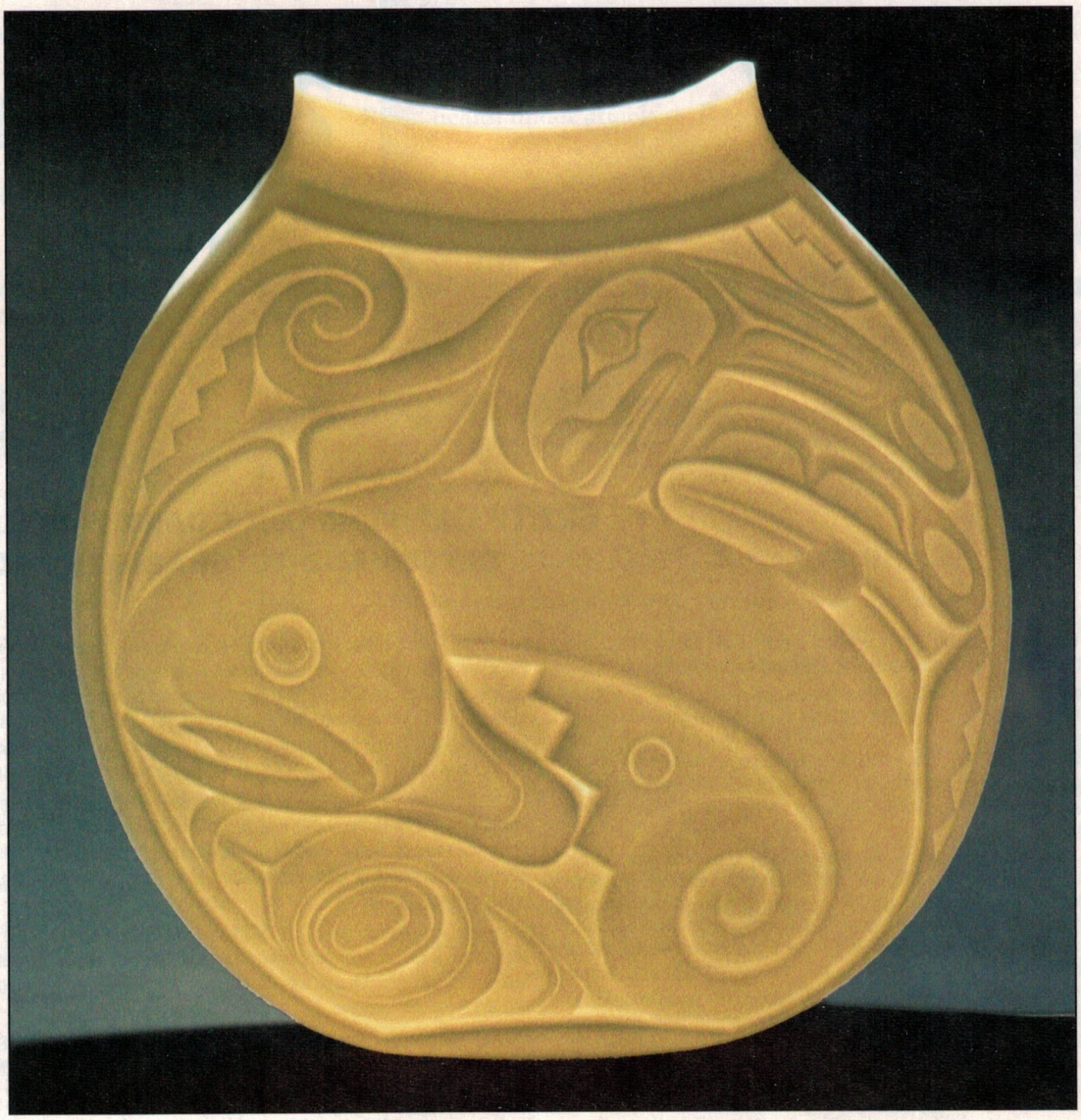
Canadian Journal of Rural Medicine

Journal canadien de la médecine rurale



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Salmon Child

Fine bisque porcelain, high fired cone 10, very translucent; 9.5" (h) ×9.25" (w), thickness 4.5". © 2007 Terry Jackson, Rock Creek, BC

"This vase, which has 2 faces, depicts the salmon — a great food source for everyone. With my people, the Metis , the buffalo was the main resource, yet they almost disappeared after deliberate programs by government and others. The West Coast Nations had specific stories to honour the salmon. One concerns the story of Salmon Child who sacrificed himself every year to the people so they could live."

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Rural health under attack

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I've handled highway trauma, difficult deliveries and heart attacks by the score, but, as a rural doctor, nothing drives fear into my heart more than a threat to my tools of the trade — the nurses, equipment and support that a hospital represents. Yet, throughout this country, whenever the budgets need trimming, rural hospitals are being closed.

If we envision the health care system as a wheel, and narrowly focus on the region without looking at the whole picture, getting rid of one of the spokes takes money from the powerless and uses it to spare the powerful hub. However, from the point of view of a patient out on the spoke, out-of-pocket costs for the patient and his or her family are always increased with service closure. The community often loses its first or second largest employer. Unemployment increases as support jobs go.[1]

Is there any real money saved? The car collision, the pneumonia and the birth will still occur somewhere. When the per capita cost of health care for rural patients is already lower than that in the specialist- and equipment-rich city — the full-service rural hospital is a very efficient beast[2] — how exactly do you save money by moving care to the city? Savings will only occur by denying care.

Even when the smallest, least efficient 2 doctor–type hospitals are closed on a massive scale, the actual money saved is insignificant on a provincial ministry level. The former Saskatchewan minister of finance, Janice MacKinnon, reflecting back on the 1993 closure of 52 rural hospitals, conceded that at best $40 million was saved.[3]

Can city hospitals give better quality care? Of a vast number of procedures that the Canadian Institute for Health Information studied, only 3 rare and specialized surgeries that rural hospitals don't do (such as a Whipple procedure) require volume for best outcome.[4] Quality measures, including care for labouring mothers and their infants, studied in both Northern Ontario and British Columbia show first-class outcomes occur when teams of caring professionals provide care in a small local hospital.[5] The question that really needs to be asked is whether transferring patients, even to an excellent city centre, improves rural outcomes. American studies show that if women have to travel to give birth (even to excellent centres) outcomes are worse and costs double.[5]

Closing rural hospitals is a mean-spirited substitute for system reform. The work out here is already hard enough. Don't make it any harder than it needs to be.

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La santé rurale attaquée

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J'ai traité des dizaines de traumatismes routiers et de crises cardiaques et pratiqué beaucoup d'accouchements difficiles mais comme médecin rural, rien ne me fait plus peur qu'une menace à mes outils professionnels : les infirmières, l'équipement et le soutien d'un hôpital. Or, partout au pays, chaque fois qu'il faut sabrer dans les budgets, on ferme des hôpitaux.

Si nous imaginons le système de santé comme une roue et que nous nous concentrons étroitement sur une région sans regarder le tableau d'ensemble, c'est comme de retirer un des rayons de la roue : on enlève de l'argent aux rayons impuissants pour protéger le moyeu puissant. Pour le patient qui se trouve sur le rayon, la fermeture de services augmente toujours ses dépenses personnelles et celles de sa famille. La communauté perd souvent son premier ou deuxième employeur en importance. Le chômage augmente à mesure que les emplois de soutien disparaissent[1].

Mais réduit-on vraiment les dépenses? L'accident de la route, la pneumonie et la naissance se produiront quand même quelque part. Lorsque le coût par habitant des soins de santé dispensés aux patients ruraux est déjà inférieur à ce qu'il en coûte dans la ville spécialisée et riche en équipement (l'hôpital rural tous services est très efficace[2]), comment exactement réduit-on les dépenses en déplaçant les soins vers la ville? On n'obtient des économies qu'en refusant des soins.

Même lorsqu'on ferme à grande échelle les hôpitaux les plus petits et les moins efficaces, comme ceux qui ne comptent que deux médecins, la réduction réelle des dépenses est insignifiante à l'échelle d'un ministère provincial. Au sujet de la fermeture de 52 hôpitaux ruraux en 1993, l'ancienne ministre des Finances de la Saskatchewan, Janice MacKinnon, a admis que l'on avait réduit les dépenses d'au plus 40 millions de dollars[3].

Les hôpitaux urbains peuvent-ils donner des soins de meilleures qualité? Parmi le vaste éventail d'interventions étudiées par l'Institut canadien d'information sur la santé, seulement trois chirurgies rares et spécialisées qui ne sont pas pratiquées dans les hôpitaux ruraux (l'intervention de Whipple, par exemple) exigent du volume pour produire les meilleurs résultats[4]. Les mesures de la qualité, y compris le soin des mères en travail et de leur nouveau-né, analysées à la fois dans le nord de l'Ontario et en Colombie-Britannique, montrent que l'on obtient des résultats de première qualité lorsque des équipes de professionnels dispensent des soins dans un petit hôpital local[5]. La question qu'il faut vraiment poser, c'est si le transfert de patients, même vers un excellent centre urbain, améliore les résultats ruraux. Des études américaines montrent que si les femmes doivent se déplacer (même vers d'excellents centres) pour accoucher, les résultats sont pires et qu'il en coûte deux fois plus cher[5].

La fermeture des hôpitaux ruraux est un moyen mesquin d'éviter une réforme du système. Le travail ici est déjà assez difficile. Inutile de le rendre inutilement plus difficile encore.

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President's message. Reflections from Laos

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Laos has a population that is 70% rural, water that must be boiled before drinking, a population with a short life expectancy, and high rates of infant and maternal mortality. I have been working with the country's single medical school to increase its production of doctors to serve the needs of the rural population. This causes me to reflect on what makes a difference to the health of the people in any country. Which investments will create the biggest improvement in health? How can we improve on the 3 year–shorter life expectancy and poorer health status of rural Canadians?

Worldwide, higher family income and freedom from violence are strongly correlated with life expectancy. Initiatives aimed at community safety and employment will create improvements in health and longevity. Clean water and a secure food supply are prerequisites for good health. Many Aboriginal communities in Canada have coped for years with high levels of violence and unemployment. Unsafe drinking water has been a fact of life in many remote Aboriginal communities, and now, increasingly, in the rest of rural Canada. It's time to ensure safe living conditions, access to employment and clean drinking water for all Canadians. The money spent will reduce health care costs and provide an economic stimulus where it's been needed for years.

Public health and vaccines remain as important as ever, and most of Canada has access to vaccines. As governments look for ways to save money, we must remind them that cutbacks in these programs will eventually cost far more than the money saved.

What about health care? After income, safety, clean water, public health and vaccination, the contribution of medical services to the health of a country is modest. Studies looking at health indicators such as life expectancy have shown that access to primary care improves health; access to specialist care does not.[1–3] If we want our tax dollars to be used effectively, spending should be focused on improving access to primary care for all Canadians. For rural Canada, spending should focus on what is required to attract and retain family doctors, nurses and other medical staff. To do this, governments and health authorities need guidance: What are the necessary community supports to make rural practice attractive and viable? Does the presence of a hospital affect access to primary care? Does the range of services offered by a hospital make a difference in the recruitment of primary care doctors and nurses? What specialty services are required to enable a particular community to attract and retain primary care physicians and nurses? How can specialized urban hospitals better serve the needs of all people in their catchment area? Do all hospitals even have an identified catchment area? How accessible are these hospitals' services for rural people?

Research would help, but in the absence of studies, the best expert advice will come from those working at the front lines of rural primary health care: our Society of Rural Physicians of Canada.

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Message du président. Réflexions au sujet du Laos

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La population du Laos est rurale à 70 %. Il faut faire bouillir l'eau avant de la boire, la population a une faible espérance de vie et les taux de mortalité infantile et maternelle sont élevés. Je collabore avec la seule faculté de médecine du pays pour augmenter le nombre de médecins qu'elle forme afin de répondre aux besoins de la population rurale. C'est ce qui m'amène à réfléchir à ce qui fait une différence pour la santé d'une population de n'importe quel pays. Quels investissements amélioreront le plus la santé? Comment améliorer l'espérance de vie plus courte de trois ans et l'état de santé moins bon des Canadiens ruraux?

Partout dans le monde, les populations qui bénéficient d'un revenu familial plus élevé et qui vivent dans un milieu exempt de violence ont une meilleure espérance de vie. Des initiatives visant la sécurité communautaire et l'emploi amélioreront la santé et accroîtront la longévité. Une bonne santé passe obligatoirement par de l'eau propre et la sécurité alimentaire. Beaucoup de communautés autochtones du Canada se débrouillent depuis des années face à des niveaux élevés de violence et de chômage. L'eau potable insalubre est une réalité de la vie pour beaucoup de communautés autochtones éloignées et maintenant, de plus en plus, pour d'autres régions rurales du Canada.

Le moment est venu de garantir à tous les Canadiens des conditions de vie sécuritaires, l'accès à l'emploi et de l'eau potable propre. L'argent dépensé réduira les coûts des soins de santé et injectera un stimulant économique là où le besoin s'en fait sentir depuis des années.

La santé publique et les vaccins demeurent tout aussi importants que jamais et la majeure partie de la population du Canada a accès aux vaccins. Au moment où les gouvernements cherchent des moyens de réduire les dépenses, nous devons leur rappeler que les compressions de ces programmes finiront par coûter beaucoup plus cher que l'argent économisé.

Et qu'en est-il des soins de santé? Après le revenu, la sécurité, l'eau propre, la santé publique et la vaccination, la contribution des services médicaux à l'état de santé d'un pays est modeste. Des études portant sur les indicateurs de la santé comme l'espérance de vie ont montré que l'accès aux soins primaires améliore la santé, ce qui n'est pas le cas de l'accès aux spécialistes[1-3]. Si nous voulons que l'argent de nos impôts soit utilisé efficacement, il faut concentrer les dépenses sur l'amélioration de l'accès aux soins primaires pour toute la population canadienne. Dans le cas du Canada rural, les dépenses devraient viser à attirer et garder des médecins de famille, des infirmières et d'autres membres du personnel médical. À cette fin, il faut guider les gouvernements et les régies de la santé : Quels sont les moyens de soutien communautaires nécessaires pour rendre la pratique en milieu rural attrayante et viable? La présence d'un hôpital a-t-elle une incidence sur l'accès aux soins primaires? L'éventail des services offerts par un hôpital fait-il une différence dans le recrutement des médecins de première ligne et des infirmières? Quels services spécialisés

faut-il offrir pour permettre à une communauté d'attirer et de garder des médecins de première ligne et des infirmières? Comment les hôpitaux urbains et spécialisés peuvent-ils mieux répondre aux besoins de toute la population de leur secteur? Tous les hôpitaux ont-ils même identifié le bassin de population qu'ils desservent? Dans quelle mesure les services de ces hôpitaux sont-ils accessibles aux population rurales?

La recherche aiderait, mais comme il n'y a pas d'études, les meilleurs conseils experts proviendront de ceux qui œuvrent aux premières lignes des soins de santé primaires en milieu rural : notre Société de la médecine rurale du Canada.

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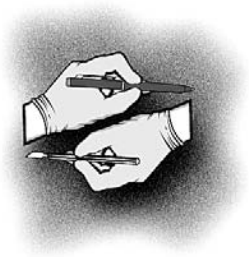

Brief smoking cessation interventions by family physicians in northwestern Ontario rural hospitals

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Introduction: We report on physicians' beliefs, confidence and clinical practice relative to the provision of smoking cessation interventions in northwestern (NW) Ontario, where tobacco use and tobacco-related disease prevalence are high and smoking cessation services are scarce.
Methods: Physicians working at the 12 rural hospitals in NW Ontario were eligible for inclusion in the study. Survey items included clinical practices based on the "5 A's" protocol for tobacco intervention, and beliefs about, confidence in, and barriers and facilitators to intervention.
Results: Physicians from 8 of the 12 hospitals responded. Almost all (> 91%) reported positive beliefs about providing smoking cessation interventions and were confident intervening. Relative to the 5 A's protocol for tobacco intervention, 100% of respondents ask, advise, assess and assist patients to quit smoking, and 89% arrange follow-up. The most frequent methods of assistance included pharmacotherapy, suggestions of specific actions to make it easier to quit and recommendations for alternatives to tobacco use. The most frequent barrier to intervenion was lack of time.
Discussion: Based on respondents' positive beliefs, confidence and current clinical practice relative to tobacco interventions, physicians in NW Ontario seem well positioned to play a key role in helping to reduce the high rates of tobacco use and tobacco-related diseases by providing smoking cessation interventions to patients who have been admitted to hospital.

Introduction : Notre rapport fait le point sur l'opinion, la confiance et la pratique des médecins en ce qui a trait à l'application de mesures antitabac dans le Nord-Ouest de l'Ontario, région où la prévalence du tabagisme et des maladies liées au tabac est élevée et où les services d'aide à l'abandon du tabac sont peu nombreux.
Méthodes : Les médecins de 12 hôpitaux ruraux du Nord-Ouest de l'Ontario pouvaient participer à l'étude. Le questionnaire portait sur les pratiques cliniques inspirées du protocole «5 A», sur l'opinion et la confiance des répondants à l'endroit des interventions et sur les facteurs susceptibles d'empêcher ou de faciliter leur mise en œuvre.
Résultats : Les médecins de 8 hôpitaux sur 12 ont répondu. La plupart (> 91 %) ont déclaré croire au bien-fondé des interventions antitabagisme et ont affirmé croire en leur efficacité. Vis-à-vis du protocole d'intervention antitabac 5 A, 100 % des répondants ont dit l'appliquer (c.-à-d., s'informer auprès de leurs patients, les conseiller, évaluer leur motivation et les aider à cesser de fumer) et 89 % ont dit exercer une forme de suivi. Les méthodes les plus fréquemment utilisées étaient, entre autres, la pharmacothérapie, des suggestions de mesures spécifiques à adopter pour faciliter l'abandon du tabac et la recommandation de solutions de rechange à l'usage du tabac. L'obstacle aux interventions le plus souvent invoqué était le manque de temps.
Discussion : Compte tenu de l'opinion favorable des répondants vis-à-vis des interventions antitabac, de leur confiance à cet égard et des pratiques cliniques actuelles, les médecins du Nord-Ouest de l'Ontario semblent en bonne position pour jouer un rôle clé dans la lutte au tabagisme et pour contribuer à réduire les taux élevés de tabagisme et de maladies liées au tabac en offrant des interventions antitabac à leurs patients hospitalisés.

INTRODUCTION

We report on physicians' beliefs, confidence and clinical practice relative to the provision of smoking cessation interventions to in-patients in northwestern (NW) Ontario rural hospitals. Tobacco use is the leading preventable cause of premature morbidity and mortality in developed countries,[1,2] and a substantial number of hospital admissions in Canada are attributable to tobacco-related diseases.[3] The provision of smoking cessation interventions to patients who are admitted to hospital has the potential to have a major impact on health and the costs and use of health care. Immediate benefits include significantly fewer intraoperative and postoperative complications and decreased recovery time.[4] Longer-term health benefits include decreased acute myocardial infarction or reinfarction, decreased cardiac and all-cause mortality,[5] and decreased hospital admissions and health care costs.[6–8]

Perhaps more so in NW Ontario than in the province's larger urban areas, physicians have the opportunity to play a key role in reducing the high rates of tobacco-related diseases. The smoking rates in NW Ontario are among the highest in the province[9] yet there are few smoking cessation services available in the rural communities. Clinical practice guidelines for smoking cessation recommend that physicians provide at least brief interventions (1–3 min) for their in-hospital patients who use tobacco.[10] Most medical associations have their own smoking cessation practice guidelines (e.g., Ontario Medical Association[11]), all of which follow the "5 A's" protocol: Ask patients if they use tobacco, advise them to quit, assess readiness to quit, assist with quitting (using counselling, cessation materials and first-line pharmacotherapy) and arrange follow-up.[10] Brief interventions (1–3 min) can be effective, although cessation increases with the intensity and frequency of the interventions provided.[10]

Both acceptance of smoking cessation interventions and cessation rates are higher for hospital-admitted patients than for the general population of smokers.[12] Provision of smoking cessation interventions during a hospital stay capitalizes on a "teachable moment" — smokers are more receptive to cessation initiatives when they feel vulnerable to illness, especially those with a smoking-related disease.[13] And the hospital situation supports cessation — many patients are too ill to go outside to smoke, they are removed from their daily cues to smoke and, because of hospital smoking bans, many will at least temporarily become nonsmokers and undergo their worst withdrawal during a hospital stay.[14]

METHODS

Sample and survey administration

All physicians working in rural communities in NW Ontario with an acute care hospital were eligible for participation in the study. The communities included Dryden, Sioux Lookout, Red Lake, Kenora, Fort Frances, Atikokan, Nipigon, Terrace Bay, Geraldton, Marathon, Manitouwadge and Hornepayne. The survey was distributed across communities from March to September 2007. We invited physicians to hospital presentations to inform them of the study, and study posters were placed around the hospitals. Distribution of the surveys to physicians was performed by each hospital; we encouraged hospitals to place surveys in physicians' hospital mailboxes as the preferred method for distribution. All surveys included a stamped return envelope. Hospitals were provided with a tally sheet to record the number of surveys distributed.

Measures

The survey instrument was adapted from a previously published survey.[15] The survey addressed 5 areas of smoking cessation: 1) physicians' clinical practices during patients' hospital stays based on the 5 A's protocol for tobacco intervention (18 items measured on a 4-point scale from "never" to "frequently"), 2) beliefs about tobacco interventions (5 items measured on a 4-point scale from "strongly disagree" to "strongly agree"), 3) confidence to provide interventions based on the 5 A's protocol (8 items measured on a 4-point scale from not "confident" to "very confident"), and 4) barriers and 5) facilitators to intervention (a series of 29 items in a check-all-that-apply format).

Basic demographics were also collected: area of specialization, years worked in current area of practice, employment status (full- or part-time) and tobacco use status. Also included were questions about the existence of hospital protocols or policies for identification and documentation of tobacco use, the types of materials available in the hospital to support tobacco interventions, perceived role relative to smoking cessation intervention, amount of time spent per patient counselling for smoking cessation, previous smoking cessation training received and desire for future smoking cessation training.

The survey and protocol, part of a larger study designed to determine the system- and clinician-level adherence to smoking cessation clinical practice guidelines, received ethics clearance.

Data analyses

The denominator used to calculate the survey response rate included information from 2 sources — tally sheets from hospitals for the total number of surveys distributed to physicians, and, for hospitals that did not keep a tally, the total number of physicians working in the hospital according to senior management. Descriptive statistics were computed for the characteristics of the respondents, beliefs and confidence relative to smoking cessation intervention, adherence to the 5 A's protocol, and barriers and facilitators to providing tobacco interventions during hospital stays.

RESULTS

Response rates and sample

Of the 12 hospitals eligible for participation in the study, 8 distributed surveys and 4 did not, representing a hospital participation rate of 67%. Of the 8 hospitals that distributed surveys, 4 distributed them directly to physicians and provided a tally of the number of surveys that were distributed (n = 33) and 4 hospitals simply put the surveys in the staff room for physicians to pick up. For the latter 4 hospitals, the number of physicians working in the hospital was used to determine the denominator (n = 47). Thirty-five physicians at the 8 participating hospitals completed surveys, resulting in a physician response rate of 44% (35/80). If the number of physicians working in the 4 hospitals that did not participate in the survey is included in the denominator, the survey responses represent 33% of all physicians working in the 12 rural hospitals in NW Ontario including the 4 hospitals that did not participate (35/105).

Sample

A description of the respondents can be found in Table 1. Preferences for future smoking cessation intervention training formats, in order of preference, included brief in-services (43%), 1-hour workshop (40%), self-study (31%) and half-day workshop (20%). None of the respondents wanted a full-day workshop.

Beliefs, confidence and clinical practice relative to the 5 A's protocol

A summary of respondents' beliefs and confidence about providing smoking cessation interventions are provided in Table 2. All (35/35) of the respondents reported that they at least sometimes ask, advise, assess and assist patients to quit smoking, and 89% (31/35) reported arranging follow-up. Forty percent of respondents (14/35) reported spending 1–3 minutes providing smoking cessation interventions for each patient who smoked, 46% (16/35) reported 10 minutes and 14% (5/35) reported spending more than 10 minutes. Details of the types of interventions provided by the respondents are shown in Table 3.

Facilitators to smoking cessation intervention

Respondents noted a number of factors that encouraged them to provide smoking cessation interventions to their patients (Table 4). The 3 most prevalent factors were knowledge that smoking cessation is the most cost-effective intervention to prevent chronic disease and cancer, knowledge that smoking cessation can improve the health of patients and the belief that helping patients to stop using tobacco is part of the role and responsibilities of physicians.

Table 1. Demographic information and beliefs of the 35 physicians who responded to the survey

Variable	No. (%) of respondents*
Area of specialization	
Family practice	30 (86)
Other	5 (14)
Mean no. of years in clinical practice (SD) [range]	13 (9) [1–35]
Employment status	
Full-time practice	29 (83)
Part-time practice	6 (17)
Locum	0 (0)
Tobacco use	
Never	26 (76)
Formerly	4 (12)
Daily	0 (0)
Occasionally	4 (12)
Missing	1 (3)
Received training for smoking cessation counselling	15 (43)
Smoking cessation intervention is part of the health care provider's role	
Not at all	0 (0)
Somewhat	3 (9)
Very much	32 (91)

SD = standard deviation.
*Unless otherwise indicated.

Barriers to smoking cessation intervention

There were few factors that respondents noted as barriers to smoking cessation intervention during hospital stays (Table 5). Only lack of time was noted by more than 50% of respondents as a barrier.

Table 2. Beliefs and confidence of the 35 respondents about smoking cessation intervention

Beliefs* and confidence†	No. (%) of respondents‡	Mean (SD) score on 4-point scale
Beliefs about tobacco interventions		
Health education on the risk of tobacco use is an important area of health care provision	35 (100)	2.6 (0.5)
Health care providers should educate other tobacco users in the patient's household about tobacco use, if at all possible	35 (100)	2.6 (0.5)
Health care providers should use every opportunity to educate patients about the health effects of tobacco use	35 (100)	2.5 (0.6)
Health care providers should advise patients to quit using tobacco even when help is not requested	35 (100)	2.6 (0.5)
Brief advice to help patients stop tobacco use is effective	33§ (97)	2.1 (0.8)
Confidence about providing tobacco interventions		
Advising tobacco users on how to quit using tobacco	35 (100)	2.4 (0.7)
Teaching tobacco users about the general health risks of using tobacco	34§ (100)	2.7 (0.5)
Discussing different methods of quitting tobacco use	34 (97)	2.6 (0.7)
Giving advice about nicotine replacement therapy	34 (97)	2.6 (0.7)
Finding out tobacco users' beliefs about tobacco use and health	34 (97)	2.3 (0.7)
Counteracting tobacco users' negative attitudes about giving up tobacco	34 (97)	2.2 (0.8)
Negotiating a target date for patients to quit using tobacco	34 (97)	2.2 (0.9)
Using leaflets and other written material to help patients quit	31§ (91)	2.1 (1.0)

SD = standard deviation.
*Measured on a 4-point Likert scale from 0 ("strongly disagree") to 3 ("strongly agree").
†Measured on a 4-point Likert scale from 0 ("not at all confident") to 3 ("very confident").
‡Respondents who responded "agree" or "strongly agree" for belief items, and "confident" or "very confident" for confidence items.
§Only 34 respondents answered this item.

Table 3. Clinical practice of the 35 respondents relative to the 5 A's protocol for smoking cessation intervention

5 A's protocol for tobacco intervention	No. (%) of respondents*	Mean (SD) score on 4-point scale†
Ask about tobacco use and tobacco history	35 (100)	2.8 (0.5)
Advise patients to quit tobacco use		
Advise patients to quit using tobacco	35 (100)	2.9 (0.3)
Explain harmful effects of tobacco use to patients	35 (100)	2.8 (0.5)
Explain how tobacco use might have contributed to patients' illness	35 (100)	2.8 (0.4)
Explain the harmful effects of second-hand smoke	35 (100)	2.4 (0.7)
Assess readiness to quit		
Encourage patients who have relapsed to try quitting again	34 (97)	2.8 (0.6)
Motivate patients to quit using tobacco	34 (97)	2.6 (0.7)
Help patients to set a quit date	33 (94)	2.1 (0.9)
Assist patients with quitting		
Suggest specific actions to make quitting or cutting down easier	34 (97)	2.6 (0.7)
Recommend or suggest nicotine replacement therapies	34 (97)	2.5 (0.7)
Instruct the patient in the use of pharmacotherapy for cessation	34 (97)	2.3 (0.8)
Recommend alternatives to using tobacco to patients	34 (97)	2.1 (0.9)
Recommend or suggest buproprion	33 (94)	2.4 (0.8)
Teach coping skills to patients to prevent relapse	32 (91)	1.9 (0.9)
Offer self-help cessation materials to patients	31 (89)	1.8 (1.0)
With consent, discuss patients' tobacco use with family members	31 (89)	1.6 (1.0)
Arrange follow-up and referrals for cessation assistance		
Refer patients to cessation resources	31 (89)	1.9 (0.9)
Refer patients to cessation counselling	24 (69)	0.2 (1.1)

SD = standard deviation.
*Respondents who reported they provide the specific intervention noted.
†4-point Likert scale: 0 (never), 1 (seldom), 2 (occasionally), 3 (frequently).

The other 2 factors most noted as barriers were lack of patient interest or motivation to quit, and heavy workload.

Hospital protocols about smoking cessation intervention and patient materials available

Forty percent of respondents indicated that hospitals had a protocol for identifying and documenting tobacco use (14/35), and 20% (6/35) reported a hospital protocol for providing and documenting smoking cessation counselling. Sixty percent of respondents (21/35) reported that hospitals displayed posters encouraging smoking cessation, 49% (17/35) reported pamphlets or self-help materials were available in-hospital, 29% (10/35) reported quit-line contact information was available in-hospital, and 17% (6/35) reported community-based smoking cessation program information was available.

DISCUSSION

Physicians in 8 of the 12 rural hospital communities in NW Ontario responded to the survey about smoking cessation practices. The majority were in full-time family practice. All respondents held positive beliefs about providing smoking cessation interventions during patients' hospital stays, were confident about intervening and spent at least some time with patients discussing tobacco (the majority spent 1–10 min). All respondents reported following the first 4 steps of the 5 A's protocol for tobacco intervention (ask, advise, assess, assist), and 89% reported following the fifth step (arrange). The most frequent methods to assist patients to quit smoking included pharmacotherapy, suggesting specific actions to make quitting or cutting down easier, and recommending alternatives to using tobacco. Only 1 barrier to providing interventions was reported by 50% or more of respondents (lack of time), whereas many factors that encouraged interventions were noted.

These findings represent among the highest adherence rates to all steps in the 5 A's protocol reported in the literature. Similar to our study, most published studies (primarily from the United States and Europe) show that a high proportion of physicians ask patients about tobacco use and advise them to quit, but unlike our study, few (usually less than 50%) assess readiness to quit, assist with quitting other than recommending pharmacotherapy, or

Table 4. Responses of 35 physicians about factors that facilitate smoking cessation intervention

Factors that facilitate tobacco intervention*	No. (%) of respondents who agree
Quitting is the most cost-effective intervention to prevent chronic disease	30 (86)
Knowledge that quitting tobacco use can improve the health of patients	29 (83)
Belief that helping patients to stop using tobacco is part of role and responsibilities	29 (83)
Patients' motivation to quit using tobacco	27 (77)
Reasonable workload that allows time to intervene with smoking cessation	27 (77)
Belief that helping patients to stop using tobacco is a high priority	27 (77)
Adequate skills in smoking cessation counselling	24 (69)
Sufficient knowledge about tobacco and health	22 (63)
Resources available to help with smoking cessation interventions	22 (63)
Confidence in helping patients to stop using tobacco	19 (54)
Past successes helping patients to quit	18 (51)
Support from colleagues	15 (43)
Support from management	13 (37)

*Measured on a "check-all-that-apply" list.

Table 5. Responses of 35 physicians about barriers to smoking cessation intervention

Barriers to tobacco intervention*	No. (%) of respondents who agree
Lack of time	23 (66)
Lack of patient interest or motivation to quit	17 (49)
Heavy workload	15 (43)
Lack of resources (e.g., human resources)	10 (29)
Past intervention experiences tended to be unsuccessful	8 (23)
No existing hospital mandate or policy to intervene	7 (20)
Lack of availability of educational materials	6 (17)
Lack of smoking cessation counselling skills	4 (11)
Belief that tobacco use is a coping mechanism for patients under stress	3 (9)
Belief that unwanted advice upsets the physician–patient relationship	2 (6)
Belief that helping patients to stop using tobacco is of low priority	2 (6)
Limited effectiveness of tobacco cessation interventions	2 (6)
Limited direct patient care	2 (6)
Lack of confidence in delivering smoking cessation interventions	2 (6)
Lack of recognition/rewards/reimbursement for intervening	2 (6)
Lack of knowledge about tobacco's effect on health	1 (3)
Lack of support from colleagues	1 (3)
Discomfort with suggesting patients alter their lifestyles	1 (3)

*Measured on a "check-all-that-apply" list.

arrange follow-up.[16–18] Results from the only other Canadian study we could find showed similar results to our study. In that study, general practitioners in Montréal, Que., reported favourable attitudes toward their role in cessation counselling, provided various interventions to their patients and indicated that the top barriers to providing interventions were lack of time and patients not being interested in quitting.[19]

Limitations

The data for our study were self-reported and not validated by medical charts or patient input. Other studies suggest that respondents tend to overreport, rather than underreport, desirable smoking cessation–related activities.[16] The measurement format could have encouraged some overreporting relative to recall differentiation over the last year of "seldom, occasionally and frequently" using various smoking cessation steps in the 5 A's protocol. However, all physicians reported spending at least 1–3 minutes counselling their patients, more than half spent more than 3 minutes and no one reported not counselling patients at all.

CONCLUSION

Based on the positive beliefs, confidence and current clinical practice relative to tobacco interventions reported in our study, physicians in NW Ontario seem well positioned to play a key role in helping to reduce the high rates of tobacco use and tobacco-related diseases by providing smoking cessation interventions to patients during hospital stays. There are many resources to help develop in-patient smoking cessation programs, including materials from professional associations[20] and published sources.[21] Most provinces have insurance billing codes to encourage physicians to provide smoking cessation counselling to their patients,[11,22] and smoking cessation training programs with continuing medical education credits are also available.[20]

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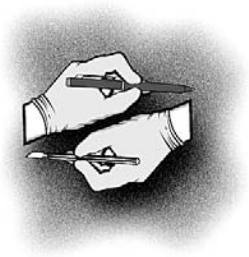

How important are out-of-pocket costs to rural patients' cancer care decisions?

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This article has been peer reviewed.

Objective: We examined the importance of 5 items (stage of illness, personal feelings, travel costs, drug costs and child care costs) in the cancer treatment decisions of urban and rural residents after they had started treatment for their cancer.
Methods: We surveyed 484 adults who presented for care at cancer clinics in Newfoundland and Labrador from September 2002 to June 2003. Respondents rated the importance of each of the 5 items in their cancer care decisions on a 5-point Likert scale, which was later collapsed into 2 categories, "important" and "not important." We used χ^2 tests and multiple logistic regression to compare the responses of urban and rural residents.
Results: In our sample of 484 respondents, there were 258 (53.3%) urban and 226 (46.7%) rural residents. After controlling for other significant predictors, we found that rural residents were more likely to report that travel costs (odds ratio [OR] 1.79, 95% confidence interval [CI] 1.21–2.63), drug costs (OR 1.69, 95% CI 1.13–2.23) and child care costs (OR 2.33, 95% CI 1.09–4.96) were "important" in cancer treatment decisions compared with urban residents. Stage of disease and personal feelings were equally important to urban and rural residents.
Conclusion: Financial impediments disproportionately affect rural residents' decisions about cancer care and highlight the need to ensure that centralized specialist care, such as cancer treatment, is accessible.

Objectif : Nous avons étudié l'importance de cinq éléments (stade de la maladie, sentiments personnels, frais de déplacement, coûts des médicaments et frais de garde d'enfants) dans les décisions relatives au traitement du cancer chez des résidents de la ville et de la campagne après le début de leur traitement.
Méthodes : Nous avons interrogé 484 adultes traités dans des cliniques d'oncologie de Terre-Neuve-et-Labrador entre septembre 2002 et juin 2008. À l'aide d'une échelle de Likert en cinq points, les répondants ont évalué l'importance qu'ils accordaient à chacun de ces cinq éléments lors de prises de décision concernant leur traitement pour le cancer; l'échelle a ensuite été scindée en deux catégories plus larges, soit «important» et «non important». Nous avons utilisé le test du 2 et une analyse de régression logistique multiple pour comparer les réponses entre résidents des milieux urbains et ruraux.
Résultats : Dans notre échantillon de 484 répondants, 258 sujets (53,3 %) vivaient à la ville et 226 (46,7 %) vivaient à la campagne. Après contrôle pour tenir compte d'autres prédicteurs importants, les résidents d'un milieu rural étaient plus susceptibles de mentionner que les frais de déplacement (rapport des cotes [RC] 1,79; intervalle de confiance [IC] à 95 %, 1,21–2,63), le coût des médicaments (RC 1,69; IC à 95 %, 1,13–2,23) et les frais de garde d'enfants (RC 2,33; IC à 95 %, 1,09–4,96) étaient «importants» lors de leurs prises de décision relatives à leur traitement contre le cancer, comparativement aux résidents de milieux urbains. Le stade de la maladie et les sentiments personnels ont revêtu la même importance pour les résidents des milieux urbains et ruraux.
Conclusion : Les contraintes financières affectent de manière disproportionnée les résidents des régions rurales lors de prises de décision relatives au traitement du cancer et rappellent la nécessité d'assurer l'accès aux soins spécialisés centralisés, par exemple dans le cas des traitements pour le cancer.

INTRODUCTION

The treatment of complex diseases such as cancer requires highly specialized professionals, equipment and services. For example, in Newfoundland and Labrador, the bulk of cancer services is centralized in St. John's, the provincial capital where, in 2007, 183 469 (36.2%) of the province's 506 275 population lived.[1] St. John's has the sole radiotherapy facility in the province and is home to all the province's oncologists. However, 42.2% (213 370) of the province's population lives in rural communities.[2] Some chemotherapy and follow-up may be offered in a number of the regional centres in the province (e.g., Corner Brook, Gander, Grand Falls–Windsor and Burin).

Although centralization of resources such as radiotherapy facilities is necessary to ensure cost-effective, high-quality care,[3–6] rural residents must travel and incur travel-related costs to receive needed services. This is in addition to the psychological impacts of leaving home for cancer treatment.[7,8] Roughly 9% of all cancer patients (19.5% of rural patients), had more than $1000 in travel-related costs for a single trip to access cancer care.[9]

With the increasing shift from hospital-based to ambulatory care, patients may also have to incur the costs of drugs provided outside a hospital setting. Although Canada's universal public health insurance covers the costs of all medically necessary drugs provided in-hospital, prescription medications provided outside a hospital setting are not covered. For cancer patients, these may include new oral chemotherapy agents that can be administered at home or supportive drugs given to combat the side effects of treatment (e.g., antiemetic or pain medications). Public drug insurance plans exist in all provinces but are not universal; they are usually available to individuals with very low incomes or who are 65 years of age and older.

Although out-of-pocket travel and drug expenses may be cost-shared through private (supplementary) health insurance, it is usually offered as a benefit for full-time employees.[10,11] Rural residents are more likely to be in seasonal or self-employed industries (e.g., agriculture or fishery) and may not be eligible for group health plans. Although private insurance is also available to individuals, it is usually at higher premiums than employee-based group plans. As a result, larger proportions of rural residents may not purchase supplementary health insurance and therefore have fewer resources with which to pay for care-related costs.

A number of studies have suggested that the treatment choices of rural residents may be related to out-of-pocket travel and drug costs.[6,12–19] However, we were unable to find studies that quantified the influence that these costs have on rural residents in a publicly insured health care system. In this study, we examine the importance of out-of-pocket costs and other factors in the treatment decisions of adults who are seeking care for breast, lung, prostate or colorectal cancer. We hypothesize that, compared with urban residents, cost-related factors play a greater role in the decisions of rural residents.

METHODS

Sample

We surveyed adult cancer patients (who had decided to have cancer care) presenting for an appointment at the 4 cancer centres in the province from September 2002 to June 2003. To be eligible for inclusion in the study, individuals had to be residents of Newfoundland and Labrador; able to communicate in English; 19 years of age or older; and seeking treatment or follow-up for breast, lung, colorectal or prostate cancer. These cancers were selected for study because they are the most common cancer types in the province and represent the majority of new cancers each year. For example, in 2007 these 4 cancers made up 60.8% of all estimated new cases in the province.[20]

To comply with ethics guidelines, participants were initially approached by either clinic registration or nursing staff, and informed about the study. Willing participants were referred to a research assistant sitting in the waiting area who screened individuals for eligibility, obtained consent and conducted the survey.

Survey

The survey instrument included questions to assess eligibility, clinical and sociodemographic characteristics, home community and care-associated costs. Respondents were also asked to rate the importance of 5 items on their decisions "about the treatment for [their] cancer" on a 5-point Likert scale, in which 1 was "not at all important" and 5 was "very important." These items were stage of illness, personal feelings (e.g., fear, anxiety), travel costs, drug costs and child care costs. These items were identified through a review of the literature and consultations with cancer care providers, cancer patients

and representatives from the provincial division of the Canadian Cancer Society. As a largely descriptive and exploratory study, given the wide range of patients surveyed (i.e., 4 different types of cancers, patients at different treatment and follow-up phases), we did not specify types of decisions. We conducted extensive pretesting with patients and cancer care providers to ensure the reliability of the questions.

Analysis

We analyzed data using SPSS software, version 14.0 (SPSS, Inc.). The dependent variables of interest in this analysis were the importance of each of the 5 items in decision-making. The 5-point Likert scale ratings for each of the items were collapsed into 2 categories ("not important" and "important"). Responses 1–3 were coded as "not important" and 4–5 were coded as "important."

The independent variable was home community, which was coded as "urban" or "rural." Rural communities had populations of less than 10 000 based on estimates from the Newfoundland and Labrador Statistics Agency[21] and were at least 1 hour (or 80 km) away from the clinic where the patient had sought care.[22] Clinical and sociodemographic characteristics were included as covariates in the analysis.

Frequencies were used to describe the characteristics of the study sample and χ^2 tests were used to detect differences between urban and rural residents in each of the 5 outcomes and covariates (shown in tables). For each outcome, significant variables from the χ^2 analyses (not shown in tables) were included in a multiple logistic regression. The final regression model included only significant predictors. Collinearity between predictor variables was examined a priori and large standard error values, indicative of multicollinearity, were not found in the regression models.

We received ethics approval from the Human Investigations Committee of Memorial University of Newfoundland and the Newfoundland Cancer Treatment and Research Foundation Research Management Committee for this study.

RESULTS

We interviewed 484 cancer patients between September 2002 and June 2003. These patients represented 96.2% of the 503 patients who were willing to participate in the study. Three patients were ineligible (1 person did not reside in Newfoundland and Labrador, and 2 did not have one of the 4 cancers under study), and 16 patients terminated the interview before it was completed.

Over half the sample were urban residents, female, under 65 years of age, retired, and had a high school education or less, a high income level (> $40 000) and private insurance (Table 1). The largest proportion of respondents was seeking follow-up care, had breast cancer and had been diagnosed with cancer less than 2 years previously. Most of the study population said the stage of their illness and personal feelings were important considerations in their care decisions, but that travel costs, drug costs, child care costs, travel time and other commitments were not important.

A significantly larger proportion of rural than urban residents had a partner, had less than a high school education, did not have private health insurance, were undergoing radiotherapy or chemotherapy during their visit, had prostate or lung cancer, and had been diagnosed less than 2 years previously. A significantly larger proportion of rural than urban residents said that travel costs, drug costs and child care costs were important in their decisions about care (Table 2). There were no differences in terms of sex, age, employment status, income or the importance of stage of illness and personal feelings in their decisions about care.

Table 3 summarizes the logistic regression models for the 5 outcomes. Each column presents the odds ratios for rural residence and the significant covariates for a given outcome. Rural residence was a significant predictor for 3 of the 5 outcomes considered in the study. After controlling for other significant predictors, compared with urban residents, rural residents were 1.79 times, 1.69 times and 2.33 times more likely to report that travel costs, drug costs and child care costs, respectively, were important considerations in their cancer care decisions. Rural residence was not related to the consideration of either stage of illness or personal feelings as important in cancer care decisions.

DISCUSSION

For most patients, regardless of place of residence, their stage of illness and personal feelings were the most important considerations in their decisions about care. However, rural residents were, on average, roughly twice as likely as urban residents to report that financial costs were important considerations in their care decisions after they had begun treatment. These results were consistent across

cancer types and were consistent whether respondents were having active treatment (radiotherapy, chemotherapy or other treatment) or seeking follow-up care. These findings highlight that the financial barriers that remain in Canada's publicly insured health care system disproportionately affect rural residents, who make up almost 20% of the country's population.[2]

These findings identify the groups for whom financial considerations remain an impediment to accessing care. In addition to rural residents, patients without private health insurance and those with low incomes were more likely to consider costs for drugs or travel in their decisions about care. Education level was also related to 2 of the items (travel costs and drug costs). Respondents with higher education levels were less likely to report that these items were important in their decisions about care. We believe that these findings reflect that highly educated people are more likely to hold full-time employment (and thus likely have private health insurance) and work in larger urban centres (and thus have fewer travel costs to access cancer care).

Although we did not directly link cost considerations to patients' actual treatment decisions, our findings are consistent with previous studies that suggest that rural cancer patients may forgo or alter their care because of travel and its associated costs.[12,13] For example, earlier Canadian studies have reported lower rates of breast conserving surgery among eligible women who live in rural regions, have longer travel times to a cancer treatment centre or have a low income.[5,14–17] Breast conserving surgery usually requires adjuvant radiotherapy, which is normally available in larger urban centres. In these studies, researchers suggested that the considerable financial

Table 1. Characteristics of 484 cancer patients interviewed between September 2002 and June 2003 while presenting for care at 4 cancer centres

Variable	No. (%) of patients	Variable	No. (%) of patients
Sex		Cancer type	
Male	211 (43.6)	Breast	201 (41.5)
Female	273 (56.4)	Lung	71 (14.7)
Age		Colorectal	101 (20.9)
< 65	262 (54.5)	Prostate	96 (19.8)
≥ 65	219 (45.5)	≥ 2 sites	15 (3.1)
Marital status		Time since diagnosis, mo	
Unpartnered	99 (20.6)	< 12	115 (23.8)
Partnered	382 (79.4)	12–23	127 (26.2)
Employment status		24–35	57 (11.8)
Full-time	46 (9.6)	36–59	89 (18.4)
Part-time/seasonal	34 (7.1)	60–119	74 (45.3)
Sick leave/long-term disability	60 (12.5)	≥ 120	22 (4.5)
Unemployed/unpaid sick leave	28 (5.8)	Stage of illness	
Retired	252 (52.4)	Not important	25 (5.3)
Homemaker/student/caregiver	61 (12.7)	Important	450 (94.7)
Education		Personal feelings	
Less than high school	180 (37.4)	Not important	51 (10.7)
Completed high school	122 (25.4)	Important	427 (89.3)
Some postsecondary	63 (13.1)	Travel costs	
Completed postsecondary	95 (19.8)	Not important	245 (51.3)
Graduate/professional degree	21 (4.4)	Important	233 (48.7)
Income		Drug costs	
High (> $40 000)	139 (30.2)	Not important	237 (50.2)
Low (≤ $40 000)	321 (69.8)	Important	235 (49.8)
Has insurance		Child care costs	
Yes	273 (56.8)	Not important	291 (89.5)
No	208 (43.2)	Important	34 (10.5)
Visit type		Home community	
Radiotherapy	78 (16.1)	Urban	258 (53.3)
Chemotherapy	58 (12.0)	Rural	226 (46.7)
Follow-up	330 (68.2)		
Other	18 (3.7)		

and social costs associated with this treatment discourage rural patients from choosing breast conservation. Similar findings (and rationales) have been reported in studies in Australia.[18,19] We are currently conducting studies linking actual out-of-pocket costs to specific cost-reduction strategies.

Our study highlights the need for programs and policies that address barriers to cancer care (and other specialized services) for rural residents. In Canada, most provinces provide medical travel subsidies for patients who must travel outside their region to access health services, although eligibility criteria and subsidy rates vary considerably. In response to recent national commissions,[23,24] Canadian provinces are expanding provincial drug insurance programs. Recently, the Government of Newfoundland and Labrador introduced drug coverage for residents with low incomes or who have catastrophic drug costs.[25]

In terms of care delivery, providers can ease the financial and psychological burdens of travel by providing care closer to the homes of rural patients, through either regional clinics or tele-oncology. A tele-oncology program was introduced in New-

Table 2. Differences between 258 urban and 226 rural residents interviewed between September 2002 and June 2003 while presenting for care at 4 cancer centres

Variable	No. (%) of residents		*p* value*	Variable	No. (%) of residents		*p* value*
	Urban	Rural			Urban	Rural	
Sex			0.05	Cancer type			0.030
Male	102 (39.5)	109 (48.2)		Breast	117 (45.3)	84 (37.2)	
Female	156 (60.5)	117 (51.8)		Lung	34 (13.2)	37 (16.4)	
Age			0.99	Colorectal	58 (22.5)	43 (19.0)	
< 65	139 (54.5)	123 (54.4)		Prostate	39 (15.1)	57 (25.2)	
≥ 65	116 (45.5)	103 (45.6)		≥ 2 sites	10 (3.9)	5 (2.2)	
Marital status			0.032	Time since diagnosis, mo			0.021
Unpartnered	62 (24.3)	37 (16.4)		< 12	51 (19.8)	64 (28.3)	
Partnered	193 (75.7)	189 (83.6)		12–23	63 (24.4)	64 (28.3)	
Employment status			0.07	24–35	28 (10.9)	29 (12.8)	
Full-time	30 (11.8)	16 (7.1)		36–59	52 (20.2)	37 (16.4)	
Part-time/seasonal	11 (4.3)	23 (10.2)		60–119	51 (19.8)	23 (10.2)	
Sick leave/long-term disability	29 (11.4)	31 (13.7)		≥ 120	13 (5.0)	9 (4.0)	
Unemployed/unpaid sick leave	14 (5.5)	14 (6.2)		Stage of illness			0.46
Retired	135 (52.9)	117 (51.8)		Not important	15 (6.0)	10 (4.5)	
Homemaker/student/ caregiver	36 (14.1)	25 (11.1)		Important	236 (94.0)	214 (95.5)	
Education			< 0.001	Personal feelings			0.13
Less than high school	72 (28.2)	108 (47.8)		Not important	22 (8.7)	29 (12.9)	
Completed high school	71 (27.8)	51 (22.6)		Important	232 (91.3)	195 (87.1)	
Some postsecondary	39 (15.3)	24 (10.6)		Travel costs			< 0.001
Completed postsecondary	56 (22.0)	39 (17.3)		Not important	152 (60.1)	93 (41.3)	
Graduate/professional degree	17 (6.7)	4 (1.8)		Important	101 (39.9)	132 (58.7)	
Income			0.07	Drug costs			0.001
High (> $40 000)	82 (33.9)	57 (26.1)		Not important	145 (57.5)	92 (41.8)	
Low (≤ $40 000)	160 (66.1)	161 (73.9)		Important	107 (42.5)	128 (58.2)	
Has insurance			0.001	Child care costs			0.033
Yes	164 (64.1)	109 (48.4)		Not important	159 (93.0)	132 (85.7)	
No	92 (35.9)	116 (51.6)		Important	12 (7.0)	22 (14.3)	
Visit type			< 0.001				
Radiotherapy	23 (8.9)	55 (24.3)					
Chemotherapy	43 (16.7)	15 (6.6)					
Follow-up	180 (69.8)	150 (66.4)					
Other	12 (4.7)	6 (2.7)					

*Based on χ^2 tests.

foundland and Labrador after we had completed our survey. Recent evaluations of regional and teleoncology programs in Canada have highlighted their positive reception by both patients and providers, particularly in terms of travel-related savings.[26,27]

Study limitations

Given the recruitment protocol, we were unable to calculate response rates since only willing respondents were referred to the research assistant and only eligible individuals were interviewed. Moreover, because we recruited patients who were presenting for treatment and follow-up appointments at cancer clinics, we did not capture individuals who decided to forgo cancer treatment altogether because of costs.

To assess the representativeness of our study sample, we compared the characteristics of our study sample with administrative data from the cancer registry for patients with breast, lung, colorectal or prostate cancer. Our sample underrepresents patients with lung and colorectal cancers and patients seeking care at the cancer centre in St. John's. It overrepresents patients with breast cancer and those seeking care at the 3 other clinics. Patients from St. John's may have been less interested in participating in the study if they felt that out-of-pocket costs were not an issue for them. The bias in our sample may overinflate the specific odds ratio values reported in the study. However, corroborating evidence from the literature support the overarching findings that cost-related factors are important considerations for rural residents.

CONCLUSION

Even with Canada's medicare system, out-of-pocket costs and travel requirements remain impediments to cancer care. Rural residents are more likely than their urban counterparts to take costs related to travel, drugs and child care into account in their decisions about cancer treatment. Developing strategies to reduce financial costs for rural residents is essential to enhancing the accessibility of centralized, specialist services such as cancer care.

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Competing interests: None declared.

Table 3. Summary of logistic regression models

Variable	Odds ratio (95% confidence interval)				
	Stage of illness	Personal feelings	Travel costs	Drug costs	Child care costs
Home community type					
Urban	1.00	1.00	1.00	1.00	1.00
Rural	NS	NS	1.79 (1.21–2.63)	1.69 (1.13–2.53)	2.33 (1.09–4.96)
Sex					
Male		1.00			
Female		2.15 (1.19–3.89)			
Has insurance					
Yes			1.00	1.00	
No			2.09 (1.37–3.18)	2.55 (1.61–4.04)	
Education					
Less than high school			1.00	1.00	
Completed high school			NS	1.94 (1.13–3.32)	
Some postsecondary			NS	NS	
Completed postsecondary			0.54 (0.31–0.96)	NS	
Graduate/professional degree			0.12 (0.03–0.54)	NS	
Income					
High (> $40 000)				1.00	
Low (≤ $40 000)				1.69 (1.02–2.80)	
Age, yr					
< 65					1.00
≥ 65					0.13 (0.04–0.42)

NS = not significant.

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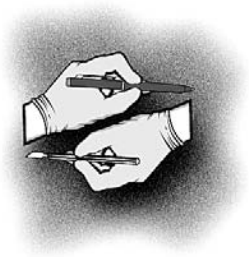

Prevalence of impaired glucose tolerance and the components of metabolic syndrome in Canadian Tsimshian Nation youth

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Introduction: Canadian Aboriginal people have been disproportionately affected by obesity and type 2 diabetes (T2D). Our objective was to determine the prevalence of obesity, glucose intolerance and the components of metabolic syndrome (MetS) in Tsimshian Nation youth living in 3 remote coastal communities.
Methods: A medical history, anthropometric measurements and an oral glucose tolerance test were performed in youth aged 6–18 years. We defined "overweight" by a body mass index (BMI) at the 85th percentile or higher and "obese" by a BMI at the 95th percentile or higher, by age and sex. We used the International Diabetes Federation criteria for MetS.
Results: Of the 224 eligible youth, 192 (85%) participated in the study. Nineteen percent were overweight, 26% were obese and 36% had central obesity (waist circumference ≥ 90th percentile for age and sex). No new cases of T2D were identified. The prevalence of impaired fasting glucose (IFG 5.6–6.9 mmol/L) and impaired glucose tolerance (IGT 2-hr glucose 7.8–11.0 mmol/L) were 19.3% and 5.2%, respectively. Five of the 10 youth with IGT had a fasting glucose less than 5.6 mmol/L. The prevalence of MetS was 4.7% and increased to 8.3% when pediatric hypertension norms were applied.
Conclusion: Tsimshian Nation youth have a high prevalence of central obesity, impaired glucose homeostasis and other components of MetS. The oral glucose tolerance test may be a more appropriate screening test to identify IGT in Aboriginal youth.

Introduction : Les populations autochtones du Canada sont affectées de manière disproportionnée par l'obésité et le diabète de type 2. Nous avions pour objectif de mesurer la prévalence de l'obésité, de l'intolérance au glucose et des différents éléments du syndrome métabolique chez des jeunes de la nation Tsimshian vivant dans trois villages côtiers isolés.
Méthodes : Nous avons procédé à une anamnèse, à des mesures anthropomorphiques et à des tests d'hyperglycémie provoquée par voie orale (HGPO) chez des jeunes âgés de 6 à 18 ans. Nous avons défini l'embonpoint par l'atteinte d'un indice de masse corporelle (IMC) se situant dans le 85e percentile ou plus et l'obésité, par l'atteinte d'un IMC se situant dans le 95e percentile ou plus, selon l'âge et le sexe. Nous avons appliqué les critères de la Fédération internationale du diabète en ce qui concerne le syndrome métabolique.
Résultats : Parmi les 224 jeunes admissibles, 192 (85 %) ont participé à l'étude. Dix-neuf pour cent d'entre eux avaient de l'embonpoint, 26 % étaient obèses et 36 % présentaient une obésité abdominale (tour de taille 90e percentile selon l'âge et le sexe). Aucun nouveau cas de diabète de type 2 n'a été repéré. La prévalence de l'hyperglycémie modérée à jeun (HMJ : 5,6-6,9 mmol/L) et de l'intolérance au glucose (résultat HGPO : 7,8–11,0 mmol/L) a été de 19,3 % et de 5,2 %, respectivement. Parmi les 10 jeunes qui présentaient une intolérance au glucose, 5 avaient une glycémie à jeun inférieure à

5,6 mmol/L. La prévalence du syndrome métabolique était de 4,7 % et passait à 8,3 % lorsque l'on appliquait les critères de l'hypertension pédiatrique.
Conclusion : Les jeunes de la nation Tsimshian présentent une prévalence élevée d'obésité centrale, d'hyperglycémie modérée et d'autres éléments du syndrome métabolique. Les épreuves d'hyperglycémie provoquée pourraient être les tests de dépistage de l'intolérance au glucose les plus appropriés chez les jeunes Autochtones.

INTRODUCTION

The rising prevalence of childhood obesity within the last decade has been associated with a corresponding increase in the incidence of type 2 diabetes (T2D) and the cluster of cardiovascular disease (CVD) risk factors (central obesity, impaired fasting glucose, dyslipidemia and hypertension) known as the metabolic syndrome (MetS). Among Canadians, Aboriginal people have been disproportionately affected by both obesity and T2D.[1] Furthermore, while the overall rates of CVD and associated mortality have been declining in North America, the opposite has been true among Aboriginal populations.[2,3]

Current literature suggests that the atherosclerotic process may begin in childhood and that obesity and the components of MetS track from childhood to adulthood.[4] With the high prevalence of obesity being documented among Aboriginal children, the burden of obesity-related diseases among Aboriginal adults will likely continue to rise as the current generation of children enters adulthood, carrying with it the associated CVD risk factors acquired in childhood. More worrisome still is that childhood-onset T2D and CVD risk factors may translate into an epidemic of premature complications in young Aboriginal adults.[4,5]

Currently, epidemiologic data characterizing the prevalence of obesity, abnormal glucose metabolism and the components of MetS in Aboriginal children living in western Canada is limited.[6] Existing Canadian pediatric data are largely based on the Ojibwa–Cree population living in central Canada.[7–10] We were invited by 3 remote coastal Aboriginal communities, belonging to the Tsimshian Nation of British Columbia to determine the scope of these health issues among their youth.

The communities

We have a long-standing relationship with the Tsimshian Nation, which includes the communities of Hartley Bay (Gitga'at), Kitkatla (Gitkxaahla) and Port Simpson (Lax Kw'alaams). This relationship was established through a community-driven cooperative program, "Brighter Smiles," initially developed for the reduction of dental caries and well-child surveillance.[11] Hartley Bay, Kitkatla and Port Simpson are remote Aboriginal fishing communities on the Pacific Coast of British Columbia. The villages are located about 650-km northwest of Vancouver, and 160-km south of Prince Rupert, and are accessible only by boat or float plane. The cumulative population of the 3 villages ranges from 1000 to 1400.

Following identification by the Brighter Smiles team of a child with asymptomatic T2D, the 3 communities requested diabetes screening for all of their youth. The objective of this screening initiative was to determine the prevalence of obesity, abnormal glucose metabolism and the components of MetS among Tsimshian youth between the ages of 6 and 18 years, in order to provide the requisite information to work collaboratively to develop sustainable prevention and treatment programs.

Study design

Youth attended the village health clinic after a 12-hour fast, and compliance was ascertained by interview on arrival. A medical history screening for symptoms of diabetes and a detailed family history for T2D, gestational diabetes and the microvascular complications of T2D and CVD were obtained. History was substantiated by a first-degree family member whenever possible. Methodology for anthropometric measurements including height, weight and waist circumference are described elsewhere.[12] A physician examined each participant for the presence of acanthosis nigricans.

An intravenous saline lock was inserted in the dorsum of the participant's hand for blood collection, following application of topical anesthetic cream (EMLA, AstraZeneca) to avoid multiple venipunctures. Blood was collected at baseline for glucose, insulin and lipid profile (total cholesterol, triglycerides, high-density lipoprotein [HDL] and low-

density lipoprotein [LDL]). Participants then drank a 1.75 g/kg (maximum 75 g) glucose oral solution (ratio-GLUCOSE 75 g/300 mL, orange flavoured) and 2 hours later, blood for glucose was collected. After the study visit, participants were provided with a nutritious breakfast. All blood was immediately spun, aliquoted and stored in a –20°C freezer, and frozen samples were transported by float plane to the BC Children's Hospital for analysis.

Laboratory measurements

Plasma glucose concentration was measured by Glu Microslides, Vitros 950/250 chemical system (Ortho Clinical Diagnostics). Total cholesterol and triglycerides were measured by Vitros analyzer (Ortho Clinical Diagnostics). Low-density lipoprotein was calculated using the Friedewald formula.[13] High-density lipoprotein was measured by phosphotungstic acid precipitation followed by enzymatic colorimetric assay (Bayer Advia 1650). Plasma insulin was measured by the Beckman-Coulter Access Immunoassay System. Insulin resistance was estimated using the homeostasis model assessment of insulin resistance (HOMA-IR).[14] A level of 2.28 was used as the threshold to indicate insulin resistance.[15] Pubertal status was ascertained by serum estradiol and total testosterone levels. Serum estradiol concentration was measured by Pantex estradiol ^{123}I Kit (catalogue no. 047) and serum total testosterone was measured by DSL-4100 testosterone radioimmune assay (Diagnostic Systems Laboratories, Inc.). Girls with a serum estradiol of 60 pmol/L or less and boys with a serum total testosterone level of 2.4 nmol/L or less were categorized as prepubertal, and the remainder was considered pubertal.[16]

Diagnostic criteria

Body mass index (BMI) was calculated as weight (kg) divided by height squared (m^2) and then standardized for sex and age.[17] We defined "overweight" by a BMI at the 85th percentile or higher and "obesity" by a BMI at the 95th percentile or higher (corresponding to BMI z scores of 1.04 and 1.64, respectively).[18] Metabolic syndrome was defined using the International Diabetes Federation (IDF) criteria,[19] which include waist circumference greater than or equal to the 90th percentile for age and sex (or adult cutoff if lower) and 2 additional criteria comprising of triglycerides 1.7 mmol/L or higher, HDL cholesterol 1.03 mmol/L or lower, fasting glucose 5.6 mmol/L or higher or known T2D, and hypertension (systolic ≥ 130 mm Hg or diastolic ≥ 85 mm Hg). To account for pediatric norms, we also used the National High Blood Pressure Education Program Working Group's[20] pediatric definitions for elevated blood pressure (≥ 90th percentile).

To align with IDF criteria, we used the American Diabetes Association[21] criteria to classify the participants as having normal fasting glucose (< 5.6 mmol/L), impaired fasting glucose (IFG 5.6–6.9 mmol/L), impaired glucose tolerance (IGT 2-hour oral glucose tolerance test [OGTT] glucose of 7.8–11.0 mmol/L) or T2D (fasting glucose ≥ 7.0 mmol/L or 2-hour OGTT glucose ≥ 11.1 mmol/L). We also determined the number of youth who met the 2008 Canadian Diabetes Association (CDA)[22] definition for IFG (6.1–6.9 mmol/L) as a means of comparing our results with those of previously published studies (see Discussion).

Analysis

We designed our study to estimate prevalences with a measure of precision and to generate hypotheses. Thus the analyses are descriptive and exploratory, not inferential. Given the small populations in each community, we conducted community comparisons for age, BMI z score, fasting glucose and insulin resistance using 95% confidence intervals (CIs). Because there were no clinically or statistically significant differences between communities, the data were combined for the later analyses. Sex differences for demographic, clinical and metabolic parameters were analyzed with means or proportions plus differences between means and proportions with appropriate CIs.

Approval

Our study was approved by the Children's and Women's Hospital Research Review Committee and the University of British Columbia Clinical Research Ethics Board. This was a community-based participatory action research project that was approved by the elected Band Council, the hereditary band chiefs and elders, the community health directors and health representatives of each village. Parents or caregivers gave written informed consent and youth gave written assent. The process for obtaining community approval, consent and study logistics[23,24] as well as preliminary data from the first community to complete screening (Hartley Bay)[12] have been previously published.

RESULTS

Of the 224 eligible youth, 193 were screened, representing a participation rate of 85%. The index case of T2D was not considered eligible for screening and therefore not included in these results. Data from 192 youth are presented because 1 adolescent was excluded from analysis after completion of screening, as it was disclosed that she was pregnant. Twenty-four youth did not consent to participate, 3 had consented but were absent on testing day, 1 did not fast and could not be rescheduled, and 3 could not complete testing. Demographic, clinical and metabolic characteristics of participants are summarized in Table 1.

Sixty percent of participants (n = 116) had a positive family history of T2D and 46% (n = 88) had a positive family history of CVD (myocardial infarction, stroke or dyslipidemia). Thirty-five percent of participants (n = 68) had evidence of acanthosis nigricans on physical examination. Prevalence of obesity by community is presented in Figure 1. Overall, 45% (95% CI 38.3–52.4) of participants had a BMI at the 85th percentile or higher: 19% of participants were overweight (17.5% of boys and 21.1% of girls) and 26% of participants were obese (23.7% of boys and 28.4% of girls). The distribution of glucose metabolism by community is summarized in Figure 2. Given the shared genealogy among the villages and lack of statistical differences between communities for clinical and metabolic parameters (see Analysis), data were subsequently pooled for analysis.

The overall rates of IFG and IGT were 19.3% and 5.2%, respectively. Boys were 2 times more likely to have IFG compared with girls (relative risk [RR] 2.0, 95% CI 1.1–3.8). Table 2 describes the characteristics of the 10 youth confirmed to have IGT. Girls appeared to be more insulin resistant than boys (RR 1.6, 95% CI 0.9–2.8), but this did not reach statistical significance. Pubertal status significantly contributed to the level of insulin resistance seen, where 25.9% of children with insulin resistance (HOMA-IR ≥ 2.28) were pubertal com-

Table 1. Demographic, clinical and metabolic characteristics of Tsimshian Nation youth

Variable	Mean (95% CI)*			Mean difference (95% CI)
	Total, n = 192*	Boys, n = 97*	Girls, n = 95*	
Demographic				
Age, yr	12.0 (11.6–12.4)	12.1 (11.5–12.7)	11.9 (11.3–12.5)	
Sex, %		50.5	49.5	
Clinical				
BMI z score	1.0 (0.9–1.1)	0.9 (0.7–1.1)	1.1 (0.9–1.2)	–0.2 (–18.6 to 18.2)
Overweight, % (95% CI)	19.3†(13.7–24.9)	17.5‡ (10.6–26.6)	21.1§ (13.4–30.6)	–3.6 (–14.7 to 7.6)
Obese, % (95% CI)	26.0¶(19.8–32.2)	23.7**(15.7–33.4)	28.4††(19.6–38.6)	–4.7 (–17.1 to 7.7)
Prepubertal, % (95% CI)	44.7 (37.8–51.8)	55.6 (45.2–65.8)	33.7 (24.3–44.1)	–22.0 (–35.7 to –8.3)
Pubertal, % (95% CI)	55.2 (48.2–62.8)	44.3 (34.2–54.8)	66.3 (55.9–75.7)	22.0 (8.3–35.7)
Metabolic				
Fasting glucose, mmol/L	5.25(5.2–5.3)	5.3 (5.19–5.36)	5.2 (5.15–5.28)	0.1 (0.0–0.2)
Fasting insulin, pmol/L	49.2 (43.9–54.6)	43.0 (35.7–52.0)	55.6 (47.7–63.4)	–12.6 (–23.2 to –2.0)
HOMA-IR score	1.7 (1.5–1.9)	1.5 (1.2–1.7)	1.9 (1.6–2.2)	–0.4 (–78.0 to –0.02)
Triglyceride, mmol/L	1.0 (0.88–1.02)	0.8 (0.76–0.93)	1.1 (1.0–1.2)	–0.3 (–0.4 to –0.2)
HDL-C, mmol/L	1.5 (1.45–1.55)	1.5 (1.37–1.52)	1.5 (1.39–1.53)	0.0 (–0.1 to 0.1)
LDL-C, mmol/L	1.8 (1.7–1.9)	1.7 (1.6–1.8)	1.9 (1.8–2.0)	–0.2 (–0.36 to –0.03)

BMI = body mass index; CI = confidence interval; HDL-C = high-density-lipoprotein cholesterol; HOMA-IR = homeostasis model assessment of insulin resistance; LDL-C = low-density-lipoprotein cholesterol.
*Unless otherwise indicated.
†n = 37.
‡n = 17.
§n = 20.
¶ n = 50.
**n = 23.
††n = 27.

pared with 11.2% who were prepubertal (95% CI –25.3 to –4.0).

Prevalence of the components of MetS is summarized in Figure 3. Central obesity was the most common component of the MetS found in this cohort. Overall, 35.9% of participants had a waist circumference greater than or equal to the 90th percentile. Girls were significantly more centrally obese relative to boys (RR 1.7, 95% CI 1.1–2.5). The overall prevalence of MetS was 4.7%. Based on pediatric norms, 26.6% of participants had hypertension, and no significant difference between sexes was present. When the IDF criteria were adjusted to reflect pediatric blood pressure norms,[20] the prevalence of MetS increased to 8.3%.

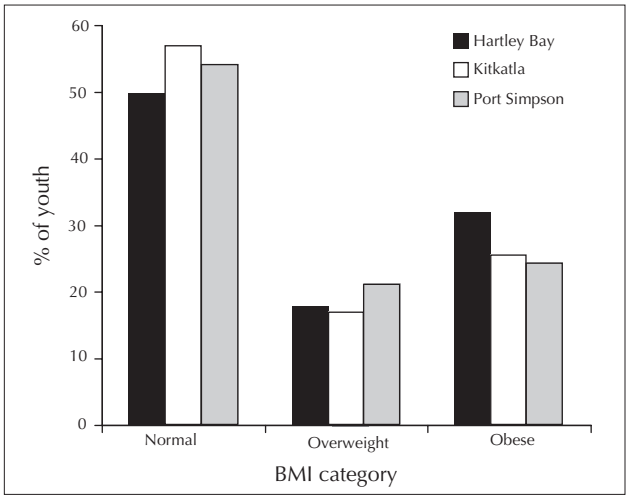

Fig. 1. Body mass index (BMI) of Canadian Tsimshian Nation youth, by community. Normal weight = BMI less than the 85th percentile; overweight = BMI at the 85th–95th percentile; obese = BMI at the 95th percentile or higher.

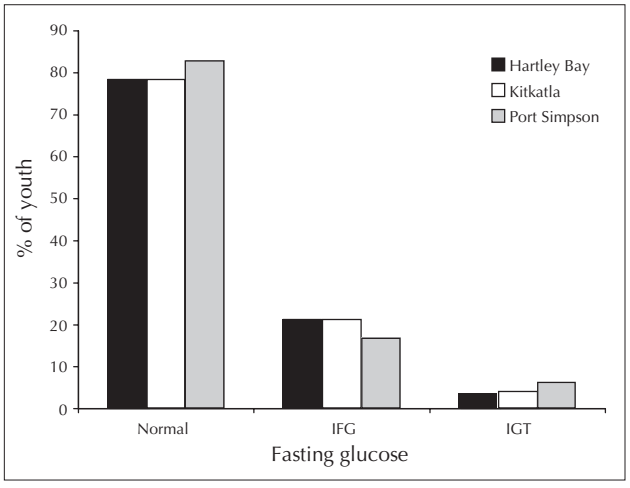

Fig. 2. Glucose metabolism of Canadian Tsimshian Nation youth, by community. The American Diabetes Association criteria were used to classify the participants as having normal fasting glucose (< 5.6 mmol/L), impaired fasting glucose (IFG 5.6–6.9 mmol/L) and impaired glucose tolerance (IGT 2-h oral glucose tolerance test glucose of 7.8–11.0 mmol/L).

DISCUSSION

Across Canada, the prevalence of overweight and obese children in non-Aboriginal populations is rising, with the overall prevalence reported to be 26%.[25] In comparison, Tsimshian Nation youth on the remote Pacific Coast of British Columbia were found to have almost double (45% overall: 41% of boys, 49% of girls) the prevalence of overweight and obese youth. Obesity and central obesity among

Table 2. Characteristics of Tsimshian Nation youth with impaired glucose tolerance

Age, yr	Sex	Glucose intolerance	Fasting BG*	2-h BG†	BMI, percentile‡	Acanthosis nigricans
10.8	F	IGT	5.4	7.8	98.4	Yes
10.0	F	IGT	5.1	8.5	72.6	No
12.0	F	IGT	5.2	8.5	48.2	No
11.4	M	IGT	5.1	7.9	94.7	Yes
15.6	M	IGT	5.4	7.8	97.8	Yes
12.6	F	IFG + IGT	5.6	8.2	50.0	No
13.4	M	IFG + IGT	6.3	8.5	77.0	Yes
12.6	F	IFG + IGT	5.8	8.1	> 99.0	Yes
11.7	M	IFG + IGT	6.1	7.8	98.4	Yes
11.8	M	IFG + IGT	5.7	8.5	88.2	Yes

BG = blood glucose; BMI = body mass index; F = female; IFG = impaired fasting glucose; IGT = impaired glucose tolerance; M = male.
*Blood glucose measured after 12-hour fast.
†Blood glucose measured 2 hours after a standard oral glucose tolerance test.
‡Body mass index percentile for age and sex.

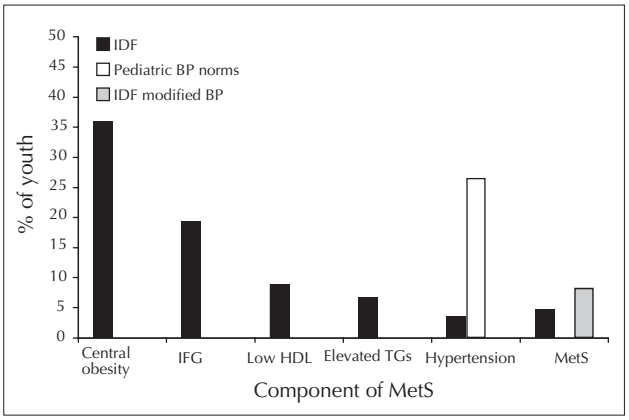

Fig. 3. Prevalence of the components of metabolic syndrome (MetS) among Canadian Tsimshian Nation youth. The components of MetS as defined by the International Diabetes Federation (IDF): central obesity (waist circumference at the 90th percentile or higher for age and sex [or adult cutoff if lower]), and 2 additional criteria comprising of triglycerides (TG) 1.7 mmol/L or higher, high-density lipoprotein (HDL) cholesterol 1.03 mmol/L or lower, impaired fasting glucose (IFG) 5.6 mmol/L or higher or known type 2 diabetes and hypertension (systolic ≥ 130 mm Hg or diastolic ≥ 85 mm Hg). Pediatric blood pressure (BP) norms reflect the National High Blood Pressure Education Program Working Group, where hypertension is defined at the 90th percentile or higher for age, sex and height percentile. International Diabetes Federation modified BP represents prevalence of MetS when pediatric BP norms are used.

these youth is also higher than that reported previously in other Aboriginal communities in Canada. For example, overall prevalence of overweight children in the Sandy Lake First Nation[26] was 27.7% in boys and 33.7% in girls; the prevalence of central obesity was 23% in this population versus 36% in the Tshimshian Nation youth. Similarly, in Mohawk children[27] aged 5–12 years, 29.5% of boys and 32.8% of girls were overweight or obese. The prevalence of overweight and obese youth in the Tsimshian Nation, however, is below that reported for the St. Theresa Point First Nation of Manitoba, where 64% of girls and 60% of boys exceeded the 85th percentile, and 40% of girls and 34% of boys exceeded the 95th percentile.[28]

To our knowledge, there is no MetS prevalence data available in non-Aboriginal Canadian children. The prevalence of MetS in Tsimshian youth (4.7%–8.3%) is difficult to compare with other Canadian Aboriginal communities because of the lack of a consensus definition for MetS.[29] With that in mind, the prevalence of MetS in Sandy Lake First Nation children has been reported to vary from 5.4 to 18.6%.[30,31] Although the most prevalent component in Sandy Lake First Nation children was low HDL,[31] the most prevalent components in Tsimshian Nation youth were central obesity followed by IFG. In a small subset of Western Cree children of Alberta, Kaler and colleagues[6] used a definition of MetS similar to that used in our study, reporting an overall prevalence of 40.5%, with central obesity also determined to be the most prevalent component (65.5%).

Although no additional cases of T2D, aside from our index case, were identified as a result of this study, the prevalence of IFG and IGT was high in this group of youth. The prevalence of IFG corresponds to that reported in the Western Cree of Alberta (25%), where the same cutoff value was used.[6] When the 2008 CDA cutoff for IFG (6.1–6.9 mmol/L) was applied to this cohort of children, the prevalence was 2.1%. This rate is comparable to that previously published (2.7%) in Ojibwa–Cree children in the St. Theresa Point First Nation.[8]

To our knowledge, ours is the first study to report the prevalence of IGT in a Canadian cohort of school-aged Aboriginal youth. Previous Canadian Aboriginal screening studies have used fasting glucose with oral glucose tolerance testing limited primarily to adult screening initiatives that included some youth aged 15 years or older.[32,33] The 2008 CDA guidelines[22] recommend considering an OGTT for screening if the fasting glucose is 5.6–6.0 mmol/L and there is 1 or more risk factor for diabetes. The specific guidelines for screening for T2D in youth recommend consideration of an OGTT if the youth is extremely obese (≥ 99th percentile) and has risk factors such as high-risk ethnic origin, family history of T2D or intrauterine exposure to T2D. Of the 10 Tsimshian youth confirmed to have IGT, only 50% had a fasting glucose 5.6 mmol/L or higher. As well, none of the 5 youth with IGT and a fasting glucose less than 5.6 had a BMI at the 99th percentile or higher. Our findings are consistent with a report of 1376 obese white Italian children in which 96% of children with IGT had fasting plasma glucose levels less than 5.5 mmol/L.[34] These data would suggest that fasting glucose may not be useful in the detection of impaired glucose intolerance that might be identified only by performing an OGTT.

The early detection of obesity, impaired glucose metabolism and the components of MetS in these youth has provided the communities with the impetus to develop primary prevention strategies for T2D and CVD-related complications. We are working collaboratively with these communities to develop culturally and environmentally appropriate lifestyle-modification programs. Future steps include a request by the communities to implement and evaluate school-based programs and to gather more extensive physical activity, physical fitness and nutritional information. We regard this partnership to be a long-term commitment with an ongoing evaluation component to gain a better understanding of the natural history of disease progression in these youth. Our goal is to develop programs that will involve the whole community and effect change that the community would be willing to implement, and be enthusiastic about sustaining for generations to come.

Limitations

This is a cross-sectional study, and therefore, longitudinal follow-up of these youth is required to understand the prognostic significance of the high prevalence of the components of MetS as well as impaired glucose metabolism in their future T2D and CVD risk. Although these data cannot be extrapolated to other Aboriginal communities in British Columbia, these findings may provide the impetus for other communities to undertake screening initiatives.

CONCLUSION

Tsimshian Nation youth living on the remote Pacific

Coast of northern British Columbia were found to have a high prevalence of central obesity, impaired glucose homeostasis, as well as other components of the MetS, particularly hypertension. International Diabetes Federation criteria in children underestimated the prevalence of MetS for this population because the current definition does not account for pediatric blood pressure norms. Oral glucose tolerance testing may be a more appropriate screening test to identify IGT in Aboriginal youth.

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The occasional acute application of continuous positive airway pressure

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INTRODUCTION

Noninvasive positive pressure ventilation evolved over several decades because of the need to avoid the complications of intubation when respiratory support became necessary. The most useful modalities have been continuous positive airway pressure (CPAP) and biphasic positive airway pressure (BiPAP). The former supports respiration by presenting the airway with a constant pressure on inspiration and expiration. The latter supplies a higher pressure on inspiration than on expiration. BiPAP normally offers an advantage in respiratory failure, but does not in cases of acute cardiogenic pulmonary edema[1] or exacerbations of chronic obstructive pulmonary disease (COPD).[2] These 2 conditions constitute the majority of cases that benefit from noninvasive interventions in rural practice. Since CPAP is equally effective and much easier to set up, it is presently the intervention of choice in small hospitals.

Most rural areas do not have respiratory therapists, and the equipment to deliver these interventions is notoriously difficult to set up, especially when done only occasionally. To achieve optimal results, it is also important to set up CPAP early when there is an indication.[3] For this reason, a simpler way of administering CPAP is required. The Boussignac CPAP system (Vitaid Ltd.) is one solution, requiring only an oxygen source and regulator to supply a single-use valve and mask system.

Objectives of the CPAP intervention include

- reduced in-hospital and postdischarge mortality;
- reduced need for intubation and the attendent complications;
- improvement in clinical parameters and symptoms, allowing improved stabilization for transport, and possibly reduced need for transport;
- improved patient comfort, with reduced need for sedation and analgesia;
- simplified management of some types of respiratory failure in settings in which resources are limited.

INDICATIONS

Evidence from controlled studies is becoming available, although blinding is not possible in these studies because of the nature of the intervention. The following are conditions possibly benefiting from early CPAP, listed in order of level of evidence:

1. Acute COPD exacerbation. Studies are in general agreement that CPAP is a first-line intervention. Two meta-analyses have been published.[4,5]
2. Acute cardiogenic pulmonary edema. Three well-conducted meta-analyses[6–8] had previously established that CPAP reduced both mortality and intubation rate. A recent megatrial[9] has disputed this, although there is agreement that there is early improvement in symptoms and physiologic parameters. CPAP should remain a first-line intervention pending further large trials.
3. Pneumonia. Benefit is only shown in patients with infection associated with COPD and in immunocompromised patients, such as those with pneumocystis or those who have had transplant surgery, for whom intubation should be avoided.
4. Do-not-intubate status. Reversal of deterioration or improvement in

acute dyspnoea may occur in patients with COPD or pulmonary edema without much risk from the intervention. The wishes of the patient and the course of the disease process must be completely understood by physician and patient.

5. Extubation failure. This might occur after a brief course of intubation for COPD or pulmonary edema in a rural practice. CPAP might ease this transition, but there must always be a fallback plan for reintubation.
6. Asthma. Although there are some reports of benefit, opinions are conflicting, and CPAP is not recommended.
7. Other causes of respiratory failure (acute respiratory distress syndrome, trauma). Little consistent benefit has been reported.

Some of the criteria for respiratory failure must be met, including symptoms, signs and physiologic parameters:

- respiratory distress
- tachypnoea (respiratory rate > 24–30 breaths/min was used in various studies)
- use of accessory muscles or abdominal paradoxical movement
- pH less than 7.35
- partial pressure of carbon dioxide greater than 5.9 kPa (45 mm Hg)
- partial pressure of oxygen less than 12 kPa (90 mm Hg) on maximal concentration fraction of inspired oxygen
- chest radiography may be useful in diagnosis, but is not sensitive enough to aid in decision-making. Changes due to acute pulmonary edema may take many hours to appear

CONTRAINDICATIONS

- medical instability with immediate need for intubation
- respiratory or cardiac arrest
- pneumothorax must always be excluded unless a chest tube is in place
- patient is unable to protect the airway
- vomiting or excessive secretions. The use of morphine is best avoided in pulmonary edema for this reason and others. Use benzodiazepines if sedation is needed
- agitated or uncooperative patient
- unable to achieve mask seal because of facial contour
- recent upper airway or upper abdominal surgery
- hypovolemia
- hypotension with systolic pressure less than 90 mm Hg
- conditions that are preload dependent, such as right ventricular infarction. Like nitroglycerin, CPAP will impair right ventricular filling
- intracranial hemorrhage or increased intracranial pressure
- respiratory muscle fatigue
- patient is younger than 12 years

COMPLICATIONS

- pain or ulcer over the nasal bridge
- mucosal dryness
- fear that the device is limiting the patient's ability to breathe
- eye irritation if the mask seal is not complete
- aspiration or gastric insufflation (rare)
- pneumothorax (very rare)

EQUIPMENT

Traditional ventilators are difficult to set up when used only occasionally. If CPAP is helpful in stabilizing the patient for transport, it is very important not to discontinue the intervention suddenly. Also, a ventilator in a transport setting must be compact

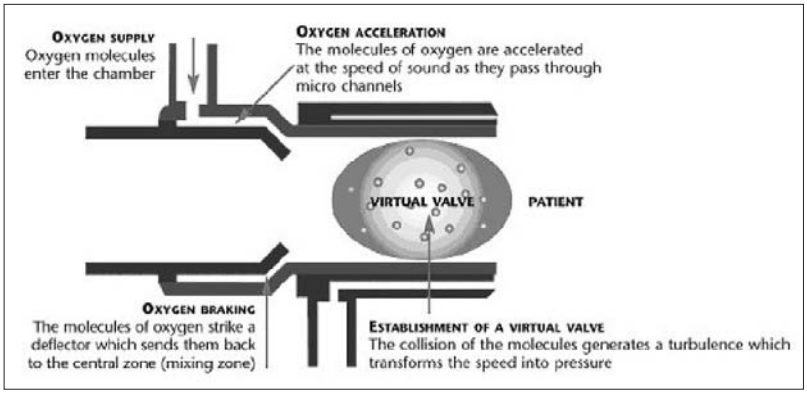

Fig. 1. Structure of the Boussignac valve.

and tends to use a lot of oxygen. A simple, compact option is preferable.

The Boussignac system is a device weighing 6.8 oz and requiring only an oxygen source with a regulator capable of delivering a flow of 25 L/min. It relies on the Bernoulli principle of gas acceleration creating a virtual valve (Fig. 1); therefore suctioning can be done through a port in the mask without loss of pressure or removal of the mask. This device has been deployed in a variety of settings including prehospital,[10] emergency department[11] and coronary care unit,[12] often with beneficial outcomes and minimal training.

The components of the system are as follows:

- sized mask, valve and tubing for connection to oxygen source (Fig. 2)
- oxygen port capable of 25 L/min with flow regulator
- optional pressure manometer (Fig. 3)
- optional nebulizer
- port for optional (but recommended) end-tidal carbon dioxide monitor

Fig. 2. Boussignac valve with attached mask.

Fig. 3. A single-use manometer can be attached in-line between the white end of the valve and the mask.

A 20-mL syringe is needed to inflate the cuff around the mask for optimal fit.

PROCEDURE

1. Select the mask size.
   - child — #3
   - female adult — #4–5
   - male adult — #5–6
2. Inflate the air cuff around the mask using 20–40 mL air. Have a 20-mL syringe available to subsequently facilitate an airtight seal to the patient's face.
3. Connect green tubing to oxygen source (Fig. 4 [1]).

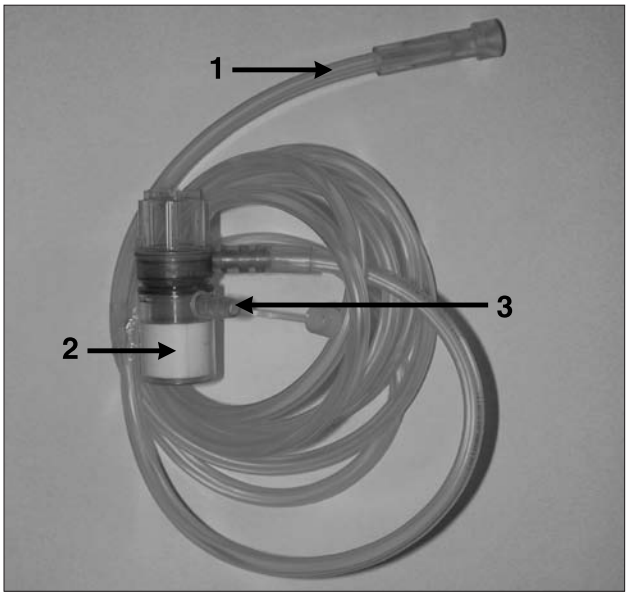

Fig. 4. The Boussignac valve with attached tubing. Green tubing attaches to oxygen regulator (1). Face mask attaches to white end of valve (2). Clear port for end-tidal carbon dioxide sensor (3).

Table 1. Oxygen flow rates to produce continuous positive airway pressure

Flow, L/min	CPAP, cm H_2O
10	2.5–3.0
15	4.5–5.0
20	7.0–8.0
25	8.5–10.0
> 25	> 10.0

CPAP = continuous positive airway pressure.

Table 2. Minutes of oxygen flow by cylinder size, based on 2200–pounds per square inch cylinders

Flow, L/min	D cylinder, EMS portable	E cylinder, EMS portable	M cylinder, EMS ambulances
10	35	61	374
25	14	23	140

EMS = emergency medical services.

4. Connect white end of the valve to the face mask (Fig. 4 [2]).
5. Connect the end-tidal carbon dioxide sensor, if used, to the clear port (Fig. 4 [3]). The transducer can also be slipped under the mask seal if this is preferred.
6. With the patient in the sitting position, hold the mask to the patient's face and begin oxygen at 15 L/min (CPAP of 5 cm H_2O) (Table 1, Table 2). Take time to explain the procedure to the patient.
7. Secure the harness around the head with straps above and below the ears. Check for leaks around

Fig. 5. System in place with head straps. Suction is used without loss of continuous positive airway pressure.

Fig. 6. Nebulizer placed between mask and white valve connection.

Table 3. Boussignac continuous positive airway pressure system. Fraction of inspired oxygen delivery with input of 100% oxygen*

CPAP setting and tidal volume		Ventilatory frequency, respiratory rate/min								
CPAP 5 cm H_2O		10	15	20	25	30	35	40	45	50
Tidal vol., mL	250	100	100	100	100	97	92	84	78	73
	500	100	100	93	83	71	65	60	56	53
	750	100	90	74	61	56	51	X	X	X
	1000	94	72	59	51	48	X	X	X	X
	1250	86	61	51	X	X	X	X	X	X
	1500	73	56	47	X	X	X	X	X	X
CPAP 7.5 cm H_2O		10	15	20	25	30	35	40	45	50
Tidal vol., mL	250	100	100	100	100	100	98	95	92	85
	500	100	100	93	84	75	67	65	61	60
	750	100	91	79	67	60	57	57	X	X
	1000	96	76	66	59	54	X	X	X	X
	1250	87	67	59	54	X	X	X	X	X
	1500	81	62	57	X	X	X	X	X	X
CPAP 10 cm H_2O		10	15	20	25	30	35	40	45	50
Tidal vol., mL	250	100	100	100	100	100	100	95	92	91
	500	100	100	97	90	82	76	72	66	53
	750	100	96	84	79	67	62	X	X	X
	1000	99	85	73	64	60	X	X	X	X
	1250	95	73	64	59	X	X	X	X	X
	1500	89	71	62	X	X	X	X	X	X

Adapted from Templier et al.[13]
CPAP = continuous positive airway pressure.
*Estimation of fraction of inspired oxygen (FiO_2): inspired oxygen concentration falls with increasing minute volume. As dyspnoea subsides and respiratory rate falls, FiO_2 rises. There is a small rise in FiO_2 with increasing levels of CPAP.

the mask and adjust the air seal as necessary.
8. Gradually increase oxygen flow to 25 L/min (CPAP of 10 cm H_2O) as tolerated (Table 1, Table 2).
9. Suction through the large end port of the mask as necessary (Fig. 5).
10. If the manometer is used, place it in-line between the valve and the mask (Fig. 3).
11. If a nebulizer is used, place it in-line between the valve and the mask (Fig. 6). Set the valve oxygen source at 15 L/min and the nebulizer source at 6 L/min.

SUBSEQUENT STEPS

1. Do not remove CPAP without a backup plan in case of deterioration — either resumption of CPAP or intubation.
2. Watch for gastric distention.
3. If nitroglycerine is required, use sublingual rather than spray.
4. Be aware of the actual fraction of inspired oxygen. This will vary with the respiratory rate and oxygen flow (Table 3[13]).
5. Look for results that indicate that the intervention is working:
   - reduced heart rate
   - reduced respiratory rate
   - reduced dyspnoea
   - blood pressure returning to normal (usually tends to be high in cardiogenic pulmonary edema)
   - increasing oxygen saturation
   - decreasing end-tidal carbon dioxide
   - improving mental status
6. If there is no improvement:
   - troubleshoot the equipment
   - check for pneumothorax
   - check for conditions that might reduce preload (hypovolemia, dehydration, nitroglycerine)
   - consider pulmonary embolism. One patient in 4 with a COPD exacerbation severe enough to warrant admission to hospital may have pulmonary embolism[14]
   - consider proceeding to intubation

CONCLUSION

Early deployment of CPAP therapy is important in acute exacerbations of COPD and in acute cardiogenic pulmonary edema, the 2 most common emergent indications for the procedure in rural practice. The single-use Boussignac device simplifies the procedure and facilitates early application, improving the prospect for successful outcomes.

Competing interests: None declared.

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Country cardiograms case 33

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This article has been peer reviewed.

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A 75-year-old man presents to a rural emergency department with a 1-hour history of severe central chest pain. He has no preceding history of pain and no cardiac risk factors. The patient's initial electrocardiogram (ECG) is shown in Figure 1. Risk stratification indicates a very positive risk–benefit ratio for thrombolysis, with a relatively low risk of major stroke, and he is given a bolus dose of tenecteplase. Soon afterwards the patient's pain decreases but he complains of weakness and dizziness, and develops ventricular fibrillation. He is promptly defibrillated, and makes a full recovery. His coronary angiogram shows only a 50% stenosis in the left anterior descending artery, not amenable to angioplasty, and medical management is recommended. The patient's ECG a week after discharge is shown in Figure 2. What is your interpretation of these ECGs?

For the answer, see page 80.

Competing interests: None declared.

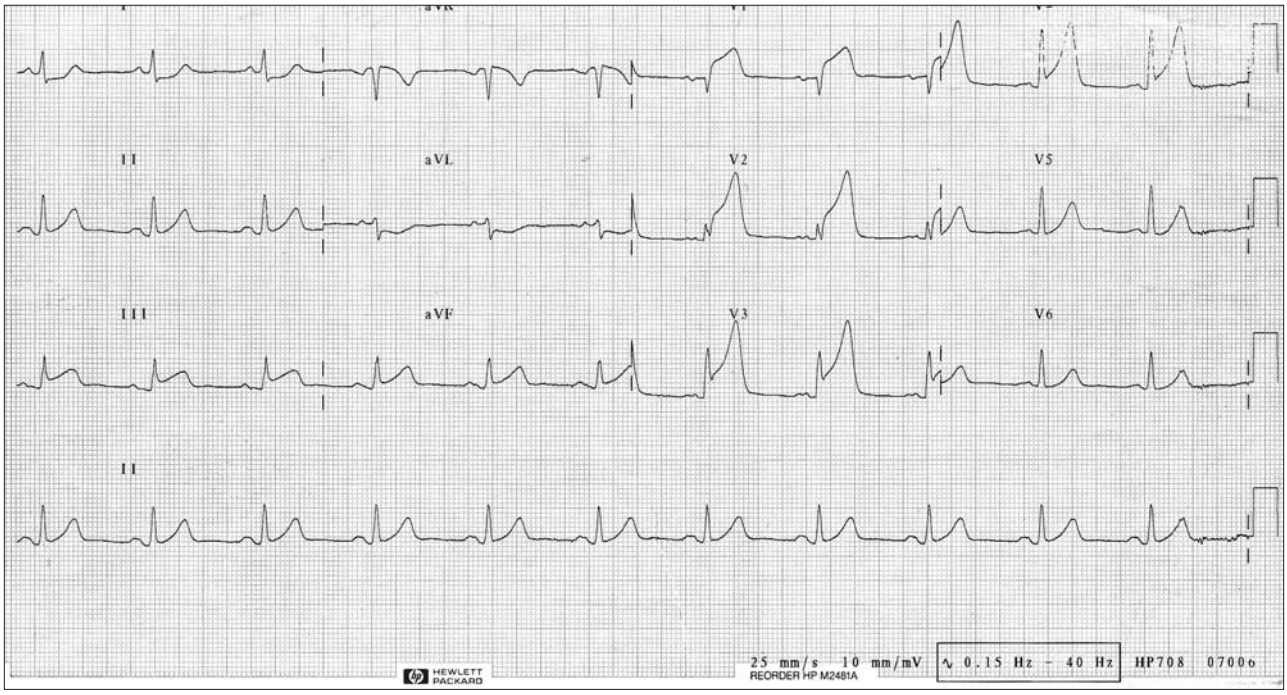


Fig. 1. Initial electrocardiogram of a 75-year-old man who presented to the emergency department with a 1-hour history of severe central chest pain.

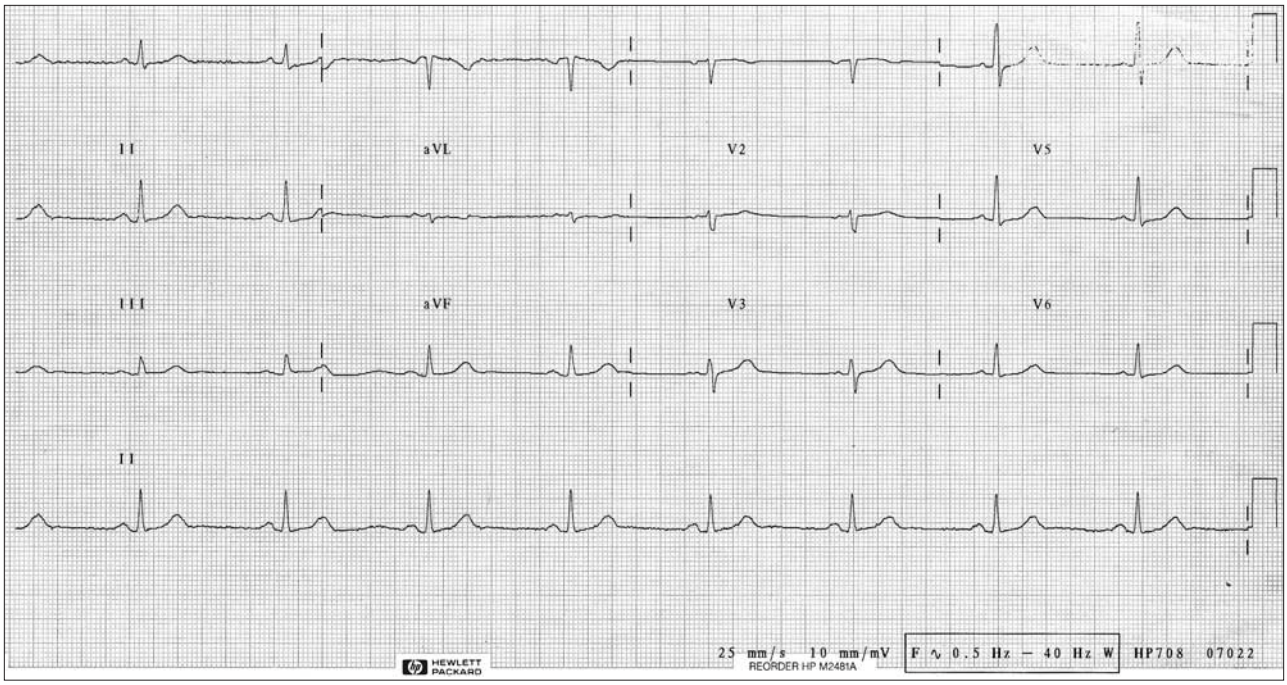


Fig. 2. Electrocardiogram 1 week after discharge.

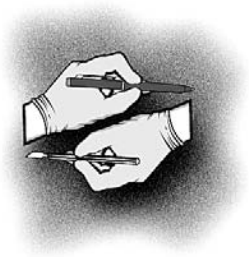
Country Cardiograms

Have you encountered a challenging ECG lately?

In most issues of *CJRM* an ECG is presented and questions are asked.

On another page, the case is discussed and the answer is provided.

Please submit cases, including a copy of the ECG, to Suzanne Kingsmill, Managing Editor, *CJRM*, P.O. Box 4, Station R, Toronto ON M4G 3Z3; cjrm@cjrm.net



Rural and remote obstetric care close to home: program description, evaluation and discussion of Sioux Lookout Meno Ya Win Health Centre obstetrics

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This article has been peer reviewed.

Problem being addressed: Aboriginal and non-Aboriginal women in rural and remote settings struggle to access obstetric care close to home.
Objective of the program: To deliver a full range of modern and safe obstetric care to 28 remote Aboriginal communities served by rural-based health care.
Program description: Rural family physicians provide intrapartum, cesarean delivery and anesthesia services to 350 rural, primarily Aboriginal women in a collegial, supportive environment.
Conclusion: Rural and remote obstetric services need support before they fail. Patient volume, remote location and organizational culture are key elements. Evidence teaches us that outcomes are best when women deliver closer to home.

Problème abordé : Les femmes autochtones et non autochtones vivant en région rurale et éloignée ont du mal à obtenir des soins obstétricaux près de chez elles.
Objectif du programme : Offrir une gamme complète de soins obstétricaux modernes et sécuritaires à 28 communautés autochtones éloignées, desservies par des services de soins de santé ruraux.
Description du programme : Prestation de services intrapartum, de césariennes et d'anesthésie obstétricale par des médecins de famille exerçant en milieu rural, à 350 femmes, surtout autochtones, dans un contexte de collégialité et d'entraide.
Conclusion : Il faut soutenir les services obstétricaux en région rurale et éloignée, faute de quoi ils pourraient disparaître. Le volume de patientes, l'éloignement géographique et la culture organisationnelle sont des éléments clés dont on doit tenir compte. L'expérience nous enseigne que l'issue des grossesses est meilleure lorsque les femmes peuvent accoucher plus près de leur lieu de résidence.

INTRODUCTION

Delivery of obstetric services to remote communities in Canada will always be challenging. Despite decades of experience there are limited descriptions of successful models of care.

In 1997, the Joint Working Group of the Society of Rural Physicians of Canada, the College of Family Physicians of Canada and the Society of Obstetricians and Gynaecologists of Canada (SOGC) identified an "urgent need for Canadian research on the maternal and neonatal outcomes of births … in small hospitals."[1] A 2007 SOGC report identified a need for increased opportunities for Aboriginal women to deliver close to home in a familiar environment.[2]

BARRIERS

Rural women are increasingly required to travel for obstetric services.[3] This need for travel results in poorer birth outcomes.[4] For women from remote Aboriginal communities, the distance

travelled is even greater and the differences in cultural environments and language compound the stress of childbearing.

The geographical challenges that accompany a centralization of obstetric services are identified as one of multiple factors associated with Canada's rising induction rate.[5] Travel for labour and delivery is associated with higher delivery complications and rates of prematurity,[4] as well as increased financial, emotional and psychologic stress.[6,7] Most women choose to deliver in their home community despite limited obstetric services.[8–10] Zelek and colleagues[10] documented that 77.8% of the eligible (nonprimigravida) women studied preferred to deliver at the rural hospital in Marathon, Ont., which had no cesarean delivery capabilities.

Most studies pertaining to the quality of maternal care by family physicians in rural hospitals indicate safe outcomes comparable to larger urban centres.[11–17] A 1984 study of rural obstetrics programs in northern Ontario found small rural hospitals that performed cesarean deliveries regularly had slightly better birth outcomes than urban centres.[12] Similar results from a recent study in Bella Coola, BC, support the conclusion that "low technology environments" are capable of providing excellent maternal outcomes even without cesarean delivery capabilities.[16] A 2007 Canadian study that analyzed 5792 cesarean deliveries compared the outcomes of those performed by general practitioners to those performed by specialists and found similar outcomes.[18]

Closures and centralization of rural obstetrics programs in Canada because of physician shortages is not uncommon[19–21] and is deemed part of the emerging maternity care crisis by the Ontario Women's Health Council.[19] The council and others[22–26] identify the need for health human resources and physician retention. Recently, the BC government has allocated funds to re-establish family physician involvement in obstetrics.[24]

SOLUTIONS

Creative solutions that fit the environment and resources of a community can reduce women's need to travel for obstetric services and allow for the survival of small obstetrics programs. The Weeneebayko Hospital in Moose Factory, Ont., services 6 remote, fly-in communities. The hospital's obstetrics program of 100 deliveries per year has closed at times because of physician shortages, requiring patients to travel to Timmins, Ont., to receive care. Now once again operational, the program has family physicians performing deliveries, and the general surgeon doing cesarean deliveries with support from obstetricians on itinerant visits. The family physicians involved can access additional training in Timmins. The program, which reopened in 2004, allows women to stay "in zone" to deliver.[25]

SIOUX LOOKOUT MENO YA WIN HEALTH CENTRE PROGRAM

The obstetrics program at the Sioux Lookout Meno Ya Win Health Centre (SLMHC) has been in operation for 25 years and services 28 remote, fly-in Aboriginal communities and the town of Sioux Lookout, Ont., serving a total population of 25 000. The SLMHC has developed a model of care that incorporates Aboriginal values and promotes an environment of culturally sensitive care. The obstetrics program has cesarean delivery, ultrasonography and version capabilities, delivered by rural physicians with appropriate additional training. The program reduces the need for patients to travel more

Renee Southwind

Four generations pose for a picture in front of the Sioux Lookout Airport, as Beatrice (Ningewance) Kanate and her newborn son, Ethan, prepare to go home to North Caribou Lake First Nation. Ms. Kanate (centre) is pictured with (from far right, counter-clockwise) her grandmother, Agnes Ningewance; her father, Merv Ningewance; her brother, Pawn Ningewance; and her son, Ethan Kanate.

than 300 km to larger centres in Thunder Bay, Ont., or Winnipeg, Man. An average of 350 deliveries are performed at the centre each year.

Prenatal care

Currently there is one federally funded ultrasonography technician who travels to remote communities performing prenatal ultrasonography. In 2007, he made 55 community visits, performing 465 portable obstetric ultrasonography procedures in the local community nursing stations.

Routine prenatal care throughout the pregnancy is provided by visiting family physicians and by the community's expanded-role nurses with telephone access to on-call physicians.

Twice weekly prenatal clinics are held in Sioux Lookout with about 1000 patient visits per year. This allows patients referred for delivery to be followed up regularly after 38 weeks. It also allows for the review of patients referred for earlier complications.

Evaluation of referrals and case management

Multidisciplinary weekly rounds are held to ensure that the 350 pregnant women per year referred to the SLMHC obstetrics program are appropriate for our facility. This provides opportunity for risk assessment and further testing on specialty referrals.

Program coordination

A nurse coordinator facilitates consultations, liaises with nursing stations and ensures patients are oriented to our facility. This coordinator maintains contact with the patients and provides prenatal education while they are in Sioux Lookout. This allows us to ensure complete documentation is received and that the appropriateness of referrals and risk assessment for local delivery is developed.

Labour and delivery staff

The hospital continues to work to ensure that staff covering the labour floor have the appropriate experience. The SOGC ALARM (Advances in Labour and Risk Management) program has been run twice in the past 7 years in Sioux Lookout. The presence of an in-house registered nurse /neonatal resuscitation instructor also allows all care providers to maintain their competence. The continuing education of both the nursing and medical personnel attending deliveries is essential.

Availability of cesarean delivery

Surgical delivery is performed by 3 family physicians (2 local, 1 locum). Anesthesia services are provided by 4 general practitioner–anesthetists (2 local, 2 locum). Six other family physicians provide on-call services for the hospital-based prenatal clinic, labour and delivery.

Cultural supports

For many of our patients, English is a second language. We have Aboriginal interpreters available 16 hours a day for routine translation. Further cultural services are provided through the SLMHC Traditional Healing, Medicine, Foods and Supports Program, which includes a visit by an elder and access to traditional foods. In these ways the program tries to provide as culturally appropriate an environment as close to home as possible.[26]

Tele-health evaluations

This component of the program commenced in September 2007 to decrease travel from communities for a broad scope of consultations, including mid-trimester assessments. Last year during a blizzard, 2 babies were born in remote communities, assisted by the on-call physician in Sioux Lookout via live video conferencing.

Evaluation

SLMHC is considered a level-1 obstetrics program (providing care to women who anticipate healthy nonemergent births and term newborns), but our patients often present unique cultural and geographic challenges. Both type 2 diabetes and gestational diabetes are becoming common complications. A 1997 study of Native women delivering in Sioux Lookout found the rate of gestational diabetes to be 8.4%, when the national average was 4%.[27] Data from 2005/06 showed that our region's rate of smoking during pregnancy and teenage mothers to be the highest in the province.[28]

Outcomes

Our obstetric outcomes compare well with provincial averages. At 24%, our cesarean delivery rate, from 2005 to 2007, was lower than the provincial averages of 28% for all hospitals and 27% for all level 1 institutions.[29] Most of our cesarean deliveries (73%) were

urgent/emergent, and 27% were elective primary or repeats. Of the 627 deliveries, we had 10 failed attempts at vaginal birth after cesarean (VBAC) and 39 successful VBACs — a success rate of 80% versus a provincial success rate of 53%.[29] All 17 breech presentations were delivered by cesarean (10 happened to be elective repeat cesarean deliveries).

Complications

Our rate of gestational diabetes, combined with Aboriginal heritage, resulted in a 25.5% rate of large-for-gestational-age babies (> 4 kg), versus a provincial rate of 11%.[30] This is in keeping with information from other provinces which also demonstrates higher rates of macrosomia in Aboriginal offspring.[31]

Between 2006 and 2008 there was no intrapartum fetal or maternal death and only 1 readmission for postpartum infection. Six newborns weighing less than 2500 g were delivered in our facility, none of which were predicted or avoidable.

DISCUSSION

Key strengths

Three elements account for maintaining the ongoing success of our program: patient volume, remote location and organizational culture.

Patient volume

The volume of 300–350 deliveries per year ensures that physicians and nurses are busy enough to maintain competence, interest and a reasonable comfort level. The 75 or so annual cesarean deliveries provide enough operative workload to maintain expertise for at least 2 trained family physicians. Programs that do not sustain reasonable volumes need funding for physicians and nurses to regularly visit regional centres to maintain competence without experiencing financial penalties. We note the recent BC initiative to facilitate retraining of family physicians to rejoin obstetric service provision.[9] Would preemptive funding and maintenance programs help obstetric service and prevent their closure?

Remote location

The remote location of our program is an asset. It ensures that broad-scope family physicians and multiskilled nurses will be the care providers. This allows for ownership of the service — including stepping forward for advanced training where needed. In both anesthesia and cesarean delivery, we have support from a small number of trusted locum family physicians with these additional skills. In Sioux Lookout, such multiskilled locum physicians provide emergency department and family physician coverage as well as contributing to the obstetrics program.

Organizational culture

The organizational culture of a sustainable program needs champions, collegiality, coordination, safety and purpose. The ALARM courses we hosted were invaluable in identifying and supporting physicians and nurses keen to provide up-to-date and safe obstetric care. It contributed to a shared sense of commitment. Additionally, our largely Aboriginal population receives most of the rest of their medical care in Sioux Lookout. This contributes to the cultural competence and experience of care providers. There is a sense of teamwork among our local providers. We access collegial and appropriate telephone support from Winnipeg and Thunder Bay when required. Complex patients requiring more advanced care are air transferred to one of these centres as needed.

Needs and challenges

Travel from home communities to distant centres increases emotional stress and has the potential to have a negative impact on pregnancy outcomes. Although SLMHC ensures a more local and familiar facility for most of the patients, the women do have to spend time away from their families. One of the greatest limitations of the present program is inadequate federal funding support for escorts, to allow women the support of a family member during labour. This option is not funded despite evidence of improved delivery outcomes associated with labour support.[32–33]

Our program's reliance on a small core group of family physicians to ensure anesthesia and cesarean delivery capabilities reveals both the strength of the program and a potential for difficulties in the future. There is a clear need to develop an employment package that would attract new physicians interested in providing this type of care, beyond present fee-for-service funding. Sustainability will need to be secured by achieving program-specific funding for service provision, mentoring and training. Such initiatives are in the planning stages.

In addition, rural and remote obstetric services need

- local, broadly skilled personnel: physicians, nurses, midwives, ultrasonography capability and the establishment of a critical mass of capable clinicians, including support for mentoring;
- regional support for specialist back-up, patient transfer, training, research, relationship-building, and locum nursing and physician support when needed.

CONCLUSION

It is crucial that regional and national funding bodies acknowledge the mandate to provide obstetric services close to the patient's home. This may involve identifying key regional programs and providing robust programming support and funding to enhance longevity.

Programs based on the goodwill and practice profiles of small groups of individual clinicians can carry us only so far. We have seen the closing of many rural obstetrics programs and the decline in family physicians involved in obstetrics in urban areas, where specialist obstetricians shoulder the workload. Such fallback positions are not available in rural and remote Canada. The time for a more committed approach is upon us.

Competing interests: None declared.

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Country cardiograms case 33: Answer

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Figure 1 exhibits features of anterior ST elevation myocardial infarction. There is significant ST segment elevation in leads V1–V4. To a lesser degree there is ST segment elevation in the inferior leads, with reciprocal depression in leads I and aVL. Figure 2 shows a wonderfully normal electrocardiogram (ECG), with no evidence of any new Q waves in the affected leads.

This case, with its normal follow-up ECG, demonstrates the remarkable power of thrombolytic therapy, made simpler than ever with the use of a single bolus dose of tenecteplase. The value of a short door-to-ECG time (in this case, 14 min) and a short door-to-drug time is obvious. It also illustrates the critical importance of having someone stay with the patient at all times, even during the relative chaos of a single physician and nurse attending to a multitude of tasks, which often requires one of them to be in an adjacent area. This case, seemingly progressing smoothly and without untoward incident, was abruptly complicated by ventricular fibrillation. The seconds saved by using defibrillator pads that had already been attached to the patient's chest, rather than using paddles, provided further opportunity to increase the chances of a successful outcome.

For the question, see page 73.

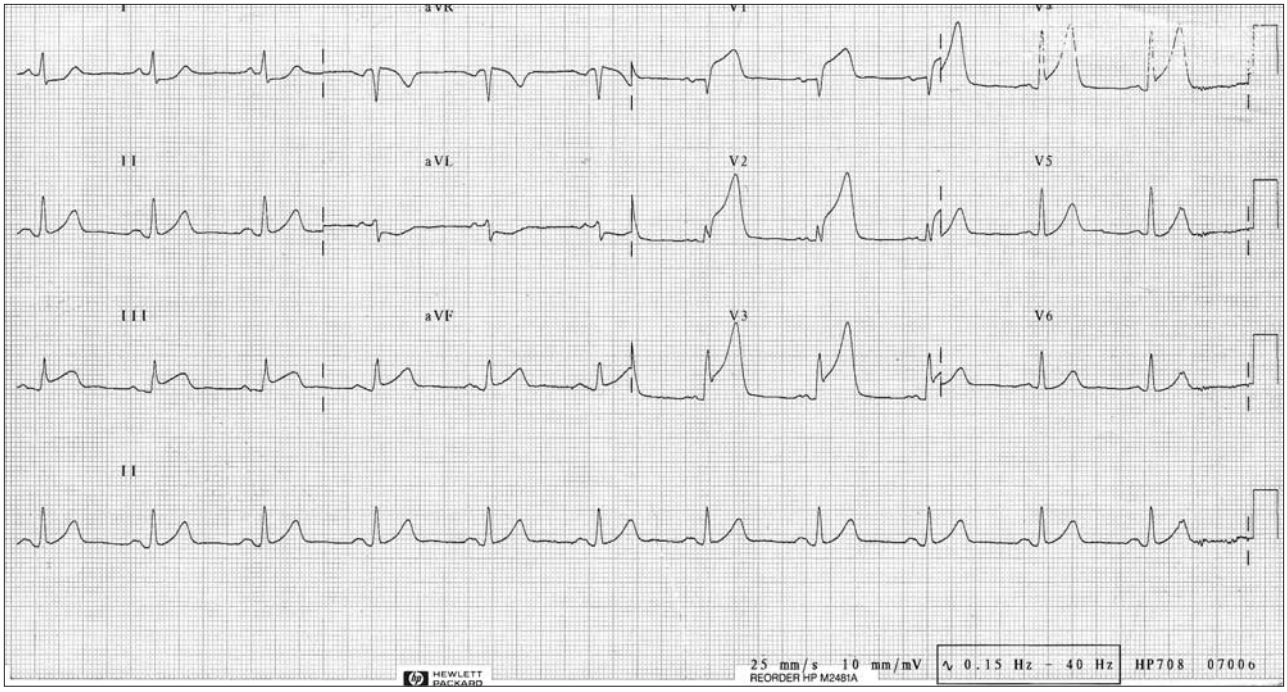

Fig. 1. Initial electrocardiogram of a 75-year-old man who presented to the emergency department with a 1-hour history of severe central chest pain.

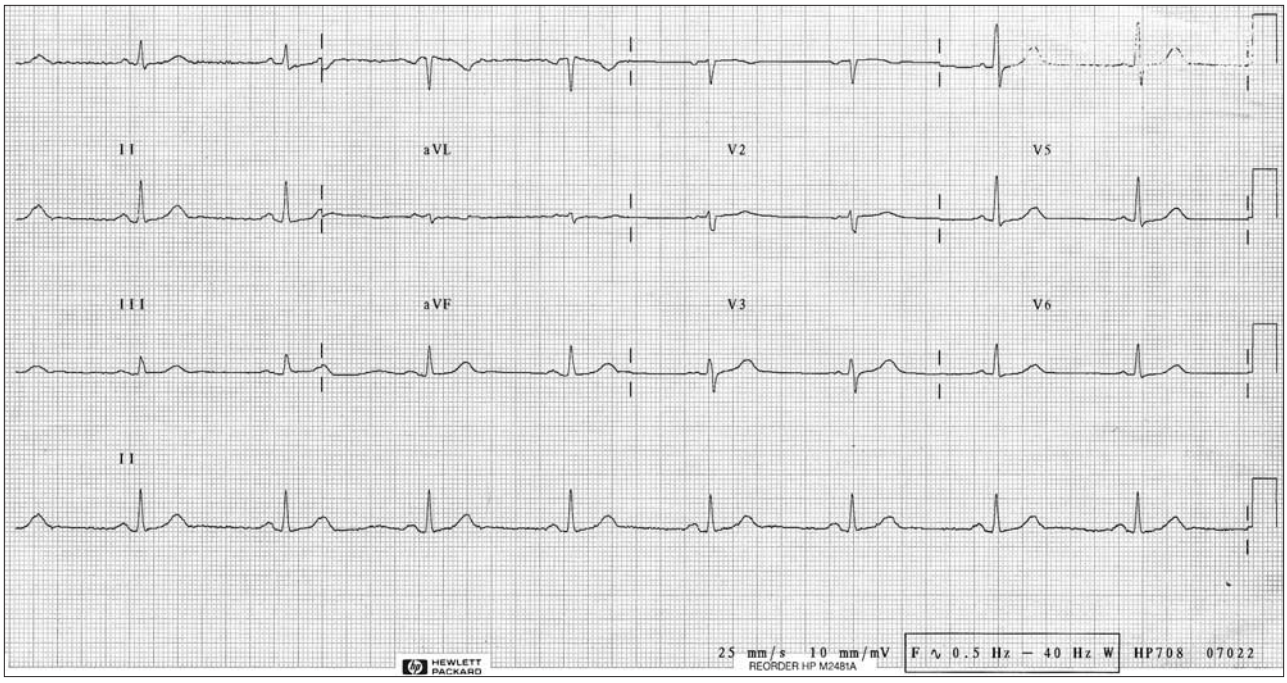

Fig. 2. Electrocardiogram 1 week after discharge.

Cardiogrammes ruraux

Avez-vous eu à décrypter un ECG particulièrement difficile récemment?

Dans la plupart des numéros du *JCMR*, nous présentons un ECG assorti de questions. Les réponses et une discussion du cas sont affichées sur une autre page.

Veuillez présenter les cas, accompagnés d'une copy de l'ECG, à Suzanne Kingsmill, rédactrice administrative, *JCMR*, C. P. 4, succ. R, Toronto (Ontario) M4G 3Z3; cjrm@cjrm.net