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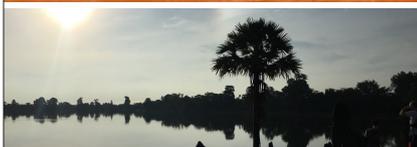
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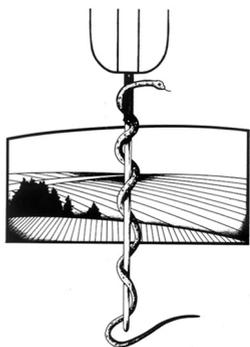
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We don't want to think about it

We may aspire to be Dr House (in parts!), but in reality, we diagnose badly.

I think everyone admits that we are human and prone to error. However, it is hard to admit how really bad we are at it. We really do not want to think about our thinking. At the last Rural and Remote conference, a plenary speaker and expert on meta-cognition, Dr Pat Croskerry, had his talk, 'Teaching the Scarecrow' stalled, if not derailed, by the audience's incredulity at his assertions.

Medical error is the third most common cause of death. Can't be so, can it? One in ten diagnoses is incorrect, and not for the fact that the information was incomplete at the time? Not me. There must be something wrong with the definitions used in the studies. They are American studies, right?

If you looked for it though, there was plenty of additional evidence later in the conference. Teri Price's talk on the not-for-profit 'Greg's wings' is based on a patient where there was a delay of over 400 days from the chance finding of epididymis thickening to the treatment of testicular cancer. It

shows, despite good intentions, how badly we can follow through.

Dr Shirley Lee presented, 'Is no news good news' and reaffirmed that misdiagnosis is the primary thing we get sued for. We may not get sued often, but it is all in the Venn diagram of the larger errors that people suffer, but may not take us to court or to the college over.

It is not that we intend to fail. Luckily we, and our patients, often get second chances. However, without thinking about thinking, we will continue to rule out acute coronary syndrome (ACS) and ignore the evidence for pericarditis. Without looking at, and making our recall systems more robust, we continue to risk fumbling the follow-up of the shadow on the chest X-ray.

To think that we ourselves are above average, is a terrible bias to succumb to. To simply aspire to be better is not enough, as thinking harder, in the same way, will not make us better. We need to think better to better avoid the traps and biases that we as humans suffer. We should want to not need a second chance. We need to design follow-up systems that are more robust the first time. Our patients deserve no less.

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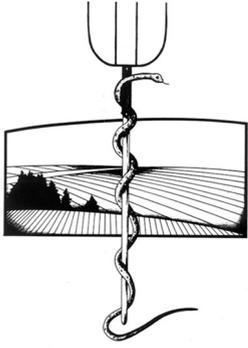
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EDITORIAL/ÉDITORIAL

Nous ne voulons pas y penser

Peut-être aspirons-nous être le D^r House (en partie!), mais en réalité nous sommes de bien mauvais diagnostiqueurs. Je pense que nous admettons tous que nous sommes humains et que nous faisons des erreurs. Il est cependant difficile d'admettre à quel point nous sommes médiocres. Nous refusons de réfléchir à ce que nous pensons. Au dernier sommet sur la médecine en régions rurales et éloignées, l'incrédulité du public à l'égard des affirmations du D^r Pat Croskerry, conférencier et expert en métaconnaissance a fait caler, sinon dérailler sa présentation «*Teaching the Scarecrow*».

L'erreur médicale se classe au troisième rang des causes les plus fréquentes de décès. C'est impossible, non? Un diagnostic sur dix est erroné, et pas parce que l'information était incomplète à ce moment-là? Pas moi. Il doit y avoir quelque chose qui cloche avec les définitions utilisées dans les études. Ce sont des études américaines, n'est-ce pas?

Si on les cherchait, les preuves additionnelles abondaient durant le sommet. La présentation de Teri Price sur l'organisme à but non lucratif «*Greg's wings*» parlait d'un patient pour lequel il y a eu un délai de plus de 400 jours entre la découverte fortuite d'un épaississement de l'épididyme et le traitement du cancer des testicules. Cela montre que, malgré toutes nos bonnes intentions, nous sommes épouvantables pour aller jusqu'au bout.

La D^{re} Shirley Lee a présenté «*Is no news good news*» et a réitéré le fait

que les erreurs de diagnostic sont la principale cause de poursuites judiciaires contre les médecins. Peut-être que les poursuites ne sont pas fréquentes, mais tout est dans le diagramme de Venn des erreurs plus graves que les personnes subissent, mais qui ne nous font pas aboutir devant les tribunaux ni devant le collège.

Ce n'est pas que nous avons l'intention d'échouer. Heureusement, nous, et nos patients, avons souvent le luxe d'une deuxième chance. Cependant, si on ne pense pas à penser, nous allons continuer à éliminer le SCA et à ignorer les signes de péricardite. Si on n'examine pas, et ne haussons pas la robustesse de notre système de rappel, nous continuons de risquer de cafouiller dans le suivi de l'ombre sur la radiographie.

Penser que nous sommes nous-mêmes au-dessus de la moyenne est un terrible préjugé auquel nous succombons. Aspirer faire mieux ne suffit pas, puisque réfléchir sérieusement ne nous permettra pas de nous améliorer. Nous devons réfléchir mieux afin de mieux éviter les pièges et préjugés qui se dressent devant nous, les humains. Nous devons aspirer à ne pas avoir besoin d'une deuxième chance. Nous devons concevoir des systèmes de suivi qui sont plus robustes dès la première fois. Nos patients ne méritent rien de moins.

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President's Message. A rural lens

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I write as we return to our communities and our practices after another successful Rural and Remote conference in Halifax.

The Rural and Remote conference is the public face of the Society of Rural Physicians of Canada (SRPC). The conference is known for providing education by rural physicians, for rural physicians. It attracts not only SRPC members but also other physicians and health-care providers who are looking for high quality rural appropriate education. Many attendees become members after experiencing the plenaries, workshops, support for families and the camaraderie that is evident at the conference.

An equally significant role of the SRPC is not as obvious to conference attendees. We are leaders, partners and advocates for rural medicine. On the day before the conference, the SRPC Council meets. This year, leaders from The Canadian Association of Emergency Physicians, the College of Family Physicians of Canada (CFPC), the Royal College of Physicians and Surgeons of Canada, Resident Doctors of Canada and the Canadian Federation of Medical Students were our guests, and we discussed initiatives of common interest.

It has always been important to examine initiatives with a rural lens. In many cases, we have been

asked to review documents that other organisations have produced. However, the SRPC is becoming a more respected partner, and we are being asked to apply the rural lens as equal partners in the development of guidelines, policies and position papers.

As examples, we have begun a project with the Canadian Association of Radiologists, the CFPC, and the Nurse Practitioners Association of Canada to develop guidelines that will suggest appropriate indications for medical imaging. We are working with Choosing Wisely Canada to develop Choosing Wisely Rural. We are reflecting on the use of tests and interventions, and decisions that must be made that are unique to the rural context. Through our work at the Canadian Medical Forum and the Rural Roadmap Implementation Committee, as well as member advocacy, we are seeing real progress on the issue of portable licensure. We have representatives on the Virtual Care Task Force and the Access to Specialty Care in Rural and Remote Communities Working Group.

We are proud to be a rural lens as we partner with other organisations at the inception of initiatives when we can have the most impact in ensuring appropriateness to the rural context.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

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Message du Président. Une lentille rurale

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Je rédige cet éditorial alors que nous retournons dans nos communautés et à nos pratiques après un autre sommet réussi sur la médecine en régions rurales et éloignées à Halifax.

Le sommet sur la médecine en régions rurales et éloignées est le visage public de la Société de la médecine rurale du Canada. Il est réputé pour ses séances éducatives animées par des médecins en milieu rural à l'intention des médecins en milieu rural. Il attire non seulement les membres de la SMRC, mais aussi d'autres médecins et fournisseurs de soins de santé en quête de formation de bonne qualité en médecine rurale. De nombreux délégués deviennent membres de la SMRC après avoir assisté aux plénières, aux ateliers, et après avoir fait l'expérience du soutien aux familles et de la camaraderie qui saute aux yeux au sommet.

Un rôle tout aussi significatif de la SMRC, mais pas aussi évident aux délégués du sommet est celui de leader, de partenaire et de défenseur de la médecine en milieu rural. La direction de la SMRC SE rencontre la veille de la conférence. Cette année, les dirigeants de l'Association canadienne des médecins d'urgence (ACMU), du Collège des médecins de famille du Canada (CMFC), du Collège royal des médecins et chirurgiens du Canada (CRMCC), de Médecins résidents du Canada (MRC) et de la Fédération des étudiants et des étudiantes en médecine du Canada (FEMC) étaient nos invités pour discuter de projets d'intérêt commun.

Il a toujours été important de voir les projets à travers la lentille de la

médecine rurale. Dans de nombreux cas, on nous demande de réviser les documents produits par d'autres organisations. La SMRC est désormais une partenaire respectée à qui on demande d'appliquer la vision rurale à titre de partenaire égalitaire dans l'élaboration des lignes directrices, des politiques et des énoncés de position.

Par exemple, nous avons entrepris un projet de collaboration avec l'Association canadienne des radiologistes (ACR), le CMFC, le CFPC et l'Association des infirmières et infirmiers praticiens du Canada (AIIPC) dans le but d'élaborer des lignes directrices qui proposeront les indications appropriées pour l'imagerie médicale. Nous travaillons avec Choisir avec soins Canada pour créer Choisir avec soins Rural. Nous réfléchissons aux tests et interventions, et aux décisions qui sont uniques au contexte rural. Par l'entremise de notre travail au Forum médical canadien (FMC) et pour le Plan d'action pour la médecine rurale, de même que de la défense de nos membres, nous observons de réels progrès sur la question du permis d'exercer portatif. Nous occupons une place au sein du Groupe de travail sur les soins virtuels et du groupe de travail sur l'accès aux soins spécialisés en régions rurales et éloignées.

Nous sommes fiers de représenter les régions rurales dans nos partenariats avec d'autres organisations dès le départ, soit au moment où nous pouvons avoir le plus d'impact pour assurer le caractère approprié au contexte rural des projets.

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Telepsychiatry and patient–provider concordance

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Abstract

Context: Telepsychiatry has become a common modality for the provision of psychiatric consultations to patients in rural regions.

Aims: The aims of this study were to assess and compare patient and provider satisfaction and perceptions of access to care with telepsychiatry.

Methods: Telepsychiatric consultations were given by providers based on an urban tertiary academic health centre to patients located in rural primary care clinics.

Results: Patients ($n = 110$) and providers ($n = 10$) were both highly satisfied with telepsychiatry and both believed that telepsychiatry provided patients with better access to care. Paired patient and provider survey results demonstrated a high level of concordance between patients and provider responses.

Conclusions: Concordance between patient and provider satisfaction may contribute to adherence and positive treatment outcomes. These results provide support for the use of telepsychiatry consultations to improve patient access to psychiatric care in rural regions.

Keywords: Access to care, patient satisfaction, provider satisfaction, rural, telepsychiatry

Contexte: La télépsychiatrie est maintenant une modalité courante de prestation de services psychiatriques aux patients vivant en régions rurales.

Objectifs: Cette étude avait pour objectif d'évaluer et de comparer la satisfaction et la perception des patients et des fournisseurs de soins quant à l'accès aux soins par l'entremise de la télépsychiatrie.

Méthodes: Des consultations de télépsychiatrie dans un centre universitaire de santé tertiaire en milieu urbain ont été dispensées à des patients situés dans des cliniques de première ligne en milieu rural.

Résultats: Les patients ($n = 110$) et fournisseurs de soins ($n = 10$) étaient très satisfaits de la télépsychiatrie et croyaient dans les deux cas qu'elle donnait aux patients un meilleur accès aux soins. Les résultats jumelés à une enquête auprès des patients et des fournisseurs de soins ont démontré une grande concordance entre les réponses des patients et celles des fournisseurs de soins.

Conclusions: La concordance entre la satisfaction des patients et celle des fournisseurs de soins pourrait favoriser l'observance et des résultats thérapeutiques positifs. Ces résultats appuient le recours aux consultations de télépsychiatrie pour améliorer l'accès aux soins psychiatriques en régions rurales.

Mots-clés: Accès aux soins, satisfaction des patients, satisfaction des fournisseurs, rural, télépsychiatrie

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INTRODUCTION

Ontario, Canada, is a large province with approximately 14.6 million inhabitants. Approximately 12.8 million live in urban regions and 1.8 million live in rural regions.¹ It has been demonstrated that Canadian patients in rural and remote areas experience worse health outcomes than their urban counterparts.^{2,3} The provision of psychiatric services to geographically isolated regions is a challenge, in part due to the difficulty in recruiting mental health specialists to practise in rural regions.⁴⁻⁶ Service providers in Eastern Ontario, where 400,000 people reside in rural areas, have responded to these challenges by creating alternative modes of service delivery to ensure access to specialised psychiatric care for rural inhabitants.

One of these modes of service delivery is telepsychiatry, which is a form of telemedicine that allows psychiatric consultations from an urban psychiatrist to a rural patient. In order to provide this service in Eastern Ontario, a telepsychiatric consultation programme was developed with partner sites. While telepsychiatry has been available for many years, the uptake of this practice has been slow due to multiple barriers to implementation, including technological and privacy concerns, and resistance to change among providers.^{7,8} Despite these barriers, telepsychiatry has been shown to be effective while increasing access to care, including geographic access to care.^{8,9} Research shows overall patient satisfaction with telepsychiatry, including with consultation appointments.^{9,10} Provider satisfaction with telepsychiatry has also been shown to be positive although more reserved compared with that of patients.¹¹ While several studies have captured both patients' and providers' perceptions of satisfaction with telepsychiatry, there is a dearth of literature which examines the concordance of patients' perceptions of satisfaction and access with the providers' perceptions of the telepsychiatric consultations.¹²⁻¹⁴ This is important because greater patient-provider concordance is associated with positive health outcomes.¹⁵ In addition, the authors are aware of only one study that examined both patient and provider satisfaction of telepsychiatry in a Canadian context.¹² To fill these gaps in the literature, and with a view to help inform the delivery of quality, accessible and acceptable telepsychiatric care, the objectives of

this study were twofold which are described as follows: the primary objective was to assess patient and provider perceptions of telepsychiatry (i.e., access to care and satisfaction with the service) in a Canadian sample, and the secondary objective was to assess the level of concordance between patients and providers.

METHODS

Setting

The current study was conducted at a tertiary academic site in Ottawa with an on-site telepsychiatry programme along with rural primary healthcare sites located throughout Eastern Ontario. The partner sites were situated at a minimum distance of 65 km and a maximum distance of 200 km from the tertiary academic site. Partner sites were selected to be evenly distributed throughout the region, and they were screened to ensure that they had adequate staffing (e.g., a nurse coordinator) and the physical environment (i.e. a private space with adequate lighting) required to support telepsychiatric consultation appointments. All partner sites used telemedicine equipment approved by the Ontario Telemedicine Network.

Participants and procedure

Participants were outpatients who attended telepsychiatry consultation appointments between February and October 2016 from one of the rural partner sites and providers were those who provided consultations from the tertiary academic site. All participants were recruited immediately following the appointments and completed surveys measuring their perceptions of access and satisfaction with telepsychiatric consultations. Informed consent was obtained from all participants upon recruitment. This study was approved by the Royal Ottawa Health Care Group Research Ethics Board.

Measures

Patient and provider questionnaires

The patient questionnaire contained a short demographic section. Both the provider and the patient questionnaires were designed to measure the perceptions of access and satisfaction

with telepsychiatry sessions. The items in the questionnaires were adapted from other published surveys used in similar evaluations of telepsychiatry and were selected to capture important aspects of the patient experience with telepsychiatry consultations. Each item used a 5-point Likert response scale, with responses ranging from 'strongly disagree' to 'strongly agree'.¹⁶⁻¹⁸

Data analysis

Analyses were performed using SPSS software version 24 (IBM Corp., Armonk, NY, USA).¹⁹ Patient and provider responses to survey items were summarised with frequency counts and percentages. Bennett *et al.*'s coefficient *S* was used as the index of concordance between patients' and providers' responses to paired survey items.²⁰ *S* yields values ranging from -1, representing absolute discordance, to 1, representing absolute concordance, with value of 0 representing the proportion of concordance that would be expected by chance based on the number of response categories. The 5-point response scale used in the survey was collapsed to three response categories (i.e. 'disagree', 'neither agree nor disagree' and 'agree') prior to calculating *S*. The statistical level of significance was set at $P < 0.05$.

RESULTS

One hundred and ten patients from ten rural sites participated, with each patient completing a single survey. Ten providers were recruited: nine were psychiatrists and one was a psychiatric consultant nurse. The providers completed 59 surveys in total, each one in reference to a specific telepsychiatric consultation appointment. Three providers completed surveys for 10 or more telepsychiatry consultations, 3 providers completed surveys for 2–8 consultations and 4 providers completed surveys for a single consultation. The provider survey included 25 items, whereas the patient survey included 15 items and a short demographic section.

Patient demographics

Most patients were female (64.5%) and were primarily Caucasian (91.8%). The majority had completed college or university (50.9%). Most patients had transportation to attend an in-person appointment for their mental healthcare

Table 1: Patient demographics (n=110)

Item	Percentage
Age (mean years) ^a	40.5
Gender (female)	64.5
Ethnicity	
Caucasian	91.8
First Nations/Metis	5.5
Other	2.7
Highest education ^b	
Grades 1-8	5.6
High school	41.7
College diploma	31.5
University degree	19.4
Other	1.9
Employment ^c	
Paid employment (full or part time)	34.9
Paid disability	18.4
Ontario Works	13.8
Student (full or part time)	8.3
Unemployed	10.1
Homemaker/parent	4.6
Retired	6.4
Other	3.7
Transportation to healthcare appointments ^b	
Personal vehicle	65.9
Ride from family member or friend	27.7
Outreach van	5.6
No transportation	5.6
Other	1.9

Missing data not counted in percent calculations. ^an=105, ^bn=108, ^cn=109.

if needed, with most having access to a personal vehicle (65.9%) [Table 1].

Provider experience

Two providers had more than 5 years of experience with telepsychiatry, 6 providers had 2–5 years of experience, one provider had 1 to 2 years of experience and one provider had <1 year of experience.

Patients' perceptions of access

Most patients reported that telepsychiatry increased their access to care. Compared to an in-person appointment, most patients agreed that the telepsychiatry session was easier to attend (76.2%), saved them time (89.1%), allowed them to get healthcare sooner (75.4%) and reduced their travel requirement (79.8%). Most patients also agreed that telepsychiatry made it easier to get healthcare (79.9%) and

Table 2: Patient perceptions of telepsychiatry (n=110)

Survey item	Disagree (%)	Neither agree nor disagree (%)	Agree (%)
Satisfaction			
1. I felt I could talk about anything with my healthcare team today	2.7	8.2	89.0
2. My healthcare team cared about me as a person	2.7	8.2	89.1
3. My healthcare team knew what they were doing	0.9	3.6	95.5
4. My healthcare team was able to address what was bothering me today	1.8	15.5	82.7
5. The care I received from my telepsychiatry session today was as good as a regular in-person visit ^a	7.4	11.0	81.6
6. I felt my privacy was respected today	0.9	3.6	95.4
7. In general, I was satisfied with the telepsychiatry system	0	5.5	94.5
8. Overall I was satisfied with my telepsychiatry session today	0	3.6	96.3
9. I would use telepsychiatry again	0	4.5	95.4
Access			
10. Telepsychiatry makes it easier to get my healthcare	5.5	14.7	79.9
11. It was easier for me to attend my session with my healthcare team using telepsychiatry rather than in person ^a	8.3	15.6	76.2
12. Telepsychiatry allowed me to see my healthcare team sooner than I could have in person	5.4	19.1	75.4
13. If telepsychiatry was not available, I would have travelled for my visit ^a	8.2	11.9	79.8
14. Today's telepsychiatry session saved me time	0	10.9	89.1
15. Telepsychiatry sessions are a convenient form of healthcare for me ^a	0	13.8	86.2

Missing data not counted in percent calculations. ^an=109.

that telepsychiatry is a convenient form of healthcare (86.2%) [Table 2].

Patient satisfaction

Patients also reported a high degree of satisfaction with their telepsychiatry consultations. For example, almost all patients were satisfied with the telepsychiatry session overall (96.3%) and agreed that they would use telepsychiatry again (95.4%). As well, most patients agreed that their telepsychiatry consultation was as good as an in-person visit (81.6%) [Table 2].

Providers' perceptions of access

Providers consistently reported that telepsychiatry increased patient access to care. Compared to an in-person visit, all providers agreed that the telepsychiatry session saved their patient time (100%), and almost all agreed that the telepsychiatry session provided the patients with earlier access to healthcare (94.9%) and reduced patients' travel requirements (94.9%). Moreover, all providers agreed that telepsychiatry made it easier for their patients to get healthcare overall (100%) [Table 3].

Provider satisfaction

Providers also reported a high degree of satisfaction with their telepsychiatry consultations. For example, all providers were satisfied overall with their telepsychiatry consultations, all agreed that they would use telepsychiatry again and all agreed that they would recommend telepsychiatry to their colleagues (100%). In addition, all providers agreed that their patients seemed satisfied with the telepsychiatry consultation (100%) and almost all believed that their patients would be willing to use telepsychiatry again (98.3%) [Table 3]. Despite high levels of provider satisfaction overall, some providers reported that they were unable to observe the details of their patients' facial expression and body movements (20.4%), had impaired provider-patient rapport (27.1%) and communication (25.4%) by using telepsychiatry and that they would have preferred to see their patients in person (17%).

Patient and provider concordance

Patients ($n = 32$) and providers ($n = 10$) completed the surveys in reference to the same telepsychiatry consultation appointment, resulting in 32 pairs of patient and provider surveys. Items 8, 9, 10, 12,

Table 3: Provider perceptions with telepsychiatry (n=59)

Survey item	Disagree	Neither agree nor disagree	Agree
Satisfaction			
1. I was satisfied with my orientation to using telepsychiatry ^a	0	0	100
2. I was satisfied with the quality of the picture	0	1.7	98.3
3. The quality of the audio was acceptable	0	0	100
4. The technology (the normal operation of the instrument rather than any problems encountered) distracted me from the session	93.2	5.1	0
5. The inability to touch my patient impaired the diagnosis	91.5	8.5	0
6. I could accurately assess audible symptoms	0	0	100
7. I was unable to observe details of my patient's facial expression and body movements that would have been important in connecting with him/her	76.3	3.4	20.4
8. The provider-patient rapport was unimpaired by the use of telepsychiatry	27.1	3.4	69.5
9. I would have preferred to see my patient in person	76.3	6.8	17.0
10. Technical difficulties made this process too time consuming	94.9	5.1	0
11. My communication with my patient and/or referring health provider was unimpaired by telepsychiatry	25.4	1.7	72.9
12. Overall, the system was accessible and easy to use	0	0	100
13. Using telepsychiatry takes longer than a face-to-face session	86.4	10.2	3.4
14. If I had any problems with the telepsychiatry equipment, someone was available to help me	0	0	100
15. Today's telepsychiatry session may have improved my patient's prognosis	3.4	5.1	91.5
16. My patient seemed satisfied with today's telepsychiatry session	0	0	100
17. My patient would be willing to use telepsychiatry again	0	1.7	98.3
18. Overall, I was satisfied with the telepsychiatry session	0	0	100
19. I would use telepsychiatry to see patients again	0	0	100
20. I would recommend telepsychiatry to my colleagues	0	0	100
Access			
21. Telepsychiatry improves clinical efficiency	1.7	1.7	96.6
22. Today's telepsychiatry session may have made it easier for my patient to get healthcare	0	0	100
23. Today's telepsychiatry session allowed my patient to access services earlier than they could have in person	0	5.1	94.9
24. If today's telepsychiatry session was not available, my patient would have had to travel	1.7	3.4	94.9
25. Today's telepsychiatry session saved my patient time	0	0	100

Missing data not counted in percent calculations. ^an=58.

13 and 14 on the patient survey [Table 2] measure equivalent content to items 16, 17, 22, 23, 24 and 25 on the provider survey [Table 3], respectively. Four of the paired items measured the perceptions of access with telepsychiatry (patient survey items 10, 12, 13, 14 and provider survey items 22, 23, 24 and 25) and two of the paired items measured satisfaction (patient survey items 8 and 9 and provider survey items 16 and 17). Responses to equivalent items by these patients and providers were assessed for their level of concordance [Table 4].

Concordance between the patients and providers was highly statistically significant ($P < 0.0001$) on all paired items, as both groups tended to report satisfaction and improved access with telepsychiatry. Concordance was highest on the

two paired items measuring satisfaction (i.e. items 8 and 9 on the patient survey and items 16 and 17 on the provider survey, respectively), on which absolute concordance was nearly observed. Absolute concordance was also nearly observed on two items measuring the perceptions of easier patient access to care with telepsychiatry and patient time savings (items 10 and 14 on the patient survey and items 22 and 25 on the provider survey, respectively). Concordance was comparatively weaker on the two remaining paired items, with fewer patients than providers agreeing that the telepsychiatry consultation resulted in faster access to healthcare and that the telepsychiatry consultation reduced patient travel (i.e. items 12 and 13 on the patient survey and items 23 and 24 on the provider survey, respectively).

Table 4: Patient and provider concordance on telepsychiatry satisfaction (n=32 paired surveys)

Made it easier to get to healthcare ^a				S=0.90*	Allowed access to services sooner				S=0.63*
Provider rating	Patient rating			Provider rating	Patient rating				
	Disagree	Neither	Agree		Disagree	Neither	Agree		
Disagree	0	0	0	Disagree	0	0	0		
Neither	0	0	0	Neither	0	0	0		
Agree	0	2 (6.5%)	29 (93.5%)	Agree	3 (9.4%)	5 (15.6%)	24 (75.0%)		
Without telepsychiatry, patient would have to travel for visit ^a				S=0.52*	Saved patient time				S=0.86*
Provider rating	Patient rating			Provider rating	Patient rating				
	Disagree	Neither	Agree		Disagree	Neither	Agree		
Disagree	0	0	0	Disagree	0	0	0		
Neither	0	0	1 (3.2%)	Neither	0	0	0		
Agree	4 (12.9%)	5 (16.1%)	21 (67.7%)	Agree	0	3 (9.4%)	29 (90.6%)		
Patient satisfied with telepsychiatry session				S=0.95*	Patient would be willing to use telepsychiatry again				S=0.95*
Provider rating	Patient rating			Provider rating	Patient rating				
	Disagree	Neither	Agree		Disagree	Neither	Agree		
Disagree	0	0	0	Disagree	0	0	0		
Neither	0	0	0	Neither	0	0	0		
Agree	0	1 (3.1%)	31 (96.9%)	Agree	0	1 (3.1%)	31 (96.9%)		

* $P < 0.0001$. ^a $n = 31$.

DISCUSSION

This study measured satisfaction and perceptions of access to care with telepsychiatry among Canadian providers and rural patients and assessed the level of the concordance between the two groups. To the authors' knowledge, only one study has previously examined both patient and provider perceptions of telepsychiatry in the Canadian context, and no other study has examined patient and provider concordance in the context of telepsychiatry.

Patients largely agreed that their telepsychiatry sessions afforded them better access to care compared to in-person appointments. Patients also reported a high degree of satisfaction with their telepsychiatry sessions, which is consistent with previous studies.⁸⁻¹¹ Providers unanimously agreed that the telepsychiatry sessions improved their patients' access to care and also reported a very high degree of satisfaction overall with the sessions. However, approximately one-quarter of the providers reported concerns about provider-patient communication and rapport with telepsychiatry, and 17% indicated that they would have preferred to have seen their patients in person. Previous studies have cited

concerns among providers about compromised non-verbal communication with telemedicine, with audio and visual information potentially lacking in richness.²¹ Such concerns may present a barrier to the uptake of telepsychiatry among providers.

Patients who expressed positive perceptions of access and satisfaction with telepsychiatry demonstrate that the telepsychiatry consultation model is consistent with a patient-centred approach to care. Equally important is that both patients and providers expressed positive perceptions of telepsychiatry, as adequate buy-in from both groups is needed for a broader implementation of the telepsychiatry consultation model.

Given that both patients and providers had positive views of telepsychiatry, a high level of concordance was observed between the two groups. A large body of literature indicates that concordance across many aspects of the patient-provider relationship, including shared perceptions of patient satisfaction, is associated with better treatment adherence and positive health outcomes.¹⁶ The present findings indicate that this important aspect of patient-provider concordance can be established within a telepsychiatry consultation model. However, relative to providers, fewer patients agreed

that telepsychiatry reduced their travel and provided them with earlier access to healthcare, suggesting that some patients may not fully recognise the typical barriers to access speciality care under the traditional in-person model of service delivery.

Limitations

As this study was conducted at a single site and only a small sample of providers were surveyed, the generalizability of the results may be limited. Fewer provider surveys than patient surveys were completed, limiting the number of patient-provider pairs available to assess concordance. Additionally, the participant sample may not be representative of all rural populations in Canada, which tend to be older²², and often have higher proportions of indigenous peoples²³ and limited access to transportation.

CONCLUSIONS

This research demonstrates high levels of satisfaction and concordance between patients and providers concerning telepsychiatric consultations provided from an urban mental health centre to rural regional clinics. These high levels of satisfaction among both patients and providers indicate that our regional telepsychiatry consultation model is one which other urban mental health centres located within similar catchment areas could consider for potential application to their context. The high level of concordance also suggests that good adherence and patient outcomes may be achievable within the telepsychiatry consultation model. These results provide support for the use of telepsychiatry consultations to improve access to psychiatric care for rural populations.

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Standardised early warning scores in rural interfacility transfers: A pilot study into their potential as a decision-making aid

Abstract

Introduction: While 12.4% of British Columbians live rurally, only 2.0% of specialists practise rurally, making interfacility transport of high-acuity patients vital. Decision-making aids have been identified as a way to improve the interfacility transfer process. We conducted a pilot study to explore the potential of the Standardised Early Warning Score (SEWS) as a decision-making aid for staff at sending facilities.

Methods: SEWSs were calculated from a database of 418 transfers from sending facilities in rural, small and medium population centres to larger receiving facilities. The SEWSs were compared against one another over time using McNemar's and the Wilcoxon signed-ranks tests. The SEWSs were then tested for their association with six outcomes using Pearson's or Fisher's Chi-squared test and the Mann-Whitney U-test.

Results: While at the sending facility, both the number of SEWSs that was four or greater and the average SEWS decreased over time ($P < 0.001$ for both). A first SEWS of four or greater was predictive of more intervention categories during transport ($P = 0.047$), an adverse event during transport ($P = 0.004$), an adverse event within 30 min of arrival at the receiving facility ($P = 0.004$) and death before discharge from the receiving facility ($P = 0.043$) but not deterioration during transport, or the length of stay at the receiving facility.

Conclusion: Overall, the performance of the SEWS in the context of rural interfacility transport suggests that the tool will have utility in supporting decision-making.

Keywords: Early warning scores, interfacility transfer, interfacility transport, rural Standardised Early Warning Score, Standardised Early Warning Score

Introduction: Alors que 12,4 % des résidents de la Colombie-Britannique vivent en milieu rural, seuls 2,0 % des spécialistes y pratiquent, ce qui rend essentiel le transport entre établissements des patients en état grave. Des outils de prise de décision ont été désignés comme méthode pour améliorer le processus de transfert entre établissements. Dans le cadre d'une étude pilote, nous nous sommes penchés sur le potentiel du score SEWS (*Standardised Early Warning Score*) comme outil de prise de décision à l'intention du personnel des établissements d'origine.

Méthodes: Les scores SEWS ont été calculés dans une banque de données de 418 transferts d'établissements d'origine situés dans des agglomérations rurales

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de petite et moyenne taille vers des établissements de réception plus importants. Les scores SEWS ont été comparés entre eux dans le temps à l'aide des tests de McNemar et *Wilcoxon Signed Ranks*. L'association des scores SEWS à six paramètres d'évaluation a ensuite été testée à l'aide des tests de chi carré de Pearson ou de Fisher et du test de Mann-Whitney.

Résultats : À l'établissement d'origine, le nombre de scores SEWS de quatre et plus et le score SEWS moyen se sont abaissés dans le temps ($p < 0,001$ dans les deux cas). Un score SEWS initial de quatre et plus prédisait un plus grand nombre de catégories d'interventions durant le transport ($p = 0,047$), la survenue d'un événement indésirable durant le transport ($p = 0,004$), la survenue d'un événement indésirable dans les 30 minutes après l'arrivée à l'établissement de réception ($p = 0,004$), et le décès avant le congé de l'établissement de réception ($p = 0,043$), mais il ne prédisait pas la détérioration durant le transport ni la durée du séjour à l'établissement de réception.

Conclusion : Dans l'ensemble, le rendement du score SEWS dans le contexte du transport rural entre établissements laisse croire que l'outil serait utile à la prise de décision.

Mots-clés : Early Warning Scores, Standardised Early Warning Score, Standardised Early Warning Score rural, transfert entre établissements, transport entre établissements

INTRODUCTION

Rural British Columbians, defined as those living outside census metropolitan areas or census agglomerations, make up 12.4% of the provincial population,¹ and while 11.6% of family physicians practise rurally, only 2% of specialists in the province do.² Only 5% of rural BC hospitals have an intensive care unit (ICU) and just 3% have 24/7 access to a computed tomography (CT) scanner, making interfacility transport of paramount importance in this province.³ One study found that 31% of trauma patients presenting to rural facilities in Northwestern BC required secondary transfer for higher level care,⁴ a pattern repeated in rural settings across the country.^{5,6}

A qualitative analysis of the interfacility transfer process from three hospitals in the United States, ranging from rural to urban, found that the availability of a decision-making aid improved identification of patients requiring transfer and streamlined the process of arranging the transfer. The authors of that study suggest that increased use of decision-making aids could reduce the overall time required for the transfer process,⁷ an idea which has also been identified in a recent review of rural transport structures in BC.⁸

An example of a decision-making aid already implemented in other settings is the Early Warning Score (EWS). EWSs are tools allowing a set of vital signs to be condensed into a single numerical value, simplifying determination of a patient's severity and risk of subsequent adverse events.

Vital sign components within an acceptable range are assigned the value zero, with increasingly large values assigned as the components become increasingly deranged. The component scores are then summed, such that an EWS higher than zero is associated with an increased risk of adverse events.⁹ As the EWS rises, so does the risk, and a cut-off score is used to determine when the patient's risk has reached a level which requires intervention.

EWSs are most commonly used in track and trigger systems to recognise deteriorating patients on medical wards,¹⁰ and their ability to predict outcomes including cardiac arrest, death, increased length of stay in hospital and upgrade to intensive care has been well validated in this setting.¹¹⁻¹³ In particular, a prospective study of 848 patients admitted to a high-acuity ward in the United Kingdom found that EWSs of four or greater were predictive of increased mortality and length of stay.¹¹

The utility of EWSs in other settings has also been examined. A 2015 European study of 300 emergency room patients¹⁴ found that an EWS was able to predict risk of admission, length of stay and death with greater accuracy than traditional triage methods. A 2012 retrospective chart review from the UK examined the ability of EWSs combined with clinical judgment in the prehospital setting to predict adverse patient outcomes.¹⁵ The combination was found to have a sensitivity of 72.4% and specificity of 84.8% using a cut-off of four. Another retrospective chart review from the UK found that EWSs of

seven or greater in the pre-hospital environment were associated with an increased risk of 48-h mortality, 30-day mortality and ICU admission.¹⁶ Finally, two studies of transfers escorted by either nurses or physicians between large hospitals in Hong Kong found that higher EWSs are associated with physiological deterioration during transport.^{17,18}

Following from previous, unpublished work by some of the present authors,^{19,20} here we have conducted a pilot study examining the ability of an EWS to predict a selection of adverse outcomes in patients who presented to sending facilities in rural areas, as well as small and medium population centres, throughout Southeastern BC and were eventually transferred to larger receiving facilities for higher level care. Establishing the validity of EWSs in this setting is the first step in creating an EWS-based decision-making tool which can be used by both sending facilities and transport personnel.

METHODS

We conducted a secondary analysis using a dataset created via retrospective chart review. The dataset contains a broad range of information from acutely ill patients transferred between facilities spread across 215,000 square kilometres of the southern BC interior (population approximately 743,000).²¹ All patients were transferred to one of the five receiving facilities for higher level care than was available locally and were transported by one of the four methods: ground basic life support (BLS) ambulance crew, air and ground critical care paramedic (CCP) ambulance crew, ground BLS ambulance crew with a doctor and nurse escort from the sending facility or a dedicated transfer team made up of a Registered Nurse (RN) and Registered Respiratory Therapist working with a ground BLS ambulance crew, known as a High Acuity Response Team (HART).^{22,23}

Criteria for inclusion were being 16 years or older on admission, direct admission to the sending site emergency department, a Canadian Triage and Acuity Scale (CTAS) score of one or two at the receiving facility, transport between 20th November 2010 and 6th October 2014 and categorisation as neurological, cardiac, respiratory, sepsis or trauma. Eligible records were

identified through an electronic patient database and selected randomly for data extraction, which was carried out at the five receiving facilities by a researcher and a clinician. When information was unavailable in the original patient care record, a RN and a paramedic, both with experience in interfacility transfers, attempted to infer it. If inference was not possible, the entry was left blank with no further data imputation. Validation was carried out on 20% of the data collected from one of the receiving facilities. The charts for validation were selected at random, and two research team members then compared them against the information in the database to confirm accuracy. Data collection and cleaning was completed using Microsoft Excel.

Standardised EWSs (SEWSs) were calculated from the patients' vital signs as per the method described by Paterson *et al.*¹¹ In brief, numerical scores were assigned to the patients' respiratory rate, oxygen saturation, temperature, blood pressure, heart rate and level of consciousness, with normal values scored zero and abnormal values scored from one to three, depending on the degree of abnormality. The sum of these six individual scores produced the SEWS. Patients were then grouped according to whether their SEWSs were <4 or were four or greater. Within-patient comparisons were made between the SEWS calculated from the first and last vital signs recorded by the sending facility, as well as the SEWSs calculated from the last vital signs recorded by the sending facility and the first recorded by the receiving facility. McNemar's test was used to determine if the number of patients with a SEWS of four or greater changed between these times, and Wilcoxon signed-ranks tests were used to determine if the average SEWS changed between these times.

The SEWS study groups (i.e., those with scores <4 and those with scores four or greater) were then compared against the following outcomes: the number of intervention categories during transport, an adverse event during transport, deterioration during transport, an adverse event within 30 min of arrival at the receiving facility, the length of stay at the receiving facility and death before discharge from the receiving facility [Box 1 for detailed definitions].

Chi-square tests were used to investigate the relationship between the SEWS and the following

outcomes: an adverse event during transport, deterioration during transport, an adverse event within 30 minutes of arrival at the receiving facility, or death before discharge from the receiving facility. Pearson's chi-square test was used when the expected incidence in the sample was five or greater and two-tailed Fisher's exact test when the expected incidence was below five. The relationship between SEWS and outcome was described using relative risk. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated for statistically significant results. The number of intervention categories required during transport and the length of stay at the receiving facility were both investigated using Mann-Whitney U-tests. The relationship between SEWS and outcome was described by comparing means.

All statistical analyses were carried out in IBM SPSS Statistics for Windows, version 23.0 (IBM Corp., Armonk, NY, USA), and $P < 0.05$ was considered as statistically significant.

The original data collection was carried out under an ethics application approved by the University of British Columbia in harmonisation with Interior Health.

RESULTS

The characteristics of the transfers contained within the dataset are described in Table 1²⁴⁻³² [Box 2 for an explanation of the 2011 Canadian census definitions].^{33,34} Of the 418 patient entries in the dataset, 98 (23% of total) were missing one or more data points required for statistical analysis and were subsequently excluded on a test-by-test basis.

During the time between the first and final SEWS calculated at the sending site, the proportion of scores which were four or greater decreased from 24.8% to 14.8% ($P < 0.001$). Between the second and third SEWS, there was no significant change (14.8% and 17.0%, respectively, $P = 0.358$) [Figure 1].

A first SEWS of four or greater, calculated from the first vital signs recorded at the sending site, was associated with more intervention categories during transport (1 vs. 0, $P = 0.047$), an adverse event during transport ($P = 0.004$, risk ratio [RR] = 2.41, 95% confidence interval [CI] 1.32–4.39, sensitivity = 42%, specificity = 79%, PPV = 17%, NPV = 93%), an adverse event within 30 min

Box 1: Definitions

- Adverse event during transport: A new, detrimental change in the patient's condition, ranging from oxygen saturation dropping below 88% to cardiac arrest
- Deterioration during transport: Having a final transport SEWS greater than the first transport SEWS
- Adverse event within 30 min of arrival at the receiving facility: A new, detrimental change in the patient's condition, ranging from oxygen saturation dropping below 88% to cardiac arrest
- Death before discharge from the receiving facility: Death at any time after activation of the transport team but before discharge from the receiving facility
- Number of intervention categories required during transport: A number from 0 to 5 for how many of airway, breathing, circulation, disability and other interventions were required. Only advanced procedures typical of a critical care environment (e.g., vasopressor administration) were included
- Length of stay at the receiving facility: Measured in days from when the patient arrived with the transport crew to when the patient left, rounded up to the nearest whole day

SEWS: Standardised Early Warning Score

Box 2: 2011 Canadian census definitions^{31,32}

CA: Area with ≥ 1 municipalities around a core, population $\geq 10,000$

CMA: Area with ≥ 1 municipalities around a core, population $\geq 100,000$ with $\geq 50,000$ in the core

Small population centres: Population 1000-29,999 and population density $\geq 400/\text{km}^2$

Medium population centres: Population 30,000-99,999 and population density $\geq 400/\text{km}^2$

Large urban population centres: Population $> 100,000$ and Population density $\geq 400/\text{km}^2$

CA: Census agglomeration, CMA: Census metropolitan area

of arrival at the receiving facility ($P = 0.004$, RR = 5.85, 95% CI 1.75–19.61, sensitivity = 64%, specificity = 78%, PPV = 7%, NPV = 99%) and death before discharge from the receiving facility ($P = 0.043$, RR = 2.29, 95% CI 1.01–5.18, sensitivity = 41%, specificity = 78%, PPV = 10%, NPV = 96%) as compared to a SEWS < 4 . There was no difference in deterioration during transport ($P = 0.105$, RR = 2.29, 95% CI 0.94–2.06) or the length of stay at the receiving facility (4.5 vs. 4, $P = 0.236$) between a SEWSs of four or greater or < 4 [Tables 2 and 3].

DISCUSSION

The vast size of BC combined with ongoing regionalisation of health care has meant that the services required by rural patients with complex health problems are often not available at the

closest hospital.^{8,35} Accordingly, rural health care in BC is heavily dependent on interfacility transfers provided by ground or air ambulances.^{3,36} This system is well used, with one study showing that 31% of trauma patients in Northwestern BC required interfacility transport to receive higher care.⁴ The need for improvement in this

system, however, has been identified by two recent works^{8,23} and is signalled by the fact that rural British Columbians are still more likely to die after a traumatic injury than their non-rural counterparts.^{4,37}

One possible approach to improving the outcomes of patients who require interfacility transport to receive higher level care is the implementation of decision-making aids for various steps in the transfer process.⁷ While there are a variety of predictive tools to choose from, some, such as the Acute Physiology And Chronic Health Evaluation II score,³⁸ require information from laboratory investigations that may not be readily available in rural BC hospitals or during transport.⁵ EWSs, on the other hand, require only

Table 1: Characteristics of transfers included in dataset (n=418)

Parameter	n (%) or median (IQR)
Sending facility by community location (%)	
Rural (outside CMA/CA)	343 (82.1)
Inside CA	75 (17.9)
Inside CMA	0 (0.0)
Sending facility by community population (%)	
Pop < 1,000	51 (12.2)
1,000-9,999	276 (66.0)
10,000-29,999	73 (17.5)
30,000-99,999	18 (4.3)
Time at sending facility (h)	3.54 (2.14-5.94)
Transport distance (km)	107 (72-133)
Transport time (min)	74 (50-100)
Transport crew type (%)	
Ground BLS crew	159 (38.0)
CCP crew	25 (6.0)
Ground BLS crew w/escort	34 (8.1)
HART	200 (47.9)
Patient age (years)	60 (47-71.25)
Patient sex (%)	
Male	278 (66.5)
Female	140 (33.5)
Classification (%)	
Neurological	68 (16.3)
Cardiac	157 (37.6)
Respiratory	68 (16.3)
Sepsis	24 (5.6)
Trauma	101 (24.2)

CA: Census agglomeration, CMA: Census metropolitan area, BLS: Basic life support, CCP: Critical care paramedic, HART: High-acuity response team, IQR: Interquartile range.

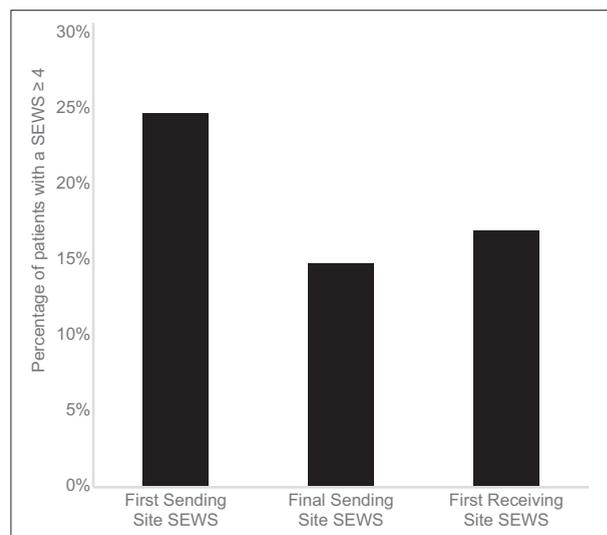


Figure 1: Proportion of patients with a Standardised Early Warning Score of 4 or greater measured at three times: the first time vital signs were recorded at the sending site, the last time vital signs were recorded at the sending site, and the first time vital signs were recorded at the receiving facility. The difference between the first and second sending site is significant ($P < 0.001$) but the difference between the second sending site and first receiving facility is not ($P = 0.358$).

Table 2: Associations between a Standardised Early Warning Score of four or greater calculated from the first set of vital signs taken at the sending facility and dichotomous outcomes

Outcome	Significance (P)	RR (95% CI)	Sensitivity	Specificity	PPV	NPV
Adverse event during transport	0.004	2.41 (1.32-4.39)	0.42	0.79	0.17	0.93
Deterioration during transport	0.105	1.39 (0.94-2.06)				
Adverse event within 30 min of arrival at receiving facility	0.004	5.85 (1.75-19.61)	0.64	0.78	0.07	0.99
Death before discharge from the receiving facility	0.043	2.29 (1.01-5.18)	0.41	0.78	0.10	0.96

Sensitivity, specificity, PPV and NPV are shown for significant outcomes. RR: Relative risk, CI: Confidence interval, PPV: Positive predictive value, NPV: Negative predictive value.

Table 3: Associations between the Standardised Early Warning Score calculated from the first set of vital signs taken at the sending facility and ordinal outcomes

Outcome	Significance (P)	Median (IQR)	
		SEWS <4	SEWS ≥4
Number of intervention categories required during transport	0.047	0 (0-2)	1 (0-3)
Length of stay at the receiving facility (days)	0.236	4 (2-8)	4.5 (2-11.25)

IQR: Interquartile range, SEWS: Standardised Early Warning Score.

the patient's vital signs, which are easily obtained at any health facility, or by any transport crew. Here, we have evaluated the ability of the SEWS¹¹ to predict a selection of outcome measures among patients who underwent interfacility transfers from sending facilities throughout the southern BC interior.

While numerous studies have used the area under the receiver operating characteristic curve to identify the optimal cut-off score to use with a particular EWS,^{15-17,39-42} the objective of this pilot study was to evaluate the usefulness of a previously validated EWS and cut-off value. The SEWS was chosen because it has performed well when compared against other EWSs⁴¹ and could be calculated from the available data.

We began by examining the proportion of patients who had a SEWS of four or greater over three time periods: two at the sending site and one at the receiving facility. The decrease in proportion between the first and second time periods from 24.8% to 14.8% represents a drop of 40.3%. We view this as an indication that sending facilities in rural areas, as well as small and medium population centres, have an important ability to improve a patient's condition before transport despite not being able to provide the full level of care required. This interpretation is consistent with the findings of Belway *et al.*⁴⁵ who examined the outcomes of patients transferred from smaller hospitals to the ICU or critical care unit (CCU) of larger hospitals in BC. They found increased time at the sending facility was associated with a decreased length of stay in the ICU or CCU, an outcome they attributed to improved pre-transport stabilisation. The potential for the sending site to improve the patient's condition before transport also highlights the importance of education and support for rural staff, previously identified by

others.^{4,8} Our failure to detect a difference between the final SEWS from the sending site and the first SEWS from the receiving site suggests that crews are maintaining the improvements achieved at the sending facility and adequately managing new problems as they arise.

A SEWS of four or greater was associated with all outcomes except deterioration during transport and length of stay at the receiving facility. The definition of deterioration during transport used here [Box 1] was a novel one we have not seen elsewhere in the literature. Because the SEWSs used to calculate deterioration were temporally proximate to the final SEWS from the sending site and the first SEWS from the receiving site, it is not surprising that this measure also failed to show a change over time. It seems likely that the transport crews are successfully correcting any deterioration of the patient's condition as it happens, and as a result, the final transport SEWS ends up very similar to the initial transport SEWS, regardless of brief variations in between. The inability of the SEWS to predict length of stay at the receiving facility was unexpected, as it has previously been shown to perform well on this measure in a selection of 848 patients admitted to a medical/surgical combined assessment area.¹¹ It is possible that it was unable to do so here because of complicating factors unique to rural interfacility transfers. These may include the lack of clinical resources required to support long-distance repatriations to the communities represented in this dataset, or the geography over which the transfers must take place.⁸

The association between a SEWS of four or greater and both adverse events during transport and the number of interventions required is consistent with the findings of Wong *et al.* in an urban setting.¹⁷ They examined the ability of the Modified EWS (MEWS) to predict complications during interfacility transfers originating in the accident and emergency department of Pok Oi Hospital in Hong Kong, and showed that the MEWS calculated from vital signs obtained at triage were best able to do this. Here, we have found the relative risk of an adverse event during transport for patients with a SEWS of four or greater to be 2.41, with a sensitivity of 42% and specificity of 79%. These values are similar to those found by Lee *et al.*¹⁸ using the MEWS with a cut-off score of 3 to predict deterioration during

interfacility transfers originating in the emergency room of Alice Ho Miu Ling Nethersole Hospital in Hong Kong (43% and 78%, respectively). With 68% of rural BC hospitals more than 300 km from a level II trauma centre,³ prior knowledge of a patient's risk for these outcomes could form a valuable part of the transport team's pre-planning, as well as play a role in decisions about what level of transport team to activate.

The SEWS was also able to predict two receiving facility outcomes. An adverse event within 30 min of arrival at the receiving facility was the outcome most strongly associated with a SEWS of four or greater, with a relative risk of 5.85, a sensitivity of 64% and a specificity of 78%. These values are similar to those reported by Fullerton *et al.* (71% and 76%, respectively)¹⁵ using the MEWS with a cut-off of 3 in the pre-hospital environment to predict an adverse event within 24 h of arrival. Patients with a SEWS of four or greater also had an elevated risk of death before discharge from the receiving facility, with a relative risk of 2.29, sensitivity of 41% and specificity of 78%. While not as impressive as the 8-fold increase in mortality among these patients observed by Paterson *et al.*,¹¹ any advanced warning about an outcome of this severity can be helpful in making decisions about patient care.

Overall, the performance of the SEWS here is similar to other EWSs in other patient transport environments. Because this study uses a database of patients who were transferred from one facility to another, clinical judgment had already been applied to recognise the need for higher level care and the risk of deterioration. What we have demonstrated is that, among these pre-selected patients, using the SEWS with a cut-off of four offers a reasonably specific means of identifying those with the greatest and most immediate need for close monitoring and care. This points towards several potential uses for the SEWS in the rural setting, including confirming clinical gestalt about the urgency of a transfer, aiding in decisions about which type of transport crew to dispatch and alerting transport crews and receiving facilities to those patients likely to require the most care.

Limitations

As a pilot study, the sample size here ($n = 418$) is relatively small, limiting its power, particularly

when examining rare outcomes such as death before discharge.

While the modes of transport included in this dataset represent the full spectrum of acute interfacility transfers within the study area, the frequency of each within the study area was not determined, so the proportions in this sample are likely not representative. This has the most bearing on the number of intervention categories required during transport because these were generally above the scope of practice of ground BLS crews, introducing the possibility of values >0 being inappropriately rare or common.

The data used in this study were extracted from clinical records rather than documents prepared specifically for research. Consequently, there were variations in both the recording style and completeness of the information. While experienced clinicians attempted to infer unclear or missing values where reasonable, this was often not possible, requiring cases to be excluded for particular tests, and it is unknown what effect this has had on the results.

Moving forward, it is important to validate these findings with a larger, prospective study conducted in the same environment and utilising a random sampling of all comers to sending facilities in rural areas, as well as small and medium population centres. This will allow evaluation of the SEWS's ability to inform the initial decision to transport patients for a higher level of care in addition to the subsequent decisions considered here.

CONCLUSION

Here, we have examined the potential of the SEWS to inform decisions about patient care and disposition when transferring patients from sending facilities in rural areas, as well as small and medium population centres, to larger receiving facilities, to receive a higher level of care. Within the limitations of this pilot study, we have found its performance to be similar to that of other EWSs in urban interfacility or pre-hospital environments. This opens the door to using the SEWS as part of the planning process and risk stratification for transfers from these sending facilities. In addition, we have found that the average SEWS generally decreases over the time patients spend at the sending facility, highlighting

the important role sending facility staff play in patient stabilisation.

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The occasional allergy skin test

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This article has been peer
reviewed.

INTRODUCTION

Sensitisation to foreign proteins affects 40% of humans, with the majority suffering symptoms of allergic rhinitis.¹ While presumptive treatment with antihistamines or steroids often helps, it is not clear, at times, what is causing the symptoms. Allergists are in short supply, often in distant cities, and waiting lists are long, so patients might appreciate some development of local testing capability. Allergy testing helps rural doctors and their patients to determine if the symptoms are allergic reactions, to identify the specific allergens, and to pick appropriate therapy.

Since 1880, physicians have been using percutaneous scratch testing (PCT) to test for immediate type hypersensitivity (IgE).^{2,3} Scratch tests are very safe, with rare systemic reaction (3:10,000 patients)⁴ and no deaths reported in the US over 5 years.⁵ Scratch testing for airborne allergies has a specificity of 70%–95% and a sensitivity of 80%–97%.⁶

EQUIPMENT LIST

- Allergen Reagents
- Reagent wells
- Prick device
- Ruler
- Syringes and needles
- Adrenalin 1:1000 intravenous (IV)
- Diphenhydramine PO and IV.

While all laboratories will provide any of a number of PCT serums for testing, inhalant allergens are particularly reliable.⁶ Standardised reagents are preferred when available, and have a concentration indicated in bioequivalent allergy units, for example, House Dust Mite (100,000 BAU/mL). Non-standard reagents are identified by simple weight-volume concentration, for example, Cat Dander (1:20 w/v).

The allergens that I test for include house dust mite, grasses, trees, feathers, mould, cat, dog, weeds mix, ragweed. I use 50% glycerine as the negative control and 1:1000 histamine for the positive control. Canadian suppliers that I have used include Western Allergy and Quantum Allergy. To my understanding, only a few physicians test for insect venom allergy as the serum is expensive, has a short shelf life, and the management of the condition is relatively high stakes. Food allergy PCT testing can be offered but is fraught with false positives and is harder to interpret as a result.

For the skin pricking device, Allersharp™ plastic needles are available from Western Allergy, and DuoTip 2® plastic needles from Quantum Allergy.

While it is unlikely that you will use them, it is prudent to have emergency equipment and supplies,

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which at a minimum would be adrenaline and diphenhydramine [Figure 1]. If the clinic is remote from a hospital, consider equipment for airway and cardiac support. Do not ask for trouble and defer allergy testing (and even more so allergy shots!) in patients with an inadequately controlled asthma flare.

THE PROCEDURE

Antihistamines, including drugs with antihistamine side effects such as imipramine and phenothiazines, will suppress allergy skin testing and may cause false negatives. While tricyclic antidepressants should be withheld for several weeks before testing, it is sufficient to withhold the others for 10 days. In contrast, inhaled and systemic steroids, beta agonists and montelukast do not affect the testing. The following are two scratch test techniques:

1. I was first taught to do PCT as follows: Apply a drop of reagent to the skin at 2 cm intervals in a line. Drag a 20 gauge hypodermic needle at 45° to scratch along the line through the drops. Maintain a constant pressure and avoid drawing blood (as it causes pain and false positives) for consistent results
2. Currently, I use disposable plastic skin pricking devices. For both the Allersharp and the Duo Sharp 2, dip them into a well of reagent, then lightly dent the skin with them and rotate. They are single use and are disposed of after each skin prick. I feel that the test is less painful, and uses less reagent than scratching with a hypodermic. The individual needles that I use (Allersharp®), matching reagent wells and serum are illustrated in Figure 2.

AFTER PROCEDURE ADVICE

A positive test to a given reagent is noted at 15–20 min post-injection when the largest diameter of the wheal is 3 mm greater than the reaction to the negative control [Figure 3]. If there is no reaction to the positive control, false negatives are possible. A positive test is adequate to make a diagnosis of sensitivity and is combined with the history to make the diagnosis of allergy.

When an allergy is documented, the primary treatment is always some form of environmental



Figure 1: Emergency supplies.

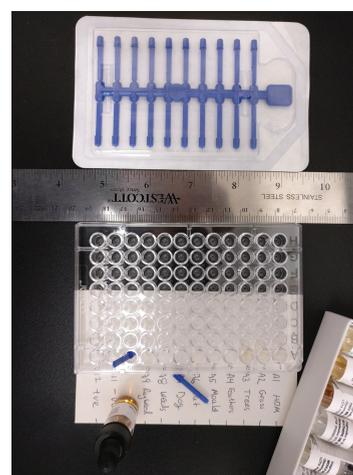


Figure 2: Allergy testing supplies.



Figure 3: Reading the reactions.

measure to reduce exposure. If you are allergic to your cat, unfortunately, you are unlikely to get symptoms under control without getting rid of the pet (allowing a few months to pass to reduce residual allergens left in the home). For house dust mite allergies, the

mattresses and pillows should be encased in plastic, and bedroom carpet should be removed. All indoor allergens can be abated with monthly changes of a high-efficiency particulate air filter for the central heating/cooling. After environmental control, antihistamines and nasal corticosteroids, for periodic symptoms, are cost-effective and may be all you need.

Immunotherapy can be offered for the specific allergens for which the patient has symptoms. Subcutaneous immunotherapy (SCIT) can be offered with weekly up-titration to a monthly maintenance dose. After 3 months, there will be some symptomatic relief. Therapy can be discontinued after 3 years, with most people having persistent control of symptoms.⁷ Children treated with pollen SCIT will have a 50% reduction in onset of new allergies and a 2-fold reduction (24% vs. 44%) in onset of asthma.⁸ In 1 of 500 injections of SCIT, there will be a serious reaction, but it is rarely fatal.⁷

More recently, daily sublingual therapy has been shown to be safer (and thus is given at home after a first dose at the clinic) although it is more expensive than SCIT.⁷

CONCLUSION

A rural doctor can safely perform PCT for common inhalant allergens, thus saving their

patients travel and delay. It is a simple procedure and has results that the patient can easily see and understand (See Appendix for suppliers).

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

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APPENDIX

Suppliers in Canada for allergy testing supplies and immunotherapy include.

ALK-Abelló Pharmaceuticals Inc.
#35-151 Brunel Road,
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Quantum allergy Canada
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Beyond an admission - Support for an ageing population

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This article has been peer reviewed.

With outmigration and a lower birth rate, Newfoundland and Labrador (NL) has the most rapidly ageing population in Canada. Compound this with a further loss of access to healthcare in NL, and the result is that rural emergency departments (EDs) and hospitals have a significant increase in older adults using the system. More specifically, older patients who present without a clear diagnosis, primarily requiring long-term care placement, ultimately require extended ED and hospital stays. Classified as 'community emergencies' or loosely as 'social admissions', they often occupy crucial acute care beds even when long-term care beds are available. These patients have extended stays and waits to complete multidisciplinary assessments, with the perceived goal of delaying and/or preventing long-term acute hospital admissions.

It is always a challenge when assessing a decompensating geriatric patient. Interpreting their presentation, however, is not. Family members crowd a clinic room barely meant for two, or a dishevelled house call belies years of elaborate broaches and colourful handknit scarfs. Slightly more obvious in a rural ED, a tea-infused nighty, a handwritten-with-a-tremor pill list and a dated suitcase all serve as less

than subtle signs. Well-intended family members usually attempt to guide them in search of something better, a safer way for their loved ones to live.

Often, over the sound made when transferring medication from an overflowing ziploc medication bag, a concerned family member hastily describes the inability of their elderly relative to manage independently at home. The patient often sits quietly, with restricted participation. However, when prompted, they are commonly witty and bright, stating 'I don't know why they brought me here'. Under their cracking patina, they fear losing everything they hold dear in their rural homes and fear placement in a distant centre or community void of connection.

I've learned to initially lighten the mood, with open conversation about their lives long ago. A worn smile generally emerges from the neutral palate of hospital bed sheets and confidential curtains. Resettled communities, fishing the Labrador, 'just a housewife' or 'jack of all trades' are present geriatric themes. Adjacent family members then also smile and boast of their relative's grit and survival as they warm to their associated ancestry. These satisfying stories, however, only delay the

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ultimate functional assessment review that is certain to unravel the patient.

Octogenarian physical examinations are always abnormal, but they are an ideal opportunity to educate medical learners. In reviewing their assessment, my mind wanders to the high probability of another weather-beaten rural Newfoundland house boarded up and community icon lost. Questioning the medical learner for a post-examination diagnosis is silently philosophical. I know we can find something wrong to justify an acute inpatient hospital admission. However, will it truly benefit the patient?

Without correlating the mandatory history and examination, it is not hard to determine what the families are desperate to have. They believe it is the best, the only option. A nurse in the family, a retired teacher in the community, recommended it and they often appeal for immediate hospital admission.

Casually countering, I quickly agree that their loved one needs more. Still, is an extended acute inpatient bed the answer? Absent will be their familiar nightstand clock and bathroom grab bar. Their unfamiliar breakfast and tea will reinforce their uncomfortable and risky stay. It is here that I also fear the unnecessary intrusive Foley catheter or the unconsidered consequences of one tiny benzodiazepam. Mostly though, I dread a protracted stay, complete with a new loss of independence, decline in cognition and physical function, all in crowded isolation.

Is the alternative, that of a lengthy ED 'assessment', a better option? Lost is access to an acute care emergency bed for critical patients, supports for waiting family members and sadly, confidentiality and humanity. Guaranteed though is the constant flow of infectious patients, loud

annoying monitors and one terribly uncomfortable, inappropriate stretcher. Moreover, as I am often aware, and ashamedly silent, having their loved one potentially boarded in the ED for days.

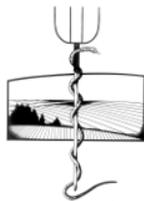
The evidence against hospital admissions for certain 'well' older adults is hard to preach. Family members sit immersed in our well-lit sterile world that likely contrasts with their loved one's home environment. I imagine cluttered closets, worn floors with ragged mats and mixed unwashed cutlery. My spiel of increased risk of hip fractures, confusion and infection follows with the family's request for admission as they see the hospital as the best solution.

We are told that 'well' older adults awaiting long-term placement will occupy acute inpatient beds significantly longer if admitted into hospital. Apparently, if they stay in the ED, it prioritises assessments that for unknown reasons are hindered by the walls of inpatient wards. Hence, for now, they, unfortunately, continue to have extended disrupted stays in a rural transitional bed or choose the risky return home to wait for the next 'opening' in a long-term care centre.

What is clearly necessary is to internally expedite and prioritise rural multidisciplinary teams to best address patients' societal needs. Required is the option of transferring older, non-coping, 'well' patients directly to available respite beds in long-term care centres, rather than extended stays in the ED or inpatient hospital beds. Finally, as our rural population continues to age, it is essential that we have the appropriate services and facilities to fully support their golden years, in their own homes and local community.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.



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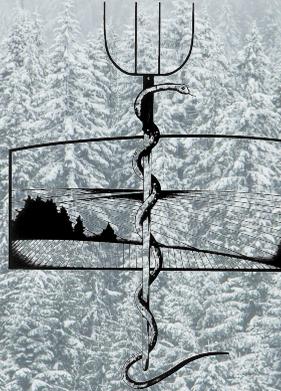
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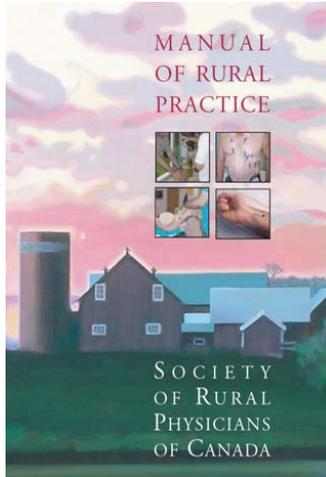
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the required equipment readily available when needed.

Edited by P. Hutten-Czapski, G. Magee and J. Wootton. November 2006. Society of Rural Physicians of Canada. Hardcover, 280 pp. Illust. ISBN 10: 0-9781620-0-5.

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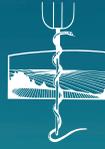
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