectomy as the optimal target. *J Pediatr Surg* 2013;48:2313-9.
16. Finlayson SRG. The volume-outcome debate revisited. *Am Surg* 2006;72:1038-42. Available: [www.ingentaconnect.com/content/sesc/tas/2006/00000072/00000011/art00010](http://www.ingentaconnect.com/content/sesc/tas/2006/00000072/00000011/art00010) (accessed 2015 Sept. 15).
17. Janakiraman V, Lazar J, Joynt K, et al. Comparing the outcomes of low volume and high volume obstetrics providers and hospitals. *Am J Obstet Gynecol* 2011;204:S244.
18. Kyser KL, Lu X, Santillan DA, et al. The association between hospital obstetrical volume and maternal postpartum complications. *Am J Obstet Gynecol* 2012;207:42.e1-17.
19. Snowden JM, Cheng YW, Emeis CL, et al. The impact of hospital obstetric volume on maternal outcomes in term, non-low-birth-weight pregnancies. *Am J Obstet Gynecol* 2015;212:380.e1-9.
20. Khuri SF, Henderson WG. The case against volume as a measure of quality of surgical care. *World J Surg* 2005;29:1222-9.
21. Urbach DR, Croxford R, MacCallum NL, et al. How are volume-outcome associations related to models of health care funding and delivery? A comparison of the United States and Canada. *World J Surg* 2005;29:1230-3.
22. Harrison A. Assessing the relationship between volume and outcome in hospital services: implications for service centralization. *Health Serv Manage Res* 2012;25:1-6.
23. Chowdhury MM, Dagah H, Pierro A. A systematic review of the impact of volume of surgery and specialization on patient outcome. *Br J Surg* 2007;94:145-61 10.1002/bjs.5714.
24. Birkmeyer JD. Should we regionalize major surgery? Potential benefits and policy considerations. *J Am Coll Surg* 2000;190:341-9.
25. Urbach DR, Baxter NN. Does it matter what a hospital is “high volume” for? Specificity of hospital volume-outcome associations for surgical procedures: analysis of administrative data. *Qual Saf Health Care* 2004;13:379-83.
26. Australian College of Rural & Remote Medicine. Barriers to the maintenance of procedural skills in rural and remote medicine. 2002. Available: [www.acrrm.org.au/docs/default-source/documents/the-college-at-work/barriers-procedural-skills-maintenance.pdf?sfvrsn=10](http://www.acrrm.org.au/docs/default-source/documents/the-college-at-work/barriers-procedural-skills-maintenance.pdf?sfvrsn=10) (accessed 2016 Aug. 24).
27. Tracy EE, Zephyrin LC, Rosman DA, et al. Credentialing based on surgical volume, physician workforce challenges, and patient access. *Obstet Gynecol* 2013;122:947-51.
28. Klein MC, Christilaw J, Johnston S. Loss of maternity care: the cascade of unforeseen dangers. *Can J Rural Med* 2002;7:120-1 Available: <https://healthpromotionsds.files.wordpress.com/2008/02/grzybowski-1-loss-of-maternity-care.pdf> (accessed 2015 Sept. 14).
29. Miller KJ, Couchie C, Ehman W, et al. Rural maternity care. *J Obstet Gynaecol Can* 2012;34:984-91. Available: [http://sogc.org/wp-content/uploads/2013/01/gui282PP1210E\\_000.pdf](http://sogc.org/wp-content/uploads/2013/01/gui282PP1210E_000.pdf) (accessed 2015 Sept. 14).
30. Johnston CS, Klein MC, Iglesias S, et al. Competency in rural practice. *Can J Rural Med* 2014;19:43-4. Available: [www.srpc.ca/PDF/cjrm/vol19n2/pg43.pdf](http://www.srpc.ca/PDF/cjrm/vol19n2/pg43.pdf) (accessed 2015 Sept. 14).
31. Klein MC, Spence A, Kaczorowski J, et al. Does delivery volume of family physicians predict maternal and newborn outcome? *CMAJ* 2002;166:1257-63. Available: [www.cmaj.ca/content/166/10/1257.full.pdf](http://www.cmaj.ca/content/166/10/1257.full.pdf) (accessed 2015 Sept. 14).
32. Iglesias S, Grzybowski S, Klein MC, et al. Rural obstetrics: joint position paper of rural maternity care. *Can Fam Physician* 1998;44:831-6. Available: [www.ncbi.nlm.nih.gov/pmc/articles/PMC2277824/pdf/canfampphys00050-0141.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2277824/pdf/canfampphys00050-0141.pdf) (accessed 2015 Sept. 14).
33. Klein M, Johnston S, Christilaw J, et al. Mothers, babies, and communities. Centralizing maternity care exposes mothers and babies to complications and endangers community sustainability. *Can Fam Physician* 2002;48:1177-9. Available: [www.ncbi.nlm.nih.gov/pmc/articles/PMC2214081/pdf/12166006.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2214081/pdf/12166006.pdf) (accessed 2015 Sept. 14).
34. Miewald C, Klein MC, Ulrich C, et al. “You don’t know what you’ve got till it’s gone”: the role of maternity care in community sustainability. *Can J Rural Med* 2011;16:7-12. Available: [www.srpc.ca/PDF/cjrm/vol16n1/pg7.pdf](http://www.srpc.ca/PDF/cjrm/vol16n1/pg7.pdf) (accessed 2015 Sept. 14).
35. Merkur S, Mossialos E, Long M, et al. Physician revalidation in Europe. *Clin Med* 2008;8:371-6.
36. Salus Global. Managing Obstetrical Risk Efficiently Program. Available: <http://moreob.com> (accessed 2015 Sept. 14).

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## Country cardiograms case 57

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This article has been peer  
reviewed.

**A** 27-year-old woman presents to a rural emergency department. She fainted at home and has sensations of a racing heart. She has no previous cardiovascular history of note.

Electrocardiograms reveal a narrow complex tachycardia, with a rate of 140 beats/min. A number of treatments are attempted, including vagal manoeuvres, adenosine, verapamil, cardiover-

sion and amiodarone, all of which are unsuccessful.

A slight change then becomes evident in the electrocardiogram, which allows the rhythm to be identified (Fig. 1). What is the interpretation, and what treatment should be considered?

**For the answer, see page 117.**

**Competing interests:** None declared.

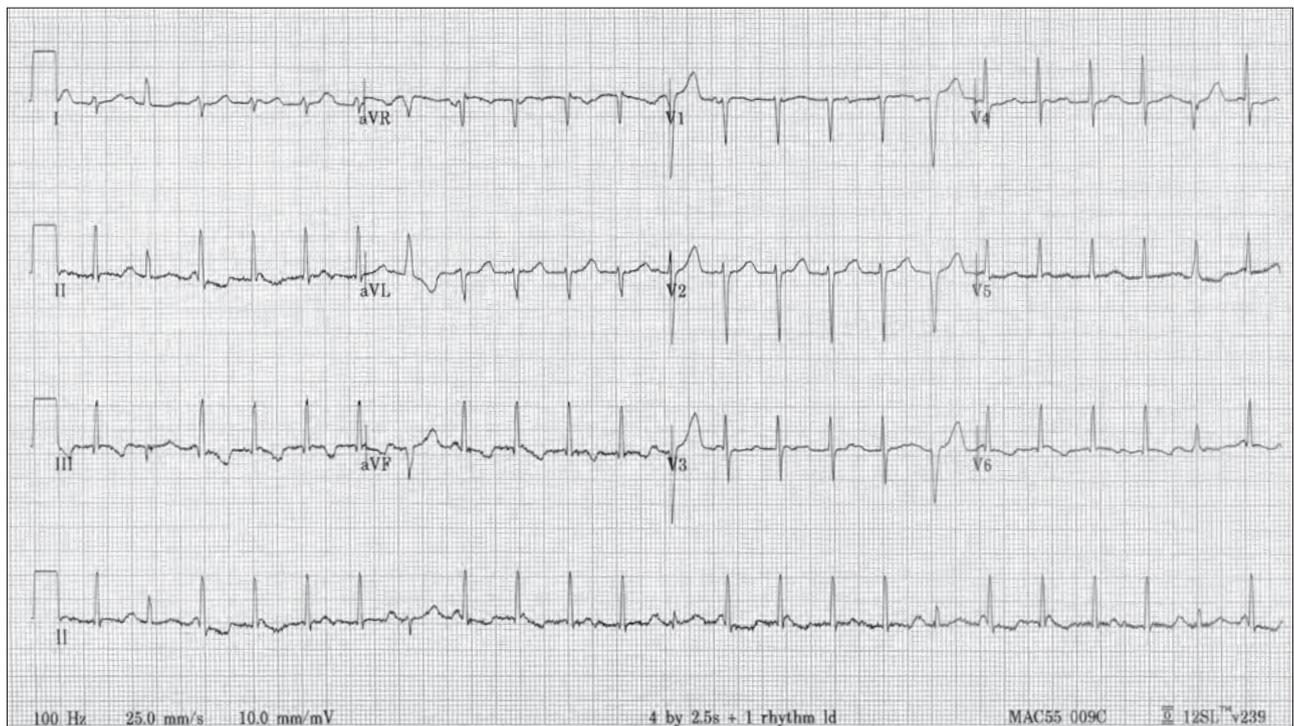


Fig. 1. Electrocardiogram of a 27-year-old woman.

## The occasional wound “gluing”

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### INTRODUCTION

The modern rural physician has in his or her armamentarium several choices for laceration closure: sutures, tape, staples and tissue adhesives (“glue”). Each has its advantages, disadvantages, wounds to which it is ideally suited and wounds to which it is less well-suited.

This article will concern itself with tissue adhesives, of which, to my knowledge, 9 types are available in Canada, as of this writing (Box 1).

#### Box 1: Tissue adhesives available in Canada

Octylseal high viscosity tissue adhesive (Medline Industries)  
Indermil tissue adhesive (Henkel Ireland Operations and Research Ltd.)  
BioGlue surgical adhesive (Cryolife Inc.)  
Glubran Tiss 2 (GEM S.r.l.)  
SurgiSeal (Adhezion Biomedical LLC)  
Coseal Surgical Sealant (Baxter Healthcare Corporation)  
Dermabond (Ethicon LLC)  
Omnex Surgical Sealant (Ethicon LLC)  
Histoacryl (B. Braun Surgical S.A.)

### HISTORY OF TISSUE GLUES

Today’s tissue adhesives are from a class of molecules known as the cyanoacrylates, first synthesized in 1949. They are composed of a cyanoacetate and formaldehyde monomers, which, when in contact with the normal moisture on the skin, polymerize in an exothermic reaction; this explains why some patients feel a sensation of heat when tissue adhesive is applied.<sup>1,2</sup>

The early cyanoacrylates (e.g., Krazy Glue) were toxic to skin, but by the 1980s, nontoxic tissue adhesives were developed and came into clinical use.

Because of their ease of application, they rapidly became accepted for use in the emergency department.

There are minor chemical differences among the various types. In particular, Dermabond forms a longer polymer, which is theoretically stronger, more stable and more flexible than the commonly used Histoacryl, but it is debatable how much clinical advantage this confers in everyday practice.<sup>3-5</sup>

### ADVANTAGES

Tissue adhesives are a safe and effective way to close wounds. Advantages include<sup>2</sup>

- fast and relatively painless application, although some patients perceive a feeling of heat;
- “no-needle” application and anesthesia with topical anesthetic cream only (a consideration in pediatric use);
- maximum bonding strength achieved within minutes;
- water-resistant covering;
- no need to return for suture removal;
- can be applied by suitably trained nonphysician personnel during on-call hours (important for rural areas).

Not all wounds are suitable for tissue adhesives. The ideal wound for closure with tissue adhesive is described in Box 2.<sup>2,6</sup>

#### Box 2: The ideal wound for closure with tissue adhesive

An uncontaminated wound of the head, extremity or torso that is < 4 cm long and

- Has minimal skin tension
- Is seen within 12 hours of injury
- Would otherwise be suitable for closure with 5-0 suture material

As seen above and in Box 2, adhesive is additionally well suited for

- pediatric use, especially for scalp lacerations;<sup>7</sup>
- flap-type lacerations (so it is handy for the thin skin of elderly patients);
- nail-bed repairs.

Adhesive can be used on areas of high tension or mobility, such as the hands, feet and joint lines, but the extremity or joint must then be immobilized.<sup>2</sup> Deeper wounds can still be closed with tissue adhesive, but layered suture closure or subcuticular sutures (especially on the extremities) should be applied before the adhesive to reduce skin tension. It is vital to have good approximation of the skin margins before any tissue adhesive is applied.<sup>6</sup>

### CONTRAINDICATIONS

Wounds for which tissue adhesives are not suitable are listed in Box 3.<sup>2</sup> General contraindications to tissue adhesives include<sup>8</sup>

- sensitivity to any of the components;
- wounds that show evidence of infection or gangrene, or pressure ulcers;
- patients with known preoperative systemic infections, uncontrolled diabetes or diseases, or conditions that are known to interfere with wound healing.

#### Box 3: Wounds for which tissue adhesives are not suitable

- Jagged or stellate lacerations
- Bites
- Puncture or crush wounds
- Mucosal surfaces
- High-moisture areas (e.g., buttocks and perineum)
- Hands, feet and joint wounds, unless kept dry and immobilized

### OUTCOME

A Cochrane review<sup>4</sup> found “no significant difference in cosmetic outcome between tissue adhesives and standard wound closure, or between different tissue adhesives.” The authors state that tissue adhesives “offer the benefit of decreased procedure time and less pain, compared to standard wound closure.”<sup>4</sup>

There is a small increase in the rate of dehiscence with tissue adhesives compared with standard sutures (4% v. 1%–2%).<sup>4,6</sup> The degree to which this is related to poor wound selection or poor technique of application is not known.<sup>4,6</sup> Infection rates are not increased<sup>1–3</sup> as long as proper attention is paid to wound cleansing (see below).

### GENERAL PROCEDURE FOR USE OF TISSUE ADHESIVE

There are slight differences among the different products, so read the package-insert directions. Assuming that the wound meets the selection criteria (Boxes 2 and 3), the following guidelines are common to all products<sup>3</sup>:

- Adequate hemostasis must be obtained before the use of tissue adhesive.
- The general principles of wound care still apply: proper cleansing, irrigation, removal of debris and review of the patient’s tetanus status. A topical anesthetic cream can be applied, if desired.
- All products have some toxicity to subcutaneous tissue, so the wound edges must be approximated during application to avoid instilling adhesive directly into the wound, where it can cause acute inflammatory reactions, giant cell reactions, inclusion body formation and seromas.
- Proper positioning of the patient is important (Box 4).<sup>1,5</sup> Tissue adhesive is often used for facial lacerations, so leakage into the eye is a concern. (Note that tissue adhesives themselves are not toxic to the eye — they are actually used for corneal perforations.)

#### Box 4: Positioning and precautions

- Position the patient so that when excess adhesive flows downward by gravity, it flows to an innocuous area.
- A rim of petrolatum jelly may be applied around the wound to block runoff.
- Have readily available a gauze sponge to quickly wipe up any excess adhesive.
- Use gravity to control the risk of leakage into the eyes: if the laceration is on the forehead, position the patient in a slight Trendelenburg position, if below the eye, use a slight reverse Trendelenburg position. Cover the eyes with gauze and/or apply a ridge of petrolatum jelly around the eyes to protect them.<sup>1,3</sup>
- If there is inadvertent leakage into the eye, do not apply water — it will only accelerate the polymerization. Apply a copious amount of antibacterial ophthalmic ointment (e.g., erythromycin) to break down the tissue adhesive. The eye will open in 1–2 days; do not attempt to pry it open. You may wish to obtain ophthalmologic consultation.<sup>1</sup>

### USE OF HISTOACRYL

Histoacryl is simple to use.<sup>9</sup> It is applied in a single layer and sets in about 30 seconds.

1. To open the ampoule, hold it securely and give the tip a full turn.
2. Without squeezing the ampoule, turn it so that the applicator tip faces downward, and gently tap on the tip to “load” the adhesive tip.

3. Push the wound margins together (or have an assistant do this) (Fig. 1). (If there is substantial wound tension, insert subcuticular sutures beforehand.)



Fig. 1. Gently press the wound edges together.

4. Two techniques are acceptable to close the wound: the “spot-weld” method and the “continuous-flow” method.

For the spot-weld method:

- a) Push the wound margins together (Fig. 1).
- b) Press the base of the ampoule gently and apply the Histoacryl as a series of small drops along the length of the incision line (Fig. 2). (For those of us who took shop courses in high school, this resembles spot-welding.)



Fig. 2. The spot-weld method.

- c) Use the neck of the applicator tip to connect the dots and then spread the Histoacryl across the entire length of the incision line. Only a thin layer is required.

For the continuous-flow method:

- a) Lightly hold the wound edges together.
- b) Here, the Histoacryl is applied by pressing on the base of the ampoule and moving the applicator down the length of the incision to apply the tissue adhesive in a continuous layer. You must maintain a constant pressure on the ampoule as you apply (Fig. 3).



Fig. 3. The continuous-flow method.

With either technique, press the wound edges together for 30–60 seconds to ensure proper polymerization.<sup>5</sup>

Tissue tape may be applied afterward for greater tensile strength, especially if the wound is long.

## USE OF DERMABOND

The technique for Dermabond differs slightly.<sup>3,10</sup>

1. Point the applicator with the tip pointing upward and away from the patient.
2. Squeeze and crush the plastic Dermabond applicator. Release the pressure. Turn the applicator so that the tip is pointing downward, and gently squeeze so that the applicator tip is coated with adhesive.
3. Approximate the wound edges, gently squeeze the tube and apply the adhesive in a thin layer along the wound, with a gently brushing motion, allowing a 5–10 mm margin around the wound. Approximate the wound edges for 30 seconds.
4. Apply a second, thin layer of Dermabond with a similar brushing motion and approximate the wound edges for 30 seconds, and then apply a third, thin layer.
5. Approximate the wound edges for 60 seconds.
6. Full polymerization will be obtained within 3 minutes.

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As above, tissue tape may be applied afterward for greater tensile strength, especially if the wound is long.

### POSTOPERATIVE CARE

A bandage is not required but may be applied. The patient should be told to keep the wound dry and clean for 24 hours, after which time he or she can gently cleanse the wound and shower. The tissue adhesive will peel off by itself in 5–8 days.<sup>6</sup>

If the wound dehisces, the patient should return. Dehiscid wounds can be closed with tape or sutures. If the wound shows signs of infection, oral antibiotics can be prescribed in the usual manner, but topical antibiotics must be avoided because they can weaken the adhesive.

### SUMMARY

- Select the right wound
- Select the tissue adhesive
- Prepare anything else you will need (e.g., gauze, petrolatum jelly)
- Prep the wound properly, as you would for suturing
- Position the patient to prevent adhesive falling in the eye

- Press the wound edges together
- Apply the adhesive, dry and repeat if necessary
- Clean up

### REFERENCES

1. Hines EQ, Klein B, Cohen JS. Glue adhesive for repairing minor skin lacerations. *Contemp Pediatr* 2013;30:25-34. Available: <http://contemporarypediatrics.modernmedicine.com/contemporary-pediatrics/news/modernmedicine/modern-medicine-feature-articles/glue-adhesives-repairin?page=full> (accessed 2016 Aug. 29).
2. Bruns TB, Worthington JM. Using tissue adhesive for wound repair: a practical guide to Dermabond. *Am Fam Physician* 2000; 61:1383-8.
3. Trott AT. Tissue adhesives and alternate wound closure. In: *Wounds and laceration: emergency care and closure*. Philadelphia (PA): Elsevier Saunders; 2012: 192-6.
4. Farion K, Osmond FH, Hartling L, et al. Tissue adhesives for traumatic lacerations in children and adults. *Cochrane Database Syst Rev* 2002;(3):CD003326.
5. Histoacryl topical skin adhesive [YouTube video]. Available: [www.youtube.com/watch?v=VVZoJtNLYVc](http://www.youtube.com/watch?v=VVZoJtNLYVc) (accessed 2016 July 10).
6. Marshall G. Skin glues for wound closure. *Aust Prescr* 2013;36:49-51. Available: [www.australianprescriber.com/magazine/36/2/49/51](http://www.australianprescriber.com/magazine/36/2/49/51) (accessed 2014 Nov. 12).
7. Charters A. Wound glue: a comparative study of tissue adhesives. *Accid Emerg Nurs* 2000;8:223-7.
8. TissueSeal. Histoacryl topical skin adhesive: contraindications. Available: [www.tissue Seal.com/contra.html](http://www.tissue Seal.com/contra.html) (accessed 2016 July 10).
9. Dermabond advance video [YouTube video]. Available: [www.youtube.com/watch?v=ZGF326XKexQ](http://www.youtube.com/watch?v=ZGF326XKexQ) (accessed 2016 Aug. 29).
10. Dermabond topical skin adhesive. Available: [www.accessdata.fda.gov/cdrh\\_docs/pdf/P960052c.pdf](http://www.accessdata.fda.gov/cdrh_docs/pdf/P960052c.pdf) (accessed 2016 Aug. 29).

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## Country cardiograms case 57: Answer

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An initial glance at the rhythm strip at the bottom of the tracing shows a recurring pattern of 4 QRS complexes of high amplitude, separated by a QRS complex of lower amplitude. Closer inspection reveals the following.

The ventricular rate is 140 beats/min. QRS complexes are narrow, with a duration of 0.07 seconds. Atrioventricular dissociation is present, with an atrial rate of 118 beats/min. Every fourth P wave is conducted to the ventricles, with a PR interval of 0.20 seconds. These are capture beats.

Simple logic dictates that this tachycardia must be originating in the atrioventricular junction. Because the QRS complexes are narrow, they cannot originate in the ventricles. The dissociated atrial rhythm implies that the tachycardia cannot originate in the atria. This rhythm is therefore a junctional tachycardia, most likely junctional ectopic tachycardia. Atrioventricular dissociation and capture beats are commonly encountered with this arrhythmia.

Such episodes can be short-lived or can be refractory to treatment, as in this case.  $\beta$ -blockade appeared to reduce the rate but did not terminate the arrhythmia, and referral to an electrophysiology facility for urgent consideration of ablation was necessary.

Why are the QRS complexes of the junctional beats different from those of the capture beats? Logically, they should look the same, as they should use the same conduction pathway to the ventricles, and rate-related aberrancy seems unlikely. Practically, however, junctional beats often appear subtly different from sinus beats.

This relatively uncommon supraventricular arrhythmia contains a caveat. Imagine that right bundle branch block or left bundle branch block were present. A wide complex tachycardia would result. The atrioventricular dissociation and capture beats would then strongly suggest ventricular tachycardia, which would be an incorrect diagnosis.

This case serves as a reminder that when one is confronted by a wide complex tachycardia and is trying to establish from the electrocardiogram whether it is ventricular or supraventricular, only fusion beats provide 100% certainty of a ventricular origin. Atrioventricular dissociation and capture beats may strongly suggest it, but as this case makes clear, they do not exclude a junctional origin.

**For the question, see page 112.**

**Competing interests:** None declared.

“Country cardiograms” is a regular feature of *CJRM*. We present an electrocardiogram and discuss the case in a rural context. Please submit cases to Suzanne Kingsmill, *CJRM*, 45 Overlea Blvd., P.O. Box 22016, Toronto ON M4H 1N9; manedcjr@gmail.com.



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## Physician Careers, Interior of British Columbia

*The choice is yours!*

Say good-bye to large commutes, traffic jams and the noises of urban life. Be a part of your community and see the rewards of your work while enjoying the scenic environment, peace and tranquility around you. Experience nature at its finest with mountain biking, kayaking and hiking right outside your door.

Make a difference in your work and impact the lives of others, we can help you choose a community that's right for you.

*Come live, work and play...  
...where others only vacation!*



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Kootenay

RM-352

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*It's the Island calling*

### FAMILY PHYSICIAN OPPORTUNITIES Vancouver Island, B.C.

Your career can be a demanding one ... so why not consider a location where the benefits are *naturally distracting*?

Family Practice opportunities are available in rural and urban locations, including **Alert Bay, Campbell River, Comox Valley, Oceanside, Port Alberni, Cowichan Valley** and on **Hornby and Salt Spring Islands**. With expansive natural beauty, access to amazing recreational activities and one of the best climates in Canada – Vancouver Island is a mecca for outdoor enthusiasts and offers a quality of life second to none!

An Alternative Payment contract is available in some locations and in designated communities, a range of attractive **Rural Benefits** are provided including:

- \$10,000 - \$20,000 Recruitment Incentive
- Up to \$15,000 Relocation Reimbursement
- Fee-for-Service Premium
- Annual Retention Payment
- Annual CME Allowance
- Rural GP Locum Program

View all our current opportunities at [www.viha.ca/careers/physicians](http://www.viha.ca/careers/physicians), follow us on Twitter@Vlphysicians or contact us directly for more information:

**Sheila Leversidge, Physician Recruitment Coordinator**  
Tel: 250-740-6972 • Email: [physicians@viha.ca](mailto:physicians@viha.ca)

*Bring your life to Vancouver Island where the outdoor living is easy!*

RM-351

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# Experience Northwest British Columbia

## Locum Opportunities

Northwest British Columbia is one of the most scenic places on earth. Rich in First Nations culture, the region boasts spectacular mountain views, clear rivers, lush forests and unspoiled coastlines. Year-round adventure awaits with fishing, hunting, biking, hiking and backcountry, downhill or cross-country skiing all in your backyard.

The Pacific Northwest has many amazing locum opportunities. Eleven diverse communities are served by over 85 family physicians with regional specialist support available. Practice opportunities include:

- Rural health centres
- Solo or group family practices
- Options with ER and obstetrics

A choice of practice size, style and timing allows you to customize your experience and workload. Remuneration is competitive, with fee-for-service, alternate payment plan and rural locum funding options available.



For more information on the locum opportunities available, check out <https://www.divisionsbc.ca/pacificnorthwest/locumnetwork> or contact Zach Davies, PNW Locum Network Coordinator [zdavies@divisionsbc.ca](mailto:zdavies@divisionsbc.ca) • (250) 877-9354



**Pacific Northwest**  
**Division of Family Practice**

A GPSC initiative

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