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DANS CE NUMÉRO

Use of Admail in Rural Surveys

Rural Risk of Dementia

The Occasional Regional Nerve Block of the Hand



Lolo™

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

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Contraindications:

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

Most serious warnings and precautions:

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

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

Other relevant warnings and precautions:

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

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

For more information:

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

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



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APR. 6-8, 2017

CALGARY, ALTA.

Risks of UpToDate medicine

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Let me start by pointing out that I am not picking on the website UpToDate. Neither am I putting down the current generation. *The Washington Manual of Medical Therapeutics* and *Scientific American Medicine* have in years past been exemplars of practising medicine “by the book.”

An evidence-based approach is necessary but insufficient to validate what you read, because how you interpret the evidence is subjective. Which studies should be counted? Is a statistical difference clinically relevant? How rural is the study population?

The influence of funding should be considered, regardless of whether it comes from the profession itself or from pharmaceutical companies. It is not a coincidence that pharmaceutical representatives will offer medication samples and a laminated copy of the summary sheet of the latest guideline, but not necessarily a laminated copy of the authors’ declarations of conflict ... if even extant in the original.

Cultural values also have an influence. At my hospital, we send someone with chest pain home after 2 normal sets of electrocardiograms and troponin tests, taking a small but nonzero risk that they will infarct. Apparently, Americans do not, and most patients with chest pain are

admitted for stress testing and potentially angiograms (with a small but nonzero number needed to harm). Some Americans advocate for the HEART score, which would reduce the admission rate for chest pain by about a third.¹ In contrast, it is not clear that the Canadian health care system could handle the large volume of admissions and testing that would ensue if we were to adopt the score.

The same principle of applying the guideline to the right population applies to the rural–urban divide. In a large hospital with access to computed tomography (CT), the Canadian CT Head Rule will decrease rates of CT of the head with excellent outcomes.² If you are rural and at a distance from CT access, those scores will increase your transfer rates for CT, with unstudied results for your patients.

So, use the latest resources to get an opinion. But if it’s an important question, wisdom would dictate that you use several references, speak to your rural colleagues and then form your own opinion.

REFERENCES

1. Backus BE, Six AJ, Kelder JC, et al. A prospective validation of the HEART score for chest pain patients at the emergency department. *Int J Cardiol* 2013;168:2153-8.
2. Stiell IG, Wells GA, Vandemheen K, et al. The Canadian CT Head Rule for patients with minor head injury. *Lancet* 2001;357:1391-6.

Les risques de la médecine fondée sur les données les plus récentes

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Je tiens à préciser d'emblée que je ne m'en prends pas au site Web « UpToDate ». Je ne dénigre pas non plus la génération actuelle. *The Washington Manual of Medical Therapeutics* et *Scientific American Medicine* sont des modèles de pratique médicale « selon les règles de l'art » depuis nombre d'années.

Un modèle de soins fondé sur des données probantes est essentiel, mais insuffisant pour valider nos lectures, parce que l'interprétation de ces données est subjective. Quelles études devraient compter? Un écart statistique est-il pertinent sur le plan clinique? Quelle est la proportion rurale de la population étudiée?

Je crois également qu'il faut tenir compte de l'influence du financement, peu importe s'il provient de la profession médicale comme telle ou des compagnies pharmaceutiques. Ce n'est pas par hasard que les représentants pharmaceutiques offrent des échantillons de médicaments et une copie plastifiée de la feuille sommaire de la ligne directrice, mais pas nécessairement de copie plastifiée des déclarations de conflits d'intérêts des auteurs ... ne serait-ce que dans l'original.

Les valeurs culturelles exercent aussi une influence. À mon hôpital, nous renvoyons à la maison toute personne atteinte de douleur thoracique après 2 séries normales d'électrocardiographies et de dosages de la tropoline. Nous prenons donc un risque faible, mais non nul, que la personne fasse un infarctus. Apparemment, ce n'est pas le cas pour les Américains. La plupart des personnes atteintes de douleur thoracique sont admises afin

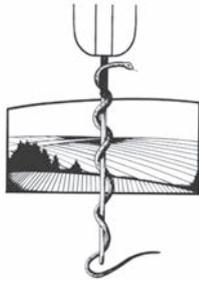
de passer des épreuves d'effort et, potentiellement, des angiographies (qui entraînent un risque pour un faible nombre, mais non nul de patients). Certains Américains préconisent le recours au score HEART, qui permettrait de réduire du tiers, environ, le taux d'admission en raison d'une douleur thoracique¹. Au Canada, il n'est pas clair que le système de santé pourrait absorber le volume élevé d'admissions et d'exams qu'entraînerait l'adoption de ce score.

Le même principe d'application de la ligne directrice à la bonne population est valable en ce qui concerne le clivage entre milieux urbains et milieux ruraux. Dans les grands hôpitaux qui ont accès à la tomographie par ordinateur (TDM), le recours à la règle canadienne d'utilisation de la TDM de la tête réduit les taux de TDM de la tête et entraîne d'excellents résultats². En milieu rural, toutefois, où l'accès à la TDM est limité, ces scores feraient augmenter le taux de transfert pour une TDM, sans que l'incidence de l'intervention sur les résultats pour les patients ait fait l'objet d'études.

Pour toutes ces raisons, utilisez les ressources les plus récentes pour éclairer votre décision. S'il s'agit d'une question importante, il serait sage d'utiliser plusieurs références et de demander l'avis de vos collègues en milieu rural avant de former votre propre opinion.

RÉFÉRENCES

1. Backus BE, Six AJ, Kelder JC, et collab. A prospective validation of the HEART score for chest pain patients at the emergency department. *Int J Cardiol* 2013;168:2153-8.
2. Stiell IG, Wells GA, Vandemheen K, et collab. The Canadian CT Head Rule for patients with minor head injury. *Lancet* 2001;357:1391-6.



President's message. The urbanization of medical care

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As incoming president of the SRPC, I have been tasked with writing the president's message for *CJRM*. It is a privilege to do so. I would be remiss if I did not open my remarks with an expression of gratitude to John Soles, who has led this organization with great distinction and wisdom over the past 2 years. Since joining the board, I have been astonished by the dedication to rural health care that each member brings to the table. John has exemplified this in his leadership, and I can only hope to emulate his example in the coming years.

I will start by stating that I am an imposter. I live and work in Prince Albert, a city of 40 000; however, I have provided clinical services to a First Nations community on a regular basis for more than 25 years. I was born and raised in a small town in Saskatchewan, and my travels throughout the province as a biologist (before I entered medicine) have given me a sound grasp of the meaning of "rural" and the diversity that the term represents.

My work in Prince Albert has allowed me to observe the transition in generalist medicine. I started my practice in a community where the family doctors provided emergency department coverage; attended most deliveries; and assisted in the operating room, with anesthesia and with inpatient care, including intensive

care and pediatrics. We also visited nursing homes and made house calls. It was an extremely busy life, but equally satisfying. As more specialists appeared, they were unfamiliar with the capabilities of their general practitioner colleagues, and our scope of practice began to shrink.

This transition was amplified in the larger cities and has greatly reduced the scope of practice of our urban counterparts. Training has similarly suffered, with fewer preceptors modelling full-scope practices. Many newly minted family physicians have little appreciation for "learning on the job" and have yet to develop clinical courage. The challenge in rural medicine will be to maintain our practice patterns. The patients and the literature are on our side, but enthusiasm from other quarters is not overwhelming.

The task ahead, as I see it, is to combat the impulse to "specialize" and leave care to the "experts" (mostly in the cities). "Country docs" have provided exemplary comprehensive care to their communities for decades. Our opposing forces are strong, and we will need greater numbers to beat the trend. It will be my mission to expand the membership of the SRPC over the coming 2 years so that we have a louder voice in our opposition to the urbanization of medical care. I will charge our current membership to assist me in this task.

I look forward to the years ahead.

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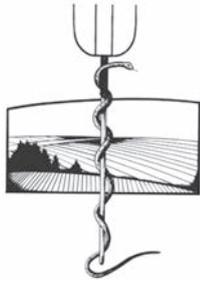
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Message du président. L'urbanisation des soins médicaux

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En ma qualité de président entrant de la Société de la médecine rurale du Canada (SMRC), j'ai été chargé de rédiger le message du président pour le *Journal canadien de la médecine rurale*. C'est pour moi un immense privilège. Je m'en voudrais de ne pas d'abord exprimer ma gratitude à l'égard de John Soles, qui a dirigé cette organisation avec beaucoup de distinction et de sagesse au cours des 2 dernières années. Depuis mon arrivée au conseil d'administration, j'ai été frappé par le dévouement dont fait preuve chacun des membres envers les soins de santé en milieu rural. John a incarné ce dévouement dans son rôle de leadership, et je ne peux qu'espérer suivre son exemple au cours des années à venir.

Je dois commencer par vous avouer que je suis un imposteur. En effet, j'habite et travaille à Prince Albert, une ville de 40 000 habitants. Toutefois, j'ai offert des services cliniques dans une communauté des Premières Nations de façon régulière pendant plus de 25 ans. Je suis né et j'ai grandi dans une petite ville de la Saskatchewan, et mes déplacements dans l'ensemble de la province en tant que biologiste (avant de me lancer en médecine) m'ont permis de bien comprendre ce qu'est un « milieu rural », avec toute la diversité que cela comporte.

Mon travail à Prince Albert m'a permis d'observer la transition qui s'est opérée en médecine générale. J'ai commencé à exercer la médecine dans une communauté où les médecins de famille fournissaient des soins d'urgence, pratiquaient la plupart des accouchements et faisaient office d'assistants en salle d'opération, en anesthésie et pour les soins aux malades hospitalisés, ce qui englobait les soins intensifs et la pédiatrie. Nous nous rendions également dans les foyers de soins infirmiers, sans parler

des consultations à domicile. Bref, nous menions une vie très remplie, mais tout aussi satisfaisante. Puis les spécialistes se sont faits de plus en plus nombreux. Ils connaissaient mal les capacités de leurs collègues omnipraticiens, et notre champ d'activités s'est mis à rétrécir.

Cette transition était encore plus marquée dans les grandes villes, et le champ d'activités de nos homologues exerçant en milieu urbain s'en est trouvé considérablement réduit. La formation en a également souffert, les précepteurs exerçant la médecine générale dans toute son ampleur étant de moins en moins nombreux. Bon nombre des nouveaux diplômés en médecine familiale ne saisissent pas la valeur de l'« apprentissage en cours d'emploi » et doivent encore développer un courage clinique. L'épreuve, pour la médecine en milieu rural, consistera à maintenir nos modèles de pratique. Les patients et la littérature nous appuient, mais dans certains cercles, on ne partage pas le même enthousiasme.

À mon avis, la tâche qui nous attend est de combattre la propension à se « spécialiser » et à laisser les soins aux « experts », qui exercent surtout dans les grandes villes. Les « médecins de campagne » fournissent des soins complets et exemplaires dans leurs communautés depuis des décennies. Les forces adverses sont puissantes, et nous devons être plus nombreux pour contrecarrer la tendance. Au cours des 2 prochaines années, j'aurai pour mission d'augmenter le nombre de membres de la SMRC afin que nous puissions exprimer encore plus haut et plus fort notre opposition à l'urbanisation des soins médicaux. Je demanderai à nos membres actuels de m'aider dans cette entreprise.

Je me réjouis à l'idée du travail à accomplir au cours des années à venir.

Use of Admail and a geographic information system to send surveys to target populations

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reviewed.*

Introduction: This paper briefly describes the use of Canada Post Unaddressed Admail and a geographic information system (GIS) for survey distribution to a specific target population in a large, sparsely populated geographic area, and the effectiveness of this approach.

Methods: Surveys were sent as Unaddressed Admail via Canada Post to a target population of people living within 5 km of a wind turbine in southwestern Ontario.

Results: The overall response rate from 8 wind farms (in 8 counties) was 8.1%.

Conclusion: This approach has the potential to save time and money, but low response rates are common, distribution is not precise and there is potential for selection bias. Despite these flaws, Unaddressed Admail is worth consideration for delivery of information, study-recruitment materials and surveys to rural, remote and specific target populations.

Introduction : Nous décrivons brièvement l'utilisation du service Médiaposte sans adresse de Postes Canada et d'un système d'information géographique pour la distribution de sondages à une population cible précise sur un grand territoire peu densément peuplé, ainsi que l'efficacité de cette méthode d'envoi.

Méthodes : Nous avons utilisé le service Médiaposte sans adresse de Postes Canada pour envoyer des sondages à une population cible habitant dans le sud-ouest de l'Ontario à moins de 5 kilomètres d'une éolienne.

Résultats : Le taux de réponse global pour les 8 parcs éoliens visés (dans 8 comtés différents) était de 8,1 %.

Conclusion : Bien que cette méthode puisse faire économiser temps et argent, elle n'engendre souvent qu'un faible taux de réponse, est imprécise sur le plan de la distribution et pourrait entraîner un biais de sélection. Malgré ces lacunes, le service Médiaposte sans adresse reste une option à envisager pour l'envoi de renseignements, de documents de recrutement en vue d'études et de sondages à des populations cibles précises vivant en milieu rural et éloigné.

INTRODUCTION

Unaddressed Admail has the potential for use in rural or remote communities when a specific geographically based sample in a community may be expensive or difficult to reach. In the case of a rural sample, it may be especially time-consuming and difficult to travel within a community to hand-deliver surveys.¹ Unlike studies in urban or suburban communities, where research assistants can distribute hundreds of surveys on foot over the course of a single day,

rural or remote communities are not as densely built or populated and present unique challenges for survey distribution. Distribution of surveys to a handful of rural communities may take several days and include costs associated with hotels, meals and car rental. For studies with budgetary constraints, Unaddressed Admail provides a fast and low-cost alternative that does not require travel.² For studies examining specific populations, use of Unaddressed Admail is a more precise method to locate the population of interest than

use of telephone survey companies that rely on 3-digit postal codes to find participants.

Canada Post Unaddressed Admail is a direct-mail service that can be used to distribute surveys to specific geographic areas. When using Admail the sender is not required to provide names and addresses of recipients. This method has been previously used for delivering surveys to rural and remote communities across Canada, and in some cases has been used in studies where researchers selected residences and communities using a geographic information system (GIS). A GIS is a geographic program used to visualize and analyze spatial data. For example, this approach was used previously for recruitment of urban residents⁵ and for mailing materials related to a health-behaviour intervention,^{4,5} and has largely been used as a tool to deliver surveys to rural residents, including surveys specifically targeting farmers.⁶⁻⁸

Our objective was to examine the benefits and shortcomings of using Unaddressed Admail for rural health research and to describe a GIS-based method for Unaddressed Admail distribution. We also discuss the appropriateness and efficacy of Unaddressed Admail for use by rural health practitioners. This method may be applicable to rural health practitioners or researchers attempting to deliver surveys or information to tailored rural communities in Canada, especially when communities have been selected using GIS methods.

METHODS

Survey distribution

As part of a larger public health study (unpublished data, 2015), a method was required to deliver surveys to targeted locations and a specific target population within large geographic areas. Wind turbines are a decentralized form of energy development and tend to be built in rural communities with low population density.^{9,10}

The wind turbine locations from wind farms in a number of counties in southwestern Ontario were mapped¹¹ and data were transferred into ArcGIS 10.1, a GIS used for managing geographic information in a database, analyzing spatial data, and creating maps and visualizations.¹¹ It was the intent to deliver the survey to residents living within 5 km of a wind turbine, a distance selected following a review of the literature and anecdotal evidence from stakeholders who had contacted the research group. Peer-reviewed health studies have involved residents living 1.4 km,¹² 2 km¹³ and 2.5 km¹⁴ from a wind turbine,

and a community-based survey reported health effects in residents living up to 5 km away.¹⁵ Based on this evidence and a desire to be inclusive and thorough, the 5-km buffer was selected.

Survey delivery relied on Canada Post Unaddressed Admail. The Admail delivery routes of interest were selected using a map of delivery routes provided by Canada Post, which identifies the geographic area covered by each route, as well as the number of residences on each delivery route. With the use of a GIS, it was spatially determined which residences would receive the survey through contrasting of a map of the delivery routes with a map of the wind turbines. The delivery routes that contained wind turbines were selected for inclusion in the study, with the exception of delivery routes that did not contain 5 or more wind turbines. This limit was enforced to exclude delivery routes or postal codes that were expected to be under a minor influence from wind turbines and to maximize the distribution to postal routes where a larger number of residents would be living near wind turbines. Therefore, only residents living within postal codes (and corresponding delivery routes) that contained more than 5 industrial wind turbines were selected as study participants (Fig. 1). One survey per household was sent to residences located near industrial wind turbines. The survey included a question on self-assessed distance to the nearest wind turbine ("How far do you think you live from the nearest wind turbine in miles or kilometres?") and asked for the participant's address ("What is your address?") so that location could be geo-coded within the GIS. This ensured that, among residents within each delivery route, residents living within 5 km of a wind turbine could be identified.

Statistical analysis

All analyses were performed using SAS 9.22. Demographic characteristics of the sample were compared with the population of the census division for each county, via a paired *t* test, using information from the 2006 and 2011 Canadian censuses. We compared variables between the populations to determine if the respondents were significantly different from the rest of the population. We used a 2-tailed *t* test to examine the differences in sex, marital status and education level between the 2 populations.

The study protocol was reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo.

RESULTS

Surveys were sent to 4876 residences located near industrial wind turbines. Response rates for each of the 8 wind farm communities in 8 counties were calculated. The overall response rate was 8.1% (Table 1). The lowest response rate was seen in Bruce County (6.9%) and the highest response rate was seen in Norfolk County (12.4%).

We compared the populations to determine if there was a significant difference between the groups (Table 1). The median age of the respondents was 13 years greater than the median age of the comparison

population. There was a greater proportion of men in the sample (52.2%) than in the comparison population (49.2%), but this difference was not significant ($p = 0.2$). The sample included a significantly higher percentage of married people (79.4% v. 61.0%; $p < 0.005$) and people with postsecondary education (58.7% v. 37.1; $p < 0.005$) than the comparison population. The median total income of the sample was \$7111.25 lower than that of the comparison population.

The difference between the number of overall residences and residences that accept advertisements (“Total Points of Call” v. “Consumers’ Choice” lists) was not significant ($p = 0.5$).

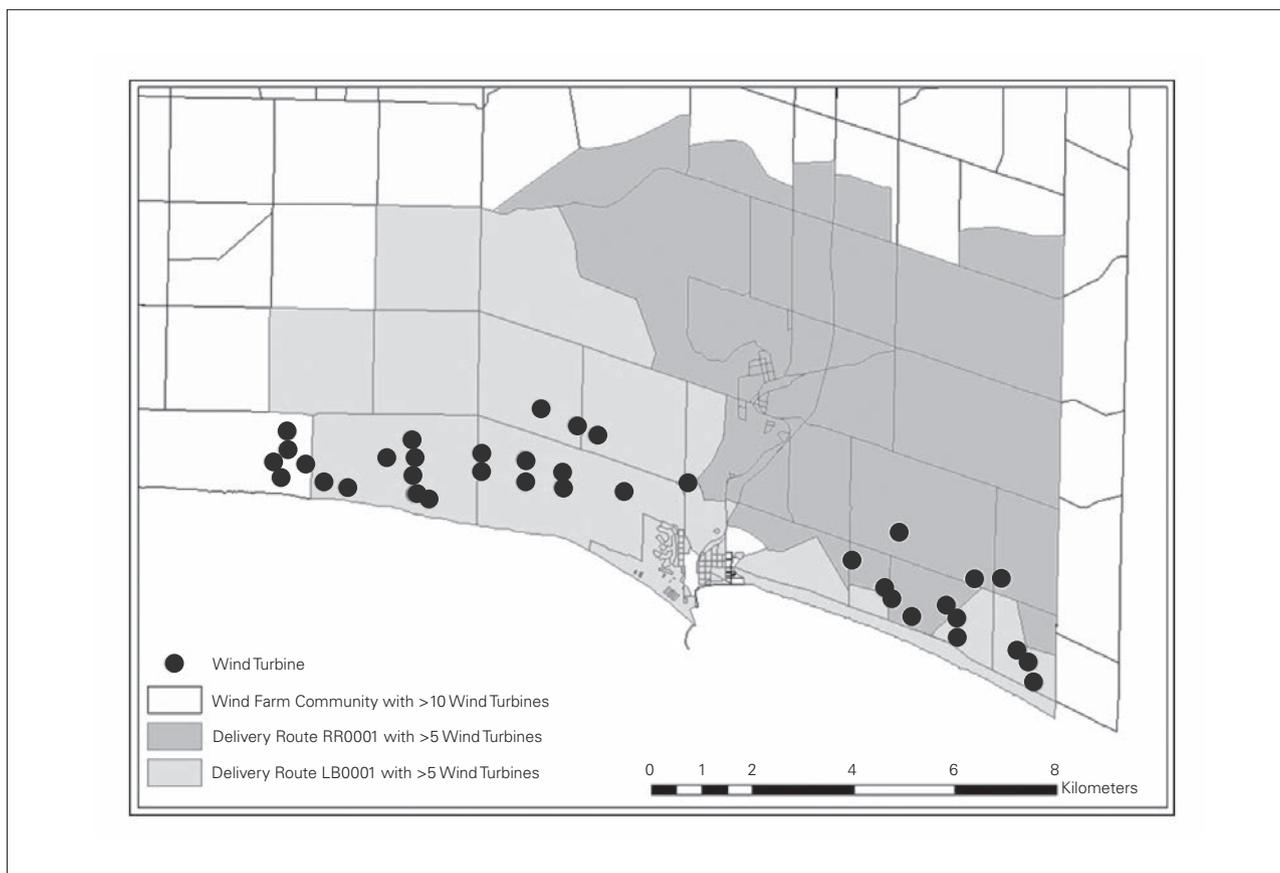


Fig. 1. The locations of wind turbines and Canada Post delivery routes (within a 6-digit postal code) in Port Burwell, Ont.

Table 1: Demographic characteristics of the study sample and the comparison population

Characteristic	Sample*	Comparison population†	<i>p</i> value
Median age, yr	56	43	—
Male sex, %	52.2	49.2	0.2
Married, %	79.4	61.0	< 0.005
Median total income, \$‡	60 000.00	67 111.25	—
Postsecondary education, %	58.7	37.1	< 0.005

*The sample included 396 survey respondents, of 4876 households that received the survey.

†The comparison population was the population of the census subdivision (1 021 257 residents).

‡Total income for the sample was calculated by using the midpoint of a range. The total income is the sum of the total incomes received by all household members from all sources, before taxes, in the past 12 months. The total income for the comparison population is the sum of the total incomes of all members of that family. Total income refers to the total money income received from various sources during calendar year 2005 by persons aged ≥ 15 years.

DISCUSSION

The objective of this paper was to examine the benefits and shortcomings of survey distribution using Unaddressed Admail to target rural communities across Canada, which is a simple approach that requires minimal time and funding yet has some limitations. Unaddressed Admail has the potential for use in rural or remote communities. This approach is relevant to rural health researchers yet does not appear to be widely used or well-documented in the Canadian health literature. Unaddressed Admail can be used to disseminate recruitment postings, health interventions and surveys to a large number of people over a large geographic area. Despite the shortcomings of this approach, in some cases it is the only financially suitable option available to researchers.

Unaddressed Admail may be particularly effective when used for the dissemination of information or finding nonrepresentative study samples. In cases where targeted distribution is required, landowner lists² or mailing lists may not be available to researchers, and the census distribution to targeted postal routes is the only available option. In cases where researchers have geographically identified communities of interest using GIS, the Unaddressed Admail method is also preferable, since the distribution routes are available as a GIS map, making route selection relatively easy. Further, in using GIS and spatial distribution methods from the outset, researchers can request information about respondents' addresses and use spatial-analysis techniques, including dose-response analysis of health effects. A dose-response relation implies that an exposure results in an outcome of interest, and spatial data (e.g., measures of distance) can be used to estimate dose (unpublished data, 2015).

Limitations of Unaddressed Admail

Our study pointed to 3 main shortcomings of Unaddressed Admail, although some researchers may find that the practicality of the approach outweighs these concerns.

First, our study had a low response rate, and this was a consistent trend in each of the 8 counties, with an overall response rate of 8.1%. Other studies that have used Unaddressed Admail have obtained response rates ranging from 1%^{3,16,17} to 27.5%.¹⁸ It has been suggested that these should not be considered true response rates, which cannot be calculated owing to a lack of data about how delivery was executed. The delivery routes will include households or residents that are not potential participants of inter-

est, and if the denominator is estimated as the number of surveys that the researchers submitted to Canada Post, this value will include surveys that were knowingly delivered to homes that did not qualify for study inclusion.^{16,17}

In another study involving the rural Ontario communities where our survey was delivered, an overall response rate of 17.1% resulted, which is greater than our response rate but still modest.² Given that the Unaddressed Admail approach generally results in low response rates, it is important for researchers to consider the possibility that the rate may be too low for research findings to be statistically significant or accepted for publication in peer-reviewed journals.

In cases where response rates are low and sampling was purposive and regional, study findings have low generalizability,¹⁸ and researchers using this method should note this in research findings. Researchers can plan to do a modest number of site visits to select research communities to perform door-to-door non-response surveys, which has been done in other studies using Unaddressed Admail to assess nonresponse bias.^{8,19} A more appropriate application of Unaddressed Admail might be for research studies using purposeful sampling techniques. For example, Unaddressed Admail can be used in studies using snowball or chain sampling to recruit the first round of participants or for reaching participants for case studies.

A second limitation is coarseness of spatial distribution. Researchers must select geographic areas based on the routes created by Canada Post and not based on the spatial pattern of interest. In this study, residents living within 5 km of a wind turbine were of interest, but residents living farther away received the survey. To combat this, participants in this study were asked to provide information about their specific geographic location by estimating distance from a wind turbine and by providing their address (which was used to objectively measure distance from a wind turbine).

Asking participants to provide geographic information enabled researchers to exclude respondents who lived beyond the 5-km buffer; however, it is important to note that the address and assessment of distance are self-reported. These data can also be used to roughly examine whether there were discrepancies in the spatial distribution of respondents. Quantifying any spatial discrepancies would require access to GIS maps that indicate the number of households in an area and comparison with a map of the respondents, and a dose-response analysis of the study variables.

A third limitation is selection bias. This results from the nature of the Unaddressed Admail service

in that items are delivered only to residences that do not opt out of receiving advertisements. Members of the target population who have opted out of advertisements may not have received the survey; however, the difference between the number of overall residences and residences who accept advertisements (“Total Points of Call” v. “Consumers’ Choice” lists) was not found to be significant. Furthermore, follow-up surveys have found that nonrespondents have thrown out surveys specifically because they were delivered as part of their “junk mail” and did not have the potential participant’s name or address on the front of the envelope.^{8,19}

Selection bias can also be a shortcoming of studies that use Unaddressed Admail, given that response rates are low. Researchers who have used Unaddressed Admail and encountered low response rates have tried to assess nonresponse bias with follow-up surveys and found no significant difference between respondents and nonrespondents in terms of demographics or study variables of interest.^{8,19} In the current study, we compared the demographic characteristics of the study sample with census division data for the 8 counties (i.e., the comparison population). Significant differences were found (i.e., marital status and postsecondary education); however, in the current study, comparisons between census division data and the study sample are of limited value owing to the low response rate and the subsequent potential for sampling error. Furthermore, these differences in marital status and education are likely a better indicator of a small sample than a systematic sampling bias. In a study that distributed a survey through Unaddressed Admail to farmers in western Canada, respondents were more educated than the overall community.^{16,17} This shortcoming is not specific to Unaddressed Admail distribution — survey respondents do not necessarily match the community, regardless of the method of data collection.²⁰ However, response rates with Unaddressed Admail are consistently low and could therefore be inferred to be consistently unrepresentative of the population. It is also worth considering that only 1 survey or item is delivered to each home; if a research study aims to reach more than 1 member per household, multiple surveys may be sent to each household in each package, or surveys may include contact information for potential participants to contact the researcher for additional copies.

Despite a low response rate in our study, Unaddressed Admail was an efficient method to deliver surveys to targeted locations covering a large geo-

graphic area. For research projects with a limited budget, it is one of the only options available. The low response rate of our study is likely the result of the specific research topic, given that many similar studies have had much higher response rates with similar methods. This method has been used modestly in public health and social sciences research, and details of this method and its strengths and weaknesses are not well-established in the literature.

CONCLUSION

Unaddressed Admail is worth considering for rural health research if door-to-door delivery is not feasible and if the population of interest is being selected using specific geographic criteria. There are many applications for Unaddressed Admail services in rural health research, for study recruitment, survey distribution or dissemination of information, and this approach is worthy of consideration by rural health practitioners.

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Rural residence and risk of dementia

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Introduction: We sought to determine whether residence in a rural region is associated with a higher risk of dementia and a higher risk of developing dementia over a 5-year period than residence in an urban region.

Methods: This was a secondary analysis of a prospective cohort study. In 1991 and 1992, 1751 adults aged 65 years and older and residing in the community were sampled from a representative population-based registry, which included the entire province (time 1). Follow-up occurred 5 years later (time 2). Age, sex and education were self-reported. Rurality was determined by the population of the Census subdivision, with a population greater than 19 999 considered urban. Cognition was assessed using the Modified Mini-Mental State Examination, with those scoring below 78 invited to undergo a clinical examination to determine the presence of dementia. Cross-sectional analyses were conducted for participants with complete data at time 1. Prospective analyses were conducted for participants with normal cognition at time 1, who had complete data and survived until time 2. Logistic regression models were constructed for the outcome of dementia at times 1 and 2.

Results: Residence in a rural region was not associated with dementia in the cross-sectional analyses (adjusted odds ratio [OR] 1.08, 95% confidence interval [CI] 0.61–1.91) and did not predict dementia 5 years later (adjusted OR 1.05, 95% CI 0.66–1.68).

Conclusion: We found no difference in the risk of dementia among older adults living in urban and rural regions of Manitoba.

Introduction : Nous avons voulu déterminer si le fait de vivre en milieu rural est associé à un risque plus élevé de démence et à un risque plus élevé de développer une démence sur une période de 5 ans, comparativement au fait de vivre en milieu urbain.

Méthodes : Il s'agit de l'analyse secondaire d'une étude de cohorte prospective. En 1991 et 1992, 1751 adultes de 65 ans ou plus vivant dans la communauté ont été échantillonnés à partir d'un registre représentatif de la population de toute la province (période 1). Un suivi a été effectué 5 ans plus tard (période 2). L'âge, le sexe et la scolarité étaient autodéclarés, et la ruralité était déterminée à partir des subdivisions utilisées aux fins de recensement : une population de 19 999 personnes ou plus était réputée urbaine. La cognition a été évaluée au moyen d'une version modifiée du mini-examen de l'état mental, et les sujets qui obtenaient un score inférieur à 78 étaient invités à subir un examen clinique pour déterminer la présence de démence. Des analyses transversales ont été réalisées pour les participants au sujet desquels on disposait de données complètes lors de la période 1. Des analyses prospectives ont été réalisées pour les participants dont la cognition était normale à la période 1, au sujet desquels on disposait de données complètes et qui avaient survécu jusqu'à la période 2. Des modèles de régression logistique ont été élaborés pour le paramètre de démence aux périodes 1 et 2.

Résultats : Le fait de vivre en région rurale n'a pas été associé à la démence selon les analyses transversales (rapport des cotes [RC] ajusté 1,08, intervalle de confiance [IC] de 95 % 0,61–1,91) et ne s'est pas révélé prédicteur de la démence 5 ans plus tard (RC ajusté 1,05, IC de 95 % 0,66–1,68).

Conclusion : Nous n'avons observé aucune différence pour ce qui est du risque de démence chez les adultes âgés du Manitoba, qu'ils vivent en milieu rural ou urbain.

INTRODUCTION

Dementia is a common issue facing older adults, their families and society in general. It is associated with functional decline,¹ reduced quality of life,² caregiver burden,³ entry into a nursing home⁴ and death.⁵ The epidemiology and geographic variation of dementia has recently received increasing attention.⁶ A rural residence over the course of one's life could be associated with dementia for several reasons. First, the educational opportunities and quality may differ between rural and urban regions (Fig. 1). This may affect dementia rates given that education is strongly associated with dementia.^{7,8} Second, access to activities that enhance cognition (e.g., libraries and social supports and networks) may vary between and within rural and urban regions. Third, disease states and risk-factor prevalence may differ in rural and urban regions, as may access to medical care. Finally, certain environmental and occupational exposures, such as pesticides⁹ and defoliants,¹⁰ may be more prevalent in rural regions and may also be associated with dementia.

Some studies have demonstrated an increased prevalence of dementia in rural regions compared with urban regions.⁶ One recent meta-analysis noted a 1.5-fold increase in the prevalence of dementia in rural areas.⁶ However, few of the studies in the meta-analysis directly compared rural and urban regions, and some of the comparisons were across societies (e.g., a comparison of New York City with rural Nigeria¹¹). Many of the other studies included in the meta-analysis used small samples or limited measures of rurality or cognition. The Manitoba Study of Health and Aging (MSHA) provided a province-

wide sampling frame in 1991 and 1996, including rural regions, targeted at dementia. This offered us the opportunity to study the effect of rural residence on the risk of dementia. Few epidemiologic studies of aging have sampled rural regions over an entire jurisdiction, and fewer still have both a rural and an urban component.

We sought to determine whether residence in a rural region is associated with a higher prevalence of dementia than residence in an urban area, whether residence in a rural region is associated with a higher risk of developing dementia over a 5-year period among those with normal baseline cognition, and whether any association between a rural residence and dementia is confounded by education or general health status. We also conducted a sensitivity analysis in which we considered cognitive test scores in rural and urban regions.

METHODS

Setting

At the time of the MSHA's initial survey in 1991, 13.4% of Manitoba residents were 65 years of age and older. The major urban centres are Winnipeg (1991 population 616 790; 13.2% aged ≥ 65 yr) and Brandon (1991 population 38 567; 15.5% aged ≥ 65 yr).¹² The northern part of the province is predominantly boreal forest, and the population density is low. The southern portion of the province is largely agricultural, with most residents living on farms or in small towns or villages. On average, 24% of the 1991 population of small towns was aged 65 and older, whereas the corresponding percentage for villages was 27%.¹³

Sample

The data are from the 1991–1992 MSHA, an expansion of the Manitoba component of the Canadian Study of Health and Aging (CSHA).¹⁴ In 1991 and 1992, 1751 individuals aged 65 and older and living in the community were interviewed in person by trained interviewers (time 1). These individuals were randomly selected from a list provided by Manitoba Health, which represents one of the most complete listings of residents. The follow-up survey took place 5 years later. All of Manitoba was sampled. However, the sampling frame excluded many First Nations people for whom health care is provided by the federal government (and they are hence not fully included in the provincial sampling



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Fig. 1. Photograph of one of the investigator's (P.D.S.) grandfather's class of a 1-room school (front row, middle boy holding the flag). In addition to lower educational attainment, there may be differences in educational quality. Note the misspelling of "We'll" in the banner.

frame). As well, in the 2 northernmost regions, the sampling frame was limited to the major towns (Flin Flon, Thompson and The Pas) to ensure the feasibility of travel to these sites.

We considered 2 samples: a cross-sectional and a prospective sample. The cross-sectional sample was the entire sample at time 1 for which complete data were available on both rural residence and cognitive status. The prospective sample was for individuals for whom data were available at times 1 and 2 on cognitive status, who survived to time 2 and did not have dementia at time 1. Figure 2 shows the flow of participants.

Measures

The measure of urban versus rural residence was based on Beale codes modified for Canada.¹⁵ Census subdivisions were classified according to their population reported in the 1991 Census of Canada¹² as urban areas (population > 19 999) and rural areas (population < 20 000). Respondents were then assigned into one of these groups based on their place of residence. In the sensitivity analyses, we also compared Winnipeg with non-Winnipeg residence. We further conducted an analysis based on the region of residence. Here, we considered the urban regions Winnipeg North, Winnipeg South

and Winnipeg West/Centre, and the rural regions Central Manitoba, Interlake, Westman, Eastman, Parkland and Norman.

Age, sex and level of education (measured by years of schooling) were self-reported. We also included self-rated health, using the item, "How is your health these days?," which we categorized as "good" (which included responses of "good" and "very good") or "not good" (all other responses).

The outcome variable was dementia. This was diagnosed according to the protocol of the CSHA.¹⁴ The Modified Mini-Mental State Examination (3MS)¹⁶ was used as the cognitive measure. This is an expansion and adaptation of the Mini Mental State Examination (MMSE)¹⁷ that includes new items and expanded scoring for some items. It is scored from 0 to 100. Those scoring below 78 on the 3MS were invited to participate in a clinical examination to determine the presence of dementia, which was diagnosed according to criteria of the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition. We defined "cognitive impairment, no dementia" (CIND) according to the CSHA protocol. Briefly, these were individuals who scored below 78 on the 3MS but did not meet the criteria for dementia on the clinical examination.

Analyses

We conducted bivariate analyses using χ^2 tests for categorical variables and Student *t* tests (assuming unequal variance) or analysis of variance for continuous variables. In bivariate analyses, we compared rural regions with urban regions. To adjust for potential confounding factors, we constructed logistic regression models. We conducted a cross-sectional analysis and a prospective analysis. For the cross-sectional analyses, the outcome was dementia at time 1. For the prospective analyses, the outcome was dementia at time 2 in a sample of participants who with normal cognition at time 1, survived to time 2 and had no missing data. Logistic regression models were constructed, adjusting for age, sex and level of education.

As a sensitivity analysis, we also considered the 3MS score as a cognitive outcome. Here, we compared the mean 3MS score in rural regions and urban regions. The mean 3MS scores at time 1 and time 2 and the change in mean 3MS scores from time 1 to time 2 were all considered outcomes. Linear regression models were constructed, adjusting for age, sex, education level and self-rated health.

We also considered regional differences. Here, we examined the predictor variable of interest as the region in which the participant resided: Winnipeg

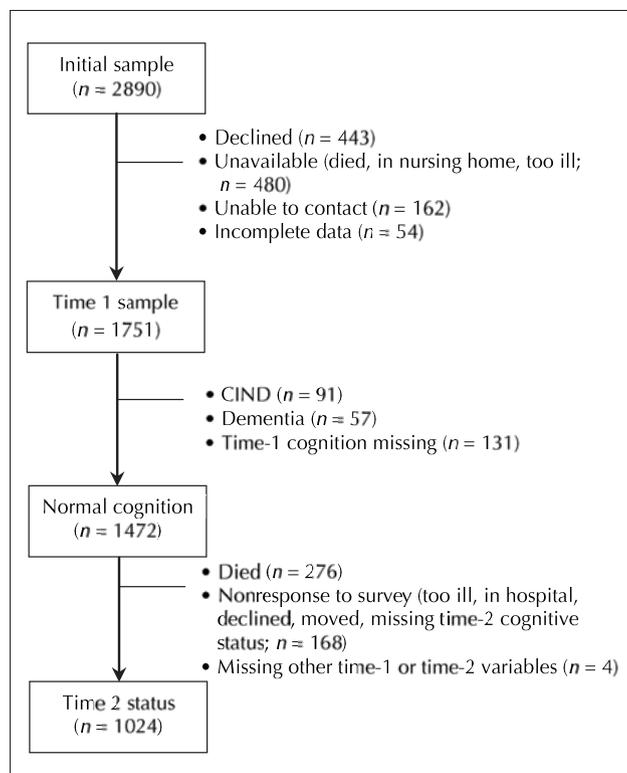


Fig. 2. Flow of participants. CIND = cognitive impairment, no dementia.

North, Winnipeg South, Winnipeg West/Centre, Central Manitoba, Interlake, Westman, Eastman, Parkland and Norman. These analyses may lack the power to detect differences in dementia rates in multivariable models because the number of individuals with dementia in any particular region was small. However, there is sufficient power to detect differences in the change in 3MS scores.

The study received approval from the Research Ethics Board of the University of Manitoba, and adheres to the Declaration of Helsinki.

RESULTS

Cross-sectional analyses

The baseline characteristics of participants are shown in Table 1. Those who lived in rural areas were more likely to be male and to have a lower level of education. Both rural and urban participants in Manitoba had a lower educational attainment than their counterparts in the CSHA. The 3MS scores were lower in the rural group; although this difference was statistically significant, it was quantitatively small.

At time 1, in the rural group, 574 (81.8%) had normal cognition, 40 (5.7%) were diagnosed with CIND, 28 (4.0%) were diagnosed with dementia and 60 (8.5%) had missing data. In the urban group, 894 (85.3%) had normal cognition, 54 (5.1%) were diagnosed with CIND, 30 (2.9%) were diagnosed with dementia and 71 (6.8%) had missing data. Those with missing clinical data at time 1 had lower education levels, lower 3MS scores and worse self-rated health. We did not note an increased risk of dementia in rural areas in the cross-sectional analyses (Table 2). The effect of a rural residence became even less significant once education level was considered in the logistic regression model. Age and education level had strong effects on the risk for dementia.

When we considered the 3MS score as an outcome (which we treated as a continuous score), the results were similar. For these analyses, we considered the 3MS scores of participants residing in rural regions and urban regions in linear regression models. The 3MS scores were not significantly different in rural regions compared with urban regions after adjustment for age, sex, education and self-rated health.

Table 1: Baseline characteristics of participants

Characteristic	Cross-sectional sample				Prospective sample			
	Rural n = 642	Urban n = 978	Missing cognitive status n = 131	Total n = 1751	Rural n = 407	Urban n = 617	Excluded n = 448	Total n = 1472
Age, yr, mean ± SD	76.1 ± 6.9	75.8 ± 7.0	79.3 ± 7.9	76.3 ± 7.1	74.8 ± 6.1	74.4 ± 6.2	77.3 ± 7.5	75.4 ± 6.7
Female sex, %	55.9*	61.2*	51.2	58.5	60.2	62.6	56.6	60.1
Years of education, mean ± SD	8.5 ± 3.2*	10.2 ± 3.5*	6.4 ± 3.3	9.3 ± 3.6	8.9 ± 2.9	10.7 ± 3.3	9.5 ± 3.4	9.9 ± 3.3
Self-rated health "poor," %	23.5	24.1	35.4	24.7	17.2	18.0	29.6	21.7
3MS score, time 1, mean ± SD	85.8 ± 9.7*	87.4 ± 9.8*	67.4 ± 10.9	85.3 ± 11.0	89.0 ± 6.7	90.2 ± 6.3	87.0 ± 6.7	88.9 ± 6.6
3MS score, time 2, mean ± SD	83.5 ± 11.1	84.6 ± 13.0	65.2 ± 19.1	83.5 ± 13.0	84.7 ± 10.4	86.3 ± 11.4	77.2 ± 12.7	85.0 ± 11.5
Did not survive to time 2, %	24.3	21.3	40.5	24.2	—	—	—	—

3MS = Modified Mini-Mental State Examination.
**p* < 0.05.

Table 2: Results of logistic regression models for dementia in the cross-sectional analyses

Variable	OR (95% CI)			
Rurality (ref: urban)	1.44 (0.85–2.43)	1.38 (0.80–2.37)	1.03 (0.59–1.81)	1.08 (0.61–1.91)
Age (per year)		1.15 (1.11–1.20)	1.14 (1.09–1.19)	1.15 (1.10–1.19)
Sex (ref: male)		0.95 (0.55–1.67)	0.89 (0.51–1.57)	0.95 (0.53–1.67)
Education (per year)			0.83 (0.77–0.90)	0.82 (0.76–0.90)
Self-rated health (ref: "good")				1.46 (0.80–2.67)

CI = confidence interval; OR = odds ratio.

Prospective analyses

We considered the sample of individuals who initially had normal cognition, survived to time 2 and had no missing data at time 2 ($n = 1024$). Here, we also noted no effect of a rural residence on the risk of having dementia at time 2; in the urban group 8.9% of the population had dementia at time 2 compared with 10.1% in the rural group ($p = 0.5$, χ^2 test). In logistic regression models, there was no effect of a rural residence after adjustment for potential confounding factors. However, age and self-rated health predicted dementia in these models (Table 3). We conducted a sensitivity analysis in which we compared the time-2 score on the 3MS among rural and urban participants. There was also no difference in the 3MS score at time 2 between those residing in rural and urban regions after adjustment for age, sex, education, self-rated health and the baseline 3MS score.

Regional differences

Because neither rural nor urban regions are homogeneous, we also considered the region of residence. We grouped participants into the region of the province in which they resided and used existing administrative boundaries at the time the study was conducted. In these analyses, we did not have enough participants in each region to consider dementia as an outcome. We therefore used the 3MS score at times 1 and 2. Here, we noted differences in the 3MS scores among the regions (Fig. 3). Generally, the regions with high levels of education and income (e.g., Winnipeg South and Westman regions) had higher 3MS scores, regardless of the rurality of the region. However, all regional differences were small, and were not apparent in models adjusting for age, sex and education.

Table 3: Results of logistic regression models for dementia in the prospective analyses

Variable	OR (95% CI)			
Rurality (ref: urban)	1.15 (0.75–1.75)	1.12 (0.72–1.75)	1.03 (0.65–1.63)	1.05 (0.66–1.68)
Age (per year)		1.16 (1.12–1.20)	1.16 (1.12–1.20)	1.16 (1.12–1.21)
Sex (ref: male)		0.85 (0.53–1.35)	0.84 (0.52–1.34)	0.88 (0.55–1.42)
Education (per year)			0.93 (0.82–1.04)	0.93 (0.83–1.05)
Self-rated health (ref: “good”)				1.83 (1.10–3.05)

CI = confidence interval; OR = odds ratio.

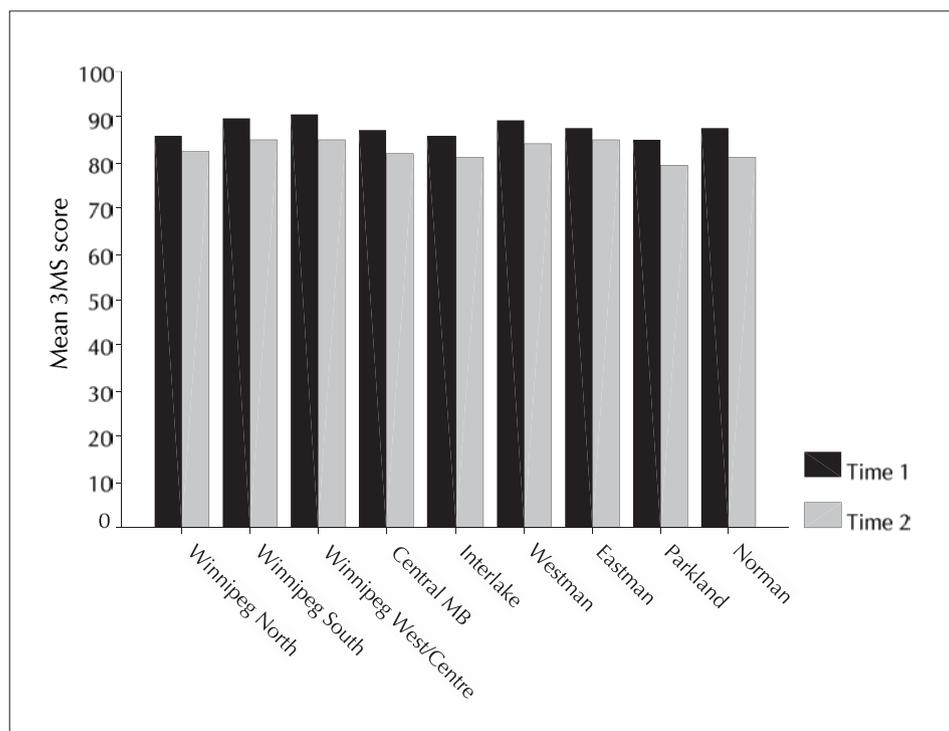


Fig. 3. Cognitive test scores in rural and urban regions of Manitoba. 3MS = Modified Mini-Mental State Examination.

Flin Flon, Thompson and The Pas were mining and service towns at the time of the survey, and the population was younger and more predominantly male, with lower education levels than other regions. We conducted sensitivity analyses in which we excluded the 19 participants from these areas, and the results were not altered.

DISCUSSION

We found no difference in the risk of dementia among older adults living in urban and rural regions of Manitoba. We also did not observe an increase in the risk of developing dementia over a 5-year period. We observed a small difference in the 3MS scores between rural and urban regions. However, this effect was likely due to the considerable difference in education levels in the rural and the urban samples, as it was not apparent in models adjusting for education.

Our results differ from those in previous reports.⁶ However, some previous studies did not use standardized measures of dementia,¹⁸ used death certificate data only¹⁹ or compared rural–urban differences across different countries.²⁰ Our results are somewhat different from the findings of the CSHA. The overall CSHA reported on rural–urban differences in dementia prevalence and found that those living in rural areas had a higher risk for vascular dementia.²¹ However, the sampling frame of the CSHA was restricted to within 50 km of a major urban centre. It is therefore difficult to generalize to all rural regions. The MSHA sampled the entire province, including all rural areas except the extremely remote regions, which have very sparse populations. Hébert and colleagues²¹ considered vascular dementia, and we did not have the power to study vascular dementia as an end point. Our findings are similar to some others. Lin and colleagues²² found no rural–urban differences in the risk of dementia in a population-based study in Taiwan. Similarly, no differences were noted in dementia rates or cognitive test scores among the various sites of the Medical Research Council Cognitive Function and Ageing Study in England and Wales.²³

This study has several strengths. It was a large study involving a large rural population. There are very few studies that have both an urban and a rural population drawn from the same sampling frame. Standardized, reliable measures of cognition were gathered. Also, the geography of Manitoba is such that there is more of a rural–urban dichotomy than in some other regions, which have large suburban and peri-urban areas. This simplifies the definition of rurality, but makes the study of these intermediate regions impossible.

This study also has limitations. First, the data are somewhat old, having been collected in the 1990s. However, it is unlikely that any association between a rural residence and dementia has changed greatly since then. Second, there are no biomedical data available, and we therefore cannot adjust for differences in blood pressure, body mass index or other potential confounding (or mediating) factors. Third, it may be difficult to generalize our findings to other societies where rural and urban regions may be markedly different. Fourth, although we had adequate power to study overall dementia, we lacked the power to study the different types of dementia (e.g., vascular and Alzheimer disease). Finally, we did not consider the residential history of the participants. The effect of a rural residence may be cumulative over the course of a life, and some participants may have moved between rural and urban settings.

The study of any association between rurality and dementia is difficult. Rural regions and urban regions are highly heterogeneous. Even within Manitoba, there is considerable variation in the remoteness, population density, income, industrial base, cultural groups and educational attainment within the rural regions and communities — as there are within Winnipeg. These issues are magnified when comparing across larger geographic areas and across societies. For instance, rural Taiwan and rural England,^{22,23} which were the sites of previous research, are quite different from rural Manitoba and from each other. It is difficult to disentangle the factors of rural life that may be relevant for health — remoteness, isolation, educational and career opportunities, access to medical care and unique exposures could all have effects, and it is difficult to understand their individual effects. Future research is needed into which aspects of rurality may affect cognition and at what geographic level they operate (e.g., regional, local and national).

In spite of these problems and limitations, we believe our results have relevance for clinicians, policy-makers and older adults themselves. Although we found no increased risk of dementia in rural regions, the well-reported effect of age on dementia prevalence emerged. We could not compare differences in age between rural and urban regions because the MSHA sampling was stratified by age and region. However, most rural areas in Canada have older populations than most urban regions.²⁴ Thus, there will be large numbers of people with dementia living in rural and remote areas. Provision of care for these people may be complicated by fewer resources and long travel times.²⁵ Innovative approaches are being studied to address some of these barriers.²⁶ The strong effect of education merits

attention as well. Education was particularly difficult to deliver to this cohort of older Manitoba residents, especially those living in rural regions. Many of the participants would have been of school age during the Great Depression, when many may have been forced to seek employment or help on farms. Many of the schools were 1-room schools, which may have provided a different experience than their contemporary urban schools. Our results underscore the central importance of education on cognition, and efforts to continue to improve educational opportunities in rural regions will be critical. We also found a significant relation between self-rated health and dementia, consistent with previous research.^{27,28} Providing access to high-quality general medical care may be an important component to dementia prevention and care.

There may also be benefits to living in rural areas, with increased support from neighbours, friends and community groups. Learning about these possible factors could help to inform the care of older adults in urban regions. These results may also be important for health care planners. For instance, the need for long-term care may not be driven by differences in dementia rates, but may be highly dependent upon the age structure of the region, and the informal and formal supports in the region.

CONCLUSION

We noted no major differences in the risk of dementia between rural and urban regions of Manitoba. However, more research is needed to address the epidemiology and interventions for older adults with dementia in other rural and urban regions, and consideration of the local context will be important.

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The occasional regional nerve block of the hand

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This article has been peer reviewed.

This is the second of 2 articles on regional hand anesthesia. The general concepts are described in “The Occasional Digital Nerve Block.”¹

This article describes nerve blocks at the wrist for the median, ulnar and radial nerves. As with all procedures, our performance can improve over time, if we take our time. Also, an inadequate regional nerve block at the wrist may be supplemented with a related digital nerve block or local infiltration when required.

EQUIPMENT LIST

- 25-gauge 1.5-inch needle
- 1% or 2% lidocaine or bupivacaine
- 5 mL syringe

MEDIAN NERVE BLOCK

The median nerve block is useful for working on the middle and ring fingers and uses a similar technique to carpal tunnel injection. Inject 3–5 mL lidocaine at the wrist flexor crease between the palmaris longus and flexor carpi radialis muscles (Fig. 1). Withdraw the needle and deposit a 2 mL subcutaneous bleb above the palmaris longus muscle to anesthetize the superficial branch as well.² One of the simplest explanations I encountered in researching this article was to proceed slowly to the bone just to the thumb side of the palmaris longus, back up 1–2 mm and inject if there are no paresthesias.³ If paresthesias are encountered, back up a bit more and redirect the needle. Do not inject in the presence of an ongoing paresthesia (Fig. 2).

ULNAR NERVE BLOCK

The ulnar nerve block, used for repair of the little and ring fingers, can be done in 3 ways. The first 2 methods — traditional and medial approaches — require aspiration before injection owing to the proximity of the adjacent artery. Both approaches also require blocking of the dorsal branch of the ulnar nerve. This is accomplished by establishing a subcutaneous wheal from the initial point of injection and “walking” under the skin around to the dorsal aspect of the wrist to the midpoint.⁴

To use the traditional method, enter the wrist crease at 90° lateral to the tendon of the flexor carpi ulnaris muscle^{5,6} (Fig. 3). Abduct the little finger against resistance, as it attaches to the pisiform



Fig. 1. Location of the median nerve.



Fig. 2. Needle passing through the tough retinaculum to reach the median nerve.

bone, to string the tendon out. The ulnar nerve can be reached by injecting just on the thumb side of this tendon to reach the ulnar nerve by this volar approach (Fig. 4). The injection for the nerve essentially lies between the tendon and the nearby ulnar artery. A 2004 cadaveric study found damage to this artery almost 40% of the time.⁷

A medial approach to the nerve has demonstrated less risk of arterial damage.^{3,7} Place the needle parallel to the wrist crease and slip it under the tendon, which is usually very easy to palpate (Fig. 5).

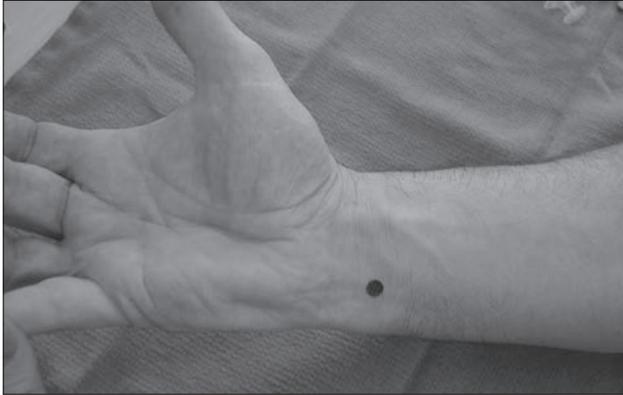


Fig. 3. Traditional distal approach to the ulnar nerve.

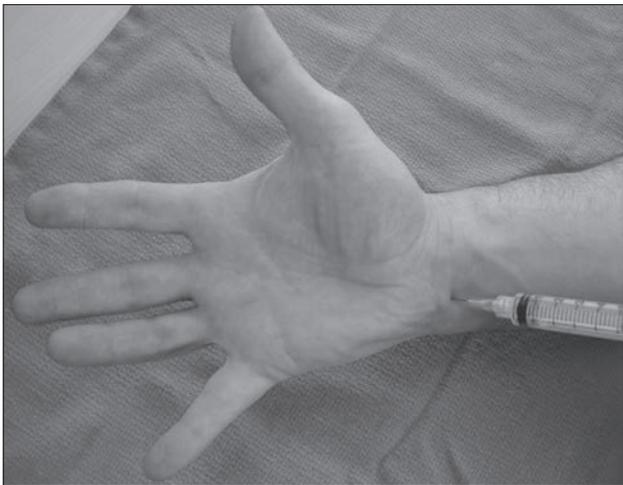


Fig. 4. Entering just lateral (thumb side) to the flexor carpi ulnaris muscle, located by flexing the wrist and abducting the little finger.

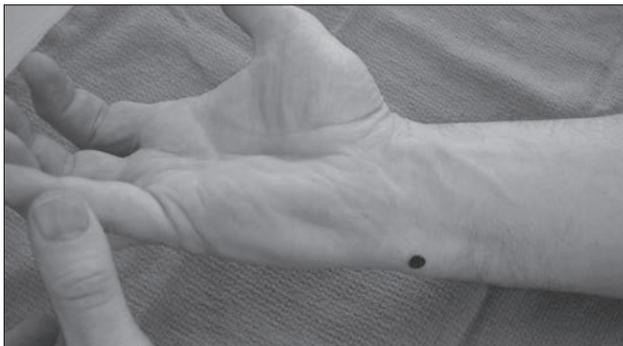


Fig. 5. The medial approach to the ulnar nerve.

Advance the needle beneath the tendon to its far side where the nerve lies, and then inject 3–5 mL (Fig. 6).

Consider an alternative, less commonly described approach that is done more proximally, before the palmar and dorsal branch of the ulnar nerve bifurcate.^{2,8} Find the spot 3 fingerbreadths (5–7 cm) proximal to the wrist crease, slide the needle under the flexor carpi ulnaris tendon and inject 3–5 mL of lidocaine. The artery is not so closely applied to the nerve, and this approach is safer and simpler (Figs. 7 and 8).



Fig. 6. Slipping the needle under the flexor carpi ulnaris tendon from the medial aspect is more protective of the ulnar artery.

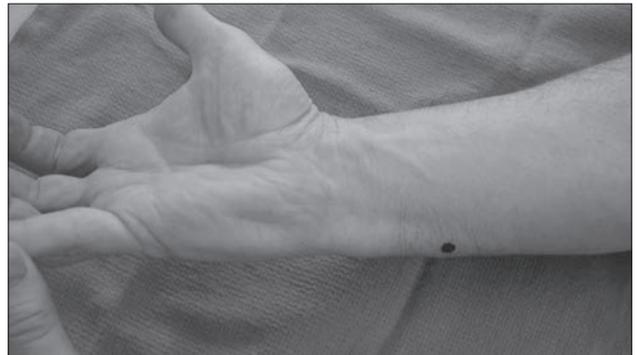


Fig. 7. Both branches of the ulnar nerve can be blocked 3 fingerbreadths (5–7 cm) proximal to the wrist crease.



Fig. 8. Needle enters just under the flexor carpi ulnaris tendon and travels to the other side of it.

RADIAL NERVE BLOCK

The radial nerve innervates the dorsum of the hand and the first 3 fingers — but only up to the proximal interphalangeal joint, then the median nerve takes over. Remember this distinction for fingertip work.⁹

This nerve block is considered a field block because anesthesia is obtained by diffusion of a generous amount of solution rather than accurate placement of the needle beside a nerve, given that the nerve has multiple and varying bifurcations.³ The first step is to place 3–5 mL of lidocaine subcutaneously in the anatomical snuff-box. Identify it by



Fig. 9. Anatomical snuff-box formed by the extensor pollicis brevis and longus muscles.



Fig. 10. Place 5 mL of lidocaine subcutaneously in the anatomical snuff-box.



Fig. 11. Follow that with 2 subcutaneous wheals as shown.

extending the thumb in typical hitchhiker style (Figs. 9 and 10). Other authors describe forming a subcutaneous wheal extending along one-half of the back of the wrist using another 3–5 mL of lidocaine¹⁰ (Figs. 11 and 12). Some also extend a shorter subcutaneous wheal around the volar aspect of the wrist to cover the radial styloid^{3,11} (Fig. 13). These additional subcutaneous wheals can be accomplished via a single needle puncture by withdrawing and re-angling the needle under the skin.¹²

The regions of sensation to the hand are shown in Figure 14. The ultrasound-guided method allows direct visualization of the needle, artery and the



Fig. 12. The dorsal subcutaneous wheal should travel several inches around the back of the hand above the tendons.



Fig. 13. A volar subcutaneous wheal is shorter and also stays above the tendon.

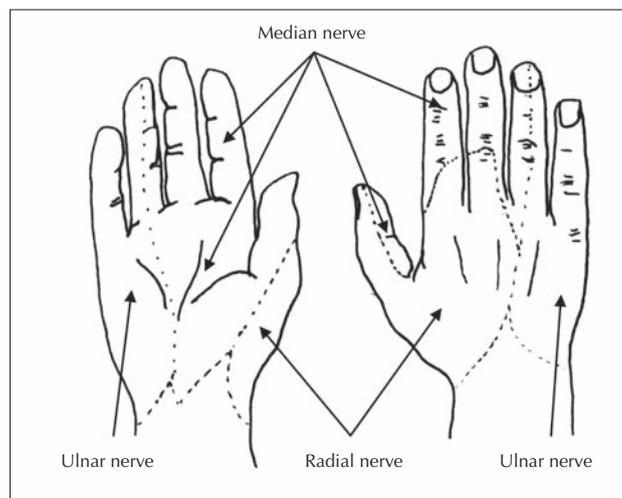


Fig. 14. Nerve regions of the hand.

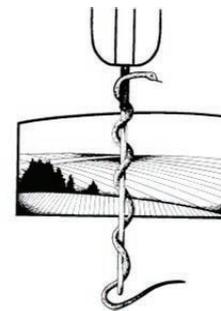
nerve. With this approach, a smaller volume of anesthetic may be used, and there is less potential for trauma to the nerve.¹⁵ Although such training is rapidly percolating throughout rural emergency departments, knowledge of the relevant anatomical landmarks and the ability to deliver regional hand anesthesia without technical aids will always be an asset. Epinephrine is sometimes used for prolonged surgeries by hand surgeons: the use of 5 mL of 2% lidocaine with 1:100 000 epinephrine can provide up to 9 hours of anesthesia.¹⁴

Competing interests: None declared.

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DIGITAL NERVE BLOCK

Thank you for your excellent article on nerve blocks for the fingers.¹ I am a family physician who also works in a busy rural emergency department, and we need to perform this procedure quite often. I never knew alternatives to the ring block even existed!

I am interested in the web-space block given your positive review, and I have a few questions:

In the article, the photo shows the needle entering the web space between the index and middle fingers. Which finger is being blocked? Does it need to be done on the other side of the finger as well? Does it work for the thumb? How soon does it take effect (i.e., same as ring block)?

Would you use it on toes as well?

Finally, when would you use 1% lidocaine, and when would you use 2%?

Izak Van Niekerk, MD, MBA

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THE AUTHOR RESPONDS

Good questions. The block needs to be done on both sides of the finger (2 web spaces). It works well on toes also. Either 1% or 2% lidocaine would work. I got into the habit of using 1% with larger volumes (e.g., for a hematoma block), where adding more volume (say, in a second attempt) might lead to lidocaine toxicity, but in this application, you would be fine to use 2%.

Len Kelly, MD, MClSci, FCFP, FRRM

Extending the line: the First Nations Telehealth Expansion Project

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Although telehealth has been around for many years, its expansion to First Nations and Inuit communities is a novel endeavour. The First Nations Telehealth Expansion Project was created to eliminate some of the obstacles First Nations people experience as part of living in isolation, partially bridging the gap between First Nations and non-First Nations Canadians. The purpose of the project was to improve First Nations health care by providing better access to clinical services and improving education, focusing specifically on mental health and addiction, maternal health and management of diabetes and chronic disease.¹ This multimillion-dollar venture was initiated by the BC Ministry of Health, the First Nations Health Authority (FNHA) and Canada Health Infoway, and has been divided into 2 stages or waves.²

Wave 1 began in January 2015. The objective was to expand telehealth to more than 45 First Nations communities throughout British Columbia.³ The first expansion focused on education and administration, as well as clinical services.³ In the summer of 2015, the FNHA reported that 18 additional rural communities had been added to the telehealth network since the start of the expansion.⁴ One of the many barriers these isolated communities face is the lack of adequate infrastructure needed to support a functional telehealth system.⁵ Many of the communities that joined the network had to first improve their Internet connectivity to enable the telehealth communication system to function properly with minimal lag. Currently, the FNHA is in the process of securing funding for the second wave of expansion in 2016. There has already been interest from 20 other rural communities in BC, and Canada

Health Infoway has invested \$4.5 million in the project.^{2,4}

The project also focuses on upgrading previously existing telehealth services. These upgrades include deploying and implementing better equipment setup, as was done in Fort Babine.⁴ New equipment may include cameras with higher resolution and additional supplemental devices, such as stethoscopes, portable ultrasonography machines and ophthalmoscopes. Ultimately, the project aims to meet the targets described in *The Transformative Change Accord: First Nations Health Plan*, with the hope of creating a “fully integrated clinical telehealth network” for the First Nations people of BC.⁶

Although this project is not a solution to the current problems in health service delivery in rural communities in northern BC, it is a step in the right direction. By expanding telehealth to First Nations communities in the northwest, Canada is moving toward equalizing health care to all its citizens and making it accessible.

Competing interests: None declared.

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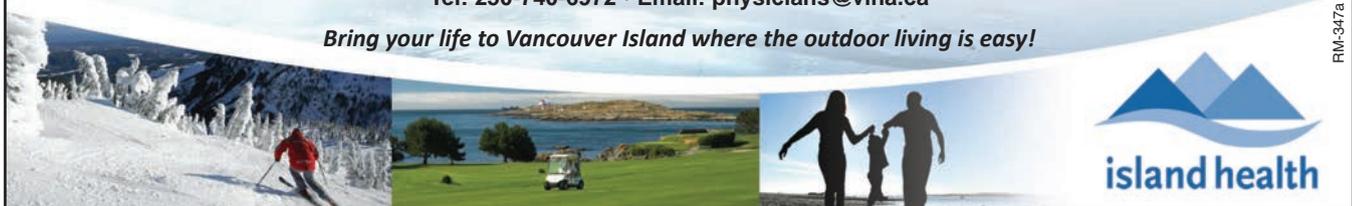
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