Canadian Journal of Rural Medicine

Journal canadien de la médecine rurale

The official journal of the Society of Rural Physicians of Canada

VOLUME 10, NO. 4, FALL 2005

Le journal officiel de la Société de la médecine rurale du Canada

VOLUME 10, N° 4, AUTOMNE 2005

IN THIS ISSUE

DANS CE NUMÉRO

Canadian Journal of Rural Medicine
Journal canadien de la médecine rurale

www.cma.ca/cjrm

The *Canadian Journal of Rural Medicine* (*CJRM*) is owned by the Society of Rural Physicians of Canada (SRPC). It appears in Winter, Spring, Summer and Fall. It is printed by Dollco Printing, Ottawa.

Address all correspondence to:
Editor, *Canadian Journal of Rural Medicine*
Box 1086, Shawville QC J0X 2Y0
tel 819 647-2972, fax 819 647-9972
cjrm@lino.com

CJRM is indexed in *Index Medicus* and MEDLINE.

"Instructions for Authors" and "Service Information": see www.cma.ca/cjrm

Publications Mail Agreement no. 41190522; Return undeliverable Canadian copies and subscription address changes to: CMA Member Service Centre, *CJRM*, 1867 Alta Vista Dr., Ottawa ON K1G 3Y6; 888 855-2555, cmamsc @cma.ca. USPS #015-606. USPS periodical postage paid at Champlain, NY. Return other undeliverable copies to IMS of NY, 100 Walnut St., #1, PO Box 1518 Champlain NY 12919-1518.

ISSN 12037796

All prescription drug advertisements have been cleared by the Pharmaceutical Advertising Advisory Board.

Printed on acid-free paper from inception.

Canadian Journal of Rural Medicine / Journal canadien de la médecine rurale

Vol. 10, No. 4, Fall / automne 2005

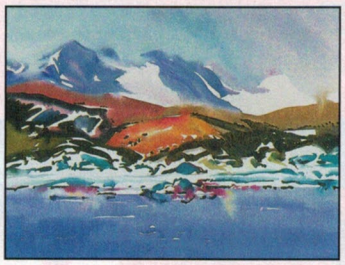
Editorials / Éditoriaux

Original Articles / Articles originaux

The Practitioner / Le praticien

Off Call / Détente

Out Behind the Barn / Dans le feu de l'action



Bylot Island #24

Watercolour on paper, 22" × 30"

Pat Fairhead, MA, MEd, RCA (Royal Canadian Academy)

www.patfairhead.ca

AMC MÉDIA INC. FILIALE DE L'AMC — CMA MEDIA INC. A CMA SUBSIDIARY

PUBLISHER / ÉDITEUR
CMA MEDIA INC. / AMC MÉDIA INC.

CJRM is published for the SRPC by CMA Media Inc., 1867 Alta Vista Dr., Ottawa ON K1G 3Y6. The SRPC, the Canadian Medical Association (CMA) and CMA Media Inc. assume no responsibility or liability for damages arising from any error or omission, or from the use of any information or advice contained in the journal, including articles, editorials, case reports, reviews, book reviews, letters and advertisements. All editorial matter in *CJRM* represents the opinions of the authors and not necessarily those of the SRPC, the CMA or CMA Media Inc.

PRESIDENT / PRÉSIDENT
GRAHAM MORRIS

ASSOCIATE DIRECTOR
DIRECTRICE ASSOCIÉE
GLENDA PROCTOR, MSc, ELS

EDITOR / RÉDACTRICE
JENNIFER E. RAICHE
800 663-7336 x2114
jennifer.raiche@cma.ca

PRODUCTION
KATHRYN A. FREAMO
NICOLE BARBEAU, CLARA WALKER

ONLINE PUBLISHING
PUBLICATION EN DIRECT
NATASHA KLASSEN
JEREMY SIMS, SHIRLEY WADDELL

CLASSIFIED ADVERTISING
ANNONCES CLASSÉES
BEVERLEY KIRKPATRICK
DEBORAH RODD

DISPLAY ADVERTISING
ANNONCES PUBLICITAIRES
NANCY POPE
advertising@cma.ca

MARKETING AND ADVERTISING SALES
MARKETING ET PUBLICITÉ
KEITH COMMUNICATIONS INC.
info@keithhealthcare.com
Toronto: 905 278-6700; 800 661-5004
fax 905 278-4850
Montréal: 514 624-6979; 877 761-0447
fax 514 624-6707

Mark your calendars!

The SRPC's **14th Annual Rural and Remote Medicine Conference** will be held **Apr. 20–22, 2006**, at the Fort Garry Hotel in **Winnipeg**, Man. More than 100 seminars, small group workshops and hands-on Rural Critical Care modules in a family-friendly (day care included) collegial atmosphere. For more details see our ad (p. 240), visit our Web site at www.srpc.ca/rr2006 or email us at admin@srpc.ca

ADVERTISERS' INDEX / INDEX DES ANNONCEURS

A lemming's view of rural practice

John Wootton, MD

Shawville, Que.

Scientific editor, CJRM

Correspondence to:
Dr. John Wootton,
Box 1086, Shawville
QC J0X 2Y0

Have you ever felt like a lemming? — behaving in such a predictable way that when you reflect on it from a distance it seems to abolish the concept of free will, and is no more logical than the famous headlong rush over the cliff of our distant rodent relative? I used to feel that way in university days when I would pick up a copy of *Psychology Today*, and find in it neat and tidy explanations for my angst-ridden student self. I learned to stop reading that stuff.

It has, however, caught up with me.

It should perhaps not have come as a complete surprise that favourite concepts, which rural physicians everywhere have been struggling with, actually have a name (well known at that) in the social sciences literature. Listen up:

> Take one of the most famous dilemmas in social theory: the problem of 'free riding' with public goods — enjoying things like clean air or national defence, whether or not you have helped create them. Individuals face a temptation to cheat — to save energy or money by not contributing, while still enjoying the benefits. All too frequently, the outcome is social disaster.[1]

The interesting twist on this story is that solving this dilemma does not depend on altruism. It is either accomplished by "a government with the power and authority to force individuals to contribute,"[1] or it is solved by finding a mechanism that convinces individuals that cooperation will actually produce a better outcome for them in the long run, than cheating.

What has this to do with rural medicine? Medical services in rural areas are a public good (at least in Canada — at least for now), and those who provide them are acutely conscious within their own environments of the extent to which the tension between the demands of service, and the self-interest of lifestyle pushes them toward or away from a decision to cooperate. When new graduates on a large scale choose not to provide rural services, they are manifesting a collective decision to not cooperate with an expressed social need. Clearly in Canada governments have not been strong enough to force this cooperation, perhaps wisely.

What seems to be missing are the ingredients to successfully navigate the other pathway toward a solution. Namely to provide a mechanism by which the virtues of cooperation, i.e., sharing in the provision of rural services, is actually seen to be in the best long-term interests of all individuals.

How might this long-term interest be described? Those rural physicians who work in functional environments would have no difficulty describing such a situation. It might go something like this:

> "My practice is interesting, but sometimes difficult, occasionally more difficult than I think is tolerable, but I look around and my colleagues are sharing the load, and so I do not feel unfairly singled out. At the same time I realize that if I stop what I am doing, my colleagues will in their turn feel that they are unfairly shouldering the load, and will also stop, and the eventual consequence is that there will be no one to do the work, and my patients will suffer. It is better all around for me to cooperate, and perhaps look for ways to reduce the burden on us all, than to turn my back on the work." (Can anyone say "Geraldton"?)

You can insert into this illustration any rural service that you like, whether it be teaching, emergency call, obstetrics, in-patient care, or any other service that benefits from being widely shared. The fact remains that we are mired in a short-sighted perspective, the consequences of which we only dimly perceive. We need to look farther down the road, and perhaps it will rise to meet us.

Reference

1. Buchanan M. Mind games. *New Scientist* 2004;Dec 4-10:34.

La pratique en milieu rural, du point de vue du lemming

John Wootton, MD

Shawville (Qué.)

Rédacteur scientifique,
JCMR

Correspondance :
Dr John Wootton,
CP 1086, Shawville
QC J0X 2Y0

Vous êtes-vous déjà senti comme un lemming? Que vous vous comportiez de façon tellement prévisible qu'en y réfléchissant, vous vous aperceviez que votre comportement semblait abolir le concept du libre choix et n'être guère plus logique que la fameuse ruée tête première vers le précipice de notre parent éloigné qu'est ce rongeur? C'est ce que je ressentais à l'université lorsque je lisais un exemplaire de *Psychology Today* et que j'y trouvais des explications claires et nettes des angoisses existentielles de l'étudiant que j'étais alors.

J'ai appris à cesser de lire ce genre de choses, mais elles m'ont toutefois rattrapé.

Il ne faut peut-être pas s'étonner tout à fait de voir que des concepts favoris avec lesquels sont aux prises les médecins ruraux de partout aient en fait un nom (bien connu quant à cela) dans les publications du monde des sciences sociales. Lisez ceci, par exemple :

> Prenons un des dilemmes les plus célèbres de la théorie sociale : le problème posé par la «resquille» des biens publics — qui consiste à profiter de certains avantages comme l'air propre ou la défense nationale, que l'on ait ou non participer à les créer. L'individu est tenté de tricher — d'épargner de l'énergie ou de l'argent en ne contribuant pas, tout en profitant des avantages. Il en découle trop souvent un désastre social[1].

Ce qui intéresse dans ce propos, c'est que la solution du dilemme ne réside pas dans l'altruisme. Le dilemme est tranché soit par «un gouvernement qui a le pouvoir et l'autorité nécessaires pour forcer l'individu à contribuer[1]», soit par la découverte d'un moyen de convaincre l'individu qu'à long terme, il s'en tirera mieux en collaborant qu'en trichant.

Quel est le lien avec la médecine rurale? Les services médicaux en milieu rural constituent un bien public (du moins au Canada — et du moins pour le moment) et ceux et celles qui les fournissent sont vivement conscients dans leur environnement de la mesure dans laquelle la tension entre les exigences du service et l'intérêt personnel relié au style de vie les poussent vers la décision de collaborer ou non. Lorsque de nouveaux diplômés décident en masse de ne pas fournir de services ruraux, ils et elles prennent une décision collective de ne pas collaborer à satisfaire à un besoin exprimé par la société. Il est clair qu'au Canada, les gouvernements n'ont pas été suffisamment forts pour imposer cette collaboration, ce qui est peut-être sage.

Ce qui semble manquer, ce sont les ingrédients nécessaires pour suivre avec succès l'autre voie vers une solution : offrir un moyen de considérer qu'en réalité, les vertus de la collaboration, c.-à-d. du partage dans la prestation de services ruraux, sont dans le meilleur intérêt à long terme de chacun.

Comment décrire cet intérêt à long terme? Les médecins ruraux qui travaillent dans des environnements fonctionnels n'auraient aucune difficulté à le faire. Leur description pourrait ressembler à celle-ci :

> «Ma pratique est intéressante mais parfois difficile, et à l'occasion plus difficile que je pense pouvoir l'endurer, mais je regarde autour de moi et mes collègues partagent le fardeau, et je ne me sens donc pas injustement traité. Par ailleurs, je réalise que si je cesse de faire ce que je fais, mes collègues sentiront en retour qu'ils ont une charge de travail injuste et cesseront eux aussi de partager l'effort. Il finira par n'y avoir plus personne pour faire le travail et mes patients en souffriront. Tout compte fait, il est préférable pour moi de collaborer et peut-être de chercher des moyens d'alléger le fardeau qui nous est imposé à tous au lieu de tourner le dos au travail.» (Y a-t-il quelqu'un qui peut dire «Geraldton»?)

Vous pouvez insérer dans cet exemple le service rural que vous voulez, qu'il s'agisse d'enseignement, d'appels d'urgence, d'obstétrique, de soins des patients hospitalisés ou de n'importe quel autre service qui bénéficie d'être partagé entre plusieurs prestateurs. Il reste que nous sommes embourbés dans une perspective myope dont nous pouvons à peine percevoir les conséquences. Il faut regarder plus loin vers l'avenir et peut-être la solution prendra-t-elle forme.

Référence

1. Buchanan M. Mind games. *New Scientist* 2004;4-10 décembre:34.

President's message. Summertime and the livin' ain't easy

Trina M. Larsen Soles, MD

Golden, BC

Correspondence to:
Dr. Trina Larsen Soles;
PO Box 1170, Golden, BC;
tsoles@srpc.ca

The lazy days of summer are often not a holiday for those of us practising in rural Canada. Summer is the time when many urban residents head to the cottage or the backcountry for recreation. Rural populations dramatically increase around the time we start having our own thoughts about time off to enjoy the brief warm weather. However the days of locum abundance have faded with the increasing physician shortage, and so we work the summers as best we can with the docs we have. Our community hosts a mountain bike race aptly named the "Mount 7 Psychosis." This adds an interesting degree of orthopedic trauma to the usual emergency department mix! Other rural locations have equally challenging summer medicine. Problems occur when we have unexpected staffing issues. Doctors get sick. Doctors have families who get sick and occasionally die. Most rural communities are thinly enough staffed that having one or 2 doctors unexpectedly out of commission tips us into completely unsustainable working conditions. The lack of adequate numbers of physicians and nurses is still the biggest challenge facing rural Canada.

So, what is being done to address the shortage of health care providers in Canada? Health human resources was one of the issues addressed nationally at the Canadian Medical Association's annual meeting in Edmonton this year. I attended CMA General Council as the SRPC delegate. Motions supported the need for more medical student positions, more residency positions and more general and family practitioners. GP Forum, another CMA group we participate in, had successful motions supporting general practice as a cornerstone of primary health care delivery. General Council motions are used as tools to influence the federal budget process and for focused lobbying by the CMA and member organizations.

SRPC is providing rural input at other meetings and projects dealing with physician supply issues. Dr. Michael Jong, President-elect, will attend a national conference, Mainstreaming Health Human Resources Innovations, in Halifax in September. He will present SRPC initiatives and policies that have a positive impact on physician supply in rural areas. SRPC will send 2 representatives to the National Conference on Physician Human Resources in Ottawa in January 2006. This is sponsored by Task Force Two: a Physician Human Resource Strategy for Canada, a project of the Canadian Medical Forum. Our own Health Canada–funded project, Enhancement of Physician Health Human Resources in Rural Canada, is ongoing.

The other hot topic at the CMA's General Council was the level of support for possible private delivery of publicly funded health care services. It is interesting to speculate how potential changes might affect rural communities. We already wait longer and travel further to access basic services. Centralization of services has pillaged many small towns. Perhaps the advent of privately owned health care facilities would allow rural communities to own and operate facilities that could deliver a whole range of services to rural Canada. Rural centres of excellence and innovation already exist. Providing adequate human resources with appropriate infrastructure support could make Canada an international leader in rural health.

Message de la présidente. C'est l'été et la vie n'est pas si facile

Trina Larsen Soles, MD

Golden (C.-B.)

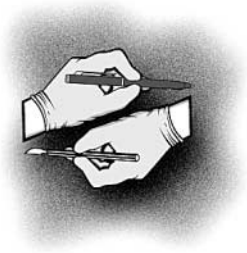
Correspondance :
Dr Trina Larsen Soles, CP 1170, Golden BC V0A 1H0; tsoles@srpc.ca

Souvent, les jours de paresse de l'été ne sont pas une vacance pour ceux d'entre nous qui pratiquent en milieu rural au Canada. L'été, c'est la période où de nombreux citadins envahissent les chalets ou l'arrière-pays pour se divertir. Les populations rurales augmentent au moment même où nous commençons nous-mêmes à penser à prendre congé pour profiter de la brève période de temps chaud. L'époque d'abondance des remplaçants est toutefois révolue en raison de la pénurie croissante de médecins, et c'est pourquoi nous passons l'été le mieux possible avec les médecins que nous avons. Notre communauté organise une course de vélo de montagne appelée à juste titre «Psychose du Mont *7*». Ce qui ajoute un pourcentage intéressant de traumatismes orthopédiques à l'éventail des cas que l'on accueille habituellement l'urgence! D'autres communautés rurales connaissent une médecine estivale tout aussi remplie de défis. Les absences inattendues de membres du personnel nous causent des problèmes. Les médecins tombent malades eux aussi. Il arrive que des membres de leur famille tombent malades ou qu'il y ait des décès dans la famille. Dans la plupart des communautés rurales, les effectifs sont si minces que l'absence inattendue d'un ou de deux médecins rend les conditions de travail tout à fait invivables. La pénurie de médecins et d'infirmières demeure le plus gros défi auquel fait face le Canada rural.

Que fait-on donc pour contrer la pénurie de travailleurs de la santé au Canada? Les ressources humaines du secteur de la santé ont été au nombre des grands dossiers abordés à l'échelle nationale au cours de l'assemblée annuelle de l'Association médicale canadienne à Edmonton cette année. J'ai participé au Conseil général de l'AMC en tant que délégué de la SMRC. Des motions appuyaient le besoin d'augmenter le nombre de places pour les étudiants en médecine et de postes pour les résidents, ainsi que le nombre d'omnipraticiens et de médecins de famille. Le Forum des omnipraticiens, autre groupe de l'AMC auquel nous adhérons, a réussi à faire adopter des motions pour appuyer la médecine générale comme pierre angulaire de la prestation des soins de santé primaires. Les motions du Conseil général sont des moyens d'orienter le processus d'établissement du budget fédéral et, pour l'AMC et ses organisations membres, d'organiser des démarches ciblées.

La SMRC apporte la contribution des milieux ruraux à d'autres réunions et projets portant sur des problèmes d'offre de médecins. Le Dr Michael Jong, président désigné, assistera à Halifax, en septembre, à une Conférence nationale sur l'intégration des innovations en ressources humaines du secteur de la santé. Il présentera des initiatives et des politiques de la SMRC qui ont une incidence positive sur l'offre des médecins en milieu rural. La SMRC déléguera deux représentants à la Conférence nationale sur les effectifs médicaux à Ottawa en janvier 2006, parrainée par le Groupe de travail Deux : Stratégie pour les effectifs médicaux au Canada, projet du Forum médical canadien. Notre propre projet subventionné par Santé Canada, Amélioration des effectifs médicaux au Canada rural, se poursuit.

L'importance de l'appui en faveur de la prestation privée possible de services de santé financés par le secteur public a constitué l'autre sujet chaud au cours du Conseil général de l'AMC. Il est intéressant de s'imaginer les répercussions que ce changement possible pourrait avoir sur les communautés rurales. Nous devons déjà attendre plus longtemps et nous rendre plus loin pour avoir accès aux services de base. La centralisation des services a dévasté beaucoup de petites villes. L'avènement des établissements de santé privés permettrait peut-être aux communautés rurales de posséder et d'exploiter des installations qui pourraient dispenser tout un éventail de services aux milieux ruraux du Canada. Il existe déjà des centres ruraux d'excellence et d'innovation. En fournissant des ressources humaines suffisantes disposant d'un appui infrastructurel approprié, le Canada pourrait devenir, sur la scène internationale, un chef de file dans le domaine de la santé rurale.



Qualitative troponin I estimation in the diagnosis of acute coronary syndromes in three rural hospitals

Hugh Ross Hindle, MB BS, CCFP

Family physician, Hinton, Alta.

Unit Director, Rural Alberta North (Rural Family Medicine Residency Program), University of Alberta, Edmonton, Alta.

Clinical Associate Professor, Department of Family Medicine, University of Alberta

Sally Katherine Hindle

Medical Student, University of Alberta, Edmonton, Alta., During this project Ms. Hindle was a Research Assistant at the Hinton Medical Clinic, Hinton, Alta.

Correspondence to: Dr. Hugh Hindle, Hinton Medical Clinic, 102 Allen Cove, Hinton AB T7V 2A6

This article has been peer reviewed.

Objective: To examine the utility of point-of-care qualitative troponin I (TnI) testing in patients with possible acute coronary syndromes (ACS).
Methods: A retrospective chart review of all patients undergoing qualitative TnI testing between September 2001 and February 2002 was conducted at the emergency departments of 3 rural hospitals in Alberta. We looked at the incidence of ACS, the comparison between TnI and creatine kinase (CK) testing and the timing of testing.
Results: Of the 235 patients tested, 8 had ST-elevation myocardial infarctions and 11 non ST-elevation infarctions. One patient had unstable angina with minimal myocardial damage. Qualitative TnI testing was positive in all 14 cases of infarction tested more than 6 hours after symptom onset, and CK elevation occurred in 15/17 cases (TnI sensitivity 1.0 [95% confidence interval (CI) 0.78–1.0], CK sensitivity 0.882 [95% CI 0.66–0.97]). There were 3 positive TnI tests and 33 raised CK levels in patients without evidence for ACS (TnI specificity 0.986 [95% CI 0.96–0.99], likelihood ratio [LR] 72.0 [95% CI 23.4–221.5]); CK specificity 0.847 [95% CI 0.79–0.89], LR 5.8 [95% CI 4.0–8.3]). In 44 patients (20.8%) TnI testing was inappropriately not repeated more than 6 hours after symptom onset.
Conclusion: Qualitative TnI testing appears highly sensitive and more specific than CK estimation in detecting myocardial infarction. Diagnostic algorithms must emphasize the importance of testing 6 or more hours after symptom onset.

Objectif : Étudier l'utilité du dosage qualitatif de la troponine I (TnI) au point de soin chez des patients possiblement atteints de syndromes coronariens aigus (SCA).
Méthodes : On a effectué une étude rétrospective des dossiers de tous les patients chez qui on a effectué un dosage qualitatif de la TnI entre septembre 2001 et février 2002 au service d'urgence de trois hôpitaux ruraux de l'Alberta. Nous avons étudié l'incidence de SCA, la comparaison entre les dosages de la TnI et de la créatine kinase (CK) et le moment où le test a eu lieu.
Résultats : Parmi les 235 patients examinés, 8 avaient eu un infarctus du myocarde avec élévation du segment ST, et 11 avaient eu un infarctus sans élévation du segment ST. Un patient avait une angine instable avec dommage minime au myocarde. Le dosage qualitatif de la TnI a donné un résultat positif dans tous les cas (14) d'infarctus chez lesquels on a effectué le dosage plus de 6 heures après l'apparition des symptômes et il y a eu hausse de la CK dans 15 cas sur 17 (sensibilité du dosage de la TnI, 1,0 [intervalle de confiance (IC) à 95 %, 0,78–1,0], sensibilité du dosage de la CK, 0,882 [IC à 95 %, 0.66–0,97]). Chez des patients qui ne présentaient pas de signes de SCA, on a obtenu des résultats positifs pour 3 dosages de la TnI et on a constaté des concentrations élevées de CK dans 33 cas (spécificité du dosage de la TnI, 0,986 [IC à 95 %, 0,96–0,99], rapport des vraisemblances [RV], 72,0 [IC à 95 %, 23,4–221,5]); spécificité du dosage de la CK, 0,847 [IC à 95 %, 0,79–0,89], RV, 5,8 [IC à 95 %, 4,0–8,3]). Chez 44 patients (20,8 %), le dosage de la TnI n'a pas été répété comme se doit plus de six heures après l'apparition des symptômes.
Conclusion : Les dosages qualitatifs de la TnI semblent très sensibles et plus spécifiques que l'estimation de la CK pour détecter l'infarctus du myocarde. Les algorithmes de diagnostic doivent mettre l'accent sur l'importance d'effectuer le test 6 heures ou plus après l'apparition des symptômes.

Introduction

Diagnosis of acute coronary syndromes (ACS) is often challenging. Although the typical ECG features of acute myocardial infarction are well known, such changes are apparent in only 50% of patients at the time of presentation.[1] The ECG in patients with unstable angina may be normal or show only subtle ST or T wave changes. It is important to identify these patients, as there is a significant risk of disease progression to acute infarction or death.[2,3]

Traditionally the diagnosis of acute myocardial infarction is confirmed by finding elevated serum levels of creatine kinase (CK) and, more specifically, elevated levels of the CK MB isoenzyme. Recently assays for new markers of myocardial damage such as troponin I (TnI) and troponin T have become available. As with CK MB, levels of these markers rise about 6 hours after the onset of infarction, but elevated troponin levels are more cardio-specific and correlate better with prognosis than do CK MB levels.[2–6] In addition, approximately 30% of patients with unstable angina have elevated troponin levels with a negative CK MB assay.[2,3] These patients, with minimal myocardial injury, are at increased risk of progression to myocardial infarction or death, and should be targeted for more aggressive medical therapy.[7,8] Elevated troponin levels may also occur outside the spectrum of ACS, in settings such as heart failure, pulmonary embolism, both myocarditis and pericarditis, renal failure, rhabdomyolysis and severe sepsis, probably reflecting minor degrees of cardiac injury.[9]

Rural hospitals face an additional challenge in making the diagnosis of myocardial infarction because many have limited laboratory facilities. Estimation of CK MB often requires transport of the blood sample to a distant laboratory for analysis, leaving the attending physician in a dilemma regarding patient management.

A point-of-care qualitative test for troponin I is now available; it has been evaluated in trials in larger urban hospitals.[10–12] Although the test would seem ideally suited for use in rural areas, reports are scanty, apart from a study reviewing patients presenting with chest pain to an emergency department in Newfoundland.[13] The paper neither demonstrated nor refuted the utility of the test, as the number of tests performed was low.

This retrospective study examines the use of this test in 3 rural hospitals, focusing on the utility and appropriateness of qualitative troponin I testing in patients with possible ACS. In particular, we wanted to determine whether the addition of point-of-care troponin I testing allowed more accurate diagnosis of ACS than ECG and CK estimation alone. We also wanted to ensure that the timing of testing was appropriate to rule out myocardial infarction.

Methods

A chart review was undertaken of all patients who had qualitative TnI estimation between September 2001 and February 2002 at 3 hospitals in rural Alberta. These 3 hospitals together have approximately 30 000 emergency department visits per year and are staffed by family physicians. Patients with ACS are typically admitted to the local hospital, with transfer to a tertiary care centre if unstable or if coronary artery imaging is required. The on-site laboratories provide quantitative estimation of CK, but estimations of the MB isoenzyme are referred out with a turn-around time of 12–24 hours.

In April 2001 qualitative TnI testing together with guidelines for appropriate use were introduced into the 3 hospitals. The guidelines recommended a baseline TnI test at presentation and then a repeat test at 6 hours after symptom onset. Positive samples are sent to the regional laboratory for quantitative TnI estimation, but these results are not available to clinicians for several days.

Patients were identified from laboratory records. We excluded patients referred from local medical clinics where no clinical information was available. The health records departments also identified records of all patients attending the emergency departments with diagnoses of acute myocardial infarction or unstable angina over the same time period, to ensure capture of all cases of ACS.

Information was abstracted from the records including the results of the qualitative troponin I assay and CK levels, together with quantitative troponin I and CK MB levels, if available. The time from symptom onset to the collection of the troponin samples was also calculated.

Cases with a diagnosis of myocardial infarction, positive results on TnI testing or elevated levels of CK, together with the cases identified by health records, were classified into diagnostic groups, using information from the clinical record, discharge summary, laboratory and ECG data, together with reports from hospitals to which patients had been transferred for further care. The classification rubric is shown in Table 1.

The Health Research Ethics Board at the University of Alberta granted ethical approval.

Laboratory methodology

Qualitative TnI testing was performed with Spectral Diagnostics Cardiac STATus™ (Spectral Diagnostics, Toronto). Exposure of blood or plasma containing TnI to antibodies embedded in a chromatographic matrix generates a coloured line. Laboratory staff performed all testing, as in a pilot study physician testers obtained unreliable results.

The Dade Behring Opus method was used for quantitative TnI testing. This test is considered positive for myocardial infarction if the recording exceeds 1.5 µg/L, and a blood level below 0.15 µg/L is reported as normal. Intermediate levels between 0.15 µg/L and 1.4 µg/L may represent unstable angina with minimal myocardial damage.

CK was measured using the J&J Vitros 250 analyzer (Ortho-Clinical Diagnostics). A blood level below 180 U/L is considered normal for men, with a blood level below 150 U/L normal for women. CK MB testing was performed with the Vitros 250 CK MB activity measurement. Results are interpreted as positive for myocardial infarction if both the CK MB exceeds 10 U/L and the ratio of CK MB/CK exceeds 10%.

Results

During the 6-month review the laboratory performed qualitative TnI testing in 235 patient encounters (1.6% of 14 396 emergency department visits). In all, 302 tests were performed (mean 1.29 tests per case; range 1–4). Health records identified 3 additional patients with possible ACS who had not undergone TnI testing, 2 of whom had no evidence for myocardial injury on chart review. Overall there were 8 ST-elevation myocardial infarctions and 10 non–ST-elevation infarctions. One case of unstable angina with minimal myocardial damage was detected. The diagnosis was indeterminate in one case and the remainder had no evidence of high-risk ACS.

Troponin testing

There were 17 positive TnI tests (Table 2): 12 were positive on initial testing and 5 only on repeat testing. Troponin testing was positive on 4/8 ST-elevation infarctions, 9/10 non–ST-elevation infarctions and the single case of unstable angina with minimal myocardial injury. In one case, where the diagnosis of infarction was obvious, no troponin testing was done. In the 4 cases of myocardial infarction with negative TnI, initial CK levels were within normal limits and repeat TnI estimations were not performed. In these cases the initial testing for cardiac markers was within 6 hours of the onset of symptoms. Three tests appeared to be false positives (Table 3). Quantitative testing on these samples showed borderline values in 2 cases (no. 4, no. 101). The final diagnosis for both was nonspecific chest pain. Neither patient had clinical features of other conditions associated with elevated troponin levels. The third patient (no. 117) presented with a cerebrovascular accident and had lain on the floor for several days. He had an elevated level of troponin and very high CK and CK MB, but the CK MB ratio was low. A pyrophosphate scan showed no evidence of acute infarction, and the final diagnosis was of rhabdomyolysis.

Creatinine kinase testing

Elevated creatinine kinase levels occurred in 49 of the 235 patients tested, 43 on initial testing and a further 6 on repeat testing. Thirty-three tests were classified as false positive and 2 as false negatives.

Table 1. Rubric for classification of acute coronary syndromes

Diagnosis	Clinical features	ECG findings	Markers (> 6 h)
STEMI	Appropriate	ST elevation	TnI / CK MB positive
NSTEMI	Appropriate	Normal or LBBB or ST depression or T inversion	TnI / CK MB positive
UAMMI	Appropriate	Normal or LBBB or ST depression or T inversion	TnI positive; CK MB negative
False positive test	Atypical	Normal or nonspecific changes	TnI positive or CK elevated; CK MB negative; quantitative TnI low
False negative test	Appropriate	ST elevation or LBBB or ST depression or T inversion	TnI negative or CK normal; CK MB positive

STEMI = ST-elevation myocardial infarction; NSTEMI = non–ST-elevation myocardial infarction; UAMMI = unstable angina with minimal myocardial injury; LBBB = left bundle branch block

(Table 3). There were no false positives in the 6 cases where initial CK was low and subsequently rose. CK testing was positive in 5/8 ST-elevation infarctions and 9/10 non–ST-elevation infarctions. The patient with unstable angina with minimal myocardial injury also had a minimal elevation of CK, but CK MB estimation was negative. In 2 ST-elevation infarction cases the patients were transferred before any repeat testing could be done. Review of the 2 false-negative cases showed that one had a positive troponin, left bundle branch block and a positive CK MB assay, and the other had a positive troponin and typical ST elevation, despite repeatedly normal total CK levels.

The final diagnosis was not clear in 1 case with elevated CK and a negative troponin. This patient, an elderly man, presented with transient atypical chest pain and a mildly raised CK (276 U/L.) Troponin was negative and his ECG was normal, but the CK MB was elevated. The attending physician's final diagnosis was non-cardiac chest pain.

Timing of testing

For 23 patients we were unable to determine if troponin testing was performed more than 6 hours after symptom onset because of missing or confusing documentation. Of the remaining 212 patients, 57 did not have TnI testing more than 6 hours after symptom onset. Repeat testing was not performed because of patient transfer (6), death (1), or because the initial early test was positive (2). Three were followed up with repeat CK testing rather than TnI, and 1 patient declined to stay for repeat testing. In 44 (20.8%) patients there was no documented reason for not repeating the test after 6 hours.

Discussion

The retrospective nature of the study does provide some limitations. The quality of documentation was variable, particularly with regard to timing of symptoms. We did not review the charts of all patients presenting with chest pain, so it is possible that we omitted patients with unrecognized myocardial ischemia who did not have troponin testing. Similarly, we cannot be sure that some of the patients discharged home, particularly those who were not tested 6 hours or more after symptom onset, did not have ACS. However we examined charts for evidence of later attendance at the emergency depart-

Table 2. Details of positive troponin I cases ranked by quantitative troponin I levels

Classification	Case no.	Quantitative troponin I (mcg/L)	Peak CK, U/L	CK MB	ECG findings
False positive*	101	0.2	74	Neg	Septal Q wave
False positive†	4	0.21	122	‡	Nonspecific ST changes
UAMMI	129	1.18	181§	Neg	Dynamic ST depression
NSTEMI	21	1.2	255§	‡	T changes
NSTEMI	61	1.5	1 089§	Pos	Normal
NSTEMI	147	2.4	283§	Pos	Normal
NSTEMI	126	2.88	295§	Pos	Nonspecific ST changes
STEMI	76	3.0	171	‡	ST elevation
NSTEMI	190	4.2	171	Pos	LBBB
STEMI	75	4.5	258§	Pos	ST elevation
NSTEMI	206	5.4	259§	Pos	LBBB
STEMI	128	5.86	586§	Pos	ST elevation
NSTEMI	110	9.9	762§	Pos	Nonspecific ST changes
False positive	117	11.2	20 752§	Pos¶	Inferior Q waves
NSTEMI	199	13.8	660§	Pos	ST depression
NSTEMI	200	19.0	832§	Pos	Nonspecific ST changes
STEMI	55	‡	2 982§	Pos	ST elevation

STEMI = ST-elevation myocardial infarction; NSTEMI = non–ST-elevation myocardial infarction; UAMMI = unstable angina with minimal myocardial injury; pos = positive; neg = negative
*Patient transferred, no evidence of ischemia.
†Repeat troponin testing negative.
‡Quantitative confirmation not performed.
§Indicates above reference range for CK: men >180 U/L, women >150 U/L.
¶CK MB elevated at 102 but ratio < 0.01.

ment, and did not find repeat attenders with missed infarction. Quantitative TnI testing was only performed if the qualitative test was positive. It is possible that some patients with minor myocardial damage could not be identified with this strategy. The classification of patients into diagnostic groups also has a subjective component and would be methodologically stronger if performed by a panel rather than a single physician.

Qualitative point of care troponin I testing appears to be a useful tool for the diagnosis of myocardial infarction in settings where CK MB testing is not available or delayed. Unlike CK estimation, TnI testing identified all definite cases of myocardial infarction in this series when testing was done 6 hours or more after symptom onset. Similarly the specificity of the test was significantly better than for CK. Availability of quantitative troponin testing would improve the specificity further, as 2 of the false positives had very low levels of troponin I on further analysis. Disappointingly, the test did not appear to identify a subset of patients with high-risk unstable angina that was not detectable by other means. All the patients with true-positive troponin testing had clearly ischemic ECGs and/or elevated CK levels. This may be a reflection of the small numbers of patients with ACS in our series.

It is of concern that over 20% of patients were not tested at an appropriate time interval. This is similar to the findings in Newfoundland, where 26% of patients were tested less than 6 hours after symptom onset.[13] For many patients it is probable that the clinical course of their symptoms dictated that a diagnosis of ACS was unlikely. However it raises the possibility that physicians may have incorrectly discharged patients on the basis of the negative early troponin test. We would recommend that troponin testing should not be performed until 6 hours after symptom onset. This would avoid the cost of testing in patients who clearly do not have an ACS and prevent the false reassurance of a premature negative test.

Table 3. Sensitivity and specificity of creatine kinase (CK) and troponin I (TnI) testing

Test	No. of patients with ACS (tested ≥6 hr)	No. of patients without ACS	Total
CK result			
Elevated	15	33	48
Normal	2	183	185
Total CK tests	*17*	*216*	*233*
TnI result			
Positive	14	3	17
Negative	0	213	213
Total TnI tests	*14*	*216*	*230*

Note:
CK specificity 0.847 (CI 0.79–0.89); sensitivity 0.882 (CI 0.66–0.97); LR 5.8 (CI 4.0–8.3).
TnI specificity 0.986 (CI 0.96–0.99); sensitivity 1.0 (CI 0.78–1.00; LR 72.0 (CI 23.4–221.5).
Exclusions from analysis: Two patients with normal CK levels and 4 with negative TnI testing ≤ 6 hours from symptom onset had confirmed ACS but did not have repeat testing. One patient with an indeterminate diagnosis had an elevated CK and a negative TnI.
ACS = acute coronary syndromes; CI = confidence interval; LR = likelihood ratio

Conclusion

This study suggests that point-of care qualitative troponin I testing could replace CK estimation for the initial diagnosis of ACS in rural hospitals. Results from qualitative TnI testing are highly sensitive and more specific for myocardial damage than CK levels. Positive tests should be verified by further quantitative analysis. In the interests of patient safety and cost effectiveness, cardiac marker testing should be deferred until at least 6 hours from symptom onset.

Acknowledgements: Thanks to the physicians and health records staff at Hinton General Hospital, Hinton, Alta., Seton General Hospital, Jasper, Alta., and Edson Health Care Centre, Edson, Alta. Dr. Trefor Higgins from Dynacare Kasper Medical Laboratories provided help with the laboratory methods. Olga Szafran supplied statistical assistance.

The paper was written as part of the Rural Medicine and Health Course at the University of Western Ontario, supervised by Dr. Leslie Rourke and Dr. James Rourke.

Competing interests: None declared.

References

1. Gibler WB, Aghababian RV. Early diagnosis of acute myocardial infarction and myocardial ischemia. In Gibler WB, Aufderheide TP, editors. *Emergency cardiac care*. St. Louis (MO): Mosby; 1994. p.147.

2. Hamm CW, Ravkilde J, Gerhardt W, Jorgensen P, Peheim E, Ljungdahl L, et al. The prognostic value of serum troponin T in unstable angina. *N Engl J Med* 1992;327:146-50.

3. Galvani M, Ottani F, Ferrini D, Ladenson JH, Destro A, Baccos D, et al. Prognostic influence of elevated values of cardiac troponin I in patients with unstable angina. *Circulation* 1997;95:2053-9.

4. Antman EM, Tanisijevic MJ, Thompson B, Schactman M, McCabe CH, Cannon CP, et al. Cardiac specific troponin I levels to predict the risk of mortality in patients with acute coronary syndromes. *N Engl J Med* 1996;335:1342-9.

5. Ohman EM, Armstrong P, Christenson R, Granger CB, Katus HA, Hamm CW, et al. Cardiac troponin T levels for risk stratification in acute myocardial ischemia. *N Engl J Med* 1996;335:1333-41.

6. Falahati A, Sharkey SW, Christensen D, McCoy M, Miller EA,

Murakami MA, et al. Implementation of serum cardiac troponin I as a marker for detection of acute myocardial infarction. *Am Heart J* 1999;137:332-7.

7. Braunwald E, Antman EM, Beasley JW, Califf RM, Cheitlin MD, Hochman JS, et al. ACC/AHA guidelines for the management of patients with unstable angina and non-ST-segment elevation myocardial infarction: executive summary and recommendations: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on the Management of Patients with Unstable Angina). *Circulation* 2000;102: 1193-209.

8. Fitchett D, on behalf of the University of Toronto Division of Cardiology and the Greater Toronto Area Community Cardiologists. Guidelines for the early management of acute coronary syndromes: Focus on antithrombotic and antiplatelet therapy. *Can J Cardiol* 2000;16:1423-32.

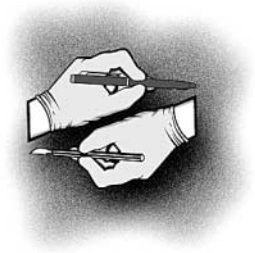
9. Collinson PO, Stubbs PJ. Are troponins confusing? *Heart* 2003;89: 1285-7.

10. Hamm CW, Goldmann B, Heeschen C, Kreyman G, Berger J, Meinertz T. Emergency room triage of patients with acute chest pain by means of rapid testing for cardiac troponin T or troponin I. *N Engl J Med* 1997;337:1648-53.

11. Heeschen C, Goldmann B, Moeller R, Hamm C. Analytical performance and clinical application of a new rapid bedside assay for the detection of serum cardiac troponin I. *Clin Chem* 1998;44:9:1925-30.

12. Mutrie D. A new chest pain strategy for Thunder Bay. *Can J Emerg Med* 1999;1:57-60.

13. Worrall G, Sherman G, Knight J. Cardiac troponin I use for diagnosing acute myocardial infarction in a rural emergency department. *Can J Rural Med* 2001;6:195-8.



Relationship between practice location of Ontario family physicians and their rural background or amount of rural medical education experience

James T.B. Rourke, MD, FCFP(EM), MCLSc

Formerly Professor, Dept. of Family Medicine, University of Western Ontario (UWO), London, Ont.; Director, Southwestern Ontario Rural Regional Medicine Education, Research and Development Unit (SWORRM); and rural family practitioner, Goderich, Ont. Presently, Dean of Medicine, Memorial University of Newfoundland, St. John's, Nfld.

Filomena Incitti, MD, CCFP

Formerly, family medicine resident, Dept. of Family Medicine, UWO (at the time of this research). Presently, rural family practitioner, Elora, Ont.

Leslie L. Rourke, MD, FCFP, MCLSc

Formerly, Adjunct Professor, Dept. of Family Medicine, UWO, and rural family practitioner, Goderich, Ont. Presently, Associate Professor of Family Medicine, Memorial University of Newfoundland.

MaryAnn Kennard, MLIS

Formerly, Research Assistant, SWORRM. Presently, works with the Admissions Office, UWO Schulich School of Medicine and Dentistry, London, Ont.

Correspondence to:
Dr. James T.B. Rourke, Dean of Medicine, Memorial University of Newfoundland, St. John's NL A1B 3V6

This article has been peer reviewed.

Introduction: The present study was designed to determine if there was a difference in rural background and rural medical education experience between practising rural physicians and practising urban physicians in Ontario.
Method: A cross-sectional survey was mailed to 507 strictly defined rural family physicians and 505 urban family physicians practising in Ontario. The main outcome measures were population of the community while growing up, rural medical education and medical school attended.
Results: Responses of 264 rural physicians were compared with 179 urban physician responses. The groups were comparable in years of practice. Rural physicians were significantly more likely to have grown up in a rural community (34.9% v. 14.6%), to have had clinical training in a rural setting during medical school (55.4% v. 35.2%) and to have had clinical training in a rural setting of 8 weeks or more during postgraduate residency training (38.8% v. 20.2%). During residency training, longer duration of rural placements (more than 6 months) was significantly associated with practice in a rural area (15.5% of rural physicians, 1.7% of urban physicians). After controlling for other predictors, each of the following were independent variables: growing up in a community of less than 10 000 people (odds ratio [OR] 3.31), having had some undergraduate rural clinical training (OR 2.46), having had postgraduate rural training of 8 weeks or more (OR 2.17), attending a Canadian medical school outside Ontario (OR 3.80) and being male (OR 2.57).
Conclusion: Practising rural physicians compared with urban physicians were significantly more likely to have come from a rural background, to have had an undergraduate rural medical education, to have had postgraduate rural training, to have graduated from a Canadian medical school outside Ontario, and to be male. Each of these had an independent effect on practice location.

Introduction : L'étude visait à déterminer s'il y avait une différence au niveau des antécédents ruraux et de l'expérience de formation médicale en milieu rural entre médecins ruraux et médecins urbains actifs en Ontario.
Méthode : On a envoyé par la poste un questionnaire transversal à strictement 507 médecins de famille ruraux et 505 médecins travaillant en médecine familiale urbaine en Ontario. Les principales mesures de résultats étaient la population de la communauté où l'intéressé a grandi, la formation médicale en milieu rural et la faculté de médecine fréquentée.
Résultats : On a comparé les réponses de 264 médecins ruraux à celles de 179 médecins urbains. Les groupes étaient comparables sur le plan des années d'expérience. Les médecins ruraux étaient beaucoup plus susceptibles d'avoir grandi en milieu rural (34,9 % c. 14,6 %), d'avoir suivi une formation clinique en contexte rural pendant leurs études en médecine (55,4 % c. 35,2 %) et d'avoir reçu une formation clinique en contexte rural d'une durée de huit semaines ou plus pendant leur résidence postdoctorale (38,8 % c. 20,2 %). Au cours de la formation en résidence, on a établi un lien important entre des stages ruraux de plus longue durée (plus de six mois) et la pratique en région

rurale (15,5 % des médecins ruraux, 1,7 % des médecins urbains). Compte tenu d'autres prédicteurs, chacun des facteurs suivants constituait une variable indépendante : fait de grandir dans une communauté de moins de 10 000 personnes (risque relatif [RR] 3,31), d'avoir reçu un peu de formation clinique prédoctorale en milieu rural (RR 2,46), d'avoir suivi une formation postdoctorale en milieu rural d'une durée de huit semaines ou plus (RR 2,17), d'avoir fréquenté une faculté de médecine canadienne en dehors de l'Ontario (RR 3,80) et d'être de sexe masculin (RR 2,57).
Conclusion : Comparativement aux médecins urbains, les médecins ruraux actifs étaient beaucoup plus susceptibles d'avoir des antécédents ruraux, d'avoir suivi une formation médicale prédoctorale en milieu rural, d'avoir reçu une formation postdoctorale en milieu rural, d'avoir obtenu leur diplôme d'une faculté de médecine canadienne en dehors de l'Ontario et d'être de sexe masculin. Chacune de ces variables avait un effet indépendant sur le lieu de pratique.

Introduction

In Ontario, as in the rest of Canada and around the world, there is a continuing shortage of rural physicians. Two of the most important factors associated with a physician's choice of rural practice location are rural background and rural medical training.[1] This study was designed to determine whether rural and urban family physicians in Ontario differed with respect to where they grew up and the amount of rural undergraduate/postgraduate medical training they received.

Studies of physicians in other countries indicate that rural physicians are more likely than their urban counterparts to have a rural background.[2–5] Medical school selection processes that facilitate entry of rural students have been shown to be effective in producing more physicians who will practise in rural areas.[6–11] The location of the medical school, or decentralized affiliate medical school in a rural area, has also been effective partly through the natural selection process of students from rural areas.[12–14]

Physicians practising in rural locations are more likely to have had rural experiences as medical undergraduates,[3,6,7,10,14–16] and to have had some postgraduate rural training.[5,17–19]

Most rural undergraduate medical school programs and postgraduate rural family medicine training tracks encourage or actively select rural-oriented students. This makes it difficult to distinguish between the confounding variables of rural background and rural education effects ("nature-versus-nurture"[20]). For example, extensive study of Jefferson Medical College graduates who were practising in Pennsylvania in 1996 found participation in the Jefferson Physicians Shortage Area Program (rural medical education stream) was significantly associated with rural practice but when entered into a logistic analysis with rural background and specialty interest was not an independent predictor of rural practice. The most consistent finding was the powerful impact of rural background on eventual rural practice.[10]

A study of practising rural physicians in the United States found that those who were prepared for small town living stayed longer in rural practice.[21] A Canadian study found that those who had done rural practice residency felt more prepared for rural practice.[22]

There are only a few Canadian studies that address this relationship between practice location and rural background and rural medical education. In a study reported in 1987, Robin Carter surveyed 562 physicians in Manitoba who had graduated from the University of Manitoba to assess the effect of personal characteristics on choosing practice location.[23] Those in non-urban practice locations were significantly more likely to have had non-urban backgrounds and to have spouses with non-urban backgrounds. Practitioners who were male and whose fathers were farmers or health care professionals were also more likely to practise in non-urban areas. Regression analysis found that non-urban physicians were 4.63 times more likely to have had a non-urban high school education and 1.87 times more likely to have had a non-urban medical school preceptorship.

The Canadian Medical Association (CMA) surveyed 2400 rural physicians in 1991, with a response rate of 55%.[24,25] Of the respondents, 14% were female. The respondents were asked about the size of the community they lived in before university: 1 in 3 reported coming from communities of 5000 or fewer; 27% reported coming from communities >250 000. Forty-four percent reported that they had received exposure to practice in a rural area in the course of their medical education. Fif-

teen percent indicated "rural experience in training" was very important in the decision to locate in a rural area. Fifty-three percent indicated "desire for rural practice" was very important in the decision to locate in a rural area. Both rural background and rural experience in training can contribute to this "desire for rural practice."[25]

Easterbrook and colleagues surveyed 159 physicians in 1993 who graduated from the family medicine program at Queen's University, Kingston, Ont., between 1977 and 1991.[26] Physicians who were raised in rural communities were 2.3 times more likely than those from non-rural communities to choose to practise in a rural community immediately after graduation. They were also 2.5 times more likely to still be in rural practice (at the time of the survey). Physicians exposed to rural practice during their undergraduate medical training were 1.7 times more likely to practise in a rural area than those who did not have such exposure. Although a similar difference (relative risk 1.62) was found for exposure to rural practice during family medicine residency training, this difference was not statistically significant. The authors suggest that their study may not have had the power to detect associations that were not as strong. In addition, they suggest that self-selection at the Queen's University Family Medicine Program, "because of its reputation for offering rural medical training," may have minimized the outcome differences.[26]

The current study was designed to test the hypothesis that rural family physicians in Ontario are more likely to have had a rural background, and rural undergraduate and postgraduate medical training than their urban counterparts; and to determine if these confounding nature-versus-nurture variables also act independently.

Method

This study was developed as part of the resident research project of one of the authors (F.I.) for the University of Western Ontario Rural Regional Family Medicine Training Program. After a literature review, a survey was developed based in part on the 1991 CMA study of medical care in underserved regions.[24] The survey was developed to address multiple factors and issues related to rural and urban practice, as perceived by practising family physicians.[27,28] The first section of the questionnaire contained demographic and educational background questions as reported in this paper. This included questions such as "What was the population range of the city or town in which you grew up: a) <10 000, b) 10 000–50 000, c) 50 000–100 000, or d) >100 000?" The study was piloted by Goderich, Ont., physicians and subsequently modified. It underwent further modification after review and before approval by the University of Western Ontario Review Board for Health Sciences.

A mail survey of Ontario family physicians was conducted in November 1999. A modification of the Dillman method was used as a basis for the survey.[29] One follow-up mailing was sent to non-responders. All surveys were affixed with an identification number, and confidentiality of all questionnaires was maintained.

The questionnaire was sent to all 507 family physicians defined as practising in a rural area by the Ontario Medical Association (OMA). For the purposes of its continuing medical education grant allocation, the OMA has strictly defined "rural practice" as practice in communities with a population of <10 000 and >80 km away from a regional centre of >50 000 people.[30,31] This very restrictive definition of rural practice was used in this study in order to distinctly define a group of physicians in rural practice. The urban comparison group of 505 physicians was randomly selected from a list of Ontario family physicians practising in communities with a population of >50 000, which was generated from the 1998 MD Select database of Canadian physicians (www.mdselect.com). This value was chosen in order to exclude centres with a population that less clearly distinguished it as either urban or rural.

Findings

Of 1012 surveys sent out to family physicians in active practice, 484 (47.8%) were returned completed. Twenty-six surveys were excluded because the physician was no longer in active practice. Fifteen additional surveys were excluded as the practice location was a community with a population between 10 000 and 50 000. The study sample comprised 443 active family physicians: 264 rural and 179 urban. The data were analyzed using SPSS 8.0.

Personal characteristics

While no data were collected on the age of respondents, the year of graduation provides a good comparison for the groups' demographic similarity. There was no difference in years since graduation

between the rural and urban respondents. Seventy-two percent of rural respondents were male, compared with 50% of the urban cohort (χ^2 = 21.24, degrees of freedom [df] = 1, $p < 0.001$). Male physicians had been in practice longer than female physicians (F = 39.21, df = 1, $p < 0.001$); this was consistent for both the urban and rural groups.

Rural background

Table 1, "a" section, shows the breakdown of physicians by their current practice location and the population of the community where they grew up. Rural physicians were 2.4 times more likely to have grown up in a town with a population under 10 000 than their urban counterparts. Urban physicians were 1.6 times more likely to have grown up in a large city of over 100 000. The higher the population of the town the physician grew up in, the less likely it was that they would currently be practising in a rural location. The odds ratios (ORs) are shown in Figure 1.

Medical school location

Table 1, "b" section, shows the medical schools that

Table 1. Location of current practice by background, medical school and education variables

Variable	Rural physicians (Valid %)	Urban physicians (Valid %)	Rural/Urban % ratio
Background			
a) Population of community where physicians grew up			
<10 000*	90 (34.9)	26 (14.6)	2.39
10 000–50 000	32 (12.4)	15 (8.4)	1.48
50 000–100 000	33 (12.8)	25 (14.0)	0.91
>100 000*	103 (39.9)	112 (62.9)	0.63
Total	258 (100)	178 (100)	
Medical school			
b) Graduating medical school			
In Canada, but not Ontario*	55 (21.1)	12 (6.9)	3.06
Ontario	182 (69.7)	147 (85.0)	0.82
University of Toronto*	44 (16.9)	72 (41.6)	0.41
University of Western Ontario	40 (15.3)	25 (14.5)	1.06
Queen's University	35 (13.4)	19 (11.0)	1.22
University of Ottawa	35 (13.4)	13 (7.5)	1.79
McMaster University	28 (10.7)	18 (10.4)	1.03
International	24 (9.2)	14 (8.1)	1.14
Total	261 (100)	173 (100)	
Education variables			
c) Duration of clinical training in a rural setting during medical school			
None*	116 (44.6)	116 (64.8)	0.69
Up to 7 weeks†	92 (35.4)	43 (24.0)	1.48
8 weeks – 6 months†	49 (18.8)	19 (10.6)	1.77
>6 months	3 (1.2)	1 (0.6)	2.00
Total	260 (100)	179 (100)	
d) Duration of clinical training in a rural setting during residency training			
None	125 (48.4)	93 (52.2)	0.93
Up to 7 weeks†	33 (12.8)	49 (27.5)	0.46
8 weeks – 6 months	60 (23.3)	33 (18.5)	1.26
>6 months*	40 (15.5)	3 (1.7)	9.12
Total	258 (100)	178 (100)	

*Significant difference between rural and urban physicians, $p < 0.001$.
†Significant difference between rural and urban physicians, $p < 0.01$.

graduated the rural and urban physicians who responded to the survey. Rural physicians were 3 times more likely than urban physicians to have graduated from Canadian medical schools outside Ontario. The urban physicians were 2.5 times more likely to have graduated from the University of Toronto.

Rural undergraduate education

Rural physicians were 1.6 times more likely than urban physicians to have received clinical training in a rural setting during medical school (Table 1, "c"). Rural physicians were 1.8 times more likely to have spent ≥8 weeks in a rural setting during their undergraduate medical training compared with their urban counterparts. Almost no respondents received >6 months of clinical training in a rural setting during medical school (3 respondents in rural practice, and 1 respondent in urban practice). Figure 2 shows the ORs of rural training compared with no rural training in medical school.

Rural residency training

Rural physicians were only slightly more likely to

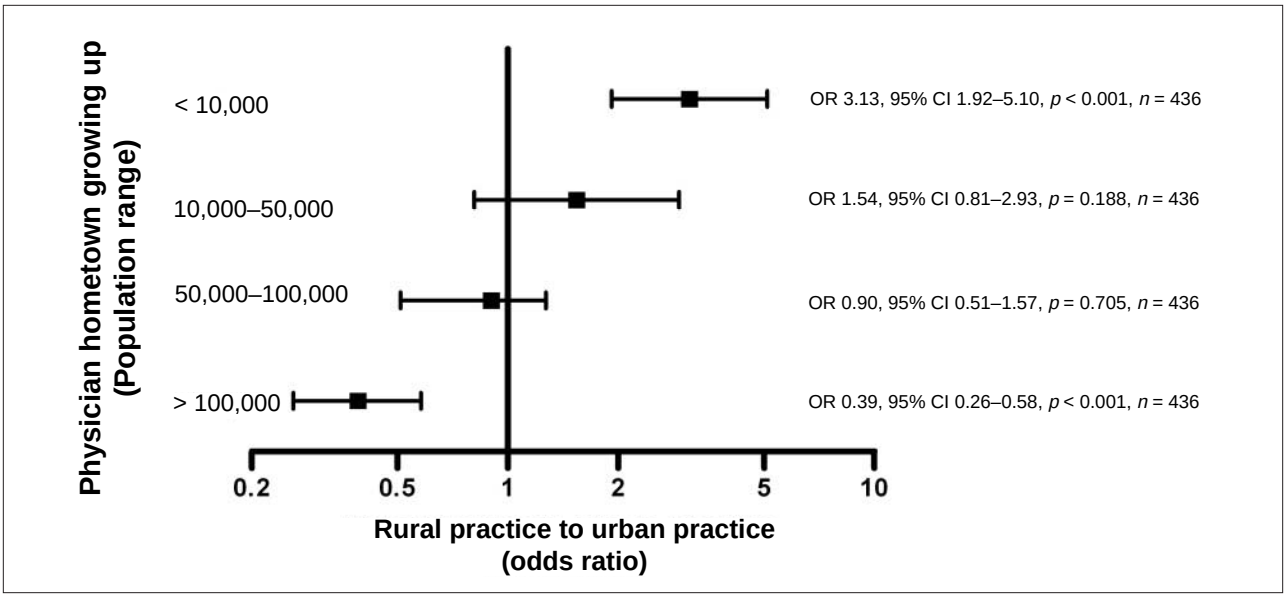


Fig. 1. Odds of physician choosing rural practice versus urban practice, based on the physician's hometown population.

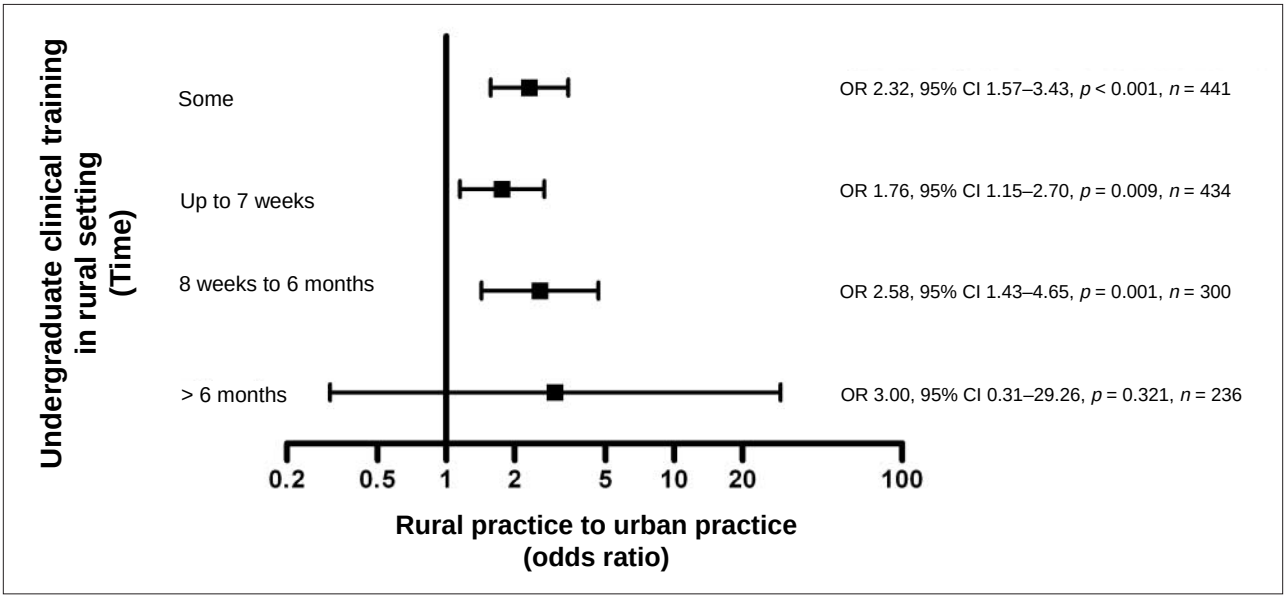


Fig. 2. Odds of physician choosing rural practice versus urban practice based on time spent in rural setting during undergraduate clinical training.

have had some clinical training in a rural setting during residency training; however, there was a positive relationship between practice in a rural location and duration of clinical training in a rural setting during residency training (Table 1, "d"). Rural physicians were 1.9 times more likely to have had ≥8 weeks of clinical training in a rural setting during their residency compared with their urban counterparts and were 9.1 times more likely to have had >6 months clinical training in a rural setting during residency training. Figure 3 shows the ORs of rural training during residency compared with no rural training.

Regression analysis

Multiple logistic regression analysis of the key study variables was done and is shown in Table 2. After controlling for other predictors, growing up in a community of <10 000 people (OR 3.31), some undergraduate rural clinical training (OR 2.46), postgraduate rural training of ≥8 weeks (OR 2.17), outside Ontario Canadian medical school (OR 3.80) and male gender (OR 2.57) each were independent variables.

Large city urban and rural background subsets

Physicians who grew up in large cities (>100 000 population) made up 39.9% of the practising rural physician group and 62.9% of the urban physician group. Of note, the 103 rural physicians from a large city background were significantly more likely (2.7 times, $p = 0.001$) to have had clinical training in a rural setting during medical school, than their 112 urban background counterparts in urban practice.

Seventeen of these 103 rural physicians from a large city background had >6 months of clinical training in a rural setting during residency training compared with just 1 of the 112 urban physicians from a large city background ($p < 0.001$). Clinical training in a rural setting during residency training of 8 weeks to 6 months was not significantly different between rural and urban physicians from a large city urban background.

Table 2. Multiple logistic regression analysis showing predictions of rural practice

Variable	Odds ratio (95% CI)
Population of community growing up	
>10 000	1.00
<10 000	3.31 (1.87–5.86)
Undergraduate rural clinical training	
None	1.00
Some	2.46 (1.53–3.96)
Medical school	
Ontario	1.00
Other Canadian	3.80 (1.85–7.81)
Gender	
Female	1.00
Male	2.57 (1.60–4.12)
Postgraduate rural training	
0–7 weeks	1.00
≥8 weeks	2.17 (1.28–3.69)

CI = confidence interval

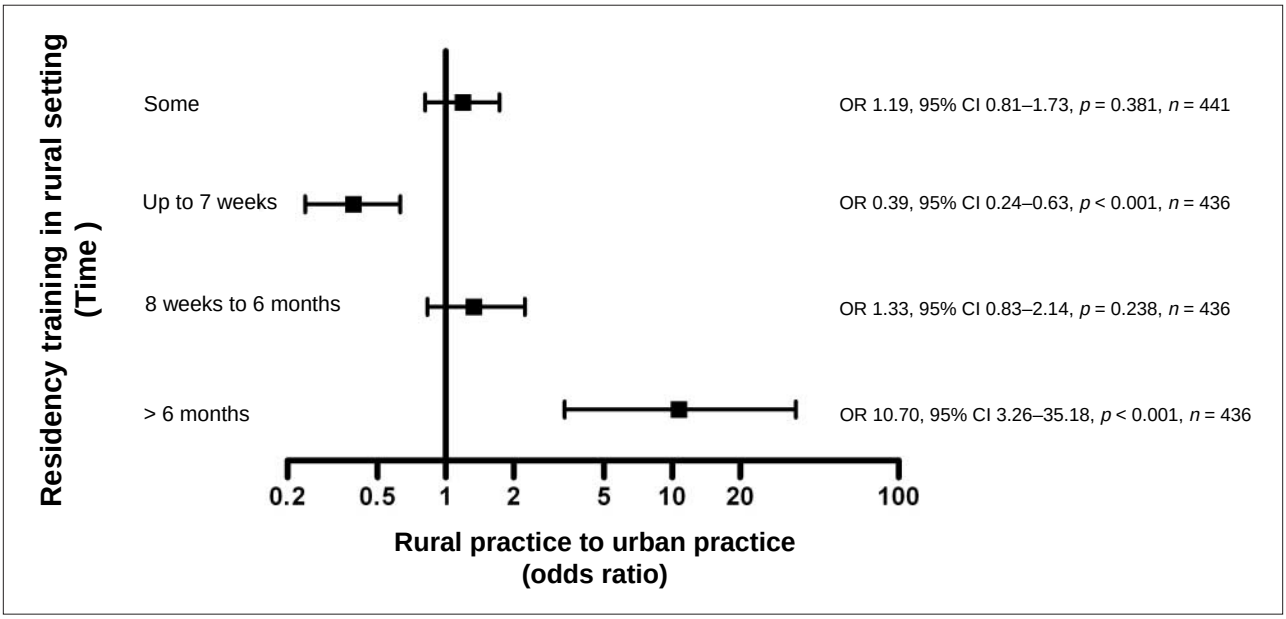


Fig. 3. Odds of physician choosing rural practice versus urban practice based on rural residency training.

Physicians who grew up in rural communities (<10 000 population) made up 34.9% of the practising rural physician group and 14.6% of the urban physician group. Of note, the 90 rural physicians from a rural background were 2.1 times more likely to have had clinical training in a rural setting during medical school than their 26 rural background counterparts in urban practice.

Fifteen of these 90 rural physicians from a rural background had >6 months of clinical training in a rural setting during residency training compared with none of the 26 urban physicians from a rural background ($p = 0.027$).

Discussion

This study helps to clarify the nature-versus-nurture confounding variables of rural background and rural medical education effects. Multiple logistic regression analysis found that the population of community growing up, undergraduate rural clinical education, postgraduate rural training of ≥8 weeks, graduation from Canadian medical schools outside Ontario and male gender were each independent variables for rural practice compared with urban practice in Ontario.

This study shows that rural background is significantly associated with rural versus urban practice location. Rural background students however, may be under-represented in medical schools for a variety of reasons, including various education and financial barriers.[32,33] Based on these and other similar findings around the world, it is reasonable to suggest that in any strategy to increase medical school production of physicians who are likely to choose rural practice as a career, admission policies should consider rural background and life experience.

The size of the study permitted an analysis of rural education variables on the rural background subset (<10 000 population when growing up) and the large city urban background subset (>100 000 population when growing up).

In this study, rural physicians were significantly more likely than urban physicians to have had clinical training in a rural setting during medical school. This was consistent for both the subsets of those from a rural background and those from a large city urban background. This indicates that for physicians in Ontario, clinical training in a rural setting during medical school is an important variable independent of rural background.

Rural physicians were significantly more likely than urban physicians to have had clinical training in a rural setting during residency training of >6 months duration. This was also consistent for both the subsets of those from a rural background and those from a large city urban background. This indicates that for physicians in Ontario, long rural residency experience is an important variable that is associated with rural practice independent of rural background.

It is notable that 40% of rural physicians are from large city backgrounds. Given that Ontario will never have enough rural background students in medical school to produce enough rural physicians, (since many will go on to choose specialist careers or urban family practice), it is necessary to attract urban background students to rural practice as a career.

Rural medical education is also important for rural background students, as a desire for rural practice that many bring into rural medical school may be either extinguished or improved depending on their experience during medical school and postgraduate training. For the study subset of physicians who grew up in rural communities of <10 000, rural physicians were 2.1 times more likely to have had clinical training in a rural setting during medical school compared with urban physicians and all those with >6 months clinical training in a rural setting during residency training were in rural practice.

Another interesting finding of the study was that rural physicians in Ontario were significantly more likely than their urban counterparts to have graduated from Canadian medical schools outside Ontario. These medical schools may have had more students with a rural background and provided more rural undergraduate or postgraduate medical education.

These findings would indicate that strategies to increase the number of rural doctors should include increasing admission of rural background students into medical school, as well as providing extensive undergraduate and long postgraduate rural clinical education experiences for students with both rural and urban backgrounds.

Study limitations

The study's overall response rate of 47.8% is lower than we would have liked but is comparable to that of other large surveys (for example, the response rate of the College of Family Physicians of Canada 2001 Janus Survey[34] was 51.2% and the CMA rural

physician survey[24] was 55%). There was no statistical difference in gender and years since graduation between responders and non-responders indicating that the sample is fairly representative. Not all the physicians surveyed replied, and there remains the possibility of a non-response bias.

In Ontario, at the time of the study, 27.5% of urban physicians were female and 23.0% of rural physicians were female (CMA physician master file data, January 2000). Our respondents fairly represented the rural female and male gender mix; however, a higher percentage of urban women than urban men responded. Twenty-three out of the 24 rural-based international medical graduates were male, while 9 out of the 14 urban international medical graduates were male. Significantly fewer rural females had no rural training, which may reflect their more recent graduation, when rural training was more available.

The study included a broad range of ages of physicians as represented by number of years in practice or years since graduation. Most of the older physicians would not have had the opportunity to undertake rural medical education. This may have reduced the magnitude of the effects shown. When the 69 graduates from before 1971 are removed from this table, the difference of medical undergraduate and postgraduate rural learning experience between rural and urban physicians was increased.

The length of clinical training in a rural setting during residency training "8 weeks to 6 months" was not broken down into smaller units. Such a breakdown may have revealed significant differences at some lengths shorter than 6 months.

This study does not compare optional versus mandatory rural rotations. There may have been a self-selection bias in those physicians who have taken optional rural rotations, especially longer rural rotations.

As always, a study of established physicians in practice is not necessarily translatable to new physicians entering rural practice in a different time and with a different training experience.

Conclusion

Practising rural physicians, compared with urban physicians, were significantly more likely to have come from a rural background, to have had clinical training in a rural setting during medical school, to have had ≥8 weeks of clinical training in a rural setting during residency training, to have graduated from a Canadian medical school outside Ontario, and to be male. Each of these had an independent effect on practice location. More than 6 months of rural residency training was almost always associated with rural practice location and was significant for rural physicians from both rural and large city urban background subsets. Canadian medical schools outside Ontario were found to be a significant source of Ontario's rural physicians

This study indicates that selection of rural background students into medical school is important in graduating physicians who practise in rural locations; and that undergraduate and longer postgraduate rural medical education is important for both rural and urban background medical students.

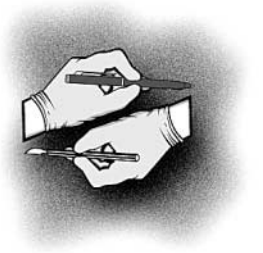
Acknowledgements: The survey and analysis were conducted by the Southwestern Ontario Rural Medicine Education, Research and Development Unit in Goderich, Ont. Partial funding of $9000 for the study was received from the Ontario Medical Association's CME Program for Rural and Isolated Physicians. The authors gratefully acknowledge Larry Stitt, Dr. Marshall Godwin and Dr. Maria Mathews for their assistance with the statistical analysis.

Competing interests: None declared.

References

1. Rourke J. Rural health care in Canada. In: Geyman J, editor. *Textbook of rural medicine*. New York: McGraw-Hill, 2000. p. 395-409.
2. Rabinowitz HK. Relationship between US medical school admission policy and graduates entering family practice. *Fam Pract* 1988;5: 142-4.
3. Stratton TD, Geller JM, Ludtke RL, Fichenscher KM. Effects of an expanded medical curriculum on the number of graduates practising in a rural state. *Acad Med* 1991;66:101-5.
4. Strasser RP. Attitudes of Victorian rural GPs to country practice and training. *Aust Fam Physician* 1992;21:808-12.
5. Fryer GE Jr, Stine C, Vojir C, Miller M. Predictors and profiles of rural versus urban family practice. *Fam Med* 1997;29:115-8
6. Brazeau N. The Upper Peninsula Program: a successful model for increasing primary care physicians in rural areas. *Fam Med* 1990;22: 350-5.
7. Boulger JG. Family medicine education and rural health: a response to present and future needs. *J Rural Health* 1991;7:105-15.
8. Lampert PH. The secret of success. *Minn Med* 1991;74:13-8.
9. Rabinowitz HK. Recruitment, retention, and follow up of graduates of a program to increase the number of family physicians in rural and underserved areas. *N Engl J Med* 1993;328:934-9.
10. Rabinowitz HK, Diamond JJ, Hojat M, Hazelwood CE. Demographic, educational and economic factors related to recruitment and retention of physicians in rural Pennsylvania. *J Rural Health* 1999; 15:212-8.
11. Rabinowitz HK. The role of the medical school admission process in the production of generalist physicians. *Acad Med* 1999;74(1 suppl):S39-44.
12. Rosenblatt RA, Whitcomb ME, Cullen TJ, Lishner DM, Hart LG. Which medical schools produce rural physicians? *JAMA* 1992;268; 5:142-4.

13. Johnson KG, Haughton PB. An outreach program for a rural medical school. *J Med Educ* 1975;50:38-45.
14. Magnus JH, Tollan A. Rural doctor recruitment: Does medical education in rural districts recruit doctors to rural areas? *Med Educ* 1993;27:250-5.
15. Ebbesson SO. The Alaska WAMI Program: a preliminary study of factors affecting specialty choice and practice location. *Alaska Med* 1988;30:55-60.
16. Fryer GE Jr, Miyoshi TJ, Stine C, Krugman RD. Colorado's decentralized medical education to increase the number of graduates practising primary care in rural areas. *Acad Med* 1993;68:310-1.
17. Asher EF, Martin LF, Richardson JD, Polk HC Jr. Rural rotations for senior surgical residents: influence on future practice location. *Arch Surg* 1984;119:1120-4.
18. Norris TE, Norris SB. The effect of a rural preceptorship during residency on practice site selection and interest in rural practice. *J Fam Pract* 1988;27:541-4.
19. Rosenthal TC, McGuigan HM, Anderson A. Rural residency tracks in family practice: graduate outcomes. *Fam Med* 2000;32:174-7.
20. Pathman DE. Medical education and physicians' career choices: are we taking credit beyond our due? *Acad Med* 1996;71:963-8.
21. Pathman DE, Steiner BD, Jones BD, Konrad TR. Preparing and retaining rural physicians through medical education. *Acad Med* 1999;74:810-20.
22. Whiteside C, Mathias R. Training for rural practice: are graduates of a UBC program well prepared? *Can Fam Physician* 1996;42:1113-21.
23. Carter RG. The relation between personal characteristics of physicians and practice location in Manitoba. *CMAJ* 1987;136:366-8.
24. Canadian Medical Association. *Report of the Advisory Panel on the Provision of Medical Services in Underserviced Regions*. Ottawa: CMA; 1992.
25. Rourke JTB. Politics of rural health care: recruitment and retention of physicians. *CMAJ* 1993;148:1281-4.
26. Easterbrook M, Godwin M, Wilson R, Hodgetts G, Brown G, Pong R, et al. Rural background and clinical rural rotations during medical training: effect on practice location. *CMAJ* 1999;160(8):1159-63.
27. Incitti F, Rourke J, Rourke L, Kennard M. Rural women family physicians: Are they unique? *Can Fam Physician* 2003;49:320-7.
28. Rourke J, Incitti F, Rourke LL, Kennard M. Keeping family physicians in rural practice: solutions favoured by rural physicians and family medicine residents. *Can Fam Physician* 2003;49:1142-9.
29. Dillman DA. *Mail and telephone surveys: the total design method*. Toronto: John Wiley and Sons; 1978.
30. Rourke J. In search of a definition of "rural." *Can J Rural Med* 1997; 2:113-5.
31. Ontario Ministry of Health/Ontario Medical Association. *1993 Interim agreement on economic arrangements*. Toronto: MOH/OMA; August 1993.
32. Dhalla, IA, Kwong JC, Streiner DL, Baddour RE, Waddell AE, Johnson IL, et al. Characteristics of first-year students in Canadian medical schools. *CMAJ* 2002;166(8):1029-35.
33. Rourke J; for the Task Force of the Society of Rural Physicians of Canada. Strategies to increase the enrolment of students of rural origin in medical school: recommendations from the Society of Rural Physicians of Canada [editorial]. *CMAJ* 2005;172(1):62-5.
34. College of Family Physicians of Canada. Initial data release of the 2001 National Family Physician Workforce Survey. Mississauga: The College. 2001.



Women's health in northern British Columbia: the role of geography and gender

Beverly D. Leipert, PhD, RN

Chair, Rural Women's Health Research; Associate Professor, Faculty of Health Sciences and Faculty of Medicine and Dentistry, University of Western Ontario, London, Ont.

Linda Reutter, PhD, RN

Professor, Faculty of Nursing, University of Alberta, Edmonton, Alta.

Correspondence to: Beverly D. Leipert, Chair, Rural Women's Health Research, Room H029, Health Sciences Addition, University of Western Ontario, London ON N6A 5C1

This article has been peer reviewed.

Introduction: Although research interest in women's health is growing, much of the literature does not sufficiently describe the importance of geography and gender for the health of women. This qualitative study explored factors in the northern Canadian context that influence women's health by interviewing 25 women in northern Canada.
Results: Findings reveal that the importance of the northern context for women's health can be attributed to the north's historical location, and its physical, sociocultural and political environments. The northern context contributes to the marginalization of northern women that is characterized by isolation, limited options, limited power and being silenced.
Conclusion: Health care practice and policy must attend to contextual as well as individual and sociocultural factors if women's health is to be advanced in northern settings.

Introduction : Même si la recherche sur la santé des femmes suscite de plus en plus d'intérêt, une grande partie des publications ne décrivent pas suffisamment l'importance de la géographie et de la sexospécificité pour la santé des femmes. Au cours de cette étude qualitative, les chercheurs ont analysé des facteurs du contexte du nord du Canada qui jouent sur la santé des femmes en interviewant 25 femmes du nord du Canada.
Résultats : Les constatations révèlent que l'importance du contexte du Nord pour la santé des femmes peut être attribuée à l'emplacement historique du Nord, ainsi qu'à ses environnements physique, socioculturel et politique. Le contexte septentrional contribue à la marginalisation des femmes du Nord caractérisée par l'isolement, les options limitées, le peu de pouvoir et le fait qu'elles sont bâillonnées.
Conclusion : Les politiques et les pratiques sur les soins de santé doivent tenir compte des facteurs contextuels autant qu'individuels et socioculturels si l'on veut promouvoir la santé des femmes dans le Nord.

INTRODUCTION

Various factors and conditions, labelled determinants of health, and the complex interactions among these determinants are now known to have a profound effect on health.[1] Determinants of health include income and social status, social support networks, education, employment and working conditions, social environments, physical environments, biology and genetic endowment, personal health practices and coping skills, healthy child development, health services, gender, and culture.[1] In this paper we discuss how geographic location affects women's health in a northern Canadian setting, with emphasis on the determinants of physical and social environments and gender.

The physical environment includes factors in the natural environment such as air and water quality, geography and distance, as well as factors in the human-made environment such as community and road design, and housing and workplace safety.[1] Reports about the effects of the physical environment on health in northern Canada[2,3] tend to focus on the natural environment with minimal attention to the human-made environment. There

is limited knowledge on how the natural and human-made environments influence the health of women.

Social environments include societal norms and values, social stability, diversity, safety, good working relationships and cohesive communities.[1] Social factors such as low availability of emotional support, low social participation, and social exclusion limit life prospects, supportive networks, life chances and self-esteem; these factors prove damaging at all societal levels, from the individual through to the community.[1,4] Little is known about the nature of social environments in northern settings and the effects of these environments on women's health.

Gender is a social construct based more in human culture than in biological difference.[1] Gender affects health through the "array of socially determined roles, personality traits, attitudes, behaviours, values, relative power and influence that society ascribes to the two sexes on a differential basis" (p. 17).[1] Although minimal research has focused on the health of women in isolated settings, research that exists indicates that these settings create challenges for women's health. Health services provided by family physicians, public health nurses, and specialist services such as obstetricians either do not exist, are intermittent, or are limited in range and quality.[3,5,6] Issues of confidentiality and anonymity exist when women seek care in small communities, and lack of transportation to care elsewhere exacerbates access problems. The values and priorities of male physicians, the dominant care providers in small communities, often influence the practices of female physicians, nurses and other health care providers, thus compromising women's access to the type of care and provider they desire.[6] Because traditional roles of wife and mother are favoured in small communities, education and career opportunities for women are limited.[7–10] In addition, small communities have limited employment opportunities and access to high paying positions in the resource-based industries are largely denied women.[11] Although northern women may obtain employment, employment is often not permanent, respected, adequately remunerated, or is not work in which they can take pride.[12] These challenges not only limit women's health, they also compromise women's life chances.

Research indicates that understanding the contexts of women's lives is crucial to the advancement of women's health.[13–15] While studies employing quantitative research methods identify some aspects of northern women's health, in-depth qualitative understanding of the effects that a northern place has on women's health is needed. The study on which this paper is based used a qualitative research design to examine how women perceive and maintain their health within northern British Columbia (BC), Canada. This study seeks to enrich understanding of the northern social environment so that social support, which is key to northern women's health,[13] can be advanced. This paper describes one aspect of the study, namely factors in the northern context that influence women's health. Findings of the study that describe how women address factors to maintain their health in northern BC are reported elsewhere.[13]

Methods

This study was conducted in northern BC, where most communities depend upon a single resource-based industry such as forestry, mining or fishing. The largest city in northern BC, Prince George, has a population of 80 000; however, most communities are much smaller — some contain fewer then 15 residents — and are typically remote from each other and from larger centres. Many people in northern BC live on isolated farms and ranches.

The study was conducted using a feminist grounded theory method. Feminist grounded theory seeks to generate a theory that explains how a central problem for women is resolved or processed.[16,17] The feminist grounded theory research process attends to tenets of feminist research such as respect for participants, avoidance of oppression and usefulness of findings. In addition, feminist inquiry considers not only women's individual voices and experiences, but also larger sociopolitical, economic, and cultural structures that influence women's lives.[18]

Ethical approval for the study was obtained from the University of Alberta and the University of Northern British Columbia. Women were recruited from 2 health regions in northern BC. Inclusion criteria were: able to read and write English, over 20 years of age, and have lived in northern settings for a minimum of 2 years. To reach women in remote areas, recruitment strategies included radio and television interviews about the research, publishing recruitment information in community newspapers and posting study information in feed and tack stores, grocery stores, and clothing shops in small communities. Recruitment information included the purpose of the study (identifying how living in the north influences women's health), the inclusion crite-

ria and the study procedures. Recruitment efforts were very successful; over 100 women from throughout the 2 northern health regions telephoned, emailed or applied in person for the research.

In compliance with the feminist grounded theory method,[16,17] the final sample of 25 women was selected using purposeful and theoretical sampling. Initially, women were selected to represent diverse geographical locations (cities, towns, villages, ranches, farms), ages and cultural backgrounds. In theoretical sampling, study participants are selected throughout the course of the research for their ability to enrich and enlarge upon themes and codes emerging from the ongoing analysis. Theoretical sampling also ensures that participants will provide contradictory as well as confirmatory evidence.[19] The recommended sample size for a grounded theory study is approximately 30 to 50 interview instances.[20] In this study, 75 interview instances were included (25 women, each interviewed 3 times).

First and second interviews were 1.5–2 hours in length and were tape recorded. Third interviews, which were about a half hour, were not tape recorded, but comments were noted and incorporated in the analysis. First interviews occurred in the women's homes and work places. Due to weather, distance and time constraints, three-quarters of the second interviews and all third interviews were conducted by telephone.

In first and second interviews, women were asked open-ended questions about how they maintained their health, how the northern context influenced their health, and how northern BC could be healthier for women. After each interview, each participant was provided with a summary of the analysis of her interview and invited to comment in a subsequent interview on the accuracy and completeness of the analysis and on emerging categories and relationships. These comments were incorporated into the data and analysis of the study. Third interviews provided each participant with an opportunity for final commentary on the emerging theory.

In addition to interviews, observations about geographical terrain, distance, road conditions and isolation were collected during travels to farms, ranches and small northern communities. Written documents such as maps, tourist guides, locally produced histories, newspapers and northern poetry enriched understanding of northern history, culture, and social and physical environments.

Data were analyzed using the constant comparative method of grounded theory.[16,19] Data analysis in grounded theory research occurs concurrently with data collection[16,19] Each interview tape was transcribed verbatim and then reviewed while listening to the tape to determine accuracy and to facilitate analytical thinking. With the assistance of the NVivo computer program, transcripts were then reviewed line by line and coded for categories. NVivo is designed for qualitative researchers who need to combine subtle coding with qualitative linking, shaping, searching and modelling. It is ideal for those working with complex data and for deep levels of analysis. Emerging categories were constantly compared to determine their nature and significance and their relationships to each other.[19] Second and third interview questions clarified, elaborated and verified emerging categories, subcategories and relationships. Consistent with the grounded theory method, data from the literature relevant to emerging categories and relationships also informed the analysis. Data collection and analysis ceased when no new information or insight was forthcoming about the categories and their relationships, and when the theory seemed to be elaborated in complexity and clear in its articulation of the central problem and the process used to address it.[19]

Results

The findings of this research revealed that northern women develop a process of resilience to address the central problem of vulnerability to health risks.[13] This vulnerability was influenced by the northern context and women's marginalization within that context. In this paper, we discuss findings regarding the northern context and effects of this context on women's health.

The sample

The final sample consisted of 25 women of diverse backgrounds (Table 1). The majority of the women were 20–60 years of age, had post high school education, were married or living common-law, employed full-time or part-time, in good health and of relatively adequate financial status. They represented various geographical locations including cities, towns, villages, a community with under 20 residents, ranches and farms. Culturally, one woman was Métis, one woman was First Nations, 2 were of Asian background, 3 were of European

background, and the remaining 18 participants claimed Canadian Caucasian heritage. Each woman selected a pseudonym and these pseudonyms are used throughout this article when referring to study participants.

The northern context

The importance of the northern context to women's health can be attributed to the north's historical location, and its physical, sociocultural and political environments.

Historical location

Because of the severe climate, social isolation and relative absence of material resources, indigenous peoples and early settlers needed to be self-reliant, hard working, and able to live off the land.[21] These attributes survive in the north today. Casey, a ranch woman in the study, noted that women are still expected to carry on the tradition of living off the land by having large gardens and canning and preserving food. Other historical elements include a heritage of control of the north by outsiders, impoverishment of indigenous populations, emphasis on rapid, profit-oriented resource development and exploitation, and limited ability of local northern residents to control their destinies.[21] Fluctuations in the economy, globalization of markets and the political view of northern settings as primarily locations for resource extraction have created and perpetuate northern communities of insecurity and transience.

Because of resource-based employment opportunities, northern regions have been comprised largely of relatively younger populations who come north in search of work. When resource-based economies fluctuate and jobs are lost, young people move elsewhere in search of employment. Consequences of this demographic shift include inconsistency and decline in the quantity, quality and nature of goods and services in northern communities, and instability, insecurity and the under-resourcing of northern communities.

Table 1. Sociodemographic information on the 25 study participants

Variable	No. of participants
Age	
20–30	2
31–40	5
41–50	6
51–60	7
61–70	2
71–80	2
81–90	1
Education	
<Grade 9	2
Grade 9–13	8
Trade/Technical diploma	8
University undergraduate degree	6
University graduate degree	1
Marital status	
Married or common-law	14
Divorced / Separated	5
Widowed	2
Never married	4
Employment	
Currently employed	
Full-time	10
Part-time	7
Not employed outside the home	3
Retired	5
Rating of health	
Good	16
Fair	8
Poor	1
Annual household income, $	
<10 000	2
11 000–20 000	6
21 000–30 000	1
31 000–40 000	5
41 000–50 000	2
51 000–60 000	4
61 000–70 000	1
71 000–80 000	2
>80 000	2

The physical environment

Climate, distance and geography, pollution, and dependence upon resource-based employment were noted by women in the study as problematic. Long periods of cold weather exacerbate physical problems such as arthritis and make getting around difficult, especially for elderly women and women with physical disabilities. Christine, a woman who had lived 23 years in the north, noted that winter weather results in being "housebound . . . more depression and anxiety." Several women noted that the long, cold, dark winter season also contributes to the depressive condition termed seasonal affective disorder. Leah, a young northern woman, stated, "Winter is so damn depressing here. Seasonal affective disorder syndrome — half the town has it." Gill[8] noted that, especially in February, the incidence of mental disorders (known as 'cabin fever' or 'housewife psychosis') among northern women reaches its peak. Travelling in the north is time consuming, expensive and hazardous. Long distances, poor road conditions and large logging trucks make travel dangerous, especially in winter. Barbara

summed up many northern women's perspectives when she stated: "I'm really stranded here for 6 months of the year. It's my own fear of driving on winter roads."

For some women, though, the physical environment provided accessible and affordable opportunities for outdoor recreation, such as skating, hiking and swimming. These activities were valued if women had good physical and mental health, and the time and finances to participate. Women who enjoyed solitary activities could better cope with the isolation engendered by northern distance and winter weather.

Women in this study were concerned about pollution in northern environments caused by resource-based industries such as pulp mills. Jocelyn lived near a pulp mill town and perceived that "a mill town is not the healthiest place to live," and Mary observed that "living here in Prince George is the only time I've had asthma. . . . I really feel that it has to do with the pollution due to the pulp mills." Still, women may be reluctant to complain too loudly about the pollution because it is the resource-based industries that provide jobs and income for their families.

Although the north provides resource-based employment, the precarious nature of the employment due to decline in resources and international influences can result in unstable communities, decline in the diversity and quality of goods and services, and threats to community security and sustainability. Casey, a ranch woman, noted that, as a result of a mine closure, "the population has gone down. . . . The elementary school may close. The fall fair's no longer held." Diminishing employment within the north and consequent seeking of jobs outside of the north weaken the community because fewer people are available to sustain it. This affects women's quality of life, as women often assume — or are designated — the responsibility to deal with contexts of diminishing goods and services.

The sociocultural environment

Overfamiliarity, outsider status and lack of resources were the primary negative sociocultural factors noted by women in the study.

In spite of — or perhaps because of — the vast distances between people and communities, overfamiliarity can lead to lack of anonymity and compromised confidentiality. Over-familiarity occurs when people in small isolated communities become visible and identifiable, with the result that unduly intimate and personal liberties may be taken and presumptions made.[22] Park explained how being known can interfere with women's abilities to access services:

> If somebody's car was parked at the women's centre . . . people kind of assume that she's gone there to get help. . . . When you're going to see a counsellor, you may be seeing her in other social functions as well . . . so women probably feel their confidentiality is at stake. . . . In bigger cities, nobody knows where you're going for help.

Being an outsider in a community can also be a problem for women in small northern communities. An outsider is someone who is different from the dominant community culture and characteristics, and is unconnected to family or other personal ties in the community.[23] Outsiders tend to experience less inclusion and more exclusion. Conversely, an insider is someone who has been a long time resident of a community and who is intimate with the community's norms and assumptions.[24] Insiders are included and valued.

Outsider status is created in several ways in northern communities. Outsider women who are new to the community or who have identities, associations and experiences that are seen to be somehow different may be deemed outsiders. Christine, a woman who moved to the north from elsewhere, explained how being new and unfamiliar may act to create outsider status:

> . . . when you first move up here . . . you don't have the network of people that you may have had. . . . You have to develop that and it takes time. Small communities may be very friendly once you get into them, but they can be very cold as well. . . . Possibly they want you to prove yourself.

Women who return to a community after leaving may also find that they have become outsiders because they now subscribe to different norms and values. Outsider women experience more limited employment opportunities, social isolation and marginalization than women who are perceived as insiders.

Insider status can be achieved in several ways. Casey, originally an 'outsider' woman, suggested that marrying an 'insider' man can facilitate inclusion:

> My father-in-law was very highly regarded in the community. I took my husband's surname when we married . . . that was definitely an in. And I think it expedited my acceptance into the community.

Rosie, a woman who moved to the north and has lived there for many years, pointed out that becom-

ing an insider requires an initial acceptance of community norms and political awareness:

> You have to prove yourself as being acceptable. You have to meet the principles of the community. You have to not be intrusive, you have to take people as they are, and know where the hierarchy is in a bigger community, the political base of the community. You have to be willing to respect their attitude, even if you don't agree with it. There's got to be that acceptance period. Once you're accepted, you're family.

For some women, achieving insider status is problematic. Mary, an Aboriginal human services worker, described several instances where her children or clients "had to try to defend themselves against people who are not of the same race as them." Ruhi, a young South Asian woman who had recently immigrated to Canada, noted that new immigrants may be pressured by their cultural community to minimize their culture and conform to the Canadian way of life. Women who do not subscribe to insider behaviours such as becoming married and having children are likely to have more problems achieving insider status in the north. Elizabeth, Casey, Leah and Marie, women who were single or child free, noted how the "couples and child oriented" nature of their communities affected their mental health. Elizabeth stated: "As a single person, you never quite fit in." Casey noted that since she and her husband now have their niece living with them and so 'have a child,' she feels more included in community events than when she did not have a child.

The northern sociocultural environment was less problematic for women who had adequate finances, time, good health and interests that coincided with those in the north. Women with adequate finances could purchase resources within and outside the north, women with adequate time could travel to resources, women with good health did not need resources that could not be accessed in the north, and women who enjoyed the north or who did not realize the potential of resources such as enhanced cultural amenities did not expect or miss these in the north.

The political environment

The political environment in the north can be characterized by 2 elements: undervaluing of the north and undervaluing of women. Undervaluing had profound effects on northern women's health.

Undervaluing of the north is reflected in misunderstanding, exploitation, lack of commitment and lack of political power and support. Misunderstanding results from minimal contact between southern and northern residents. Southerners rarely travel north, thus "they think we're still mukluks and sleighs, sled dogs. They figure Prince George is a little one-horse town where the horse died" (Signe).

Undervaluing of the north is also evident in the exploitation of northern natural resources and the inequities that exist between northern and southern locations. As Christine noted: "We northerners don't get our share of resources. We provide all sorts of stuff for the province but we don't get back in return." Several women identified a lack of commitment to the north by human services professionals as an important manifestation of undervaluing. Health care professionals come to the north for various reasons: because jobs are available, to obtain professional experience, and for more generously remunerated employment.[25,26] However, they may have little intention of staying in the north. Unhappy and uncommitted care providers compromise women's health. As women in the study explained: "Some of the people hate it here. And when you don't like where you are, you don't do a good job"(Christine). Jocelyn noted: "I have never gone to the same doctor twice. . . . it seems that every time I see a doctor, I have to start over." Thus, northern women and northern communities often benefit very little or not at all from the rich experience gained by workers in their communities. This type of situation, where the north is undervalued by workers, compromises consistency of care and the building and sustaining of northern communities.

Lack of political power was also recognized as evidence of the undervaluing of the north. Sparse populations result in fewer elected positions and thus, less representation in government, as reflected in Elizabeth's comment:

> The political attitude — it's that we don't exist. There's not enough of us in the north to vote to make a difference, so we're totally ignored.

Lack of political power was seen as leading to under-resourcing of northern communities, and this under-resourcing could lead to dissatisfaction and depopulation of the north. For example, Marie had decided to leave the north for more resources elsewhere so that she could obtain "the quality of life I want to lead."

Undervaluing of women in the north is most clearly seen in the undervaluing of women's roles and perspectives. Women described this undervaluing as reflecting a "redneck" attitude, one that

favours men's values, interests and behaviours, and traditional oppressive roles for women. Leah, a young single woman, stated: "It's a really redneck mentality here. The man's the breadwinner. I don't see a lot of choices for women here." Rhoda stated:

> The woman's place is in the house chewing the leather [laughs]. . . . It's about that sign I saw (when I was travelling): "Lexington, Kentucky: Where Men Are Men and Women Are Glad of It." That's the kind of attitude around here. . . . that's partly why there's violence and drinking and it's like an old time western movie.

However, even traditional roles such as mothering were sometimes not respected. Eileen, a single mother who had grown up in the north, moved away for several years, and then returned, observed:

> I noticed a lack of respect for me as a mother and as a thinking person, particularly by men in the community. There's this idea that men and women are on different sides. . . . There isn't easy mixing between the sexes here. Everything is more gender labelled.

Undervaluing of women may also result from the nature of employment in northern communities. Resource-based industries tend to be male-oriented and prefer male employees; few of the pulp mills, for example, employ female foresters. Eileen noted:

> The resource-based work place isn't integrated in terms of gender. . . . The pulp mills are male work places, and the offices are run by women.

In addition, small northern communities do not have many opportunities for well paying, satisfying work for women. Jobs for women tend to be in low status, traditional and low paying sectors. Gender segregation at work can accentuate and sustain gender segregation and the undervaluing of women at home and in society at large.

Undervaluing of women was clearly exemplified in the attitudes of some physicians. Women felt undervalued when physicians did not respect them, or denigrated them, and when they excluded women as equal partners in their care. The following comments provide a beginning appreciation of physician attitudes and behaviours that women in the study experienced:

> When I asked for a second opinion, my doctor was quite rude. He wanted to know who I thought I was that I should ask for a second opinion. . . . quite arrogant, and he told my husband and me to prepare ourselves for the fact that it was cancer. (Vicki)

> My doctor said that it was absolutely none of his concern about doing follow-ups for patients, and didn't I know that he was a very busy person, and didn't I know that it was my responsibility if I wanted a follow up with a specialist, and he had no more time to spend on my file. (Vicki)

Asking for a second opinion and for specialist consultation indicates women's commitment to self-care and empowerment. Such requests require courage and initiative in the north because these requests often involve substantial travel and expense, and the assertiveness to endure responses of unsupportive physicians. Although female physicians were often perceived as more caring and respectful of women, female physicians are rare in the north and their practices fill up quickly. To deal with physician shortages and attitudes, geographical challenges and women's desires for respectful holistic care, women often turned to public health nurses and other care providers. Alice noted: "You can go to the health unit. The public health nurses really open their doors."

"Listening," "respect," "preventive medicine" and "helping me — and I underline *helping* me — do what I could to be responsible and knowledgeable regarding my body, health, mind and emotions" were rarely experienced but highly valued approaches in physician care that women in this study talked about.

The political undervaluing of the north and of women was less problematic for women who were less dependent on the north, less committed to the north, or who were able to leave the north for respites and resources. These women were able to avoid or negate some of the undervaluing and provide themselves with hope and sustaining experiences. However, women needed time, finances, knowledge and awareness in order to avoid or address the undervaluing they perceived in the north.

Marginalization of northern women

Marginalization as experienced by women in the study relates to experiencing inequitable access to resources necessary to achieve and maintain health when compared with non-northern women and men within the northern context. Marginalization that northern women experience can be characterized by 4 aspects: isolation, limited options, limited power and being silenced.

Isolation

Women in the north are isolated first and fore-

most by the physical environment, especially in winter. However, isolation is also created by social and political environments. Women in the study believed that northern social and political environments isolated women from each other. Although northern beliefs in traditional gender roles may favour women-only groups for traditional activities such as child care, women-only associations for other reasons, such as for self help or to advocate for women, may be seen as problematic, perhaps because these associations are perceived as 'subversive' or threatening to the status quo. Park, a director of a women's centre, explained:

> People have the perception that they [staff in women's resource centres in small northern communities] are a bunch of men-hating, lesbian women and that the Centre is there to rip the family apart.

Park noted that lesbian relationships can expose women to safety issues and "affect their mental, emotional, and physical health" because these women may feel they must keep their relationships "in the closet" due to lack of acceptance of diversity in small northern communities.

Social and political environments can also isolate women in the north by creating unstable and chronic underfunding of women's centres in small communities. Underfunding limits the social and other resources that these centres can provide for women. In the few communities where women's centres exist, they provide vital — and often the only — services that facilitate women's health, particularly from a holistic health promotion perspective. Park noted that men sometimes access centre services as well. Limits to and losses of these centres contribute significantly to the isolation of northern women and restrict the ability to make change at personal and community levels.

In addition to isolating women from women, the social and political environments also isolate women from men. Marie observed: "We have loggers, miners, ranchers and there's this macho sense, there's this real male camaraderie, and it excludes women." Women attributed the social division of the sexes to the dominance of the male culture in the north. Exclusion of women and segregation of the sexes can sustain and foster isolation and oppression of women.[27]

The north can also create isolation through the fostering of a social status as 'outsider,' as someone who lives in the community but is not truly part of the community. Outsider women experience greater social isolation and marginalization than insider women. For example, in small communities, outsider women may be isolated from the few employment opportunities that exist. Leah, a woman who grew up in the north, noted that for women new to her community

> It is so hard for them because they didn't grow up here and people know that. You have to be friends with someone to 'get in,' you can't just be a new person [to be included or hired].

Limited options

The limited quantity, quality and diversity of goods, services and education available in the north also reflect and impact upon the status of northern women. Goods that are limited include diverse and affordable food, especially fresh fruit and vegetables, and clothing and goods for women and children. Because women in the north often do most of the shopping for their families, limitations in these goods is especially problematic for women. One participant stated: "You're either buying the really low, low quality stuff or you're paying top dollar." It is perhaps reflective of the undervaluing of women that small communities have a greater selection of goods related to the northern male lifestyle, for example, hunting weapons, outdoor recreational vehicles, and farming, ranching and forestry related supplies.

Daycare services, supports for parenting and relationships, and artistic and cultural opportunities were some of the services and experiences that women found restricted. For example, Park noted that the women's centre had only "one full-time counsellor — it's not for the full year and it's a contract position." This was inadequate because over 100 women come yearly for one-on-one counselling to the centre. Eileen noted that "there were no services that were oriented to treating the whole family" when her marriage broke down. Limitations in services constrained women's abilities to obtain resources that could support them in employment, personal situations and family relationships. Limited cultural experiences in music and the arts made living in the north harder because the relief from the harshness of the north and the enhanced quality of life that these experiences could provide were not available.

Women found particularly problematic the limitations in traditional and alternative health care services and in health promotion and disease prevention services. Limited numbers of nurses,

physicians, hospitals, mental health and other services exist in the north. The north has difficulty recruiting and retaining health professionals, and recent health care reforms and personnel shortages have resulted in the elimination or downsizing of health care sites. Women's options were thus compromised and they often had to put up with inadequate care:

> There's more depression up here in women than in men. And yet, from what I can see, physicians' solution is drugs . . . not counselling. Without counselling, I would never have come out of my depression. I would never have learned to turn it around. (Christine)

> It's the amount of time that doctors spend with you — 10 minutes at the most and . . . I always feel that I'm being pushed out the door. (Rhoda)

> The first thing my doctor says to me is "The government pays me to see eight patients a day and you're the twelfth." I didn't feel like I was going to get any kind of quality check-up or interview and he was very quick and brusque with me. (Barbara)

Although women in urban areas may experience similar limitations, in rural and remote areas women are more compromised because they have fewer or no other options; they may not be able to access a second opinion or change care providers because they don't exist in their communities or close by. Medical specialists, such as psychiatrists, from southern urban areas occasionally fly to northern communities to provide care for a few days. Sometimes clinics are held in remote northern communities. Women felt that this was inconsistent and second-rate care and, for the most part, ineffective.

Quality of care was also compromised by the knowledge and attitudes of physicians. Women felt that their health issues were often dismissed or downplayed by physicians, as displayed in attitudes that

> . . . women bring on a lot of their own illnesses, that whatever a woman has that she's responsible for it directly. If a man has it — he's the bread winner so he deserves to have [care]. (Barbara)

Disrespect of the contexts of women's lives and of their needs was evident, as Elizabeth, a single woman, vividly articulates:

> That man was brutal, but he was the only gynecologist. . . . I just thought "this man shouldn't even be a doctor." He was rough, and he says to me, "Well, if you're going to have kids, you better have them now." And I said, "Well, I'm not into being a single parent." [He says] "Well, what's the matter? Good looking girl like you, you should be able to find a man." I would have asked to go somewhere else but there was nowhere else to go.

When the nature of women's lives and their perspectives are not taken into account, or when care is difficult to access, women may choose to forego care, or they may receive care that does not fit with their values or lifestyle and that is not timely or appropriate. As a result, women may live with disease and illness longer, experience increased complications of treatment due to advanced illness and endure compromised recovery.

To avoid or minimize the impact of inadequate and inappropriate health care, women wanted to prevent health problems and promote their health. Services that women favoured included massage, midwifery, naturopathic services, health education, and social and counselling services. However, these services either do not exist in most northern communities, are provided in inadequate ways, or are not included in the national health insurance plan. Women thought that physicians were often ill-informed about, or did not appreciate, the value of health promotion and illness prevention services, and that physicians needed "a more open mind" regarding alternative health care. Christine summarized the values of several women in the study when she stated that she appreciated that her physician "told me about people to see about different holistic medicines." Physician discomfort with women's requests for alternative health care services and limited availability of other health care professionals, such as public health nurses who could advise women, resulted in under use or ineffective use of health promotion and illness prevention services. Consequently, northern women often live with pain, discomfort and illness that could be prevented, and that is not treated in a timely, valued and effective manner.

In addition to limitations in goods and services, women also noted limitations in education. Women valued education because, especially in the under-resourced north, "women have to have the information to be responsible for themselves" (Elizabeth), and because education would enhance women's self-esteem and sense of agency, especially for women in low socioeconomic situations. Mary, an Aboriginal woman who works with low-income Aboriginal women, explained:

> A lot of [my clients] want to just be able to take a course, just to feel good that they can do something. . . . you know, 'cause if they can do one course, maybe they can do this [other activity to improve their lives] and, you know, [it] branches off from there.

Women felt that improving women's education would also strengthen families. Lilac stated: "A

woman needs an education. You educate a boy, you educate a man. You educate a girl, you educate a family."

In spite of the benefits of education, educational resources are limited in the north. Libraries, health education personnel and community colleges are not readily accessible due to distance and weather. Computers and the creation of the University of Northern British Columbia in the north in 1994 have increased the ability of northern women to acquire information and education. However, women must still have the money, time and self-confidence to access these resources. Often they must also relocate to Prince George to access on-campus university classes and other educational resources. Study participants believed that women in the north live in a patriarchal culture that does not privilege the advancement of women. Thus, girls and women may not be encouraged or supported to access educational resources or achieve academic success.

The politics of funding for education seems to be an ongoing problem in the north. Although more affordable technology such as satellite dishes, computers and the Internet are facilitating distance learning, this technology is only available to women who have the funds and technology such as electricity and telephone services to access these education resources.

Limited power

Aspects of limited power were evident in women's descriptions of their agency and activities and in observational data. Several women suggested that women's voices and perspectives are not valued because northern communities are segregated by gender, with women occupying the less powerful role:

> There's this idea that men and women are on different sides. I think it's partly pure sexism. That women don't have anything interesting to say. (Eileen)

> I hate to say this in this day and age, but women don't feel that they have a lot of power in a lot of rural communities. . . it's like stepping back in time 40 years. (Rosie)

Within the north, women's lives are often linked to economic dependence on men who are employed in the resource industries. This limits women's power. Marie noted that women's dependence on resource-based economies may compel them to tolerate gender inequities to sustain employment for their husbands. "If you're blatant about it [feminism] and open about it, it's not really good, because you might be ostracized or not accepted." In a small community with few jobs, non-acceptance could cost one one's livelihood.

Women's economic dependence is further perpetuated by the assumption that housewives and mothers do not need to be responsible for their own economic well-being and that women's primary responsibility is to home and family, as Eileen's comments reveal:

> If you're going to be a 'real' woman — quotes around that, right — and be married and have a family or be a mother, you don't do that kind of thing [have a well paying job].

In addition, few well paying and satisfying jobs exist for women in the north, and the limited access to education compromises women's acquisition of well paying and satisfying employment that might be available.

Religious beliefs that foster traditional attitudes can further compromise northern women's power. Leah observed:

> A large religious population here probably contributes to the lack of opportunity for women with beliefs such as "men are the bread winners, women belong at home raising the children."

Marie believed that while the church fosters a sense of community, it may also result in rigidity of values, whereby people become "so dogmatic . . . they don't want to actively listen and even consider the possibility that there could be other answers."

Limited power that results from religious and male values was most often noted by older and single women and by women who had university education and life experience outside the north. It may well be that women who are aware of other ways of being and who have independent life experiences may be better able to locate northern women's power — or lack thereof — in the structures of northern communities.

Being silenced

Women in the study noted the importance of having a voice. The overwhelming response to recruitment initiatives indicates that northern women have a great desire for a voice in health-related matters, and suggests that northern women often do not have the opportunity for such participation.

The silencing of northern women's experience and their desire for voice were revealed in several of the women's comments about the research:

How wonderful it is that someone's finally sitting down and reaching out to women and finding out what people are thinking. This is so needful. I talked last time about women not having a voice — well, this is giving women a voice. (Jocelyn)

I admire you so much for having done this [research]. Our . . . voices wouldn't be heard if it wasn't for you drawing them out and possibly putting them where they will be heard. (Amelia)

I think what you're doing is really valuable. This [research] needs to be done because men have been in control for so long and women have just had to go along with it. They've had no say. They've had no say at all. (Signe)

Other indicators of northern women being silenced include the limited number of women in public positions of authority and decision-making. For example, during this study the Prince George city council of 10 elected members included only 2 women. Prince George has had only one female mayor in its almost century-long existence. Representation of northern women in elected provincial and federal government positions is also very much in the minority. Women's lack of representation in public venues reflects social, political and gender roles and power structures inherent in northern resource-based communities.[28]

The importance of women having a voice was also evident in women's stated preference for face-to-face interviews, rather than written surveys or telephone interviews. Although women would be listened to in telephone interviews, it seemed that the women felt that they would not 'really be heard.' Face-to-face interviews in women's communities and across their kitchen tables were important in conveying respect, facilitating communication and understanding, and decreasing the silence that many northern women experience. Casey, a ranch woman, explained:

. . . a lot of times up here we get a lot of phone research . . . and the people at the end of the line don't care. It's all written out for them. . . . It's just cold. . . . Whereas a face- to-face encounter — there's a body there, there's warmth, there's humanity. There's a connection.

Fred, a woman who has lived in the north all her life, valued face-to-face research because it afforded her the opportunity to evaluate the respect for her, and to voice concerns and be heard:

. . . seeing the person and seeing their face . . . a lot of communication is body language, that they aren't a threatening person . . . not laughing at you. . . . A voice on the phone — it's really impersonal. What you're doing is listening, and you did a good job of it.

Discussion

This study revealed how the historical, physical, sociocultural and political contexts of the north influence northern women's health by contributing to their marginalization. More specifically, the marginalization experienced by women in northern BC was characterized by isolation, limited options of goods, services and education, limited power and being silenced.

While there is considerable research focusing on marginalization related to race, ethnicity and socioeconomic exclusion, less attention has been directed to marginalization resulting from geographical location and gender. Geographers and social and political scientists have discussed marginalization in the north in terms of the terrain, distance and sociopolitical and economic factors, such as the lack of political power and economic dependence on a single resource.[8,12,21,29,30] This study reveals important new information about the relationship of geography and gender and implications for women's health. For example, this study found that the depth and scope of factors in the northern context such as extensive distances and isolation, prolonged severe climates, power and sociocultural aspects of relationships, and fewer health and human service resources make northern women's needs more acute, their solution options more limited, and their plight more problematic. Moreover, a 'pile-up' or accumulation of contextual factors such as isolation and severe climate and limited personal and social resources increase northern women's marginalization and health challenges.

Hall, Stevens and Meleis[27] note that one's identity, associations, experiences and environments can all form the basis of an individual's or a group's marginalization. Various attitudes and behaviours such as discrimination, scapegoating, stigmatizing and segregation may also serve to marginalize and exclude women.[4,27] This study confirms, clarifies and extends information about factors of marginalization and exclusion that affect women's health in northern settings. For example, this study revealed that women without male partners may be stigmatized and excluded in northern settings and that this may be seen as legitimate because of patriarchal male-dominated values and behaviours that are promoted within socioeconomic contexts in northern communities.

A strength of this study is that it provides beginning information about diverse women's lives in northern settings. The study included northern

women who were elderly, young and middle-aged; disabled and able-bodied; poor, middle-class and wealthy; Caucasian and from minority cultures; and women from remote, rural and urban locations. Thus, this research extends understanding about how geography intersects with other determinants of health in remote northern settings. Nevertheless, the small study sample limits the depth and scope of understanding about the health and lives of northern women. Research is especially needed regarding the health and marginalization of northern women who are physically disabled, elderly, low income, lesbian, single/widowed/divorced, and about those who live in particularly remote settings. Given the size and nature of the sample, the findings regarding health provider attitudes and behaviours may not be reflective of health providers as a whole; therefore, additional research that explores human service provider attitudes and behaviours from the perspective of consumers and providers would be beneficial. Participatory action research and research that uses interviews, focus groups and other methods that privilege women's voices and experiences would enrich understanding and would foster respect, inclusion and empowerment as northern women 'come to voice' in research.

Conclusions

This study has relevance for rural and northern health care practice and northern women's health. To strengthen northern women's access to quality health care, equitable inclusion and empowerment, increased efforts must be made to recruit and retain human service professionals in the north, especially female public health nurses, nurse practitioners and physicans who will provide respectful and appropriate care and who are comfortable with the professional and personal aspects of living and working in small northern communities.[25,31,32] Northern health practitioners must be able to work in environments that are culturally diverse, where lack of anonymity, scarcity of resources and isolation characterize life, and where they may be regarded as outsiders.[6,32–34] In addition, health care practitioners must include women as equal partners in health care and realize that women are experts of their own lives.

Human service providers in northern settings must include in their practices advocacy for healthy public policy, community development and coalition building approaches. These activities, if conducted for and with women,[6,14,35] help to give power and recognition to northern women, make the most of limited resources and draw enriched resources to northern communities.

In 2002, a national report on health care in Canada[3] highlighted the need to improve health and access to health care for people in rural and remote communities. When national reports include initiatives and suggestions proposed by women in geographically isolated settings, such as the women in this study, health care practice and women's health in rural and remote settings will significantly improve.

Acknowledgement: This research was supported by an Isaac Walton Killam Memorial Scholarship from the University of Alberta.

Competing interests: None declared.

References

1. Health Canada. *Towards a common understanding: clarifying the core concepts of population health*. Ottawa (ON): Health Canada; 1996.
2. Health Canada; Ministry of Health and Ministry Responsible for Seniors. *Report of the northern and rural health task force*. Victoria (BC): Health Canada; 1995.
3. Romanow RJ. *Building on values: the future of health care in Canada*. Saskatoon (SK): Commission of the Future of Health Care in Canada. Available: www.hc-sc.gc.ca/english/pdf/romanow/pdfs/HCC_Final_Report.pdf (accessed 2005 Aug 18).
4. Guildford J. *Making the case for social and economic inclusion*. Halifax (NS): Health Canada; 2000.
5. Health Canada. *Rural health in rural hands*. Available: www.phac-aspc.gc.ca/rh-sr/rural_hands-mains_rurales_e.html (accessed 2005 Aug 18).
6. Leipert B. Women's health and the practice of public health nurses in northern British Columbia. *Public Health Nurs* 1999;16:280-9.
7. Leipert B, editor. *Northern voices: health, community, and economic perspectives in northern British Columbia*. Prince George (BC): University of Northern British Columbia; 1998.
8. Gill A. Women in northern resource towns. In: *Social science in the north: communicating northern values*. Occasional publ no 9. Ottawa (ON): Association of Canadian Universities for Northern Studies; 1984.
9. Luxton M. *More than a labor of love: three generations of women's work in the home*. Toronto (ON): The Women's Press; 1980.
10. Young J. Farm women's perceptions of health and work [Master's thesis]. Edmonton (AB): University of Alberta; 1997.
11. Wall M. Women and development in northwestern Ontario. In: Southcott C, editor. *Provincial hinterland: social inequity in northwestern Ontario*. Halifax (NS): Fernwood Publishing; 1993.
12. Heald S. Projects and subjects: women, the north, and job creation. In: Dunk T, editor. *Social relations in resource hinterlands*. Thunder Bay (ON): Lakehead University; 1991.
13. Leipert B, Reutter L. Developing resilience: how women maintain their health in northern geographically isolated settings. *Qual Health Res* 2005;15:49-65.
14. Leipert B, Reutter L. Women's health and community health nursing

practice in geographically isolated settings: a Canadian perspective. *Health Care Women Int* 1998;19:575-88.

15. Walters V, Lenton R, Mckeary M. *Women's health in the context of women's lives*. Ottawa (ON): Minister of Supply and Services Canada; 1995.

16. Glaser B. *Basics of grounded theory analysis: emergence vs. forcing*. Mill Valley (CA): Sociology Press; 1992.

17. Keddy B, Sims S, Stern P. Grounded theory as feminist research methodology. *J Adv Nurs* 1996;23:448-53.

18. MacDonald M. Finding a critical perspective in grounded theory. In: Schreiber R, Stern P, editors. *Using grounded theory in nursing*. New York (NY): Springer Publishing Company; 2001.

19. Glaser B. *Theoretical sensitivity*. Mill Valley (CA): Sociology Press; 1978.

20. Morse J. Designing funded qualitative research. In: Denzin N. Lincoln Y, editors. *Handbook of qualitative research*. Thousand Oaks (CA): Sage, 1994.

21. Coates K, Morrison W. *The forgotten north: a history of Canada's provincial norths*. Toronto (ON): James Lorimer & Company; 1992.

22. McNeely A, Shreffler M. Familiarity. In: Lee H, editor. *Conceptual basis for rural nursing*. New York (NY): Springer Publishing Company; 1998.

23. Bailey M. Outsider. In: Lee H, editor. *Conceptual basis for rural nursing*. New York (NY): Springer Publishing Company; 1998.

24. Myers D. Insider. In: Lee H, editor. *Conceptual basis for rural nursing*. New York (NY): Springer Publishing Company; 1998.

25. Belzer E. *What health professionals need to know: how to survive and thrive in rural and underserved practices*. Kansas City (MO): National Rural Health Association; 1999.

26. Delaney R, Brownlee K. Ethical dilemma in northern social work practice. In: Delaney R, Brownlee K, Zapf M, editors. *Issues in northern social work practice*. Thunder Bay (ON): Lakehead University; 1996.

27. Hall J, Stevens P, Meleis A. Marginalization: a guiding concept for valuing diversity in nursing knowledge development. *ANS Adv Nurs Sci* 1994;16:23-41.

28. Delaney R, Brownlee K, Zapf M. *Issues in northern social work practice*. Thunder Bay (ON): Lakehead University; 1996.

29. McCann L, Gunn A. *Heartland and hinterland: a regional geography of Canada*. 3rd ed. Scarborough (ON): Prentice Hall; 1998.

30. Weller G. Hinterland politics: the case of northwestern Ontario. In: Southcott C, editor. *Provincial hinterland: social inequity in northwestern Ontario*. Halifax (NS): Fernwood Publishing; 1993.

31. Bushy A. *Orientation to nursing in the rural community*. London (UK): Sage; 2000.

32. Bushy A, Leipert B. Factors that influence students in choosing rural nursing practice: a pilot study. Rural Remote Health. Available: http://rrh.deakin.edu.au/articles/subviewnew.asp?ArticleID=387 (accessed 2005 Aug 18).

33. Canitz B. *Everything for everyone and no one for you: understanding nursing turnover in northern Canada*. Toronto (ON): University of Toronto; 1990.

34. Dunkin J. Applying interventions in rural areas. In: Helvie C. *Advanced practice nursing in the community*. London (UK): Sage; 1998.

35. Denton M, Hadjukowski-Ahmed M, O'Connor M, Zeytinoglu U. *Women's voices in health promotion*. Toronto (ON): Canadian Scholars' Press; 1999.

The occasional removal of an embedded fish hook

Harvey V. Thommasen, MD, MSc, CCFP, FCFP

Clinical Associate Professor, Department of Family Practice, Faculty of Medicine, University of British Columbia, Prince George, BC

Amy Thommasen, BSc

Second-year BSc Student, University of Northern British Columbia, Prince George, BC

Correspondence to:
Dr. Harvey V. Thommasen, Clinical Associate Professor, Faculty of Medicine, University of British Columbia, 4202 Davie Ave., Prince George BC V2M 4G7

This article has been peer reviewed.

Fishing is a popular rural recreational activity involving millions of Canadians. Rural physicians can expect to see the occasional patient presenting with penetrating tissue trauma involving fish hooks. Management of an embedded hook includes taking a careful history, doing a physical examination of the hook injury and surrounding tissue and preparing the skin with antiseptic solution before attempting removal. Local anesthetic is probably necessary for all but the most superficially embedded hooks. Radiography may provide additional information with respect to presence of internally embedded barbs, depth of penetration or bony involvement. Complicated wounds, such as those involving the eye and those deeply embedded near tendons, blood vessels and nerves should be referred to more experienced specialists.

Five fish hook techniques are described; namely, the 1) Simple Retrograde technique, 2) String-pull technique, 3) Advance-and-Cut technique, 4) Needle-Cover technique, and 5) Cut-it-Out technique. The technique chosen will depend on a number of variables, including the type of fish hook embedded, the anatomic location of the injury, the depth of tissue penetration and provider experience. The first 2 techniques result in the least amount of tissue trauma, can be performed with local anesthetic and should be attempted first, especially with barbless hooks and superficially embedded barbed hooks.

Wound care following hook removal involves flushing any open wound with saline, applying topical antibiotic ointment and covering the wound with a simple dressing. The patient should be reminded about the risk of infection and told to return if signs of infection arise — erythema, discharge, pain and swelling. A follow-up appointment is organized as needed. Consideration should be given for the use of prophylaxis antibiotics, but they are generally not indicated. Tetanus status should be addressed before discharge.

La pêche est une activité récréative rurale prisée par des millions de Canadiens. Les médecins ruraux peuvent donc parfois traiter des patients qui présentent des traumatismes des tissus causés par des hameçons. Dans de tels cas, il faut connaître les antécédents médicaux du patient, examiner la blessure causée par l'hameçon et les tissus proches de la blessure et préparer la peau avec une solution antiseptique avant de retirer l'hameçon. Une anesthésie locale s'avérera probablement nécessaire, sauf pour la plupart des hameçons pris de manière superficielle. Une radiographie peut fournir des renseignements additionnels sur la présence de barbillons, la profondeur de la pénétration ou la proximité des os. Il faut confier à des spécialistes les cas compliqués, comme les blessures à un œil ou près de tendons, de vaisseaux sanguins ou de nerfs.

Les cinq techniques de traitement sont les suivantes : 1) le mouvement rétrograde, 2) la ficelle tirée, 3) la technique «avance et coupe», 4) l'aiguille de soutien et 5) la chirurgie. Le choix de la technique dépend d'un certain nombre de facteurs, dont le type d'hameçon en cause, l'emplacement de la blessure, la profondeur de la pénétration et l'expérience du médecin. Les deux premières techniques minimisent les traumatismes des tissus et requièrent une anesthésie locale. Ce sont les premières techniques à essayer, particulièrement pour les blessures causées par des hameçons sans barbillons ou les blessures superficielles causées par des hameçons à barbillons.

Après le retrait de l'hameçon, il faut arroser la plaie ouverte avec une solution saline, appliquer un onguent topique antibiotique et protéger la plaie avec un simple pansement. Il faut mettre le patient au courant des risques d'infection et lui demander

de revenir si des symptômes suivants se manifestent : rougeurs, écoulements, douleurs et enflures. Il faut prévoir un examen de suivi au besoin. L'usage d'antibiotiques prophylactiques n'est généralement pas nécessaire. Il faut demander au patient s'il a été vacciné contre le tétanos.

Introduction

One of my passions is fly-fishing and, judging by the number of fly patterns named after physicians, I am not the only one. In fact, one year I fished only "doctor" fly patterns — e.g., General Practitioner, Lady Doctor, Dr Burke Streamer, Dr Milne Streamer, Dr Oatman, Dr Rex, Silver Doctor, Surgeon General and Doc Spratley — and all of them caught fish![1]

Recreational fishing is an extremely popular activity in Canada.[2] For example, in 2000 an estimated 3.6 million Canadian anglers fished an estimated 47.9 million days and caught an estimated 233 million fish of various species. Almost all of these fish were caught with a hook and line. Over 60% of all fish caught are released. Over 95% of these anglers fished in freshwater lakes, streams or rivers. The rest fished in ocean waters. The economic value of recreational fishing in Canada exceeds $6.5 billion dollars. Recreational fishing is more popular among rural Canadians than among urban Canadians.

Rural physicians occasionally have fishers present to the emergency department with injuries related to fishing.[3,4] One of the most common fishing-related injuries is the embedded fish hook. This article deals with the management of penetrating fish hook injuries, with a focus on ways one can retrieve hooks embedded in the skin. Many of the principles outlined here also apply to retrieval of other cutaneous foreign bodies, such as nails and splinters.[5]

Hook terminology

While it is true that fish hooks come in a variety of sizes and shapes, all hooks are made up of the same basic parts. The basic parts of a fish hook are the eye, shank, bend, barb and point (Fig. 1). Most anglers use single hooks, but 2 (also known as double hooks) and 3 (also known as treble hooks) hooks on the same shank are sometimes used.[1,6]

The point is sharp and designed for penetration of a fish's tough skin. Most hooks just have a single barb, but hooks with multiple barbs on the shank, and hooks with no barbs are also used (Fig. 2). The theoretical purpose of the barb is to prevent the hook from easily dislodging once skin penetration has taken place. This may be true for fish hooked on gear weighed down with heavy lures or lead weights, but it is my experience that the use of a barbed hook when fly-fishing does not result in more landed fish. Fly-fishers should be encouraged to remove the barbs from their hooks (simply crush it gently with pliers) or to buy flies with barbless hooks. Barbless hooks are associated with quicker and easier release of fish and easier removal from skin of an accidentally hooked angler!

History and physical examination[3–10]

Ask about how, where and when the fish hook became embedded. Ask about the size and type of hook used, and presence or absence of barbs on the shaft and near the hook point. Ask about allergies, particularly those to local anesthetics, immunizing agents and to antibiotics. Ask about tetanus status,

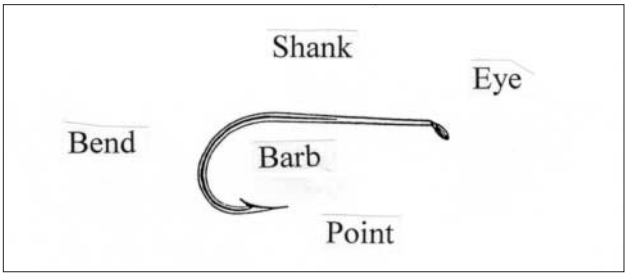


Fig. 1. Basic parts of a fish hook.

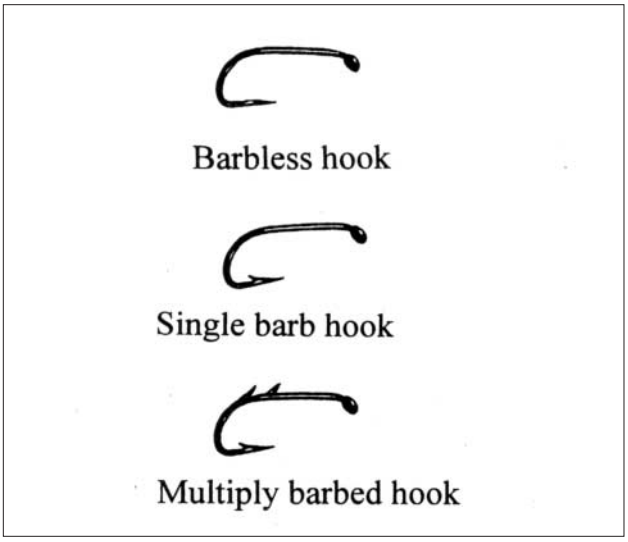


Fig. 2. Various kinds of barbed hooks.

and begin the process of deciding which tetanus immunizing agents are indicated for the patient.

Ensure the involved body part is in a secure resting position on top of a plastic-backed absorbent pad and ensure there is good direct lighting of the wound site. During examination note the size and type of hook used and presence or absence of barbs on the shaft and near the hook tip, and estimate how deep the hook penetrates into tissue. Document the neurovascular status distal to the wound before anesthetizing or attempting to remove the fish hook. Make a decision as to whether or not radiography would be helpful to identify internally embedded barbs, depth of penetration and/or bony involvement.

Review complications associated with fish hook removal including infection, bleeding and additional damage to the underlying and surrounding tissue. Explain the procedure you plan to use to extract the embedded fish hook; answer any questions the patient may have; and consider obtaining written consent as per institution policy. Tell the patient how long you estimate the procedure should last, and set a maximum time limit (e.g., 20 to 30 min) on how much time you are prepared to spend exploring and manipulating the embedded fish hook. This avoids prolonged manipulation, which can be stressful for both patient and physician and which is associated with increased risk of iatrogenic trauma.

Equipment for removal of fish hook

Equipment necessary for fish hook removal is summarized in Table 1 and consists basically of the same equipment one would use to manage any laceration (i.e., a suture set), plus wire cutters.[5]

Table 1. Equipment necessary for fish hook removal

Gloves
Antiseptic skin preparation solution
Sodium chloride (saline) solution (0.9%)
4″ × 4″ (10 cm × 10 cm) sterile gauze sponges
Anesthesia equipment:
5-cc syringe
18-gauge needle for drawing up anesthetic
30-gauge 0.5″ needle for infiltrating skin
27-gauge 1.5″ needle for deeper infiltration
Local anesthetic of choice
Suture set
Wire cutters
Scalpel with #11 blade
Optional:
Metzenbaum scissors
Tissue retractors
Sterile elastic tourniquet
Dressing materials

Wound care before hook removal

Using sterile technique, clean the wound and surrounding area with an antiseptic skin solution (e.g., chlorhexidine 2% with 4% isopropyl alcohol [e.g., Dexidin 2 Solution], antiseptic isopropyl alcohol pad [e.g., WEBCOL Alcohol Prep] or Betadine Surgical Scrub [7.5% Povidone-iodine]) and wash it off with sterile sodium chloride (saline) solution (0.9%).

Decide whether local anesthesia with 1% or 2% Lidocaine hydrochloride is required. Superficially embedded hooks often do not require anesthesia. If hemostasis is desired along with local anesthesia — and if the site is appropriate — consider using 1% or 2% Lidocaine hydrochloride with epinephrine (1:100 000). Anesthetize the entry site, and possibly also the anticipated exit site, with 1–2 mL of local anesthetic solution. Consider using a digital block if the hook is embedded in a finger. If the wound is gaping, irrigate with copious amounts of sterile saline solution until it looks clean.

Fish hook removal techniques

A number of different methods have been described for the removal of fish hooks.[3–10] The decision regarding which technique to use is based on many variables, including the location, depth of skin penetration, size of the hook and the presence or absence of barbs. Fish hooks embedded in or near the eye should be simply covered with a metal cup or patch and referred immediately to an ophthalmologist.[3–5,11] Fish hooks embedded deeply in the vicinity of arteries, tendons, nerves, or in atypical places (e.g., hypopharynx) should also be left to a physician with surgical skills.[3–5,12]

First, remove unnecessary fish-line, bait and lure parts. If the embedded hook is part of a double or treble hook or part of a lure with multiple hooks, ensure that all the barbs and tips are protected with tape or removed with a wire cutter before starting any fish hook removal techniques. There is nothing more embarrassing than to remove an embedded hook, only to find out that another hook has become embedded during the removal procedure!

Five fish hook techniques have been described; namely, the 1) Simple Retrograde technique, 2) String-pull (or String-yank) technique, 3) Advance-and-Cut (or Pull-through) technique,

4) Needle-Cover technique, and 5) Cut-it-Out technique. The techniques are listed in order of the least amount of tissue damage to the greatest amount of tissue damage caused. The first 2 techniques can be attempted without local anesthesia; all the others require local anesthesia.

1. Simple Retrograde technique

The Retrograde technique is simple and works best with barbless or superficially embedded hooks (Fig. 3). Pressure is applied downward on the shank of the hook with the index finger (1) and then the hook is backed out of the skin along the projected path of entry (2). The Retrograde technique is the least successful technique because the presence of barbs usually prevents backward movement of the hook.

2. String-Pull technique

Also known as the String-yank, Strong-yank and "Stream-side" method, the String-Pull technique is fast, relatively painless, carries a high rate of success and usually does not require any local anesthesia (Fig. 4). This technique works best with small- and medium-sized fish hooks. Do not perform this technique if the fish hook is embedded into a body part that is not fixed, for example, an ear-lobe. A piece of strong line (e.g., fishing line or 2–0 or 3–0 silk suture) is first tied to or looped around the midpoint in the hook's curve (1). At least a foot of line should extend from the hook. The other end of the string is then wrapped around a finger (e.g., the operator's right index finger), a tongue depressor or similar object, so that the operator will have a good grip when the string is pulled.

Slight downward pressure is then applied on the hook shank (e.g., with left index finger) per the Simple Retrograde technique, in an attempt to stabilize the hook against the skin surface and disengage the tip and/or barbs from the tissue (2). Slowly straighten, to take out excess slack in the line. Next, quickly, suddenly and forcefully pull/jerk the string away from the skin at about a 30° angle (3). Do not hesitate once the decision is made to yank the string. If you (and the patient!) are lucky, the hook will rapidly exit out of the skin along the projected path of entry. The use of protective eye goggles and careful positioning of operator, patient and witness is recommended so that the rapidly flying hook will not impale another body part or another person.

3. Advance-and-Cut technique

Also known as the Pull-through extraction technique, the Advance-and-Cut technique consists of grasping the fish hook shank with a needle holder, hemostat or needle-nose pliers (1) and then advancing the hook tip and barb out through the skin (Fig. 5A). Once it is through the skin (2), the fish hook is re-stabilized and then cut off behind the barb (3). Next, the barbless hook is backed out the hook's entrance wound the way it came in (4). A variant of this technique consists of cutting off the eye of the hook and then advancing the rest of the hook out through the skin without backing the hook out the way it came into the skin (Fig. 5B). This lat-

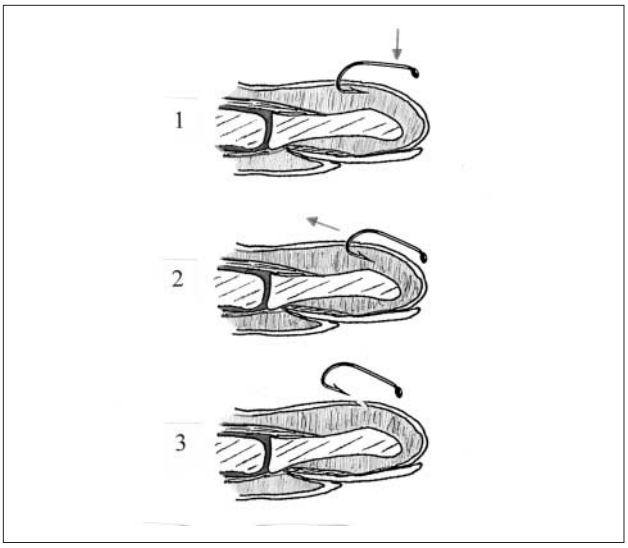


Fig. 3. Simple Retrograde technique.

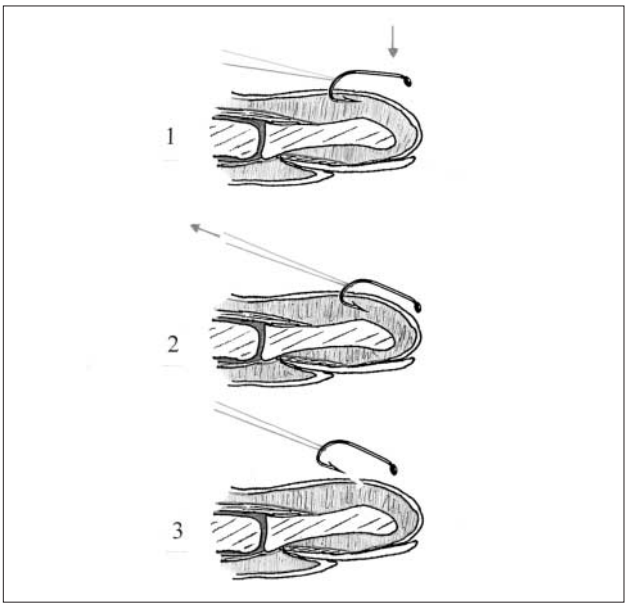


Fig. 4. String-pull (or String-yank, Strong-yank or Stream-side) technique.

ter technique is recommended for hooks with multiple barbs on the shank.

4. Needle-Cover technique

Also known as the Barb-Sheath technique, the Needle-Cover technique consists of inserting an 18-gauge (or larger) needle parallel to and along the inside curvature of the hook (Fig. 6). The needle is inserted via the entry wound so that it will incise strands of tissue that hold the barb in place, as well as cover/sheath the barb (3). Make sure that the bevel of the needle is directed downward as it is being advanced and that the barb is well engaged before pulling back the hook as per the Simple Retrograde technique (4).

5. Cut-it-Out technique

The Cut-it-Out technique consists of making a small incision with a scalpel blade at the entrance wound (2) and then sliding the scalpel blade along the hook to the point of the fish hook (Fig. 7). After this incision is made, the fish hook is simply backed out of the wound as per the Simple Retrograde technique (3). If the hook is quite deeply embedded, authorities recommend using scissors or hemostats to bluntly spread and dissect down to the hook's barb so as to avoid the risks associated with blindly cutting deep into tissue; i.e., the cutting of vital structures. The Cut-it-Out technique can also be combined with the Needle-Cover technique or even the String-Pull technique. One of the advantages of this technique is that the wound is opened up so that complete irrigation of the wound tract is possible.

Wound care after hook removal

After removing the hook, re-cleanse the wound area with saline-soaked sterile gauze. If the wound is gaping and there is concern it remains contaminated with bait fragments or dirt, irrigate copiously with sterile saline again and decide whether the wound needs to be sutured or left open. Dry off the area with sterile gauze, apply antibiotic ointment (e.g., Polytopic [Polymyxin B, Bacitracin] or Bactroban [mupirocin 2%]), and cover with a simple dressing and adhesive bandage. Useful advice includes telling the patient to elevate the affected area as much as possible for the first 24–48 hours. The patient should be reminded about the risk of infection and told to return if signs of infection arise — erythema, discharge, pain and swelling. The patient

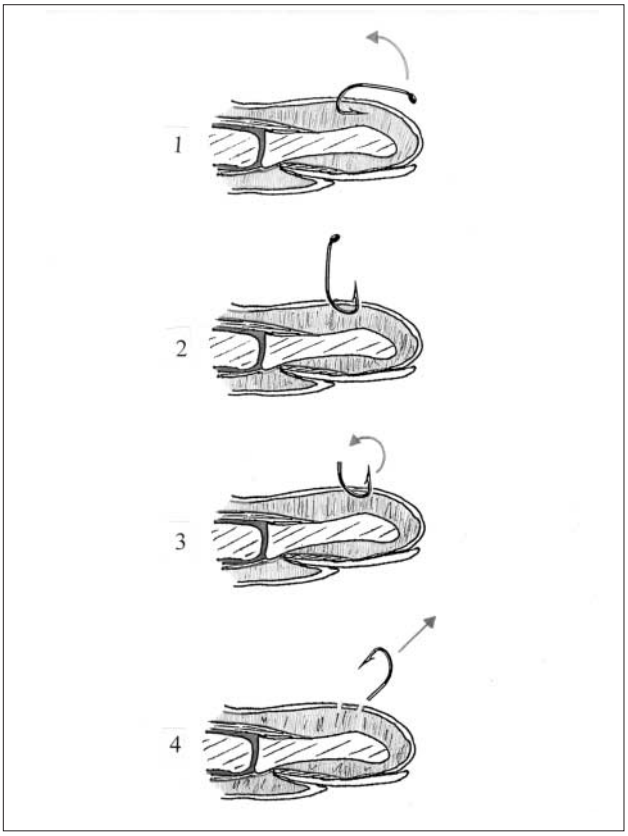


Fig. 5A. Advance-and-Cut technique (also known as the Pull-through Extraction technique).

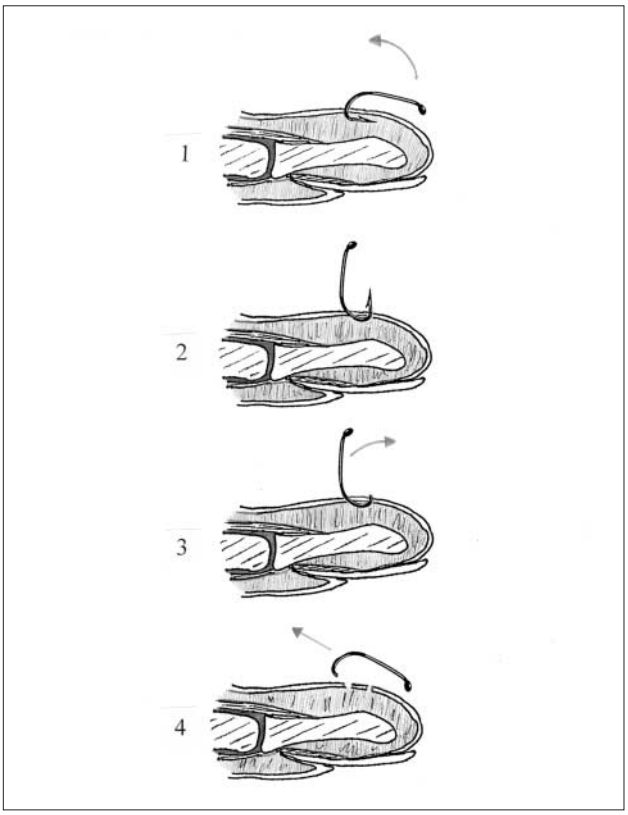


Fig. 5B. A variation of the Advance-and-Cut technique, recommended for hooks with multiple barbs on the shank.

should change the dressing daily and apply topical antibiotic ointment with each dressing change.

Tetanus toxoid and if necessary, tetanus immune globulin should be given if past tetanus immunization history suggests they are indicated. Prophylactic systemic antibiotics are generally not needed unless the hook injury is dirty and deep, or is associated with tendon, cartilage or bone injury. Patients who are immunosuppressed or prone to poor wound healings (e.g., diabetes, peripheral vascular disease) are also candidates for prophylactic antibiotic therapy. Remember that *Pseudomonas* species, *Aeromonas* species, and gram-negative bacteria are associated with freshwater fish hook injuries; and Vibrio organisms are associated with saltwater fish hook injuries. The prophylactic antibiotic chosen should cover these species.[7,13,14] I generally prescribe trimethoprim–sulfamethoxazole or ciprofloxacin for 3–5 days for fish hook injuries or fish-bite injuries, which occur while someone is fishing in freshwater in British Columbia. I would add cloxacillin or cephalexin if the wound is particularly worrisome. Unfortunately, there is little scientific data available on this aspect of wound care.

Nonsteroidal anti-inflammatory (NSAID) medication is usually all that is required for analgesia after removal of the fish hook. A routine follow-up appointment is recommended by some authorities, particularly if sutures are to be removed. Last but not least, remind your patient that fishing is a potentially sight-threatening pastime and recommend that they always wear protective eyewear.

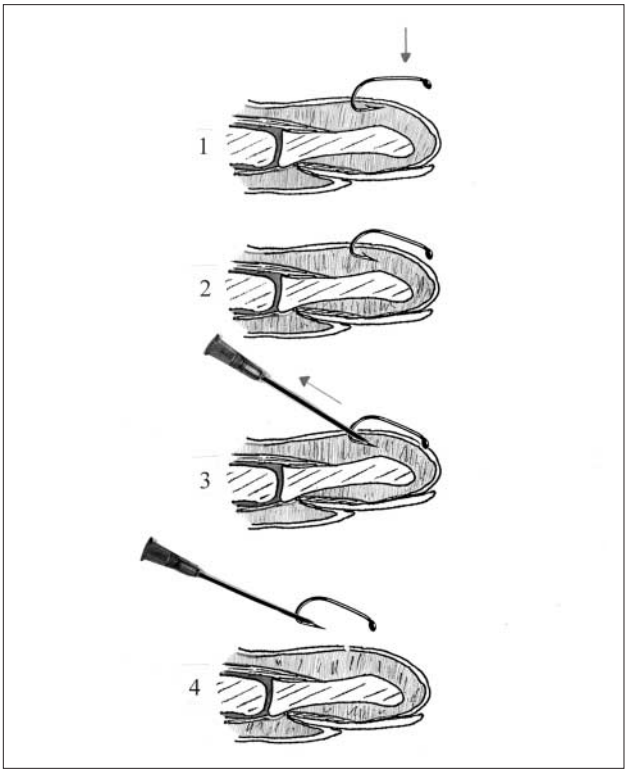


Fig. 6. Needle-Cover (or Barb-Sheath) technique.

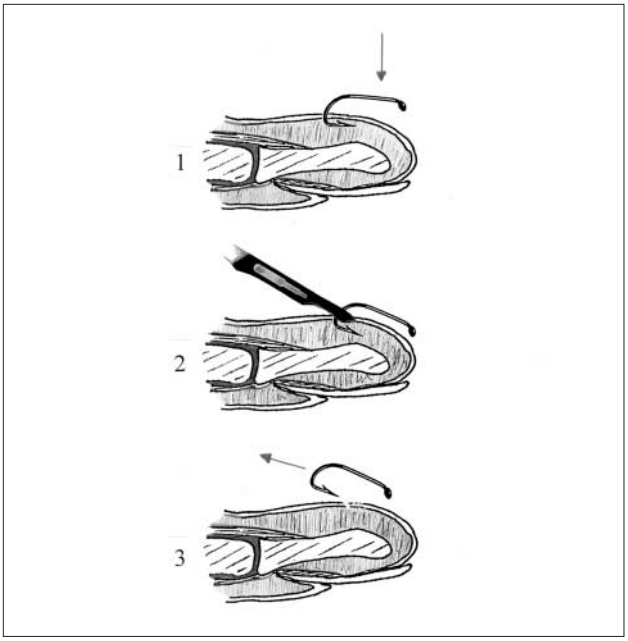


Fig. 7. Cut-it-Out technique.

Competing interests: None declared.

References

1. Hughes D. *American fly tying manual*. Frank Portland (OR): Amato Publications; 1986. p. 48.
2. Fisheries and Oceans Canada. *2000 Survey of Recreational Fishing in Canada Survey Highlights*. Available: www.dfo-mpo.gc.ca/communic/statistics/recreational/Canada/2000/index_e.htm (accessed 2005 Sept 6).
3. Eldad S, Amiram S. Embedded fishhook removal. *Am J Emerg Med* 2000;18:736-7.
4. Gammons M, Jackson E. Fishhook removal. *Am Fam Physician* 2001;63:2231-6.
5. Stewart C, Ruiz F, Winograd SM. Foreign body removal: a guide for ED physicians. *Emerg Med Rep* 1996;17:101-9.
6. Bramley A. On the sizing of hooks. *FlyTyer* 1988;Winter:76-9.
7. Scott PM. Removing a fishhook. *JAAPA* 2003;16:69-70.
8. David SS. Fish-hook removal. *Lancet* 1991;338:1463-4.
9. Reid AJ. Removal of fish-hooks. *Can Fam Physician* 1997;43:1063.
10. Graham P. Removal of embedded fish-hook. *Aust Fam Physician* 1995;24:691.
11. Kalyanasundaram TS, Depla D, Steel D. An unusual case of severe penetrating ocular injury with the shank of a triplet fish hook. *Eye* 2003;17:663-4.
12. Swanson PB, Apicella SA, Rosen CA. Removal of a triple-barbed fishhook from the hypopharynx with microlaryngoscopy. *Am J Otolaryngol* 2002;23:233-6.
13. Stephens M, Thommasen HV. Salmon-associated skin infections. *BC Med J* 1998;40:108-9.
14. Gilbert DN, Moellering RC Jr, Sande MA. *The Sanford guide to antimicrobial therapy*. 32nd ed. Hyde Park (VT): Antimicrobial Therapy, Inc.; 2002.

Country cardiograms case 28

John Pawlovich, MD, CCFP

Fraser Lake, BC

Correspondence to:
Dr. John Pawlovich,
Fraser Lake Medical Clinic,
PO Box 98, Fraser Lake BC
V0J 1S0

This article has been peer reviewed.

History

An 87-year-old woman presents to the emergency department complaining of shortness of breath with very minimal exertion, but no chest pain. She has a recent history of orthopnea and worsening ankle edema. She has a known history of chronic obstructive pulmonary disease and congestive heart failure. On examination her pulse is 63 beats/min and regular, blood pressure is 130/66 mm Hg and her respiratory rate is 24 breaths/min. She is afebrile. Her chest examination reveals bilateral crepitations from the bases to the mid level of each lung. Results of a CVS exam reveal a normal S1 S2 with positive S3 and no S4 (Fig. 1). Jugular venous pulse is 6 cm above the sternal angle with a positive hepatojugular reflux. She has a Grace 2 out of 6 systolic murmur heard loudest over the second intercoastal space along the right sternal boarder. There is no radiation of the murmur. She has +3 pitting edema in both lower limbs.

What is your interpretation of her ECG (below)?

For the Answer, see page 270.

Competing interests: None declared.

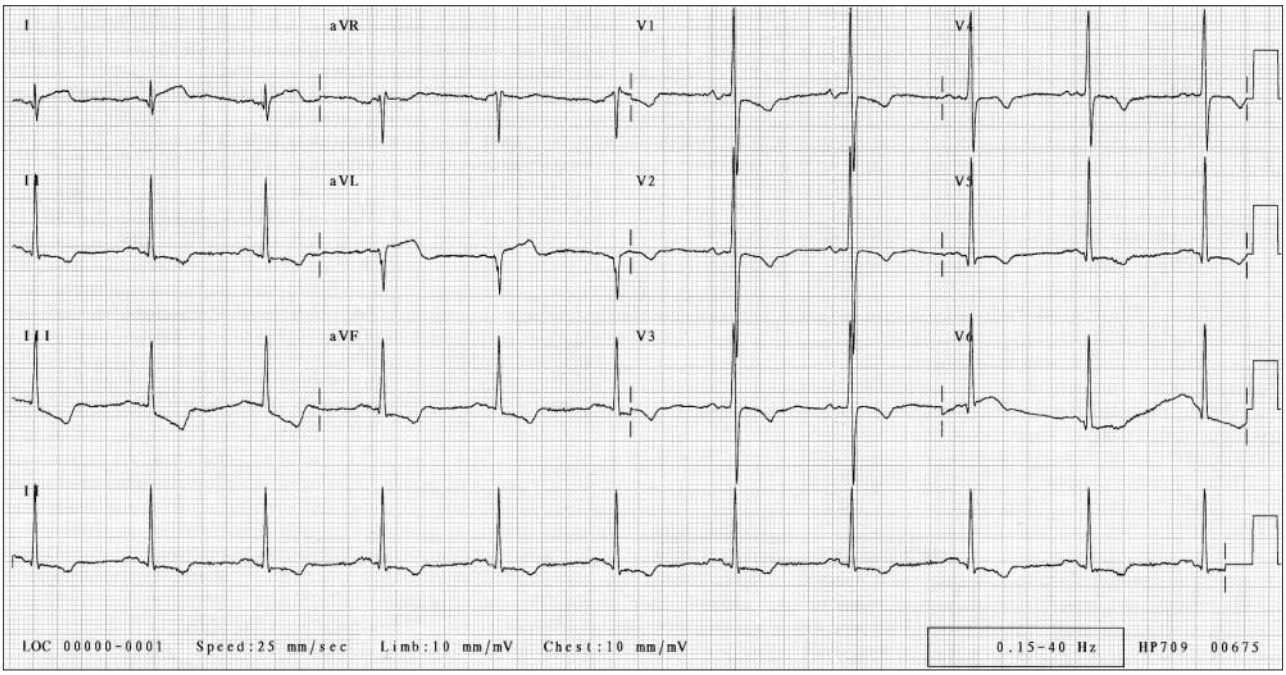


Fig. 1. ECG, done at the time of presentation to the emergency department.

Polar physician

Tia Renouf, MD, CCFP, CCFP(EM)

St. John's, Nfld.

Correspondence to:
Dr. Tia Renouf, Faculty of Medicine, Memorial University of Newfoundland, Health Sciences Centre, 300 Prince Phillip Dr., St. John's NL A1B 3V6;
trenouf@attglobal.net

I have made several trips to Antarctica and the Arctic as an Expedition Physician and always hope to be the idlest member of the crew. I was part of an experienced group of boatsmen, naturalists and expedition leaders whose skills ensure safe passage aboard 2 research vessels, travelling Polar regions in search of wildlife, icebergs and isolation. From these vessels, passengers are safely taken ashore to explore remote and beautiful parts of the Polar environment.

Antarctica and the Arctic can be sunny and calm, but the weather there can change in a moment and become the most unforgiving on earth. Expertise in planning finds the balance in safely providing memorable experiences while avoiding excess risk. As the Expedition Physician my role was to deal with illness and injury as it occurred. Prevention is by far the best treatment because the ship's infirmary is only basically equipped and definitive care is a long way away; it may not be available for several hours or days, depending on weather conditions and the ship's location.

Preparing the passengers

Injury prevention begins right in the passengers' cabins. The Drake Passage, famous for its spectacularly wild seas, must be crossed to reach Antarctica. Passengers are taught to "Drake-proof" their quarters by securing objects that could become projectile weapons in rough weather. "Keep one hand for the ship" is a common mantra to prevent falls. Passengers must step up and over doorjambs and keep their hands out of doorways because the door may suddenly close with a lurch of the ship. Decks can be slippery, a particular problem when passengers are in a hurry to get to a good vantage point for seeing a special event like a breeching whale.

Most days involve one or two departures from the ship on Zodiacs, small rubber dinghies that carry 12. Each Zodiac is carefully maintained to minimize engine trouble, and numerous backups are aboard to deal with unexpected problems. A "shore barrel" is brought ashore with each excursion and a "Zodiac barrel" remains with each boat. These waterproof containers hold boat repair kits, rations, water, thermal blankets, tents, sleeping bags, hypothermia suits, flares, whistles, compasses and emergency first aid kits.

In order to get to the Zodiacs passengers must descend a steep gangway, sometimes in rough and wet conditions. People's names are ticked off a list as they disembark. They have been taught to wear their packsacks on their back, thus freeing their hands to grip the handrails on both sides of the ladder. At the bottom, a sailor on the gangway hands the passenger over to a crew member on the Zodiac, using the "Sailor's grip." They immediately sit down and slide along the rubber pontoons to the rear of the craft. Packsacks are removed lest they tip the passenger backward and over the side. There is a similar procedure for exiting a Zodiac and getting ashore. Passenger understanding and compliance is the same in this setting as for medical situations; it is a great credit to an experienced crew that mishap is almost never encountered.

The unexpected

On one trip to Antarctica a Zodiac was punctured by a piece of ice. We had been cruising the waters, looking at several leopard seals. These seals,

unique to Antarctica, have no predators and have been known to injure and kill humans. As the Expedition Physician it was disquieting to see a boat carrying 12 passengers begin to deflate among a number of curious leopards. Fortunately the Zodiac has several independently inflated chambers; though the puncture deflated one part of the boat, it remained afloat and passengers were safely transferred to another boat. This was accomplished smoothly and quickly with a notable lack of panic, testament to a seasoned and experienced crew.

The older passenger

Many passengers are elderly and less than completely mobile. These people will have been identified early in the journey and will receive extra attention from the crew. The aim here is to prevent slip and fall injuries, which can range from lacerations and abrasions to fractures, dislocations and all manner of blunt trauma. Older passengers are often taking anticoagulants, clearly complicating trauma management.

The Expedition Physician accompanies the passengers on all excursions, usually having done a mental triage to assess who will be most likely in need of help. Physicians are connected via radio to all expedition staff and the ship's Captain. The physician cannot be everywhere at once but can be hailed over the radio and arrive quickly where needed. Some excursions involve hikes of several hours' duration for those fit enough, in addition to short walks for others. The physician must decide where he or she is to be optimally located; in reality an accident could occur hours away. Expedition staff are all trained in first aid and are able to operate the AED, which is always brought ashore.

The AED is part of a medical kit that is kept close at hand; this bag contains tools for airway management, rigid cervical collars, IV fluid and drugs for RSI and analgesia. There are thoracostomy kits and material for splinting and suturing, as well as a hypothermia blanket.

A medical emergency

On a recent Arctic excursion I was enjoying a Zodiac cruise on a perfectly clear sunny day. As we approached the ship I was radioed by a crew member — would I please return to the ship immediately to attend a passenger in the "mud room," the area of the ship where passengers remove life jackets and boots before proceeding inside. I was met with a COPD patient in obvious severe respiratory distress. His colour was grey and his lips cyanotic. He was able to speak in single words only; he looked at me and said, "oxygen." One hand held a salbutamol inhaler, but he was too dyspnoeic to use it effectively. Auscultating his chest revealed only the thrum of the ship's engines. His wife told me that he had become dyspneoic after ascending the gangway; he later admitted to a cough that started shortly after our journey began. He had only just finished a course of antibiotics and prednisone, and had a history of atrial fibrillation for which he took Coumadin. He had never been admitted to the ICU, but his wife related that he had been "just as sick" just 10 days before departure.

I guided him to take continuous puffs of Ventolin and gave him prednisone from the shore kit. He declined going to the infirmary where I could give him oxygen; in fact, getting him there would have been difficult because he couldn't walk, and navigating a stretcher around small corridors aboard a ship is problematic. He felt he would settle down if he was just allowed to relax and "catch his breath." I complied with this wish, though I knew that had he presented to my ED in this much distress he would have been whisked to the resuscitation room and given Bipap while I prepared for intubation.

The complexities of evacuation

This emergency happened off the coast of Baffin Island. Had the patient needed emergency evacuation, as I initially felt was likely, the Captain and expedition leader would have decided the means for this. This is a complex decision that depends on weather and sea conditions, the location of the ship and the nature of the patient's illness or injury. In general it is preferable to evacuate the patient to land because the level of care at even its most basic, for example a nursing station in the Canadian

Tia Renouf

Beechey Island, Lancaster Sound, site of the lost Franklin Expedition. Cross is made from some of the infamous tin cans, whose lead soldering contributed greatly to the death of Franklin and his crew.

North, is probably more advanced than shipboard. Because of changeable weather in Polar latitudes, there may be only a brief window of opportunity for evacuation from the ship, compared with more options for potential air evacuation (to higher levels of care) from land. This contrasts greatly with the situation aboard luxury liners, which are very well equipped and can care for ICU patients for greater periods of time, often until a port is reached.

Only basic care can be provided aboard small vessels travelling to extreme Northern and Southern latitudes. I was able to provide MDI salbutamol and oral prednisone to the patient described above, and could have performed an RSI. There was an AED to treat life-threatening arrhythmias. However, suction was rudimentary, as was the oxygen delivery system. There was no ventilator. Drugs were in limited supply. Only the first steps of critical care management can be provided on small ships, and transfer to land is the next step. There exists a debate in the literature whether small expedition vessels ought to have only a basic infirmary or a fully-stocked ICU as exists on large cruise ships.[1]

The realities of Polar travel are that definitive care can be a very long way away. Patients may or may not be able to be evacuated, depending on weather and the ship's location. In Antarctica there are some 40 research stations with well-equipped infirmaries, designed for semi-permanent residents. While there is usually a high degree of international cooperation in an emergency, their mandate is not to provide care for tourists.

Caring for the staff

In addition to being comfortable working with minimal tools, the ship's physician must be sensitive to the needs of the expedition staff. These people live aboard the ship for several months of the year, with little privacy. They are like a close-knit family. Staff interact with passengers constantly and must be personable and helpful regardless of stresses they may feel themselves. There is little opportunity for staff to find solitude and tend to their own needs. The Expedition Physician must be aware of this and, when necessary, act as the crews' counsellor and confidante. They are ideally able to do this because most Expedition Physicians are aboard for a short period of time and are relatively anonymous.

The medical log kept aboard small expedition vessels reveals a list of ailments that would present to any ED or doctor's office. There is no disease unique to the Polar environment; sun and cold-related problems are uncommon, probably because travellers are generally well-prepared to deal with the environment.[2] There have been reports of cardiac arrest, acute MI, DKA, anaphylaxis, malaria, ruptured ectopic pregnancy, acute appendicitis, significant head injury and laceration, and fracture dislocations, but mostly one sees URTIs, motion sickness, small lacerations, sprains and nonspecific complaints.[3]

Insurance coverage

Litigation is a difficult issue for Expedition Physicians. It is difficult if not impossible to get malpractice coverage while practising at sea. Patients may have a variety of levels of expectation. They are on holiday and expect high-quality care, but may not be fully aware of the realities of treating injuries and illnesses at Polar latitudes. Many companies ask

Tia Renouf

A glacier in the Canadian Arctic.

Tia Renouf

Iceberg in Pond Inlet ("Mittimatalik"), which is in the Baffin Region of the Canadian Arctic.

passengers to get "medical clearance" in order to travel. They must also buy insurance to cover the cost of medical evacuation.

There is a medical manifest available to the Expedition Physician; travellers are supposed to make the physician aware of any ongoing medical problems and medications. There are disincentives to being candid in completing these forms, however, and so many are incomplete.[4] The traveller wants to go on the journey and may not be frank about potential medical problems that may stop him or her. This leaves the Expedition Physician vulnerable; one might have sicker passengers than anticipated, have little in the way of medical equipment, and be exposed to litigation without malpractice coverage. Litigation would be extremely complex but, in fact, has never happened in the industry. Passengers are travelling in International waters aboard a Russian ship chartered by a company from a different country. A lawsuit in this setting is sufficiently complex to deter many cases. However, the passengers probably have a mixture of expectations about the medical "safety net" aboard the ship. Some of these expectations may not be realistic, and a poor outcome, more likely at sea than on land, could lead to litigation.

Could you do this?

What are the ideal characteristics of an Expedition Physician? Emergency physicians are most often recruited for their mix of expertise in acute care and the general nature of their skills. There is no "high tech" equipment available aboard a ship, so a degree of creativity is desirable in maximizing what is at hand. An urban EP might not be ideal for the job if he or she is heavily reliant on laboratory tests and radiology to diagnose and manage patients. Rural or remote physicians have a certain comfort level in being able to "fly by the seat of their pants" but may have rusty procedural skills.

There are often other physicians travelling as passengers on Polar voyages. Sometimes it is feasible to request their help, especially in dealing with mass casualties. In dealing with my COPD patient I was offered assistance by an internist who theorized that it would be useful to know the patient's baseline CO_2 level, as features of his presentation (presyncope before his acute respiratory distress) were in keeping with CO_2 narcosis. After some thought (possibly triggered by the look of incredulity on my face) he realized that would not have affected management in this setting, where my only tools were Ventolin inhalers, steroids and a Russian oxygen delivery system with Cyrillic operating instructions! There were 2 other physician passengers, a urologist and a neurologist. In caring for my patient, I was essentially alone. While I sat with him, guiding yet another puff of salbutamol, I did a lot of reflecting on what indeed might be ideal characteristics of an Expedition Physician. At the time, "anyone but me" seemed an ideal answer; however, I was grateful for my mixed background in emergency and remote/rural medicine. Thanks more to good luck and some element of reversible bronchospasm within my patient's COPD, the patient eventually settled down and was able to be managed aboard ship without a medical evacuation.

Memorial University of Newfoundland offers a unique 18-month program in Emergency Medicine and Enhanced Skills. This course offers a standard EM program in addition to 6 months of extra training in whatever skills a rural physician would like to enhance in order to maximize their practice. For example candidates could complete training in Anaesthesia, Plastics, ICU, Endoscopy or Ob/Gyn, to name a few. It is hoped that physicians having completed this training would have a greater comfort level practising rurally, given their enhanced skills. Such a physician might do well as an Expedition Physician.

Perks of the job

Working as Expedition Physician is both extremely gratifying and fraught with risk. Travelling in Polar regions, I have experienced magical natural wonders that I might never have seen otherwise. Calving glaciers, pods of endangered species of whale, northern lights, all seen from the bow of a ship travelling silently through extreme Northern and Southern latitudes; experiencing these have been some of my life's sentinel moments. I have followed the routes of explorers like Scott Shackleton and Franklin, and seen their graves or wondered where their graves might be. Sometimes I have worried that I may have to deal with a poor outcome in case of emergency, or that I have no malpractice coverage. Such are the realities of being an Expedition Physician.

Competing interests: None declared.

References

1. Lamberth P. Death in Antarctica. *Med J Aust* 2001;175:583-4.
2. Lugg DJ. Antarctica: Australia's remote medical practice. Hobart, Tasmania: Antarctic Division; 1993. p. 12.
3. Curry C, Johnston M. Emergency doctors by sea to Antarctica: small ship medicine in polar regions. *Emerg Med* (Fremantle) 2001;13:233-6.
4. Levinson JM, Ger E, editors. *Safe passage questioned: medical care and safety for the polar tourist*. Centreville (MD): Cornell Maritime Press; 1998.

Out Behind the Barn
Dans le feu de l'action

CMA Web site: InfoPOEMs

Barrie McCombs, MD, CCFP, CCFP(EM)

Director, University of Calgary Medical Information Service, Calgary, Alta.

Correspondence to:
Dr. Barrie McCombs, Director, University of Calgary Medical Information Service, 3330 Hospital Dr. NW, Calgary AB T2N 4N1; bmccombs@ucalgary.ca; www.ruralnet.ab.ca/medinfo/

Mary had a little lamb,
It followed her to school,
It went behind the teachers desk,
And left a little pool.

That children's poem is an interesting case study in overflow incontinence, hazardous waste disposal and livestock management. However, the POEMs discussed in this article are part of the CMA's new InfoPOEMs database.

What's a POEM?

A POEM (Patient-Oriented Evidence that Matters™) is a short review of an article in the medical literature that is relevant to primary care physicians. Specialists may also find them a useful way to stay up-to-date in fields outside their own. POEMs must meet 3 criteria: 1) answer a question that we physicians face as clinicians; 2) measure outcomes that we and our patients care about (e.g., symptoms, morbidity, quality of life and mortality); and 3) have the potential to change the way we practise.

Accessing POEMs through the CMA Web site

Access to InfoPOEMs through the Canadian Medical Association's Web site is free to all members, but registration is required. Go to the CMA Home page (www.cma.ca), select Clinical Resources, then InfoPOEMs Clinical Tools.

Daily InfoPOEMs

You can have a new POEM sent to you by email every weekday. You can choose to receive the messages in plain text or HTML. Plain text is more compact, but HTML format will display active hyperlinks. To receive daily InfoPOEMs, click on the links provided or go to the CMA's My Profile section, under Email Information.

InfoPOEMs Archive

An option is provided to browse the InfoPOEMs Archive by month and year, or enter a search term to find all related items. To print a POEM, use the Print It link rather than your browser's print feature.

Level of evidence

When on the Daily POEM Archive page, choose a POEM. You'll note that at the end of the Bottom Line section of each POEM there's a code stating the applicable level of evidence (LOE) (e.g., 1a, 1a–, 1b, 2a). Click on the code to display a pop-up list of the different levels of evidence. Right-click on this list to print a copy.

InfoRetriever® Database

The InfoRetriever database contains all POEMs, and more (see "InfoRetriever Options, below). Simply click on Visit InfoRetriever Now at the bottom of the InfoPOEMs Home page.

InfoPOEMs Web site

The Visit InfoRetriever Now link takes you to the InfoPOEMs Online Access Web site and opens the Welcome page in a new browser window. To see this new page, you may need to disable the "pop-up blocker" feature of your browser program. Don't bother with the listed video tours, as they may require you to download additional software and are very slow to load, even over a high-speed Internet connection.

Getting started

While on the InfoPOEMs Welcome page, click on Getting Started to see an overview of available resources, then select Using the InfoRetriever Program (last item), followed by Using InfoRetriever. To return to the Welcome page, you may need to use your browser's Back button. Some of the information is only applicable if you have an individual InfoPOEMs subscription.

InfoRetriever: Initiating a search

To initiate a search through InfoRetriever, return to the InfoPOEMs Welcome page and click on InfoRetriever. Enter a search term, then click on Find Matching Keywords. The default is a text search in all available databases, not just the InfoPOEMs Archive. Other search options allow you to select from a list of key words or to search by ICD-9 (*International Classification of Diseases*, 9th rev) codes. Several options are provided for narrowing your search.

InfoRetriever Options

Clinical rules and calculators: This option under the InfoRetriever menu displays a list of several rules and calculators, organized by body system. Some calculators, such as the Body Mass Index, have a metric option, but others have no option to enter the International System (SI) laboratory values used in Canada.

Title:

No antibiotics necessary for lower respiratory infection

Clinical question:

What is the optimal management strategy for acute uncomplicated lower respiratory tract infection?

Bottom line:

After excluding patients with chronic lung disease or clinically suspected pneumonia, antibiotics provide little or no benefit for patients with cough and lower respiratory tract symptoms, including those with fever and green sputum. Regardless of treatment method, cough will last about 3 weeks for the majority of patients and for at least 1 month in 25%. Patients given an immediate prescription for an antibiotic are more likely to expect antibiotics in the future. Providing a verbal explanation about the expected course and potential complications of cough during the consultation is most likely to assure optimal patient satisfaction.

Reference:

Little P, Rumsby K, Kelly J, et al. Information leaflet and antibiotic prescribing strategies for acute lower respiratory tract infection. A randomized controlled trial. *JAMA* 2005;293:3029-35.

Study design:

Randomized controlled trial (single-blinded)

Setting:

Outpatient (primary care)

Synopsis:

The investigators enrolled 807 adults and children presenting to their primary care clinician with cough and at least 1 other symptom referable to the lower respiratory tract (colored sputum, chest pain, dyspnea, or wheezing). Patients with asthma, other chronic lung diseases, or suspected pneumonia were excluded. Subjects were randomly assigned (concealed allocation assignment) in a factorial design to 1 of 6 groups: They received an educational leaflet on cough or no leaflet, and were then placed in 1 of 3 antibiotic groups (immediate antibiotics, no offer of antibiotics, or delayed antibiotic).

Antibiotic treatment included amoxicillin 250 mg 3 times daily or erythromycin 250 mg 4 times daily. The delayed prescription could be picked up from the receptionist up to 14 days later without further physician contact. Patients were similar to those seen with acute bronchitis in primary care practice: 2 in 3 patients reported fever and more than 40% reported production of colored sputum. Patients not blinded to treatment group assignment self-reported symptoms for 3 weeks. Follow-up occurred for 70% of the subjects at 3 weeks.

Using intention-to-treat analysis, there was no significant difference in the duration of cough or severity of cough or other symptoms between patients receiving or not receiving antibiotics. The duration of "moderately bad symptoms" was shorter in the immediate antibiotic group, but only by 1 day. Cough lasted a mean of 12 days regardless of treatment, with 25% of patients reporting a cough lasting more than 17 days, after physician consultation (which is usually 7 to 10 days after the cough began). Children and adults with colored sputum did not benefit more than other groups and elderly patients were less likely to benefit from antibiotics. Compared with the immediate antibiotic group, fewer patients in the delayed and control groups used antibiotics (96% vs 20% and 16%, respectively). The leaflet had no effect on any outcomes. Although slightly fewer patients were satisfied in the delayed and control groups, more than 75% of patients were satisfied with not receiving an immediate prescription for an antibiotic. The study was 80% powered to detect an 11% difference in reconsultation rates.

A sample POEM from August 17, 2005.

Practice guidelines: This option displays a pull-down menu of clinical guidelines from the US National Guideline Clearinghouse. For Canadian guidelines, use the Clinical Practice Guidelines link on the CMA Clinical Resources page.

Internet resources: Allows you to search selected Internet-based resources, including MEDLINE, a dermatology atlas (Dermis.net) and the US Centers for Disease Control and Prevention (CDC). The MEDLINE search engine is fine for a simple search, but is not as powerful as PubMed (www.pubmed.gov).

Individual databases: Gives direct access to a number of other resources, such as the Cochrane database, InfoPOEMs Archives and the 5-Minute Clinical Consult (5MCC). Some of these resources also have direct links to PubMed. The 5MCC is a well-known quick-reference medical text that gives you the option to browse by body system. To search for a topic by name, use InfoRetriever's Search By Text feature.

InfoPOEMs Archive revisited

Note that the Archive link on the InfoPOEMs database provides some features that are not available in the version you access through the CMA Web site — such as the ability to download the archives in PDF format, to display the MEDLINE abstract of the original article and to see a list of the journals that are reviewed as sources of POEMs. A search can be limited to different sections of the POEM, such as Title, Clinical Question, Synopsis and Bottom Line.

InfoPOEMs for PDAs

The PDA version of InfoPOEMs and InfoRetriever is available for both Palm and Windows Mobile (Pocket PC) devices. You can purchase it at a discount in the CMA's online store.

Competing interests: None declared.

Residents' Page
Page des résidents

The diversity of Family Medicine Fellowship programs

Angela Naismith, BSc, MD

PGY-2 Family Medicine Resident; and Chief Resident, Moncton Site, Dalhousie University, Halifax, NS; Resident Committee Executive Member, SRPC

Jean Warneboldt, MD

Resident Committee Chairperson, SRPC

Correspondence to: Jean Warneboldt; jean_warneboldt@alumni.sfu.ca

Autumn has fallen. This is a bustling time of year full of coloured leaves, school-supply shopping and 3rd-year fellowship applications. Those interested in a 3rd-year fellowship are busy preparing resumes and cover letters and organizing references for another application process.

Of the Family Medicine Fellowship programs, Emergency Medicine is the most formally recognized program with an accompanying licensing exam. However, it is far from the only program available. If it is diversity you are after, you have chosen the correct career path. Options abound! Whether you are a family medicine resident wondering if that rotation can be more than a passing interest, or a physician in a rural community where an area of need has been identified, there are opportunities for you.

A good place to obtain information is the College of Family Physicians of Canada Web site (www.cfpc.ca). Under the 'Students and Residents' tab, there is a breakdown of many available 3rd-year programs and links to most Canadian university Web sites. The 3 programs widely recognized and most formally organized are Emergency Medicine, Anesthesia and Palliative Care. However, new programs are continually under development (Table 1). One of the exciting new programs that is peeking over the horizon is Research.

Table 1. Options for PGY3 years from Canadian universities

Emergency Medicine
Anesthesia
Palliative Care
Advanced Obstetrics
Maternal and Child Health
Women's Health
Surgery
Psychiatry
Care of the Elderly / Geriatrics
Sports Medicine
Addictions
International Health
Environmental Health
AIDS/HIV
Aboriginal Health
Breast Diseases
Academic Family Medicine
Research

In addition to these programs, many academic centres have flexible Enhanced Skills options that vary in length from 2 months to 1 year and are tailored to the enterprising resident. They are designed by you to fit your particular need. The bottom line is that if you have an interest for which there is an established need, contact the Family Medicine department at your nearest university to explore, and reach, your goal.

All these exciting options exist to broaden our horizons, but at what cost? There are basically 2 ways to obtain funding to support yourself through training. One is with a return of service contract, which is often 1:1 to the time spent training. The other option is to obtain funding through the university or province. As with the first 2 years of residency, this has no return-of-service requirement. The salaries are based on the Resident contract for PGY3s for each province, and range from approximately $45 327–$53 455.

Fellowship training provides an illustration of the options that exist in our field. Family Medicine continues to offer us variety at every turn. Options, such as those provided by these training programs, create colleagues as diverse as the colours of the autumn leaves.

Letters / Correspondance

Please send us your comments and opinions. / Nous serons heureux de recevoir vos commentaires et opinions. Letters to the editor should be addressed to: / Prière de faire parvenir les lettres à la rédaction à l'adresse suivante :a

CJRM, Box / CP 1086, Shawville QC J0X 2Y0; fax 819 647-9972, cjrm@ca.inter.net

For the record...

In the "Medicolegal issues" section of their Spring 2005 article[1] Worster and colleagues stated: "CNPS assistance is available up to $2 million for each occurrence to a maximum of $3 million per year . . .". This should read "CNPS assistance is available up to $5 million for each occurrence to a maximum of $5 million per year . . ." (Patricia A. McLean, Executive Director, Canadian Nurses Protective Society: personal communication, 2005; Wilma Kirenko, Chair, Nurse Practitioners' Association of Ontario: personal communication, 2005).

In their "Legislation and regulatory issues" section the authors[1] incorrectly stated (p. 91) that a physician is required to interpret the 101 laboratory tests listed in the *RN(EC) Practice Standard*. In fact, physicians are not required to interpret any of the now 103 investigations that an RN(EC) can do (Heather Campbell, Director, Practice and Policy, College of Nurses of Ontario: personal communication, 2005; Wilma Kirenko, Chair, Nurse Practitioners' Association of Ontario: personal communication, 2005). To view the *Practice Standard* and the *RN(EC) Drug and Laboratory Lists* please see URLs provided below.[2,3]

References

1. Worster A, Sardo A, Thrasher C, Fernandes C, Chemeris E. Understanding the role of nurse practitioners in Canada [published erratum appears in *Can J Rural Med* 2005;10(3):190. Sarco, Arlene (corrected to Sardo, Arlene)]. *Can J Rural Med* 2005; 10(2):89-94.

2. College of Nurses of Ontario. *Practice Standard. Registered Nurses in the Extended Class*. Available: http://search.freefind.com/find.html?id=2366123&pageid=r&mode=ALL&n=0&query=RN%28EC%29 (accessed 2005 Sept 20).

3. *RN(EC) Drug and Laboratory Lists: Drugs that may be prescribed by Registered Nurses in the Extended Class (Amended August 2004) - Nursing regulation 275*. Available: www.cno.org/docs/prac/41059_Rneclablist.html (accessed 2005 Sept 20).

Instructions for Authors

The *Canadian Journal of Rural Medicine* (*CJRM*) is a quarterly peer-reviewed journal available in print form and on the Internet. *CJRM* seeks to promote research into rural health issues, promote the health of rural (including native) communities, support and inform rural practitioners, provide a forum for debate and discussion of rural medicine, provide practical clinical information to rural practitioners and influence rural health policy by publishing articles that inform decision-makers.

Material in these areas will be considered for publication. **Original articles:** research studies, case reports and literature reviews of rural medicine. **Commentary:** editorials, regional reviews, opinion pieces. **Clinical articles:** practical articles relevant to rural practice. Illustrations and photos are encouraged. **Off Call articles:** a grab-bag of material of general interest to rural doctors (e.g., travel, musings on rural life, essays). **Cover:** artwork with a rural theme.

Manuscript submission: Submit 3 hard copies of the manuscript to the Editor, *CJRM*, Box 1086, Shawville QC J0X 2Y0; 819 647-2972, fax 819 647-9972, and an electronic version to cjrm@lino.com. Include a covering letter indicating that the piece has not been published or submitted for publication elsewhere. Hard copies of the manuscript should be double-spaced, with a separate title page, an abstract of no more than 200 words, followed by the text, full references and tables (each table on a separate page).

"Uniform requirements for manuscripts submitted to biomedical journals": see www.cmaj.ca/misc/ifora.shtml

Written permissions: Written permission must be provided for reproduction of previously published material, for illustrations that identify human subjects, and from any person mentioned in the Acknowledgements or cited as the source of a Personal Communication.

Illustrations and electronic figures: Illustrations must be good quality unmounted glossy prints no larger than 8 × 10 in (20.3 × 25.4 cm). If figures are submitted electronically they should meet the specifications outlined in www.cma.ca/cjrm (click on "Instructions for Authors").

References: Please ensure that references are not prepared using electronic EndNotes or Footnotes.

Accepted manuscripts: Authors will be required to submit the most recent version of the manuscript by email or on diskette. Please specify the software used.

Country cardiograms case 28: Answer

John Pawlovich, MD, CCFP

Fraser Lake, BC

ECG INTERPRETATION

Normal sinus rhythm at a rate of 63 beats/min. There is evidence of left and right ventricular hypertrophy with repolarization changes. Interpretation of the ECG (Fig. 1) reveals the following . The R-wave in lead VI, in addition to the S-wave in lead V5 or V6, is >1.10mV, which meets the criteria of right ventricular hypertrophy. The S-wave in VI in addition to the R-wave in V5 is >3.5mV, which meets the criteria for left ventricular hypertrophy. There are ST-T changes throughout the ECG, which are consistent with repolarization changes associated with the biventricular hypertrophy. The axis is approximately 95°, which is consistent with right axis deviation. The left atrial abnormality is noted by the duration of the terminal, negative portion of the P-wave in lead VI (>0.04 sec). This is the most sensitive criterion for left atrial enlargement.There is also a wide notched P-wave in lead II, which is the most specific criterion for left atrial enlargement.

For the Question, see page 260.

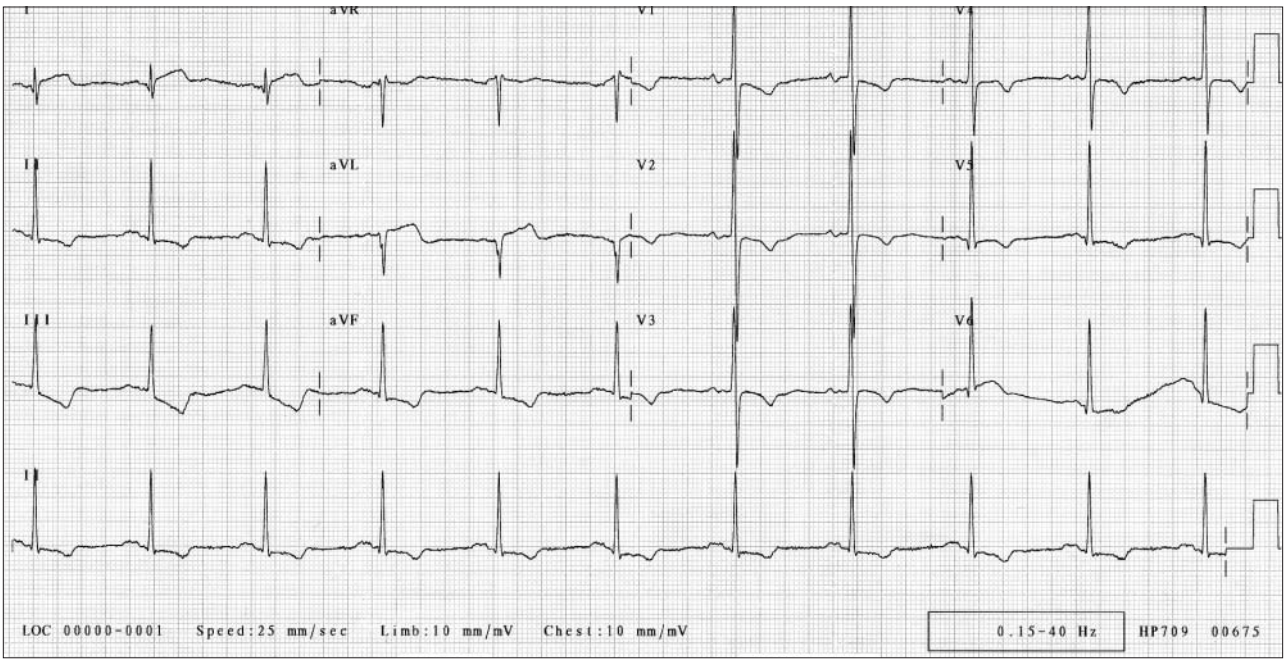


Fig. 1. ECG (as shown in the Question section, page 260), done at the time of presentation to the emergency department.