Canadian Journal of Rural Medicine

Journal canadien de la médecine rurale

The official journal of the Society of Rural Physicians of Canada

VOLUME 11, NO. 1, WINTER 2006

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

VOLUME 11, N° 1, HIVER 2006

IN THIS ISSUE

DANS CE NUMÉRO

Canadian Journal of Rural Medicine
CJRM CMR
Journal canadien de la médecine rurale

www.cma.ca/cjrm

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

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

CJRM is indexed in *Index Medicus* and MEDLINE.

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

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

ISSN 12037796

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

Printed on acid-free paper from inception.

PAAB
PMB Medical Media Study

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

VOL. 11, NO. 1, WINTER / HIVER 2006

EDITORIALS / ÉDITORIAUX

ORIGINAL ARTICLES / ARTICLES ORIGINAUX

THE PRACTITIONER / LE PRATICIEN

"Range Road"

36" × 48" acrylic on canvas

W.H. Webb

Pincher Creek, Alta.

West End Gallery, Edmonton, Alta.

info@westendgalleryltd.com

877 388-0009

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

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

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

PRESIDENT / PRÉSIDENT
GRAHAM MORRIS

ASSOCIATE DIRECTOR
DIRECTRICE ASSOCIÉE
GLENDA PROCTOR, MSc, ELS

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

PRODUCTION
KATHRYN A. FREAMO
NICOLE BARBEAU, CLARA WALKER

ONLINE PUBLISHING
PUBLICATION EN DIRECT
HOLLY BODGER
JEREMY SIMS, SHIRLEY WADDELL

CLASSIFIED ADVERTISING
ANNONCES CLASSÉES
BEVERLEY KIRKPATRICK
DEBORAH RODD

DISPLAY ADVERTISING
ANNONCES PUBLICITAIRES
NANCY POPE
advertising@cma.ca

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

DIRECTIVES AUX AUTEURS
[Voir le numéro d'été 2005 ou visitez www.srpc.ca]

SERVICE INFORMATION
[See page 271, Fall 2005 issue, or visit www.srpc.ca]

RENSEIGNEMENTS GÉNÉRAUX
[Voir le numéro d'été 2005 ou visitez www.srpc.ca]

Attention Residents! WIN $1,000

To be applied toward attending the SRPC's Rural and Remote Conference in Winnipeg, Apr. 20–22, 2006.

Write a 500-word article for an upcoming Residents' Page in *CJRM* on a topic of interest to residents. It can be informative or reflective in nature.

Email your entries to jean_warneboldt@alumni.sfu.ca **before Feb. 15, 2006**. Two winners will be notified by Mar. 1, 2006. Essays will be judged by representatives from the SRPC's Resident Committee and the SRPC's Nominations and Awards Committee. The winning essays will be published in *CJRM*, pending acceptance by *CJRM*.

So ..... get writing!

We look forward to seeing you at the Rural and Remote Conference!

Mark Your Calendars!

The SRPC's **14th Annual Rural and Remote Medicine Conference** will be held **Apr. 20–22, 2006**, at the Fort Garry Hotel in **Winnipeg**, Man. For more details see our ad on page 240 of the Fall issue, visit our Web site at www.srpc.ca/rr2006 or email us at admin@srpc.ca

ADVERTISERS' INDEX / INDEX DES ANNONCEURS

Dr. Francis Alexander Carron Scrimger

John Wootton, MD

Shawville, Que.

Scientific editor, CJRM

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

Editor's Note: *On Oct. 18, 2005, Dr. Scrimger's Victoria Cross was donated to the Canadian War Museum by his family.*

Perspective isn't everything, but it helps. The November 11th ceremonies that occur all around the world challenge us to examine our present against the sacrifices and struggles of the past.

My grandfather, Dr. Francis Alexander Carron Scrimger, served as a surgeon on the front lines in the 1st World War and received a Victoria Cross at the 2nd battle of Ypres. Throughout my growing up I always marvelled at this fact, even as I struggled to understand it. Most, if not all, of the accounts I read of Victoria Cross recipients described fighting men, in desperate, occasionally hopeless, situations, who, with no heed for their own safety, tackled the enemy against all odds, more often than not, paying for it with their lives. How then did this highest of honours come to be awarded to a behind-the-lines physician?

Victoria Cross, Captain F.A.C. Scrimger. © Canadian War Museum, 2005

On the day he won his VC, two armies were dug in mere 100s of yards apart, in a devastated landscape of muddy trenches and bombed-out buildings. Furious communications behind both lines flew back and forth as men and machines moved from one position to another, attempting to seize the initiative from any slight weakness in the adversary. Snipers and shelling enveloped all. Into this mix, on the morning of April 25th, 1915, clouds of chlorine gas were released from behind enemy lines, and drifted on a gentle killing breeze onto the dug-in Canadians.

Dr. Scrimger was in charge of an Advanced Dressing Station in an outbuilding ironically called "Mousetrap Farm." From there he tended the wounded, who streamed in from the front, treating them as facilities and the chaos permitted. They had been under continuous attack for 3 days, and now the gas attack and a renewed barrage forced the evacuation of the wounded, as the front moved perilously close. One man with a severe head wound was in danger of being left behind, and Dr. Scrimger, braving heavy shell fire, carried him to temporary "cover" in the lee of a shell hole, where he protected him with his body until help could arrive.

His citation notes these actions but goes on to say that the VC was also being awarded for "…the greatest devotion to duty among the wounded at the front." This phrase has been for me the key to understanding. He was, in the end, simply being a physician, and continuing to be one, without faltering, under the most extraordinary of conditions. This is what brought him to the attention of his superiors, and is the feature of this scrap of family history that reaches across 90 years to touch me.

I would not wish it on anyone to have to pass such baptisms of fire as were experienced by my grandfather and his colleagues, but I draw some comfort from his example when I get tired, when some clinical priority disrupts my plans, or when my capacities are tested and I am called upon to display "clinical courage." On November 11th each year I don't think about war, I think about what it means to be a doctor.

Le Dr Francis Alexander Carron Scrimger

John Wootton, MD

Shawville (Qué.)

Rédacteur scientifique,
JCMR

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

Note de la rédaction : *La famille du Dr Scrimger a fait don de sa Croix de Victoria au Musée canadien de la Guerre le 18 octobre 2005.*

La perspective n'est pas tout, mais elle aide. Les cérémonies du 11 novembre qui se déroulent dans le monde entier nous incitent à réfléchir au présent en fonction des sacrifices et des luttes du passé.

Mon grand-père, le Dr Francis Alexander Carron Scrimger, a servi comme chirurgien au front au cours de la Première Guerre mondiale et s'est mérité la Croix de Victoria au cours de la deuxième bataille d'Ypres. Cette décoration m'a émerveillé durant toute mon enfance même si j'avais de la difficulté à la comprendre. La plupart, sinon la totalité, des comptes rendus que je lis au sujet de récipiendaires de la Croix de Victoria décrivent des combattants qui se sont retrouvés dans des situations désespérées et qui, sans penser à leur propre sécurité, se sont attaqués à l'ennemi contre vents et marées et ont plus souvent qu'autrement payé le prix ultime. Comment se fait-il que l'on ait décerné une aussi grande distinction à un médecin en poste derrière les lignes?

Croix de Victoria, capitaine Francis A.C. Scrimger. © Musée canadien de la Guerre, 2005

Le jour où il a mérité sa CV, deux armées étaient retranchées à 100 verges à peine l'une de l'autre, dans un paysage dévasté de tranchées boueuses et d'édifices bombardés. De furieux échanges de communication se déroulaient derrière les deux lignes pendant qu'hommes et machines changeaient de position pour essayer de saisir l'initiative face à la moindre faiblesse de l'adversaire. Le tout, sous les balles des tireurs d'élite et les bombes. Dans cet enfer, au cours de la matinée du 25 avril 1915, des nuages de chlore ont été libérés derrière les lignes ennemies et ont commencé à dériver, portés par une douce brise mortelle, vers les Canadiens postés dans leurs tranchées.

Le Dr Scrimger était responsable d'un poste de secours avancé dans un bâtiment appelé ironiquement «Ferme de la trappe à souris». Il y traitait les blessés arrivant du front, dans la mesure où les installations et le chaos le lui permettaient. Ils étaient sous attaque constante depuis trois jours et les nuages de gaz et un barrage renforcé d'artillerie les obligeaient à évacuer les blessés, car le front se rapprochait dangereusement. Un soldat gravement blessé à la tête risquait d'être laissé derrière et le Dr Scrimger, bravant un lourd bombardement, l'a transporté dans un «abri» temporaire dans un trou d'obus où il a protégé le blessé de son corps jusqu'à ce que qu'on vienne l'aider.

Sa citation mentionne ces actes, mais poursuit en disant que la CV lui est aussi décernée pour «…le plus grand attachement au devoir parmi les blessés au front». C'est ce passage qui m'a permis de comprendre. Tout compte fait, il agissait tout simplement en médecin et continuait de le faire sans fléchir dans les conditions les plus extraordinaires. C'est ce qui a attiré sur lui l'attention de ses supérieurs et c'est cette anecdote de l'histoire familiale qui me touche 90 ans plus tard.

Je ne souhaite à personne d'avoir à subir le même baptême du feu que mon grand-père et ses collègues, mais son exemple me réconforte un peu lorsque je suis fatigué, lorsqu'une priorité clinique perturbe mes plans ou lorsque mes capacités sont mises à l'épreuve et que l'on me demande de faire preuve de «courage clinique». Le 11 novembre chaque année, je ne pense pas à la guerre : je pense plutôt à ce que veut dire être médecin.

President's message. Are we disappearing?

Trina M. Larsen Soles, MD

Golden, BC

Correspondence to:
Dr. Trina Larsen Soles,
PO Box 1170, Golden BC
V0A 1H0; tsoles@srpc.ca

Recently I was asked what the SRPC plans to do about the fact that the rural population in Canada is decreasing. How can we adequately plan for physician supply and rural education when rural communities are disappearing? An urban anesthetist suggested we forget about training GP anesthetists for rural practice. After all, everyone knows that in a decade the rural communities will be deserted, since all of us will have seen the light and moved to the city.

I found these comments interesting at a time when there is significant energy and passion to deal with rural issues in many jurisdictions across Canada.

The SRPC had its Fall council meeting in Winnipeg, and the work being done by our committees is impressive. Some provinces have made great strides in promoting rural education initiatives and in developing programs to recruit and retain rural physicians. The SRPC project to make an inventory of successful rural recruiting programs is ongoing. Educational programs such as the Northern Ontario School of Medicine, the Northern Medical Program in BC, and distributed learning models for medical students provide opportunities for positive change in the number of physicians choosing rural practice. The Interprofessional Rural Program in BC sends teams of health professional students to rural areas and has supported rural primary care initiatives. In some areas rural has so successfully claimed attention that urban areas are concerned their vulnerable populations are being ignored.

Is the Canadian demographic changing radically? Well, it is certainly true that the urban population is growing. Eventually this results in a decreasing percentage of Canadians living in rural communities. However, many rural communities have quite stable populations, some of them have stable medical services, and many of them have developed innovative solutions to health care delivery that could serve as models to the rest of Canada — if anybody cared to examine them.

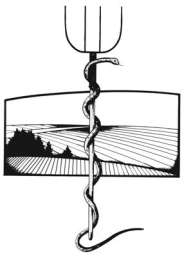
The biggest threat to the existence of rural communities is lack of support for rural infrastructure. Despite providing the raw materials that drive provincial economies, small rural populations need help from larger jurisdictions to maintain roads, clean water and hospitals. If there is no recognition, on the part of urban dwellers, of the importance of having rural communities (except when they want to fish or ski there) then as the percentage of Canadians living in rural areas decreases we will continue to fall victim to urban-centric planning.

Nowhere is this process more evident than in the regionalization of health services. The entire concept of the basket of services we provide is foreign to the urban planners. Small utilization numbers become an excuse to eliminate services, and this is happening across Canada.

The solution to preserving rural services is education. We need education for rural physicians, communities and other medical organizations. Most challenging is the need to educate bureaucrats and politicians.

This is the challenge for the SRPC. We must keep rural issues on the agenda of governments and other organizations. We must continue to develop policy statements that can be used to support rural health and lobby for support for rural infrastructure.

Political change is slow, but rural Canada is not disappearing.



Message de la présidente. Sommes-nous en voie de disparition?

Trina M. Larsen Soles, MD

Golden (C.-B.)

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

On m'a demandé récemment ce que compte faire la SMRC devant la diminution de la population rurale au pays. Comment planifier adéquatement l'offre de médecins et la formation rurale lorsque les communautés rurales disparaissent? Un anesthésiologiste urbain nous a suggéré de cesser de former des omnipraticiens en anesthésie pour la pratique rurale. Après tout, nous savons tous que dans une décennie, les communautés rurales seront désertées puisque nous auront tous compris et déménagé en ville.

J'ai trouvé ces commentaires intéressants au moment où beaucoup d'administrations au Canada s'attaquent aux problèmes ruraux avec beaucoup d'énergie et de passion.

La SMRC a tenu la réunion d'automne de son conseil à Winnipeg et le travail que font nos comités est impressionnant. Des provinces ont beaucoup avancé dans la promotion d'initiatives d'éducation rurale et l'élaboration de programmes de recrutement et de maintien en poste de médecins ruraux. Le projet d'inventaire des programmes fructueux de recrutement rural lancé par la SMRC est en cours. Des programmes de formation comme la Faculté de médecine du nord de l'Ontario, le programme médical du Nord en Colombie-Britannique et les modèles d'apprentissage distribué à l'intention des étudiants en médecine pourraient modifier à la hausse le nombre de médecins qui choisissent de pratiquer en milieu rural. Le programme rural interprofessionnel de la C.-B. envoie des équipes d'étudiants des professions de la santé dans les régions rurales et a appuyé des initiatives de soins primaires en milieu rural. Dans certains domaines, le milieu rural a attiré l'attention avec tant de succès que des secteurs urbains craignent qu'on oublie leurs populations vulnérables.

La démographie canadienne change-t-elle radicalement? Il est certes vrai que la population urbaine augmente, ce qui finira par réduire le pourcentage des Canadiens qui vivent en milieu rural. Beaucoup de communautés rurales ont toutefois des populations très stables, certaines ont des services médicaux stables et beaucoup d'entre elles ont créé des solutions novatrices à la prestation des soins de santé qui pourraient inspirer le reste du Canada — si quelqu'un se donnait la peine de les analyser.

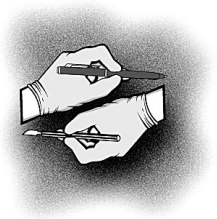
La plus grande menace à l'existence des communautés rurales, c'est le manque d'appui à l'infrastructure. Même si elles fournissent les matières premières qui font tourner l'économie des provinces, les petites populations rurales ont besoin de l'aide des grandes administrations pour entretenir les routes, assainir l'eau et maintenir les hôpitaux. Si les citadins ne reconnaissent pas l'importance de l'existence de communautés rurales (sauf pour aller y pratiquer la pêche ou le ski), nous continuerons d'être victimes de la planification urbanocentrique à mesure que le pourcentage des Canadiens vivant en milieu rural diminuera.

Ce phénomène n'est nulle part plus évident que dans la régionalisation des services de santé. Tout le concept du panier des services que nous offrons est étranger aux planificateurs urbains. Le nombre limité d'utilisateurs devient une excuse pour supprimer des services et on le voit d'un bout à l'autre du Canada.

La solution au maintien des services ruraux réside dans l'éducation. Nous avons besoin d'éducation pour les médecins, les communautés et d'autres organisations médicales des milieux ruraux. La nécessité d'éduquer les fonctionnaires et les politiciens pose le plus grand défi.

C'est ce défi que doit relever la SMRC. Nous devons maintenir les enjeux ruraux au programme des gouvernements et autres organisations. Nous devons continuer de formuler des énoncés de principes et les utiliser pour appuyer la santé en milieu rural et exercer des pressions afin de mobiliser des appuis en faveur de l'infrastructure rurale.

Le changement politique prend du temps, mais le Canada rural n'est pas en voie de disparition.



Alcohol drinking habits and community perspectives on alcohol abuse in the Bella Coola Valley

Harvey V. Thommasen, MD, MSc, FCFP

Associate Clinical Professor, Faculty of Medicine, University of British Columbia, Vancouver, BC

Neil Hanlon, BA, MA, PhD

Assistant Professor, Geography Program, University of Northern British Columbia,Prince George, BC

Carol Thommasen, BScN

Nursing Program Officer, University of Northern British Columbia, Prince George, BC

William Zhang, MSc, MA

Statistical Consultant, University of Northern British Columbia, Prince George, BC

Correspondence to: Dr. Harvey V. Thommasen, 4202 Davie Ave., Prince George BC V2M 4G7

This article has been peer reviewed.

Introduction: This study surveyed the residents of the rural and remote communities in the Bella Coola Valley, British Columbia, on their alcohol drinking habits and on their opinions as to which of a list of health issues were the most important considerations for the well-being of the community.
Methods: People aged 17 years and older living in the Bella Coola Valley were asked to complete a detailed Health and Quality of Life Survey during the period August 2001 to May 2002. This included two separate mailouts. Alcohol drinking habits; and ratings on whether or not people believed that alcohol abuse, drug abuse, family violence, unemployment, sexual abuse and racial discrimination were surveyed.
Results: A total of 674 adults age 17 years and older (39% response rate) completed an 11-page questionnaire. Results from the survey indicate that unemployment, alcohol abuse and drug abuse are seen as the most important community health problems by the majority of residents. Eighty-eight percent of respondents agree or strongly agree that unemployment is a problem; for alcohol abuse it was 83%, for drug abuse 77%, for both family violence and sexual abuse 58%, and for racial discrimination it was 53%. Patterns of drinking habits vary considerably between Aboriginal peoples and non-Aboriginal people. More Aboriginal respondents abstained from drinking alcoholic beverages (54%) than non-Aboriginal respondents (22%). Among the Aboriginal peoples who did drink alcohol, there were relatively more heavy drinkers (36%) compared with non-Aboriginal people (7%). There were more heavy drinkers among men than among women.
Conclusion: Patterns of drinking habits vary between men and women and between Aboriginal and non-Aboriginal people. The majority of residents agree that alcohol is a problem in these communities. Unemployment, drug abuse, family violence, sexual abuse and racial discrimination are also believed to be important issues for the Bella Coola Valley. This information should be used to set priorities for future health and wellness programs.

Introduction : Au cours de cette étude, les chercheurs ont sondé les résidents des communautés rurales et éloignées de la vallée de Bella Coola, en Colombie-Britannique, au sujet de leurs habitudes de consommation d'alcool et leur ont demandé de préciser, parmi une liste de problèmes de santé, ceux qui constituaient les facteurs les plus importants pour le mieux-être de la communauté.
Méthodes : On a envoyé par la poste, en deux envois distincts, un questionnaire sur la santé et la qualité de vie à toutes les personnes de 17 ans et plus habitant la vallée de Bella Coola, entre août 2001 et mai 2002. Les questions portaient sur les habitudes de consommation d'alcool et l'évaluation des répondants quant à savoir s'ils croyaient importants les problèmes d'abus de l'alcool ou des drogues, la violence familiale, le chômage, la violence sexuelle et la discrimination raciale.
Résultats : Au total, 674 adultes âgés de 17 ans et plus (taux de réponse de 39 %) ont rempli un questionnaire de 11 pages. Les résultats de l'enquête indiquent que la majorité des résidents considèrent le chômage, l'abus de l'alcool et des drogues comme les problèmes de santé communautaires les plus importants. Quatre-vingt-huit pour

cent des répondants sont d'accord ou fortement d'accord pour dire que le chômage est un problème. Le taux s'établit à 83 % dans le cas de l'abus de l'alcool, à 77 % dans celui de l'abus des drogues, à 58 % dans celui de la violence familiale et sexuelle et à 53 % dans celui de la discrimination raciale. Les tendances des habitudes de consommation d'alcool varient considérablement entre Autochtones et non-Autochtones. Plus de répondants autochtones (54 %) que non-Autochtones (22 %) évitaient l'alcool. Parmi les Autochtones qui consommaient de l'alcool, il y avait relativement plus de gros consommateurs (36 %) que chez les non-Autochtones (7 %). Les gros consommateurs étaient plus nombreux chez les hommes que chez les femmes.

Conclusion : Les tendances des habitudes de consommation d'alcool varient entre les hommes et les femmes et entre Autochtones et non-Autochtones. La majorité des résidents reconnaissent que l'alcool pose un problème dans ces communautés. On croit aussi que le chômage, l'abus des drogues, la violence familiale et sexuelle et la discrimination raciale sont des problèmes importants pour la vallée de Bella Coola. Il faudrait utiliser ces renseignements pour établir les priorités de futurs programmes de santé et de mieux-être.

Introduction

Bella Coola Valley is situated in the central coast region of British Columbia (Fig. 1). The 2001 Census indicated that 2289 people live in the various communities of the Bella Coola Valley, and 46% of these residents are of Aboriginal descent.[1,2] The vast majority of the Aboriginal peoples living in the Bella Coola Valley (>95%) are Status Indians. Bella Coola Valley is part of the traditional territory of the Nuxalk Nation, a tribe of Salish-speaking Coastal Indians.[3–6] A recent review of causes of death for residents of the Bella Coola Valley indicates alcohol abuse is a problem.[7,8] Between 1993 and 2001, deaths from alcohol-related diseases were statistically greater than one would predict based on the valley's population.[2] For example, the crude alcohol-related death rate for Bella Coola Valley (1993–2001) was approximately 7.8 per 1000 population compared with 4.0 per 1000 for the province of BC. Standardized mortality ratio (SMR) is the ratio of the number of deaths occurring in residents of a geographic area to the expected number of deaths in that area based on provincial age-specific mortality rates. Between 1993 and 2001 the SMR has varied from 2.1 to 3.2. Compared with the BC population, alcohol-related SMR for Status Indians living in the Bella Coola Health Region between 1987 and 1996 was 4.8; and for people who are not Status Indians the SMR was 2.2.

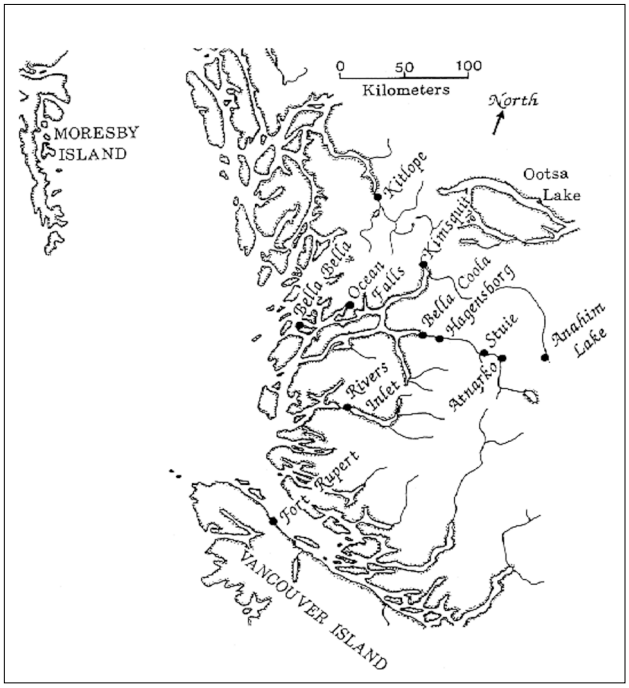


Fig. 1. Detailed map of the Bella Coola Valley.

The research questions we attempted to answer in this study include:

1. Do Bella Coola Valley residents believe there is an alcohol abuse problem in their communities?
2. What are the alcohol drinking habits of adult residents of the Bella Coola Valley?
3. Are there differences in alcohol drinking habits with respect to sex, ethnicity and age?

Methods

This research project followed the recommendations outlined in "A Guide for Health Professionals Working with Aboriginal Peoples"[9–11] and was carried out in a participatory fashion: there was consultation with the Nuxalk Band Council, community members and local health care providers with

regard to our plans to study determinants of health and disease of people living in the Bella Coola Valley. Prior to collecting data we obtained letters of support from the Nuxalk Band Council, the Bella Coola Transitional Health Authority and the Central Coast Regional District. Ethics approval was obtained from Research Ethics Committees located at the University of Northern British Columbia.

People aged 17 years and older living in the Bella Coola Valley were asked to complete a detailed Health and Quality of Life Survey during the period August 2001 to May 2002. This included two separate mailouts. All recipients were asked to read an informed consent form or were read an informed consent form prior to completion of the 11-page questionnaire. Details of this survey methodology are reported elsewhere.[12]

Eleven questions in this survey form the basis for this research paper. The first 3 questions are demographic: age (yr), sex and ethnicity (Aboriginal, other). There were 6 questions pertaining to community health issues: 1) alcohol abuse, 2) drug abuse, 3) family violence, 4) unemployment, 5) sexual abuse and 6) racial discrimination. Respondents were asked to circle a number that best indicated their level of agreement or disagreement that the health issue mentioned was a problem in the Bella Coola Valley. Agreement was rated on a 5-point Likert scale, ranging from strongly disagree (score of 1) to undecided (3) to strongly agree (5).

The last 2 questions had to do with alcohol drinking behaviour. The word "drink" in this survey was defined as: 1) one bottle/can of beer or a glass of draft; 2) one glass of wine or a wine cooler; or 3) one straight or mixed drink with 1½ oz of hard liquor. The first question on alcohol drinking behaviour was: "During the past 12 months, how often did you drink alcoholic beverages?" There were 8 choices: never (0), less than once a month (1), once a month (2), 2–3 times a month (3), once a week (4), 2–3 times a week (5), 4–6 times a week (6) and every day (7). The second question was: "On average, how many drinks do you usually have in one sitting?" There were 3 choices: 1) 1–2 drinks, 2) 3–4 drinks, and 3) 5 or more drinks.

Returned survey answers were entered into an Excel spreadsheet, from which results were summarized and graphs made.[13] The data were analyzed using the software SPSS for Windows. Pearson chi-squared (Asymp. Sig. [2-sided]) statistics were used to see if there were statistically significant differences between the various study groups.[14]

Results

Response to the survey was 39% (674/1734). Relatively more women (57% v. 49%), non-Aboriginal (63% v. 57%) and older people (mean age: 48.9 v. 43.5 yr) answered the survey.

Respondents agreed or strongly agreed that unemployment (88%), alcohol abuse (83%), drug abuse (77%), family violence (58%), sexual abuse (58%) and racial discrimination (53%) were problem issues in the valley (Table 1).

There were no significant differences between the sexes in the rating of unemployment and racial discrimination as problems (Table 2). For all other issues, men consistently gave lower scores (i.e., they perceived the issue as less of a problem) than did the women.

There were significant differences between how Aboriginal and non-Aboriginal people perceived every one of the community health issues (Table 3). Although some of the overall means were similar between the populations, proportionately more Aboriginal peoples agreed strongly that all of the health issues named were important problems for the Bella Coola Valley.

Thirty-three percent of the respondents stated that they never drink alcohol (Table 4). Five percent stated that they drink alcohol every day, men

Table 1. Bella Coola Valley Health and Quality of Life Survey response summary

Problem issue considered	No. of respondents	Response, % of respondents				
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Unemployment	657	4	3	5	24	64
Alcohol abuse	654	6	4	8	32	51
Drug abuse	650	6	4	13	35	42
Family violence	645	7	7	28	33	25
Sexual abuse	643	7	5	29	32	26
Racial discrimination	641	8	16	23	32	21

drink alcohol more often than do women ($p < 0.001$) and Aboriginal peoples drink alcohol less frequently than non-Aboriginal people ($p < 0.001$). Older people (>24 years old) abstain more frequently, and few young people (<25 yr) drink more than twice a week ($p < 0.001$).

With respect to number of drinks at a sitting, the majority of respondents have 1–2 drinks (Table 5). Men tend to drink more than women ($p < 0.001$), and Aboriginal peoples who do drink tend to consume a greater number of drinks at one sitting than do non-Aboriginal people ($p < 0.001$). Young people tend to drink 5 or more drinks (i.e., binge drinking) more often than do older people ($p < 0.001$).

Table 2. Responses to community health issues, by sex of the respondent

Variable	Mean (and SD)* Male	Female	*p* value
No. of respondents per issue, range	273–278	368–379	
Problem issue			
Alcohol abuse	4.1 (1.1)	4.3 (1.1)	<0.001
Drug abuse	3.9 (1.2)	4.1 (1.1)	0.003
Family violence	3.5 (1.1)	3.7 (1.1)	≤0.001
Unemployment	4.3 (1.0)	4.45 (1.0)	0.419
Sexual abuse	3.4 (1.1)	3.8 (1.1)	<0.001
Racial discrimination	3.4 (1.2)	3.4 (1.2)	0.931

*Unless otherwise indicated.

Table 3. Comparison of Aboriginal and non-Aboriginal responses

Variable	Mean (and SD)* Aboriginal	Non-Aboriginal	*p* value
No. of respondents per issue, range	243–245	399–413	
Problem issue			
Alcohol abuse	4.3 (1.1)	4.1 (1.1)	<0.001
Drug abuse	4.2 (1.2)	3.9 (1.1)	<0.001
Family violence	3.6 (1.2)	3.6 (1.1)	<0.001
Unemployment	4.5 (1.0)	4.4 (1.0)	<0.001
Sexual abuse	3.7 (1.3)	3.6 (1.1)	≤0.001
Racial discrimination	3.5 (1.3)	3.4 (1.1)	<0.001

*Unless otherwise indicated.

Table 4. Alcohol drinking habits* of Bella Coola Valley residents who responded to the survey, by sex, ethnicity and age

A. Sex and ethnicity

"During the past 12 months, how often did you drink alcoholic beverages?"	% of respondents, by sex and ethnicity Total (*n* = 658)	Male (*n* = 277)	Female (*n* = 381)	Aboriginal (*n* = 242)	Non-Aboriginal (*n* = 416)
Never	33	32	34	53	22
Less than once a month	17	9	23	12	20
Once a month	5	5	5	5	5
2–3 times a month	13	14	13	12	14
Once a week	6	6	6	5	7
2–3 times a week	13	14	11	10	14
4–6 times a week	7	10	5	1	11
Every day	5	10	2	2	7

B. Age

"During the past 12 months, how often did you drink alcoholic beverages?"	% of respondents, by age group (yr) Total (*n* = 658)	17–24 (*n* = 47)	25–44 (*n* = 234)	45–64 (*n* = 259)	≥65 (*n* = 118)
Never	33	17	26	34	53
Less than once a month	17	32	15	19	12
Once a month	5	4	6	5	3
2–3 times a month	13	26	18	9	8
Once a week	6	4	9	6	1
2–3 times a week	13	17	17	10	8
4–6 times a week	7	0	6	10	6
Every day	5	0	3	7	8

*The word "drink" in this survey was defined as: 1) one bottle/can of beer or a glass of draft; 2) one glass of wine or a wine cooler; or 3) one straight or mixed drink with 11/2 oz of hard liquor.

Discussion

Alcohol-related problems are an important cause of death for people living in the Bella Coola Valley — occurring at rates 2–5 times the predicted rates.[7,8] It is assumed that the delivery of health programs dealing with issues such as alcohol abuse will be most successful if the program is delivered to a community in which the majority of people believe the issue is actually a problem. The majority of Bella Coola survey respondents (83%) do agree that alcohol abuse is an important health issue. The majority also agree that drug abuse (77%), family violence (58%), sexual abuse (58%) and racial discrimination (53%) are important health issues for the valley. The information presented in this paper should assist health care planners with setting priorities for health and wellness programs.

The greatest number of people agreed with the statement that unemployment is a problem in the valley. According to the Provincial Medical Health Officer, socioeconomic status is an important health indicator because meaningful work with sufficient income contributes to a healthy life.[15] Employment rate is defined as the percent of the labour force aged 15 years and over who were employed in the week before census day. "Unemployed" is defined as persons who in the reference week were without paid or self-employed work *and* were available to work *and* had either looked for work in the past 4 weeks, were temporarily laid off or had definite arrangements to start a job in the next 4 weeks. The ***unemployment rate*** is calculated from the employment rate by subtracting the employment rate percentage from 100. The employment rate for the Bella Coola Valley Local Health Area in 2001 was 82.7%, which is significantly lower than the provincial rate of 91.5%. Sub-population analysis reveals that the younger people, especially young males, have the lowest employment rates. Such data help explain why more Aboriginal residents of the valley strongly agreed with the statement that unemployment is a problem (71%) than did the non-Aboriginal residents (60%); and it possibly explains why more Aboriginal residents strongly agreed that racial discrimination is a problem (31%) than did the non-Aboriginal residents (16%).

Aboriginal peoples in BC, across Canada and across North America, also have more health problems per capita — both physical and psychosocial — than do non-Aboriginal people. Look at mortality rates for example: the BC infant death rate for Aboriginal peoples is over twice that for all of Canada; the death rate from injury and poisonings is 4 times the Canadian average; the suicide rate among 15–19-year-old Aboriginal youth is 6 times the Canadian rate; and death from diabetes is 6 times the Canadian average.[9,16,17] These statistics would lead one to predict that more Aboriginal peoples would agree that alcohol abuse, drug abuse, family violence and sexual abuse are problems compared with other people living in the Bella Coola Valley, which is exactly what the data show.

Comparing results from the 1991 Aboriginal

Table 5. Number of alcoholic drinks* at one sitting, of Bella Coola Valley residents who responded to the survey, by sex, ethnicity and age

A. Sex and ethnicity

"On average, how many drinks do you usually have in one sitting?"	% of respondents, by sex and ethnicity				
	Total (*n* = 442)	Male (*n* = 190)	Female (*n* = 252)	Aboriginal (*n* = 118)	Non-Aboriginal (*n* = 324)
1–2	63	54	71	35	75
3–4	21	23	19	29	18
5 or more	16	23	10	36	7

B. Age

"On average, how many drinks do you usually have in one sitting?"	% of respondents, by age group (yr)				
	Total (*n* = 442)	17–24 (*n* = 39)	25–44 (*n* = 176)	45–64 (*n* = 172)	≥65 (*n* = 55)
1–2	64	38	56	71	85
3–4	21	26	25	19	11
5 or more	15	36	19	10	4

*The word "drink" in this survey was defined as: 1) one bottle/can of beer or a glass of draft; 2) one glass of wine or a wine cooler; or 3) one straight or mixed drink with 11/2 oz of hard liquor.

Peoples Survey[18] to those of the 2001 Bella Coola Survey (Table 6) reveals that proportionately more Bella Coola Aboriginal survey respondents agreed that alcohol abuse, drug abuse, family violence, unemployment and sexual abuse were problems. The significance of the differences remains to be determined.

Drinking frequency survey data are available for Prince George, BC,[12] and from the 2000–2001 Canadian Community Health Survey (Fig. 2).[19] Compared with Prince George and the Canadian community survey populations, the Bella Coola Valley population had a much higher proportion of abstainers. Aboriginal peoples were more likely to abstain from drinking alcohol (53%) than non-Aboriginal people (22%) — which is contrary to stereotypical thinking about the drinking habits of Aboriginal peoples, but consistent with other survey results.[20]

Table 6. Comparison of responses by Aboriginal peoples to 2001 Bella Coola Valley survey with responses from the 1991 national Aboriginal Peoples Survey

	% of respondents who believe that each issue is a problem in their community	
Community health issue	Bella Coola Valley survey	1991 survey
Alcohol abuse	84	61
Drug abuse	80	48
Family violence	58	39
Unemployment	87	67
Sexual abuse	59	25

The National Population Health Survey (NPHS), a longitundal survey done every two years, defines heavy drinkers as those who report drinking 5 or more drinks per occasion, 12 or more times per year.[21] According to the 1998–99 NPHS, 20% of their BC survey population and 20% of their Canadian survey population were heavy drinkers.[21] In the Bella Coola Valley survey the overall percentage of current drinkers who are heavy drinkers was 13%. Within the various Bella Coola Valley drinking sub-populations, the heavy drinking rates range from a high of 36% in the Aboriginal population to a low of 7% in the non-Aboriginal population. Although there is very little Canadian research on Aboriginal heavy drinking rates, the 36% rate reported for the Bella Coola population is consistent with numbers reported for US Aboriginal populations.[22]

The 17–24-year-old group had the greatest proportion of people drinking 5 or more drinks at a sitting. Studies have shown that alcohol intoxication is associated with physical aggression, fatal accidents, motor vehicle collisions, falling or drowning acci-

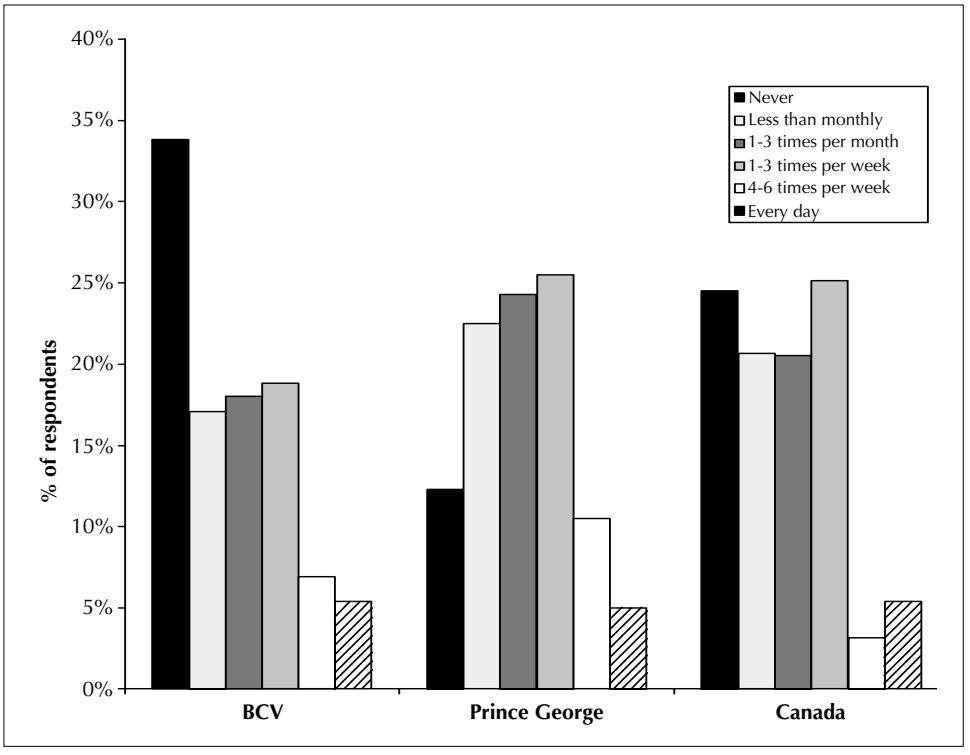


Fig. 2. Comparison of the frequency of drinking in the past 12 months for the present study (i.e., Bella Coola Valley [BCV]), for Prince George, BC,[12] and for Canada. Statistics for Canada taken from the 2000–2001 Canadian Community Health Survey.[19]

dents, depression and suicide.[23–25] We recommend that health care professionals in the Bella Coola Valley target this age group as part of a culturally appropriate primary prevention program designed to increase awareness of the negative impacts of binge drinking.[26]

Limitations

There are some limitations in this study. First, not every adult living in the valley completed the health survey. Even so, a 39% response rate for this sort of survey is very good; the usual response rate is less than 10%. The often-quoted 1997 First Nations and Inuit Regional Health Survey, for example, had a 6% adult First Nations response rate in BC and a 5% adult First Nations response rate for all participating regions. In the 1991 Aboriginal Peoples Survey approximately 6% of the Canadian Aboriginal population was surveyed.[27]

Conclusion

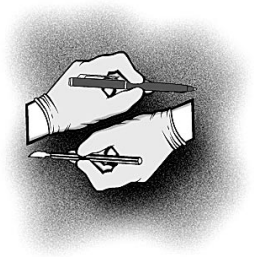
Patterns of drinking habits vary between men and women and between Aboriginal and non-Aboriginal people. There are more heavy drinkers among men than among women. More Aboriginal respondents abstained from drinking alcoholic beverages (54%) than non-Aboriginal respondents (22%). Among the Aboriginal peoples who do drink alcohol, there are relatively more heavy drinkers compared with non-Aboriginal people. Rating of health issues by residents of this rural and remote community reveals unemployment, alcohol abuse, drug abuse, family violence, sexual abuse and racial discrimination are all important issues. This information can be used to set priorities for future health and wellness programs.

Acknowledgements: The Rural Remote Health Institute at the University of Northern British Columbia contributed financial assistance to this project. Dr. Thommasen would like to acknowledge the Community-Based Clinician–Investigator Program for providing financial support.

Competing interests: None declared.

References

1. British Columbia Vital Statistics Agency. *P.E.O.P.L.E. 27, BC Stats*. Victoria (BC): Govt of British Columbia; 2003.
2. British Columbia Vital Statistics Agency. *2001 British Columbia census*. Victoria (BC): Govt of British Columbia; 2003.
3. Thommasen HV, Newbery P, Watt WD. Medical history of Central Coast of British Columbia. *B C Med J* 1999;41:464-70.
4. Kennedy DID, Bouchard RT. Bella Coola Indians. In: Suttles W, editor. *Handbook of North American Indians*. Washington: Smithsonian Institute; 1990. p. 323-39.
5. McIlwraith TF. *The Bella Coola Indians*. Toronto (ON): University of Toronto Press; 1992.
6. Thommasen HV. Prehistoric medicine on BC's Central Coast. *B C Med J* 1999;41:343-6.
7. Thommasen HV, Thommasen CT, Martiquet P, Jin A. Causes of death among Status Indian and other people living in the Bella Coola Valley Local Health Area (1987–2001). *B C Med J* 2004;46: 179-87.
8. Health Data Warehouse, Ministry of Health Planning BC. *Death-related statistics by selected causes of death: five-year period*. [Health data submitted by BC Vital Statistics Agency, BC Ministry of Health Services. Population data provided by BC STATS.] BC Ministry of Management Services. July 6, 2003.
9. Smylie J; for the Aboriginal Health Issues Committee. A guide for health professionals working with Aboriginal peoples: health issues affecting Aboriginal peoples. *J Soc Obstet Gynaecol Can* 2001;100: 54-68.
10. Macaulay AC, Gibson N, Freeman W, Commanda L, McCabe M, Robbins C, et al. Participatory research maximizes community and lay involvement. *BMJ* 1999;319:774-8.
11. Cave AJ, Ramsden VR. Hypothesis: the research page. Participatory action research. *Can Fam Physician* 2002;48:1671-2.
12. Michalos AC, Thommasen HV, Anderson N, Zumbo BD. Determinants of health and the quality of life in the Bella Coola Valley. *Soc Indic Res* 2005;72:1-50.
13. Harvey G. *Excel for Dummies*. 2nd ed. Foster City (CA): IDG Books; 1994. p. 366.
14. Snedecor GW, Cochran WG. *Statistical methods*. 7th ed. Ames (IA): Iowa State University Press; 1980.
15. British Columbia Provincial Health Officer. *A report on the health of British Columbians: Provincial Health Officer's Annual Report 2001. Feature report: The health and well-being of Aboriginal people in British Columbia*. Victoria (BC): Ministry of Health and Ministry Responsible for Seniors; 2002.
16. Foster LT, Macdonald J, Tuk TA, Uh SH, Talbot D. Native health in British Columbia: a vital statistics perspective. In: Stephenson PH, Elliott SJ, Foster LT, Harris J, editors. *A persistent spirit: towards understanding Aboriginal health in British Columbia*. Canadian Western Geographical Series, vol 31. Victoria (BC): Western Geographical Press; 1995. p. 43-94.
17. MacMillan HL, MacMillan AB, Offord DR, Dingle JL. Aboriginal health. *CMAJ* 1996;155:1569-78.
18. Statistics Canada. Language, tradition, health, lifestyle and social issues: 1991 Aboriginal peoples survey. Cat no. 11-001E. *The Daily* 1993; June 29:1-6.
19. *Canadian Community Health Survey: a first look, 2000/01*. (Ottawa): Statistics Canada. Available: www.statcan.ca/Daily/English/020508 /d020508a.htm (accessed 2005 Sept 13).
20. Wood DS. Inuit and non-Inuit alcohol consumption in the Baffin region, NWT, Canada. *Int J Circumpolar Health* 1999;58:24-9.
21. *National Population Health Survey (NPHS), 1998–99*. Ottawa: Statistics Canada.
22. Baker R, Morton M, Fraser G. Cultural aspects of alcoholism. *Can J CME* 1994;May:19-25.
23. Skog OJ. Alcohol consumption and fatal accidents in Canada. *Addiction* 2003;98:883-93.
24. Wells S, Graham K, West P. Alcohol-related aggression in the general population. *J Stud Alcohol* 2000;61:626-32.
25. Wang J, Patten SB. Alcohol consumption and major depression: findings from a follow-up study. *Can J Psychiatry* 2001;46:632-8.
26. Botvin GJ, Griffin KW, Diaz T, Ifill-Williams M. Preventing binge drinking during early adolescence: one- and two-year follow-up of a school-based preventive intervention. *Psychol Addict Behav* 2001;15 (4):360-5.
27. Bobet E. *Diabetes among First Nations People*. cat no H34-88/1998E. Ottawa: Health Canada; 1998. p. 31.



Review of salaried physician visits in a rural remote community — Bella Coola Valley

Harvey V. Thommasen, MD, MSc, FCFP

Associate Clinical Professor, University of British Columbia Faculty of Medicine, Adjunct Professor, Community Health, University of Northern British Columbia, Prince George, BC

Janet Tatlock, BSc, MSc(candidate)

Community Health Program, University of Northern British Columbia, Prince George, BC

Rhonda Elliott

Medical Office Assistant, Bella Coola Medical Clinic, Bella Coola, BC

William Zhang, MSc, MA

Statistical Consultant, University of Northern British Columbia, Prince George, BC

Sam Sheps, MD, MSc

Professor, Department of Health Care and Epidemiology, Faculty of Medicine, University of British Columbia, Vancouver, BC

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

This article has been peer reviewed.

Introduction: The current study quantifies visits to salaried physicians working in a geographically remote health care facility in British Columbia in 2001.
Methods: A retrospective chart review was conducted of patients residing in the Bella Coola Valley and attending the Bella Coola General Hospital/Medical Clinic (BCGH/Medical Clinic) in 2001. Visits to family physicians at this clinic, visits to the BCGH emergency department, hospital admissions, smoking rates and chronic disease prevalence rates were quantified.
Results: An estimated 2378 patients made *7747* BCGH/Medical Clinic family physician visits, and *4474* "other" visits in 2001. These "other" visits included emergency department visits (n = 1736), hospital admissions (n = 245) and prescription visits (n = 2252). Twenty-six percent (n = 622) of the population did not see a family physician at all in 2001, and 15% of the population accounted for 52% of all visits. Women had a higher number of visits than men; pregnant women had a higher number of visits than non-pregnant women, and the Aboriginal population saw family physicians more often than did non-Aboriginal people ($p < 0.001$). Those who had a chronic illness (e.g., diabetes) saw family physicians more frequently than did people who did not have that particular chronic illness ($p < 0.01$). The Aboriginal population used the BCGH/Medical Clinic and emergency department more frequently than did the non-Aboriginal population. BCGH/Medical Clinic physicians had an average of *75* patient visits per week. An additional 22 "visits" per week were for writing prescription refills with the patient not present.
Conclusion: Older people, people with chronic disease, women and Aboriginal peoples more frequently visited the family physicians. Salaried physicians working in geographically isolated communities appeared to behave in ways that minimized contact (e.g., used the phone, wrote prescriptions without patient being present) and maximized time efficiency for both themselves and their patients.

Introduction : La présente étude en cours quantifie les consultations de médecins salariés travaillant dans un établissement de soins de santé en région éloignée en Colombie-Britannique en 2001.
Méthodes : On a procédé à une étude rétrospective de dossiers de patients résidant dans la vallée de Bella Coola et qui se sont présentés à l'Hôpital général et Clinique médicale de Bella Coola en 2001. On a compté les consultations des médecins de famille, les visites à l'urgence de l'hôpital et les hospitalisations, et calculé les taux de tabagisme et de prévalence des maladies chroniques.
Résultats : Un total estimatif de 2378 patients ont visité *7747* fois un médecin de famille à la clinique et effectué *4474* «autres» visites en 2001. Ces «autres» visites comprenaient les visites à l'urgence (n = 1736), les hospitalisations (n = 245) et les consultations pour obtenir une ordonnance (n = 2252). Vingt-six pour cent (n = 622) des habitants n'ont pas vu de médecin de famille du tout en 2001 et 15 % ont effectué 52 % du total des consultations. Les femmes consultaient plus souvent que les hommes; les femmes enceintes consultaient plus souvent que les femmes non enceintes et les Autochtones consultaient un médecin de famille plus souvent que les non-Autochtones

(p < 0,001). Les personnes atteintes d'une maladie chronique (comme le diabète) consultaient un médecin de famille plus souvent que celles qui n'étaient pas atteintes de cette maladie (p < 0,01). La population autochtone a utilisé les cliniques et l'urgence plus souvent que la population non autochtone. Les médecins de Bella Coola recevaient en moyenne 75 patients par semaine. Vingt-deux autres «consultations» par semaine visaient à faire renouveler une ordonnance en l'absence du patient.

Conclusion : Les personnes âgées, les personnes atteintes d'une maladie chronique, les femmes et les Autochtones consultaient plus souvent les médecins de famille. Les médecins salariés œuvrant dans des communautés géographiquement isolées ont semblé se comporter de façon à réduire au minimum les contacts (p. ex., ont utilisé le téléphone, ont rédigé des ordonnances en l'absence du patient) et à maximiser l'efficience de l'utilisation du temps à la fois pour eux mêmes et pour leurs patients.

Introduction

The era of primary care reform has begun. Health care planners and decision-makers are becoming interested in the subject of visits to health care professionals.[1–3] Who visits doctors, why people visit doctors, the necessity of these visits, and their cost effectiveness are examples of questions currently of interest.

Geographic physician density (physician:population ratios), remuneration type, size of community, gender, marital status, place of graduation, clinical demands and age are all family physician (FP) specific factors that affect the number of patients seen in a given time period.[2–9] With respect to patient-specific factors, studies have shown that women visit FPs more often than do men; people of Aboriginal descent visit FPs more often than do other people; older people visit FPs more often than do younger people; and people with chronic illnesses visit FPs more frequently than those without. Aboriginal peoples have higher rates of smoking and chronic diseases, such as diabetes and inflammatory arthritis, which presumably accounts for a portion of the increased visits reported by this group.[10–18]

Studies have also shown that rural individuals use health services less frequently than their urban counterparts.[19–22] This despite the fact that, compared with their urban counterparts, rural residents are not as healthy: they have higher rates of chronic disease, they report being ill more frequently and are more likely to report poorer health status.[10,23–26] Poorer health among rural residents has in turn been attributed to less education,[10,19] lower income[10,27] and greater proportion of First Nations people in this population.[11,28,29] A number of different explanations for the lower utilization of health services by rural residents have been advanced. Rural residents are more resilient and self sustaining than their urban counterparts.[20,21,25,30,31] They must travel farther to see health care providers; therefore, the time and costs associated with travel may act as a deterrent.[19,32–34] Rural residents have fewer options with respect to the kind and the experience of health care providers available to them. Typically, there may only be one service provider within a small rural community — most likely a physician or a nurse.[35] The inability to be anonymous, confidentiality concerns and the desire to avoid stigmatization are real challenges in rural communities and lead to some people choosing not to seek medical attention.[19,21,35]

The main objective of this study was to quantify patient-visit data for a geographically isolated community staffed by salaried physicians.

Methodology

Description of the community

Bella Coola Valley is a geographically isolated valley located in the central coast region of British Columbia. The communities of Bella Coola, Hagensborg, Firvale and Stuie are all located within the Valley (Fig. 1). According to the 2001 census 2289 people live in the Valley, and 46% of these people are of Aboriginal descent.[36,37] Bella Coola Valley is part of the traditional territory of the Nuxalk Nation, which is a tribe of Salish-speaking Coastal Indians.[38–41]

The United Health Church Medical Services operates a clinic and a hospital in the town of Bella Coola. The hospital and clinic are together in the same complex. There are no other primary care health facilities in the Valley. Bella Coola General Hospital (BCGH) and its medical clinic are serviced by 3 salaried physicians.[42,43] On any given day

there are 2 physicians working at the clinic, thus calculations are based on 2 physicians working per week. BCGH/Medical Clinic is one of the most isolated health care facility communities in British Columbia. The closest higher level hospital is over 450 km by road (to Williams Lake) or a 2-hour flight by air (to Vancouver). The isolation of this community is such that almost everyone who lives in the Valley has either a clinic chart or emergency department (ED) record.

Participatory consultation process and ethics approval

This research project was carried out in a participatory fashion, following the recommendations outlined in a recently published policy statement entitled "A Guide for Health Professionals Working with Aboriginal Peoples."[44–46] Prior to collecting data we obtained letters of support from the Nuxalk Band Council, from the Bella Coola Transitional Health Authority, and from Central Coast Regional District for a comprehensive study on a broad range of determinants of health for people living in the Valley. Ethics approval to collect this data was obtained from Research Ethics Committees located at both the University of British Columbia and at the University of Northern British Columbia. Prior to submitting this manuscript for publication Nuxalk health authorities reviewed the information and approved it for publication.

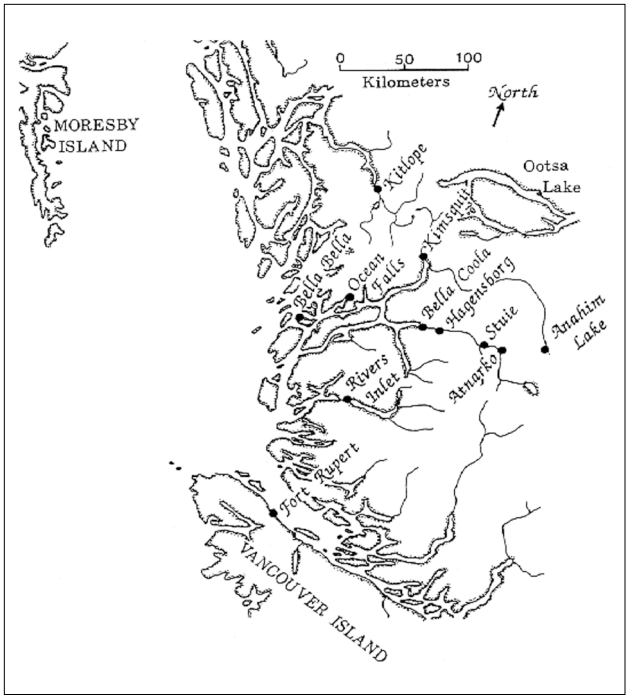


Fig. 1. Detailed map of the Bella Coola Valley.

Chart review details

In the spring of 2002 a detailed retrospective chart review was done by one of the authors (H.V.T.), who is an FP who has worked in Bella Coola Valley for over 15 years. After excluding clinic charts of BCGH/Medical Clinic patients who do not live in the Valley and the inactive charts of patients not currently living in the Valley, 2378 patients made up the 2001 clinic population list — approximately 104% of the May 2001 census estimate for the Valley. The 2378 "active" clinic charts were reviewed for the following information: age, sex, number of clinic visits, height, weight, presence or absence of diabetes and other chronic diseases. Chronic diseases studied included diabetes, osteoarthritis, inflammatory arthritis, chronic back/neck pain, musculoskeletal problems, cancer, depression/anxiety disorder, coronary artery disease, cerebrovascular disease, chronic obstructive lung disease and hypertension. Detailed definitions of these are available elsewhere.[47] For example, inflammatory arthritis refers to a collection of diseases in which the joint or joints are involved in a presumed autoimmune, inflammatory process and includes rheumatoid arthritis, systemic lupus erythematosus, mixed connective tissue disease, polyarthralgia with positive rheumatoid factor or positive anti-nuclear antibody, polymyalgia rheumatica, ankylosing spondylitis, psoriatic arthritis and gout. However, the term arthritis does not include fibrositis / fibromyalgia syndrome.[39]

In addition to presence of chronic illnesses, whether the patient was pregnant in 2001, was a current smoker or had a history of alcohol-related problems was also noted. Alcohol-related problems include 1) alcohol-related diseases (e.g., gastritis, bleed, cardiomyopathy, neuropathy, cirrhosis, elevated liver enzymes), 2) treatment for alcohol withdrawal or having been given a prescription for dye-sulfiram (i.e., Antabuse), or 3) dysfunctional behaviour (e.g., suicide gestures) while intoxicated.

Visits by patients to the BCGH/Medical Clinic were classified as follows:

Family physician visits — when a patient attends the clinic to see a family physician on a specific day for one or more problems.

Prescription visits — when a family physician, through the clinic pharmacist, orders a refill prescription without speaking to or seeing the patient in person.

Emergency department visits — visits to the BCGH ED. People seen in the ED and subsequently admitted to hospital were classified as a hospital admission, not an ED visit.

Hospital admissions — refers to admissions to BCGH.

Patient phone visits — when a physician talks to the patient on the telephone and makes a note in the clinic chart as to what was discussed.

Nurse practitioner visits — visits to the nurse practitioner who works in the clinic. It includes routine visits for infant/child immunizations, routine screening visits (e.g., pap smear or visual acuity test), teaching visits and problem-oriented visits. Nurse practitioners consult with physicians as needed.

Specialist visits — when patients see a visiting specialist at BCGH/Medical Clinic or outside the Valley.

Aboriginal status was also assigned to each patient listed in the 2001 BCGH/Medical Clinic list. Information used to determine Aboriginal status came from multiple sources, including Nuxalk Band lists; archived birth and death vital statistics information; and a comprehensive genealogy of the Nuxalk people, which was constructed in the 1990s. There were also Aboriginal people living in the Valley who were not Nuxalk people. These people were identified from a review of their charts; or by asking directly whether he or she had Aboriginal ancestry. According to the BCGH/Medical Clinic population data, approximately 47% of the residents of the Valley are of Aboriginal descent. This is almost exactly the same number reported from the May 2001 Census (i.e., 46%).[36,37]

We were unable to find any published Canadian physician-visit information that we could compare with our results, so we calculated it ourselves from the College of Family Physicians of Canada's 2001 National Family Physician Workforce Survey database.[48] We investigated the average number of patients seen per week (excluding while on-call visits), as reported by salaried, fee-for-service (FFS) and other groups, as well as by 6 different geographic patient groupings, including rural and geographically remote communities, chosen at random from across Canada.

Statistical analysis

Chart-derived information was entered into an electronic Excel spreadsheet from which results were summarized and graphs created. Then the data were sent to statisticians and other researchers for further analyses.[49] The data were analyzed using the software SPSS (Statistical Package for Social Sciences) for Windows. Differences in the outcomes between gender, ethnic groups (Aboriginal v. non-Aboriginal) and between people with or without chronic disease were evaluated using Pearson's χ^2 and/or one-way ANOVA tests. Significance was defined as having a p value ≤ 0.05 for each outcome measure.[50]

Results

Table 1 summarizes data on visits to BCGH/Medical Clinic in 2001 for residents of the Valley. A breakdown of the FP clinic visit data (Table 2) reveals that 26% of the Valley clinic population did not see an FP in 2001 and 15% of the population saw an FP more than 6 times. This latter group accounted for 52% of all FP visits.

Table 3 provides a summary of the total BCGH/Medical Clinic patient population in terms of sex, ethnic origin, tobacco use, chronic disease / chronic morbidity, and FP clinic visits. Women see FPs more often than men ($p < 0.001$); pregnant women see FPs more often than non-pregnant women ($p < 0.001$); and Aboriginal people see FPs

Table 1. Summary of Bella Coola General Hospital/Medical Clinic visit data, 2001

Visit type	No. of visits	Visits/ patient	Visits/week/ physician
Family physician	7 747	3.26	75
Prescription refill visits	2 252	0.95	22
Emergency department	1 736	0.73	17
Hospital admissions	245	0.10	2.4
Patient phone visits	241	0.10	2.3
Total	12 221	5.14	118

Table 2. Breakdown of Bella Coola General Hospital/ Medical Clinic visit data

No. of visits	No. (and %) of patients	Total no. (and %) of visits
None	622 (26)	0 (0)
1–2	766 (32)	1092 (14)
3–6	632 (27)	2628 (34)
>6	355 (15)	4027 (52)

more often than non-Aboriginal people ($p < 0.001$). Additionally, people who have any of the chronic illnesses listed in Table 3 tend to visit FPs more frequently than people who do not have that particular chronic illness ($p < 0.01$).

Table 4 reveals that as people get older, they are more likely to see an FP ($p < 0.001$).

Table 5 compares the Aboriginal to the non-Aboriginal population in terms of various types of visits, tobacco- and alcohol-related problem (past/present) prevalence rates, and a variety of chronic diseases/morbidities. Aboriginal people use the clinic and ED more frequently than other people. However, Aboriginal people are not admitted to hospital more frequently, they do not see specialists or nurse practitioners more frequently, nor do they have more prescription visits or phone visits than non-Aboriginal people. Smoking rates, history of alcohol issues, diabetes mellitus, inflammatory arthritis are all more common among Aboriginal than non-Aboriginal populations ($p < 0.05$). Non-Aboriginal people appear to have higher rates of hypertension and depression/anxiety disorders ($p < 0.05$).

Across all age groupings Aboriginal women see FPs more often than any other group, followed by non-Aboriginal women and Aboriginal men. Non-Aboriginal men are least likely to see an FP in the clinic (Table 6).

Table 7 summarizes the average number of patients seen per week, as reported by salaried, FFS and other Canadian physician groups, as well as by the 6 different geographic patient populations we studied. In all of the geographic patient populations we studied, salaried physicians saw fewer patients per week than did FFS physicians.

Table 3. Summary of Bella Coola Valley patient population versus Bella Coola General Hospital/Medical Clinic visits

	Population, no. (and %)	Mean no. (± SE) of visits
Total no. of visits	2375	3.3 (0.1)
Men	1222 (51)	2.5 (0.1)
All women	1153 (49)	4.1 (0.1)
Non-pregnant	1126	3.9 (0.1)
Pregnant	27 (1)	10.8 (1.1)
Origins		
Aboriginal	1119 (47)	3.8 (0.1)
Non-Aboriginal	1256 (53)	2.8 (0.1)
Patients with		
Diabetes	127 (5)	8.2 (0.6)
Osteoarthritis	101 (4)	6.4 (0.5)
Inflammatory arthritis	46 (2)	7.5 (1.0)
Chronic back/neck pain	129 (5)	5.7 (0.5)
Musculoskeletal problem	424 (18)	5.8 (0.3)
Cancer	58 (2)	7.8 (0.3)
Asthma	138 (6)	5.9 (0.5)
COPD	33 (1)	7.0 (1.0)
Depression/anxiety	179 (8)	7.3 (0.6)
Coronary artery disease	58 (2)	8.0 (0.8)
Cerebrovascular disease	35 (1)	7.0 (1.0)
Congestive heart failure	27 (1)	8.9 (1.3)
Hypertension	223 (9)	6.6 (0.4)

SE = standard error; COPD = chronic obstructive pulmonary disease

Discussion

The 2001 National Ambulatory Medical Care Survey (NAMCS) has detailed visit information for physicians working in the United States.[51] According to the NAMCS, the average US physician in office-based practice had 80 office visits and 13 hospital visits per week. The average BCGH/Medical Clinic physician had practically the same number of visits per week — 75 patient visits in the clinic, 17 ED visits and 2 hospital admissions for a total of 94 visits per week. The office-based physicians responding to the NAMCS survey included surgical specialties (22%) and medical specialties (26%); therefore, the physician groups are not strictly comparable.

Canadian physician-visit data[48] (Table 7) reveals that salaried physicians see fewer patients per week than do FFS physicians in all geographic patient populations studied. The results are consistent with the generally held view that salaried physicians see fewer patients than FFS physicians, although one should not equate number of patients seen to how "hard" a physician works. Bella Coola Valley is a geographically remote area, and the physicians are salaried. The average number of patient visits per week reported for salaried physicians working in geographically remote communities across Canada

Table 4. Breakdown of visits to Bella Coola Valley General Hospital/Medical Clinic, by age of patient

Age group, yr	No. of population in age group	Mean no. (and SE) of visits
0–17.9	651	2.2 (0.1)
18–24.9	232	2.9 (0.3)
25–39.9	501	3.3 (0.2)
40–44.9	185	3.1 (0.3)
45–64.9	589	4.0 (0.2)
≥65	217	4.9 (0.3)

was 76 ± 33, which is almost identical to the average number reported for Bella Coola Valley physicians — 75 patients seen per week (excluding patients seen while on-call). A closer look at the data in Table 1 shows 22 "visits" per week are for ordering prescription refills through the clinic pharmacist without the physician seeing or speaking to the patient. Inclusion of these visits increases the number of visits per Bella Coola Valley physician per week to 97, which is closer to the value reported for physicians working in geographically remote communities who are remunerated predominantly by FFS (Table 7). One can't help but speculate whether FFS physicians choose not to write prescription refills without actually seeing patients so that they can get paid for the service. Since there is no incentive for salaried physicians to see patients face-to-face when re-filling prescriptions, one should not be surprised to find out there are differences in behaviour between the 2 physician groups around this issue.

Physician:population ratios and health of a popu-

Table 5. Comparison between non-Aboriginal and Aboriginal patients

	Mean no. (and SE) of patient visits		
Type of visit	Non-Aboriginal	Aboriginal	*p* value
Family physician, clinic	2.8 (0.1)	3.8 (0.1)	<0.001
Prescription refill visits	0.9 (0.1)	1.0 (0.1)	0.218
Emergency department	0.4 (0.0)	1.1 (0.1)	<0.001
All hospital admissions	0.2 (0.0)	0.2 (0.0)	0.063
Patient phone "visits"	0.1 (0.0)	0.1 (0.0)	0.503
Specialist	0.4 (0.0)	0.5 (0.0)	0.264
Nurse practitioner	0.6 (0.0)	0.7 (0.1)	0.755
	Mean no. (and %) of patients		
Health issue	Non-Aboriginal	Aboriginal	*p* value
Currently smoking	319 (25)	382 (34)	<0.001
Alcohol issues	134 (11)	254 (23)	<0.001
Pregnancy	10 (1)	17 (2)	0.097
Diabetes	56 (4)	71 (6)	0.041
Osteoarthritis	60 (5)	41 (4)	0.18
Inflammatory arthritis	16 (1)	30 (3)	0.013
Chronic back/neck pain	79 (6)	50 (4)	0.051
Musculoskeletal problems	238 (19)	186 (17)	0.139
Cancer	39 (3)	19 (2)	0.069
Depression/Anxiety	109 (9)	70 (6)	0.026
Coronary artery disease	35 (3)	23 (2)	0.249
Cerebrovascular disease	17 (1)	18 (2)	0.607
Congestive heart failure	19 (2)	8 (1)	0.067
Hypertension	158 (13)	65 (6)	<0.001

SE = standard error

Table 6. Comparison of visits to the Bella Coola General Hospital/Medical Clinic between the non-Aboriginal and Aboriginal population, by age and sex

	Age group, in years, mean (and standard error)					
Sex	<18	18–24.9	25–39.9	40–44.9	45–64.9	>65
Non-Aboriginal men	1.3 (0.1)	1.4 (0.2)	1.3 (0.2)	2.4 (0.4)	2.9 (0.3)	4.3 (0.5)
Non-Aboriginal women	1.7 (0.2)	2.6 (0.4)	3.7 (0.4)	2.9 (0.4)	3.9 (0.4)	4.5 (0.4)
Aboriginal men	2.4 (0.2)	1.8 (0.3)	2.0 (0.2)	2.8 (0.5)	4.0 (0.5)	5.1 (1.0)
Aboriginal women	2.8 (0.2)	4.9 (0.6)	6.2 (0.6)	5.3 (0.9)	6.8 (0.7)	7.4 (1.0)

lation served are 2 things that could have an impact on the number of patients seen (i.e., visits) per week. The physician:population ratio for Bella Coola Valley is 1.03:1000, which is a similar finding to BC's overall ratio of 0.98:1000.[8] Moreover, the Valley population is not healthier than other populations across Canada. In fact, people living in the Valley have the lowest life expectancy in all of BC[28,52] and they are among the unhealthiest people in all of Canada.[10,53] It is believed that the highly rural nature of the region and the high percentage of Aboriginal peoples have contributed to the unhealthy status of people living in the Valley.[11] The Provincial Health Officer has noted that health region inequities are due mainly to differences in socioeconomic conditions. This is due in part because health regions with the highest levels of income, education and employment also have the lowest child mortality rates.[10]

The average Valley resident visits their FP 3.3 times per year. A breakdown of population in relation to clinic-visit frequency reveals that 26% of Valley residents did not see an FP in 2001. Amazingly, 15% of residents accounted for 52% of all BCGH/Medical Clinic visits. According to the NAMCS, the average number of visits to office-based physicians in 2001 was 3.1 visits per person, which is only slightly less than the 3.3 visits per clinic patient reported in our study.[50]

The data reported here should be of interest to those individuals who compare visit data for groups of patients or regional areas.[54] Although patient contact/visit data are becoming increasingly more accessible from government databases, most of these data are based on the FFS structure.

Table 7. Average no. of patients seen per week by Canadian family physicians, calculated from the College of Family Physicians of Canada's 2001 National Family Physician Workforce Survey database.[48]

	No. of physicians (mean no. of visits and SD)	
Population served	Salaried	Fee-for-service*
Inner city	258 (72 ± 43)	2 070 (134 ± 67)
Urban/Suburban	568 (74 ± 44)	9 897 (137 ± 59)
Small town	123 (93 ± 57)	3 493 (134 ± 56)
Rural	1 257 (08 ± 65)	2 116 (135 ± 56)
Geographically remote	117 (76 ± 33)	228 (112 ± 62)
Other	80 (58 ± 39)	109 (111 ± 61)
Total	1 404 (81 ± 51)	17 912 (135 ± 59)

*t test for equality of means reveals $p < 0.05$ compared to Salaried physician group.

The BCGH/Medical Clinic (and clinics in many other rural, remote communities) is staffed by salaried physicians and therefore does not bill Medical Service Plan (MSP) directly for their physician services. The result is that MSP databases do not provide complete information on physician services for residents in these kinds of communities.

Limitations

There are some limitations in this study. These data may not be easily applicable to other communities. Bella Coola Valley is a rural, remote community with over 40% of the residents being of Aboriginal descent. We encourage others to duplicate this survey in their communities to determine if the results are truly comparable. We were not able to determine accurately exactly how many full-time equivalent physicians work in any given week. However, erring on the side of conservatism, this study was based on 2 rather than 2-and-half physicians working in any given week, which would compensate for the fact that we did not have accurate numbers for visits by people who were not residents of the Valley. Moreover, we were not able to calculate the number of times a physician would visit a hospitalized patient.

Conclusion

BCGH/Medical Clinic physicians had an average of 75 patient visits per week, which is similar to those reported by salaried physicians working in geographically remote communities across Canada. An additional 22 "visits" per week are for ordering prescription refills through the clinic pharmacist without speaking to or seeing the patient. Salaried physicians working in geographically isolated communities may not actually consult fewer patients per week, as is widely assumed, compared with their non-salaried counterparts or their colleagues in urban centres who do not do ED call. Rather, these physicians may behave in ways that minimize contact (e.g., use the phone, write prescriptions without the patient being present) and maximize time efficiency for both themselves and their patients. Aboriginal peoples visit physician offices and the ED more often than do non-Aboriginal people. This presumably reflects, in part, the fact that Aboriginal people have higher rates of chronic disease such as diabetes and inflammatory arthritis in this community.

Acknowledgements: Dr. Thommasen would like to acknowledge the Community-Based Clinician–Investigator Program for financial support. The Coast Under Stress Research project contributed $5400, and the University of Northern British Columbia Research Department contributed $4800 "seed" money to this project. Special thanks to Sarah Scott, JANUS Project Coordinator, for putting together the information from the 2001 College of Family Physicians of Canada (CFPC) National Family Physician Workforce Survey (NFPWS) Database. This database is part of the JANUS Project, CFPC, Mississauga, Ont., 2001. ***Funding for the 2001 NFPWS was provided by the following associations:*** CFPC, Canadian Institute for Health Information, Fédération des médecins omnipraticiens du Québec, Royal College of Physicians and Surgeons of Canada, Canadian Medical Association, and Health Canada.

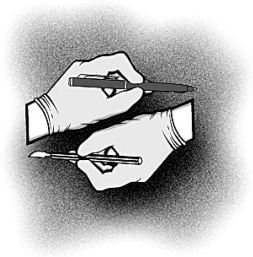
Competing interests: None declared.

Key words: rural community; physician visits; Aboriginal; First Nations health

References

1. College of Family Physicians of Canada. *Managing change: a discussion document on primary health care reform in Canada*. The College; Sept 19, 1995. p. 50.
2. Martin S. Fee-for-service v. salary: the debate is heating up. *CMAJ* 2003;169:701.
3. Canadian Institute for Health Information. *The practicing physician community in Canada 1989/90 to 1998/99: workforce and workload as gleaned through billing profiles for physician services*. The Institute. 2001. p. 37.
4. Chan B, Anderson GM, Theriault M-E. High-billing general practitioners and family physicians in Ontario: How do they do it? An analysis of practice patterns of GP/FPs with annual billings over $400,000. *CMAJ* 1998;158:741-6.
5. Woodward CA, Hurley J. Comparison of activity level and service intensity of male and female physicians in five fields of medicine in Ontario. *CMAJ* 1995;153:1097-106.
6. Norton PG, Dunn EV, Soberman L. Family practice in Ontario: how physician demographics affect practice patterns. *Can Fam Physician* 1994;40:249-56.
7. Dedobbeleer N, Constandriopoulos A-P, Desjardins S. Convergence or divergence of male and female physicians' hours of work and income. *Med Care* 1995;33:796-805.
8. Thommasen HV, Grzybowski S, Sun R. Physician-to-population ratios in British Columbia. *Can J Rural Med* 1999;4:139-45.
9. Coyte PC, Catz M, Stricker M. Distribution of physicians in Ontario: Where are there too few or too many family physicians and general practitioners? *Can Fam Physician* 1997;43:677-83, 733.
10. British Columbia Provincial Health Officer. *A report on the health of British Columbians: Provincial Health Officer's annual report 1996*. Victoria (BC): Ministry of Health and Ministry Responsible for Seniors; 1997.
11. British Columbia Provincial Health Officer. *A report on the health of British Columbians: Provincial Health Officer's annual report 2001. Feature report: The health and well-being of Aboriginal people in British Columbia.* Victoria (BC): Ministry of Health and Ministry Responsible for Seniors; 2002.
12. First Nations and Inuit Regional Health Survey National Steering Committee. *First Nations and Inuit Regional Health Survey National Report 1999*.
13. *Tobacco use in BC*. 29 Sept 1997. Available: www.hlth.gov.bc.ca /tobacrs/summary/index.html (accessed 2005 Dec 19).
14. MacMillan HL, MacMillan AB, Offord DR, et al. Aboriginal health. *CMAJ* 1996;155:1569-78.
15. Young TK. *The health of native Americans: toward a biocultural epidemiology*. Oxford: Oxford University Press ;1994. p. 265.
16. Young TK, Szathmary EJE, Evers S, et al. Geographical distribution of diabetes among the native population of Canada: a national survey. *Soc Sci Med* 1990;31:129-39.
17. Johnson S, Martin D, Sarin C. Diabetes mellitus in the First Nations population of British Columbia, Canada: Part 3. Prevalence of diagnosed cases. *Int J Circumpolar Health* 2002;61:260-4.
18. Coutts JV, Thommasen HV. Prevalence of rheumatoid arthritis in the Heiltsuk people of Bella Bella. *BCMJ* 1998;40:250-1.
19. Nemet GF, Bailey AJ. Distance and health care utilization among the rural elderly. *Soc Sci Med* 2000;50:1197-208.
20. Saag KG, Doebbeling BN, Rohrer JE, et al. Arthritis health service utilization among the elderly: the role of urban–rural residence and other utilization factors. *Am Coll Rheumatol* 1998;11:177-85.
21. Neese J, Abraham I, Buckwalter K. Utilization of mental health services among rural elderly. *Psychiatr Nursing* 1999;13:30-40.
22. Casey M, Thiede-Call K, Klingner J. Are rural residents less likely to obtain recommended preventive healthcare services? *Am J Prev Med* 2001;24:182-8.
23. Thiede-Call K, Casey M, Radcliff T. Rural beneficiaries with chronic conditions: Does prevalence pose a risk to medicare managed care? *Manag Care Q* 2000;8:48-57.
24. Rohrer J, El-Urdaneta M, Vaughn T, et al. Physician visits in a farming-dependent county. *J Rural Health* 1998;14:338-45.
25. Yesalis CE, Lemke JH, Wallace RB, et al. Health status of the rural elderly according to farm work history: the Iowa 65+ Rural health Study. *Arch Environ Health* 1985;40:245-53.
26. Mitura V, Bollman RD. The health of rural Canadians: a rural–urban comparison of health indicators. Statistics Canada Cat no 21-006-XIE. *Rural Small Town Canada Anal Bull* 2003;4(6): 1-23.
27. Wood E, Sallar A, Schechter M, et al. *Universal health care? Poor more likely to die from "avoidable" causes in British Columbia. The evidence speaks*. Monograph series, no 1. Available: www.cheos.ubc.ca/publications.html (accessed 2005 Mar 25).
28. Gobrial M, Mekael H, Anderson N, et al. Diabetic blood sugar control: an urban/rural comparison. *BC Med J* 2002;44:537-43.
29. Canadian Institute for Health Information. *Aboriginal peoples' health in improving the health of Canadians*. Available: www.cihi.ca (accessed 2005 Aug 17).
30. Coburn AE. Rural long-term care: What do we need to know to improve policy and programs? *J Rural Health* 2002;18:256-69.
31. Dellasega C, Fisher K. Posthospital home care for frail older adults in rural locations. *J Commun Health Nurs* 2001;18:247-60.
32. Rost K, Fortney J, Fischer E, et al. Use, quality, and outcomes of care for mental health: the rural perspective. *Med Care Res Rev* 2002; 59:231-65.
33. Thelin A, Stiernstrom E-L, Holmberg S. Differences in the use of health care facilities and patterns of general risk factors in farmers with and without occupational health care programs. *Int J Occup Environ Health* 1999;5:170-6.
36. Dansky K, Dirani R. The use of health care services by people with diabetes in rural areas. *J Rural Health* 1998;14:129-37.
35. Schur CL, Berk ML, Dunbar JR, et al. Where to seek care: an examination of people in rural areas with HIV/AIDS. *J Rural Health* 2002; 18:337-47.
36. P.E.O.P.L.E. 27, BC Stats. Available through BC Ministry of Management Services. PO Box 9410, Stn Prov Govt, Victoria BC V8W 9V1.
37. British Columbia Vital Statistics Agency. *2001 British Columbia census*. Victoria (BC): Govt of British Columbia. 2003.
38. Kennedy DID, Bouchard RT. Bella Coola Indians. In: Suttles W, editor. *Handbook of North American Indians*. Washington: Smithsonian Institute; 1990. p. 323-39.
39. McIlwraith TF. The Bella Coola Indians. Toronto: University of Toronto Press, 1992.
40. Thommasen HV. Prehistoric medicine on BC's Central Coast. *BC Med J* 1999;41:343-6.
41. Acheson S. Culture, contact, demography and health among the Aboriginal peoples of British Columbia. In: Stephenson PH, Elliott SJ, Foster LT, et al, editors. *A persistent spirit: towards understanding Aboriginal health in British Columbia*. Canadian Western Geographical Series, Vol 31. 1995. University of Victoria, Victoria. Western Geographical Press. p. 1-42.
42. Interprofessional Rural Program of BC. *Bella Coola: the community in brief*. Available: www.bcahc.ca/irpbc/default.asp?pageid=692 (accessed 2005 Aug 18).

43. Thommasen HV, Newbery P, Watt WD. Medical history of Central Coast of British Columbia. *BC Med J* 1999;41:464-70.
44. Smylie J; for the Aboriginal Health Issues Committee. A guide for health professionals working with Aboriginal peoples: health issues affecting Aboriginal peoples. *J SOGC* 2001;100:54-68.
45. Macaulay AC, Gibson N, Freeman W, et al. Participatory research maximizes community and lay involvement. *BMJ* 1999;319:774-8.
46. Cave AJ, Ramsden VR. Hypothesis: the research page. Participatory action research. *Can Fam Physician* 2002;48:1671-2.
47. Thommasen HV, Zhang W, Voaklander D, et al. The relationship between health survey and medical chart review results, Bella Coola Valley. *Soc Indicators Res 2006;76(2)*. In press.
48. Slade S, Busing N. Weekly work hours and clinical activities of Canadian family physicians: results of the 1997/1998 National Family Physician Survey of the College of Family Physicians of Canada. *CMAJ* 2002;166:1407-11.
49. Harvey G. *EXCEL for Dummies*. 2nd ed. Foster City (CA): IDG Books; 1994. p. 366.
50. Snedecor GW, Cochran WG. Statistical methods. 7th ed. Ames, Iowa: Iowa State University Press; 1980.
51. Cherry DK, Burt CW, Woodwell. *National Ambulatory Medical Care Survey: 2001 summary. Advance data from Vital and Health Statistics*. No. 337. US Department of Health and Human Services: Centers for Disease Control and Prevention. National Center for Health Statistics. 2003. p. 44.
52. Thommasen HV, Thommasen CT, Martiquet P, et al. Causes of death among status indian and other people living in the Bella Coola Valley local health area (1987–2001). *BC Med J* 2004;46: 179-87.
53. Thommasen HV, Patenaude J, McArthur A, et al. Diabetes related disorders and diseases among Aboriginal and other people living in the Bella Coola Valley. *Rural Remote Health J* 4:319 (Online), 2004. Available: http://rrh.deakin.edu.au
54. Reid RJ, Barer ML, McGrail KM, et al. *High users of physician services: a framework and exploratory empirical analysis*. Project #6610-2368-001. Centre for Health Services and Policy Research. Mar 2001.



Self-management of chronic conditions: implications for rural physicians of a demonstration project Down Under

Erica Bell, PhD

University Department of Rural Health, University of Tasmania, Tasmania, Australia

Peter Orpin, PhD

University Department of Rural Health, University of Tasmania, Tasmania, Australia

Correspondence to: Dr. Erica Bell, Research Fellow, University Department of Rural Health, University of Tasmania, Private Bag 103 Hobart, Tasmania 7000 Australia; tel 03-6226-6345, fax 03-6231-6601, Erica.Bell@utas.edu.au

This article has been peer reviewed.

Objectives: This paper describes the outcomes achieved for clients of a demonstration project in self-management in one of Australia's most rural and remote states.
Methods: Client survey data obtained over a maximum of 18 months from 264 clients in 3 sites across Tasmania were analyzed using standard descriptive techniques. These data provided demographic information as well as client self-assessments of health and well-being, and health-related behaviours. Tests of significance were conducted on differences in client health data over a maximum of 4 data collection times.
Results: In relation to demographic factors, these data show low education, employment and income levels in an aged population. There were gender differences in project participation (many more females than males), and relatively low levels of completion of the self-management course by those who were not married and who were living with their families. Statistically significant improvements in health dimensions were obtained for those clients attending the self-management course (where p values < 0.05): in the areas of distress, symptoms and depression. Data also show significant declines over time in client ratings of exercise behaviours and cognitive self-management strategies.
Conclusions: The effects of barriers to self-management of chronic conditions (lack of formal education, age-related physical frailty, and poverty) are likely to be multiplied in areas showing a paucity of health professionals and related health infrastructure. The data for gender and living arrangements suggest the importance of tailoring self-management programs to meet the needs of specific community sub-groups. Declining ratings are one of the least explored areas of self-management research, yet they point to the importance of sustaining interventions in rural communities. Rural physicians apprised of the issues in implementing successful self-management programs in rural contexts can be an important resource for more isolated communities wanting to achieve workable programs with sustainable gains.

Objectifs : Cet article décrit les résultats produits pour les clients par un projet témoin d'autogestion dans l'un des États les plus ruraux et les plus éloignés de l'Australie.
Méthodes : On a analysé des données de sondage réunies, pendant une période maximale de 18 mois, auprès de 264 clients à 3 endroits en Tasmanie en utilisant des techniques descriptives normalisées. Ces données ont produit de l'information géographique ainsi que des autoévaluations par les clients de leur état de santé et de mieux-être et de leurs comportements reliés à la santé. On a soumis à des tests d'hypothèse les différences au niveau des données sur la santé des clients pendant un maximum de quatre périodes de collecte de données.
Résultats : En ce qui concerne les facteurs démographiques, ces données indiquent de faibles niveaux d'éducation, d'emploi et de revenu dans une population âgée. Il y avait des différences entre les sexes au niveau de la participation au projet (beaucoup plus de femmes que d'hommes) et les taux d'achèvement du cours d'autogestion chez les célibataires vivant avec leur famille étaient relativement faibles. On a obtenu des

améliorations statistiquement significatives des dimensions de la santé chez les clients qui ont suivi le cours d'autogestion (où la valeur $p < 0,05$) au niveau de la détresse, des symptômes et de la dépression. Les données montrent aussi des reculs importants avec le temps des cotes obtenues par le client pour les comportements d'exercice et les stratégies d'autogestion cognitive.

Conclusions : Les effets des obstacles à l'autogestion de problèmes chroniques (manque d'éducation structurée, fragilité physique reliée à l'âge et pauvreté) sont susceptibles d'être multipliés dans les régions où les professionnels de la santé et l'infrastructure connexe de la santé sont rares. Les données sur les sexes et les conditions de logement indiquent qu'il importe de personnaliser les programmes d'autogestion de façon à répondre aux besoins de sous-groupes particuliers de la communauté. Les évaluations à la baisse constituent l'un des aspects les moins étudiés de la recherche sur l'autogestion, mais elles révèlent qu'il importe de maintenir les interventions dans les communautés rurales. Les médecins ruraux informés des problèmes posés par la mise en œuvre de programmes réussis d'autogestion en milieu rural peuvent constituer une ressource importante pour les communautés plus isolées désireuses d'implanter des programmes pratiques qui produiront des gains durables.

Introduction

Patients with one or more chronic conditions are a significant portion of clients seen by physicians. Appropriate interventions for these clients are a major concern for physicians, particularly in rural areas where distance and isolation can multiply the effects of having too few support professionals and a health infrastructure that may not meet the needs of the rural residents.

The broad concept of self-management has been applied to the management of chronic conditions. These include symptom action plans, client diaries, and care-planning for chronic conditions such as asthma and diabetes, and cognitive and behavioural treatments for chronic low back pain.[1–6] The results of different styles of chronic disease self-management programs in Australia, including for indigenous Australians, suggest a basis for cautious optimism. However, there is a generally acknowledged need to become clearer about what strategies might be most appropriate for particular sub-groups, such as rural communities.[6] The efficacy of specific self-management interventions in rural areas or, more broadly, the opportunities and challenges that rural areas present for the ethos of self-management in health service delivery, remains relatively unexplored.

Previous studies have demonstrated a range of results for the Standard Questionnaire for Chronic Disease Self-Management 2000 course (the Stanford course), a 6-week self-management program for people with chronic conditions.[7,8] The aim of self-management in this context is to improve the health of clients by helping them become active partners with their care providers. The focus is upon modifying client behaviours using an education program based on the idea that clients with chronic conditions share common challenges.[9,10] Ideally, the Stanford course is delivered by trained laypersons in keeping with its emphasis on the persuasive power of community role models. It can be described as a generic, interactive group program where pairs of trained facilitators use structured manuals to deliver a course emphasizing self-efficacy through guided feedback sessions, problem-solving, goal-setting and making action plans. During the 6-week program, role modelling, reinforcement, group learning and symptom re-interpretation occur.[11,12]

Self-management appears to be underpinned by social learning and behavioural theories, associated initially with Albert Bandura,[13] which emphasize an individual's abilities as an active learner in social contexts. Self-management approaches commonly involve helping an individual mobilize cognitive and behavioural capacities in goal-directed ways in the interests of improving health status and reducing health service use.

In Australia, self-management has had particular public policy appeal in a political climate that emphasizes personal responsibility and, at the level of health service delivery, the development of participative and client-centred styles of health care services. Similar cultural changes in Canadian health services have been observed over the last 2 decades, exemplified in the 1986 WHO document, *Ottawa Charter for Health Promotion* (www.who.int/health promotion/conferences/en/).[14]

This paper describes the outcomes achieved for

clients of a demonstration project in self-management in one of Australia's most rural and remote states. It also offers some implications for medical practitioners in rural areas wanting to know more about the benefits and contra-indications of self-management programs, including the Stanford course.

Methods

The Tasmanian demonstration project was funded by the Australian Government's Department of Health and Aging, as 1 of 8 demonstration projects for its Sharing Health Care Initiative across Australia. It ran from June 2001 to June 2004 under the auspices of the University Department of Rural Health, University of Tasmania.

Study sites

Tasmania is a temperate island off the coast of south-eastern Australia with over 40% of its unique wilderness areas protected in national parks and other reserves. The almost 500 000 people who live on Tasmania are relatively older and are more decentralized than in mainland Australia. This has brought numerous challenges: Tasmanians have lower incomes, higher rates of unemployment, and lower education participation rates than other Australians.[15] All of Tasmania outside the capital city of Hobart is variously classified as "rural" according to the Rural, Remote and Metropolitan Areas classification system used by the Australian government in policy and funding decisions, which is based on low population density and distance to large population centres.[16] However, the size (population 199 000) and isolation of Hobart in the state's south give it many of the characteristics of a large regional centre.

The study used 3 sites on Tasmania: the Break O'Day Municipality on the northeast Tasmanian coast, which has a scattered population of 5553 with 47.3% over the age of 45; the Devonport region on the north-central coast, which has a population of 45 175 with 39.5% of the population over 45; the Glenorchy municipal area, which is located in the southeastern part of the state on the outskirts of Hobart and has a population of 42 447 with 38.29% over 45.[17] In each of these sites the project was administered from a central office: in Break O'Day and in Devonport the offices were in community heath services centres and in Glenorchy the site office was situated in Glenview Homes, which is an elderly care residential setting. The first 2 sites could be described as rural and regional, and the third site (Glenorchy) is essentially remote metropolitan. These terms — "rural," "regional" and "remote metropolitan" — capture the different natures of the study sites, which were in a country area, a country town area, and a small city serving surrounding country areas.

The survey

The survey instrument was developed by the project's National Evaluators, PriceWaterhouseCoopers in consultation with the local evaluators for each individual project. The team examined a wide range of available quality-of-life instruments before settling on a design that combined a number of these.

At the heart of the instrument are self-management evaluation tools developed by the Stanford Patient Education Center (http://patienteducation.stanford.edu/research/index.html), with some modifications to adapt it to Australian cultural differences and local project design. The instrument included a number of questions covering client demographics constructed from items drawn from the Australian Bureau of Statistics, 2001, Australian Household Census.[17] Other sections were drawn from: The Satisfaction with Life Scale, developed by the Center for Outcome Measurement in Brain Injury (www.tbims.org/combi/bg.html) and the Kessler Psychological Distress Scale developed by the School of Survey Research Center of the Institute for Social Research, University of Michigan.[18] In addition, the Tasmanian project included a number of survey and interview questions developed locally, and the Partners in Health Scale, developed by the Flinders University Coordinated Care Training Unit.[14]

In summary, the client information component was designed to collect data to do with client characteristics, situation and chronic conditions. The client health component was designed to collect data about clients' assessments of general health, distress levels, symptoms, exercise levels, health strategies (mostly cognitive), disability levels, intrusiveness of the condition (or multiple conditions) in daily life, self-efficacy and confidence in one's own coping abilities, depression and life-satisfaction.

The client service use component of the survey was designed to obtain client assessments of frequency of use of health services (but not hospital inpatient or emergency department visits), as well as use of community services, and self-help/support groups.

The study offered self-assessment data for 4 different time points for clients participating in self-management programs over an 18-month period, as well as those who simply enrolled in the project but did not go on to participate in those programs.

Study sample

Site officers recruited clients for the program and for the surveys using a range of methods (contact with local community groups, letters, telephone calls). This method of recruitment meant that clients who self-identified as having at least 1 chronic condition (of any kind) were included in the study. Clients with chronic conditions were recruited into the self-management project between August 2002 and September 2003: clients entered and left the project at different times. All clients recruited for the project were surveyed at least once (at baseline). Subsequent surveys depended on client willingness to respond to follow-up invitations from site staff:

Clients were formally enrolled in the project and were offered opportunities to participate in a range of programs helpful to self-management of their chronic conditions. At the centre of these programs was the Stanford course (unmodified), although the project included a myriad of other programs and workshops delivered by community and health service organizations: programs to do with exercise, cooking for diabetes, Internet use and computer skills, managing grief, falls prevention, pain management, use of medicine, as well as workshops on specific conditions such as osteoarthritis and osteoporosis.

Our data do not show clients who had attended other courses but not the Stanford course.

Statistical analysis

As the observational data set for this demonstration study was discontinuous and not based on a random sample, the emphasis of the analyses was upon using different approaches to complement and supplement each other. Our analysis used summary statistics such as means and standard deviations (SDs), and also boxplots to show distributions around a median, as well as paired sample t tests. Changes in self-assessments of health over time were explored (where p values < 0.05) for groups identified by survey participation (long-term or up to 18 months, v. short-term or up to 6 months), as well as course participation (this involved 2 main groups, those who had done Stanford and other courses, and those who had done no courses).

Boxplots give an indication of effect size, while t tests give some indications of significance — a statistically significant but small effect size has less interesting implications for practice.

The study was approved by the University of Tasmania's Human Research Ethics Committee.

Results

A total of 264 clients were enrolled in the project. Eighty-eight (33.3%) clients were from Break O'Day; 61 (23.1%) were from Devonport; 115 (43.6%) of clients were from Glenorchy. There were many more females (198 [75%]) than males (66 [25%]). The median birth year ranged from around 1930 to 1940 across all 3 sites. Most clients (82.6%) were Australian or born in England, although 26 (9.8%) were Polish-born. Only 1.9% of these clients were employed full-time: most clients (233 [88.3%]) were supported by a government pension.

Over one-third of respondents indicated they had a post-secondary school qualification of some kind — much lower than in the Tasmanian population where 52.2% of people have such qualifications, which in turn is much lower than the general Australian population, where the figure is 67.7%.[19] Approximately half of the clients (52.3%) were married or de facto. Most clients (70.5%) did not have a caregiver; only 16.7% of clients had a live-in caregiver. Arthritis was by far the most common condition (212 [80.3%] clients), followed by cardiovascular disease (174 [65.9%]), depression (88 [33.3%]), and chronic respiratory/lung conditions (81 [30.7%]), diabetes (56 [21.2%]), osteoporosis (46 [17.4%]), renal disease (25 [9.5%]). "Other conditions" were also indicated by 128 (48.5%) clients.

Twenty-nine clients were surveyed only at baseline, 81 were surveyed only at baseline and 6 months after baseline; 110 were surveyed only at baseline, 6 months and 12 months; and 44 clients were surveyed at all 4 data collection points.

Fifty-nine health service providers and 15 peer leaders were trained to deliver the Stanford course. A total of 26 Stanford courses were delivered to 204 clients.

The survey also contained a group of questions about course participation. This identified 3 groups: clients who had attended the Stanford course only (15 [5.7%] clients), clients who had attended Stanford and other courses (189 [71.6%]) and clients who had enrolled in the project but not attended

any course. Our data do not show clients who hadn't taken the Stanford course but who had taken other courses.

For 148 of the 204 clients who had attended the Stanford course, duration of attendance in weeks was obtained. This showed that only 65 (43.9%) of respondents to that question completed the full 6 weeks of the course.

Data analysis

The data analyses were based on 2 major groups of data: those to do with client characteristics and those to do with changes over time in client health.

As noted, many more women than men enrolled in the project — 198 (75%) and 66 (25%) respectively; 81% of enrolled women and 69% of enrolled men went on to do the Stanford course. Those men who did go on to take the Stanford course were more likely to complete the 6-week course (a median attendance of 5 wk out of a possible 6) than women (a median attendance of 3 wk).

In relation to course participation, living arrangements and marital status, the largest group (104 [40%]) was married people, living with family, who had done the Stanford course and other courses. The next largest group (49 [18.6%]) was widowed people living alone who had done the Stanford course. The other 111 clients were scattered across 26 different permutations of

- course participation (just the Stanford course, the Stanford course and other courses, or no formal courses but enrolled in the project);
- marital status (never married, widowed, divorced, separated, married); and
- living arrangements (living alone, with family, with others).

Married people living with family were the highest completers of the Stanford course, with a median participation of 4 weeks. In contrast, the median participation in the Stanford course of the widowed group living alone was less than 2 weeks.

It has already been noted that surveyed clients had a wide range of chronic conditions. However, clients with arthritis tended to have higher completion rates for the Stanford course (a median of 4 wk), whereas the medians for all the other groups of clients with chronic conditions were 2 or fewer weeks. That is, our data on completion of the Stanford course are heavily affected by the presence of a large number (118) of highly motivated clients with arthritis and other joint/bone conditions.

The presentation of the findings that follows should be read with the following in mind. The *p* value relates to the 2-tailed test of the *difference* between the mean change for one group and the mean change of the other group. The null hypothesis that is being rejected is that the difference for the 2 groups is zero.

We report the following in relation to changes over time in client assessments of health.

- General health: There was an initial improvement from baseline to 6 months for clients observed over the long-term, particularly in the data for clients who did no courses (significant 2-tailed 0.012). Overall mean and SD at baseline were 3.340 and 1.201; overall mean and SD at 6 months were 3.095 and 1.286).

- Distress: There was an improvement (or decrease in distress) for clients surveyed over the short term, most noticeably those who took the Stanford course and no other course, but also those who took the Stanford course and other courses (sig. 2-tailed 0.007). Overall mean and SD at baseline were 2.607 and 1.160; overall mean and SD at 6 months were 2.445 and 1.

- Symptoms: There was a improvement from baseline to 6 months and from baseline to 18 months for those who had done the Stanford course and another course, or only the Stanford course (sig. 2-tailed 0.001 and 0.045). Overall mean and SD at baseline were 4.331 and 2.150; overall mean and SD at 18 months were 3.651 and 1.786.

- Exercise: There was a decrease in exercise from baseline to 6 months as reported by clients surveyed over the short term. These were primarily the group that had not taken any course, but it also included those who had done the Stanford course and no other course (sig. 2-tailed 0.043). Overall mean and SD at baseline were 1.804 and 0.552; overall mean and SD at 6 months were 1.748 and 0.503.

- Cognitive health strategies: There was a decrease in the use of health strategies over the long term, most noticeably those who had not done any courses, but also between 6 months and 18 months for those who had done the

Stanford course and other courses (sig. 2-tailed 0.008 and 0.025). Overall mean and SD at baseline were 2.545 and 1.238; overall mean and SD at 18 months were 2.192 and 0.880.

- Depression: There was an improvement from baseline to 6 months observable for clients who did at least the Stanford course (whether only the Stanford course or the Stanford course and other courses) (sig. 2-tailed 0.012). Overall mean and SD at baseline were 4.035 and 0.717; overall mean and SD at 6 months were 4.122 and 0.702.

There were no significant changes as far as disability, intrusiveness of the condition, self efficacy, or life satisfaction. No changes were observed in the data for client service use, nor were any changes observed in the data for use of community services, or attendance at self-help groups.

Discussion

Random treatment/control studies have an important role in delivering evidence-based accounts of such interventions as the Stanford course. However, observational studies of rural communities may add value by translating the experiences of rural communities in ways that point to gaps in the existing research.

The Tasmanian data (showing education levels, ages of clients, living situations, employment situation and income sources) suggest the extent of barriers — lack of education, age-related physical frailty, and poverty — that clients might experience in trying to manage their chronic conditions. The effects of these barriers are most likely multiplied in underserviced areas.

Our data suggest that self-management programs may well work differently for different groups. For example, the data on enrolments by gender suggest that recruitment strategies that work for one gender may not work for another. The data on living arrangements and course completion suggest that some groups, such as those living alone, may require particular support to complete self-management courses. The contrasting efficacy of self-management education programs such as the Stanford course for particular groups, and the nature of particular barriers to self-management at work in rural and remote areas, are some areas that need more exploration.

Although there are several areas of apparent improvement (feelings of distress, symptoms, depression), we were particularly interested in self-ratings that worsened over time, noting the relative lack of exploration of such effects in self-management research in general. Our data seem to raise the question whether some dimensions of health and well-being (such as cognitive health strategies taught by the Stanford course) were more vulnerable to "early gains" and "late losses," i.e., an improvement or at least a maintaining of baseline levels followed by a decline or a return to baseline such that the client is no better off (and sometimes worse off) than before the intervention began. We wondered whether in rural and remote areas with reduced health services and community infrastructure, this effect may be more pronounced. The mere presence and, equally, the cessation of an intervention in a rural area where clients have few such opportunities might well produce greater effects in outcome data. Certainly, the anecdotal evidence we have from working with these communities indicates they believe themselves to be "better off" with no interventions than with poorly sustained interventions, particularly of the political "here today, gone tomorrow" kind.

"No improvement" and "declining" effects as such have been observed in evaluations of the effectiveness of Stanford self-management programs in the area of disability, for example.[11,20] Their implications for particular populations such as rural and remote communities have scarcely been explored. The general lack of hypotheses about effect sizes adopted in advance in random treatment/control studies of self-management programs makes it difficult to tell the difference between a decline that is actually a positive effect of the program (it could have been worse) and a decline that indicates the program is not working as it should for a particular population. There is a need in future research for upfront quantitative indications of the expected magnitude of deterioration over time, incorporated into multivariate models, so that we can see if the observed deterioration is more or less than what was expected.

It is also possible that some dimensions of health are particularly resistant to intervention and may get worse almost in response to intervention.

What are the implications of these data for rural physicians in other countries, such as Canada? In rural and remote areas physicians may well play a key role in directing or advising their communities about the kinds of self-management programs that are needed. They may also have a range of opportu-

nities to advise about the appropriate approaches to self-management for their communities at the state and national policy levels. Certainly, once such programs are implemented in their local communities, rural physicians may be approached for their assistance, for example, by way of making advertising material available in their clinics or by participating in evaluations of their effectiveness.

Our experience suggests rural health contexts present particular challenges for self-management education programs. It is not that they do not work so well in rural areas, but that they may not work so well when transplanted to rural and remote communities without careful attention to specific barriers to self-management in those communities.

Our data suggest that these programs need to target particular groups and the barriers that exist in their recruitment and participation. Rural physicians are well placed to provide advice that can help identify these groups and their needs in the local community. In this way rural physicians might have a key role to play in ensuring that self-management education programs work optimally for those most in need in their communities, rather than groups already relatively well placed to benefit from self-management programs.

Our data also suggest that this targeting of groups needs to account for the lower education levels and greater poverty of some rural, regional and remote metropolitan communities. While self-management education programs such as the Stanford program are certainly not based on a "one size fits all" assumption, it seems that the extent of tailor-making that these courses require if they are to meet the needs of special sub-groups, is something physicians can emphasize in their local communities. Further, it is likely that factors such as access to transport and costs play a role in high attrition rates obtained for attendance at the Stanford course in Tasmania. Making self-management programs work in rural, regional and remote contexts is about thinking through those access barriers.

Our data also carry the implication that sustainability of gains is a major issue in the success of self-management programs. Rural physicians can emphasize to their communities that such programs also need to be implemented with an eye on the future sustainability of their gains, with a significant community capacity building component, if they do not want to run the risk of leaving rural, regional and remote communities worse off (or no better off) than they were before. This building of community capacity, while a key feature of our project, was a crucial and particularly difficult part of making self-management work on our island.

Limitations

This study has a number of limitations arising from the size of our data set and the difficulties we experienced gaining data from clients over the full 18-month period. As a community demonstration project it was not experimentally controlled, our sample was not random and our results are not generalizable.

When clients completed the Stanford course our data were heavily affected by 118 highly motivated clients suffering from arthritis and other joint/bone conditions.

Our data do not show clients who had attended other courses but not the Stanford course, an important point since the amorphous concept of self-management might reasonably include a range of learning opportunities clients might have had but did not tell us about.

As a study of client self-assessments, our data are unable to provide insight into changes in client health observed by health practitioners, including physicians. However, the results obtained have clinical and practical relevance, across similar cultural contexts where the same challenges can be found.

Conclusion

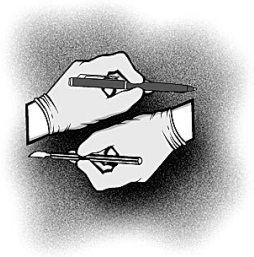
The Tasmanian data suggest some of the challenges of self-management education programs in rural and remote areas. Yet they also suggest the potential for tailored, strategic interventions that are responsive to particular community needs, and target particular community groups. A key orientation of effective self-management programs should be sustainability. Physicians in rural communities can have some confidence that if the experiences of other rural and remote communities are heeded, their clients should benefit from the presence of self-management education programs.

Acknowledgements: The project was funded under the Australian Government Department of Health and Ageing's Sharing Health Care Initiative. It involved collaboration between the University Department of Rural Health, Tasmania, the State Department of Health and Human Services, Arthritis Tasmania, and Glenview Homes Inc. Thanks are owed to site and project staff for collecting and entering the data used in this analysis.

Competing interests: None declared.

References

1. Wagner E, Austin B, Von Koff M. Organising care for patients with chronic illness. *Millbank Q* 1996;74:511-42.
2. Ignacio-Garcia J, Gonzales-Santos P. Asthma self-management education program by home monitoring of peak expiratory flow. *Am J Respir Crit Care Med* 1995;151:353-9.
3. Van Tulder M, Ostelo R, Vlaeyen J, et al. *Behavioural treatment for chronic low-back pain*. Chichester (UK): John Wiley & Sons, Ltd; 2004.
4. Barlow J, Wright C, Sheasby J, et al. Self-management approaches for people with chronic conditions: a review. *Patient Educ Couns* 2002;48:177-87.
5. Greene B, Blanchard E. Cognitive therapy for irritable bowel syndrome. *J Consult Clin Psychol* 1994;62:576-82.
6. Harvey P, Misan G. Chronic disease self-management — a health management approach for patients in rural and remote communities. 7th National Rural Health Conference, Hobart, 1–4 Mar 2003. Available: www.nrha.net.au/nrhapublic/publicdocs/conferences/papers/7_conf/harvey_misan.pdf.
7. Lorig K, Gonzales V, Laurent D. *The chronic disease self-management workshop leaders' manual* (rev). Stanford (CA): Stanford University, Stanford Patient Education Research Centre; 1999.
8. Lorig K, Holman H, Sobel D, et al. *Living a healthy life with chronic conditions*. 2nd ed. Palo Alto (CA): Bull Publishing; 2000.
9. Lorig K, Sobel D, Stewart A, et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalisation: a randomised trial. *Med Care* 1999;37:5-14.
10. Lorig K. Setting the scene for chronic disease self-management. National Chronic Disease Self-Management Conference Sharing Health Care Proceedings. Sydney, 31 July – 1 Aug 2000, p. 11-3.
11. Lorig K, Sobel D, Ritter P, et al. Effect of a self-management program on patients with chronic disease. *Eff Clin Pract* 2001;4:256-62.
12. Lorig K, Holman H. Self-management education: history, definition, outcomes and mechanisms. *Ann Behav Med* 2003;26:1-7.
13. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psycol Rev* 1977;84:191-215.
14. Battersby M, Ask A, Reece M, et al. *Sharing health care: chronic condition self management education and training manual*. Adelaide, Australia: Flinders University; 2001.
15. *General practice workforce plan: issues and future strategies for Tasmania general practice*. Hobart: Tasmania General Practice Divisions; 2001.
16. *Rural, remote and metropolitan areas classification 1991 Census edition*. Canberra: Australian Government Publishing Service; 1994. [This classification system has not been reviewed since this date.]
17. Australian Bureau of Statistics, 2001 Census.
18. Kessler RC, Andrews G, Colpe LJ, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med* 2002;32:959-76.
19. Tasmanian Qualifications Authority, Level 5, Kirksway House, 2 Kirksway Place, Hobart, Tasmania, 2001.
20. Lorig K, Ritter P, Stewart A, et al. Chronic disease self-management program: 2-year health status and health care utilisation outcomes. *Med Care* 2001;39(11):1217-23.



Surgical site infection rates at the Pontiac Health Care Centre, a rural community hospital

Runi Chattopadhyay, MD CM, FRCSC, FACS

[at time of writing] General Surgeon, Department of Surgery, Pontiac Health Care Centre, Shawville, Que.

Sevag Zaroukian, MD, CCFP, MSc

Chief of Emergency Medicine, Department of Emergency Medicine, Pontiac Health Care Centre, Shawville, Que.

Earle Potvin, BSc, MD, FRCSC

Chief of Surgery, Department of Surgery, Pontiac Health Care Centre, Shawville, Que.

Correspondence to: Dr. Runi Chattopadhyay, Breast Surgery Prevention Fellow, University of California San Francisco, UCSF Carol Franc Buck Breast Care Center, 1600 Divisadero St., Box 1710, San Francisco CA 94115; 415 353-7019, fax 415 353-9651, runi.chatto padhyay@ucsfmedctr.org

This article has been peer reviewed.

Introduction: The prevalence of surgical site infections (SSIs) at the Pontiac Health Care Centre, a rural hospital, was compared with rates obtained by large multicentre studies. Postoperative nosocomial infection (NI) rates were also calculated.
Methods: A review of all surgical interventions involving an incision, excluding ophthalmological procedures, performed between October 2001 and March 2003 (n = 831) was undertaken. Various clinical parameters were recorded. Infection rates were calculated. Data were analyzed using either the χ^2 or Student's t test.
Results: The overall SSI rate was 5.54%: 3.50% in clean cases (C), 6.77% in clean-contaminated cases (CC), and 14.58% in contaminated or dirty cases (D). The postoperative NI rate was 6.62% (C, 3.68%; CC, 9.90%; D, 16.67%). The mean duration of surgery was significantly higher among patients with SSIs and with NIs than those without infections for CC (133 ± 95 v. 78 ± 60 min, $p < 0.05$, and 129 ± 82 v. 77 ± 60 min, $p < 0.001$ respectively) and D (130 ± 96 v. 82 ± 62 min, $p < 0.001$, and 136 ± 92 v. 80 ± 60 min, $p < 0.001$ respectively). There were significantly higher SSI and NI rates among patients with combined American Society of Anesthesiologists (ASA) scores II and III than those with ASA score I in D ($\chi^2 = 5.06$ and $\chi^2 = 6.34$ respectively). There was also significantly higher SSI and NI rates among patients with combined Comorbidity Scale score 1–6 than those with no comorbid factors in CC ($\chi^2 = 4.14$ and $\chi^2 = 4.42$ repectively) and D (not significant and $\chi^2 = 4.04$ respectively).
Conclusion: SSI rates at the Pontiac Health Care Centre were comparable to multicentre rates. Wound contamination category, type of surgery, duration of surgery, ASA score and Comorbidity Scale score were associated with SSI and NI rates. Studies have shown that examining NI rates decreases these rates by raising awareness; thus, we suggest that rural hospitals implement protocols to survey their postoperative NI rates.

Introduction : On a comparé la prévalence des infections de sites chirurgicaux (ISC) au Centre des soins de santé du Pontiac, un hôpital rural, aux taux établis à la suite de grandes études multicentriques. On a aussi calculé les taux d'infections nosocomiales (IN) postopératoires.
Méthodes : On a entrepris une étude de toutes les interventions chirurgicales comportant une incision, sauf les interventions ophtalmologiques, pratiquées entre octobre 2001 et mars 2003 (n = 831). On a consigné divers paramètres cliniques, calculé les taux d'infection et analysé les données au moyen du test χ^2 ou du test t de Student.
Résultats : Le taux global d'ISC s'est établi à 5,54 % : 3,50 % dans les cas propres (C), 6,77 % dans les cas propres contaminés (CC) et 14,58 % dans les cas souillés (S). Le taux d'IN postopératoires s'est établi à 6,62 % (C, 3,68 %; CC, 9,90 %; S, 16,67 %). La durée moyenne de l'intervention chirurgicale était significativement plus longue chez les patients qui avaient une ISC ou une IN que chez ceux qui n'avaient pas d'infection, pour les cas CC (133 ± 95 c. 78 ± 60 min, $p < 0,05$, et 129 ± 82 c. 77 ± 60 min, $p < 0,001$ respectivement) et S (130 ± 96 c. 82 ± 62 min, $p < 0,001$ et 136 ± 92 c. 80 ± 60 min, $p < 0,001$ respectivement). On a constaté des taux significativement plus élevés d'ISC et d'IN chez les patients qui présentaient des résultats 2 et 3 combinés de l'American Society of Anes-

thesiologists (ASA) que chez ceux qui avaient un résultat 1 dans la catégorie S (χ^2 = 5,06 et χ^2 = 6,34 respectivement). Les taux d'ISC et d'IN étaient aussi beaucoup plus élevés chez les patients qui avaient une échelle de comorbidité combinée de 1 à 6 que chez ceux qui n'avaient aucun facteur de comorbidité dans les cas CC (χ^2 = 4,14 et χ^2 = 4,42 respectivement) et S (non significatif et χ^2 = 4,04 respectivement).

Conclusion : Les taux d'ISC au Centre des soins de santé du Pontiac se comparaient aux taux calculés dans les études multicentriques. On a établi un lien entre la catégorie de contamination de la plaie, le type d'intervention chirurgicale et sa durée, le résultat ASA et l'échelle de comorbidité, d'une part, et les taux d'ISC et d'IN, de l'autre. Les études ont démontré que l'analyse des taux d'IN les réduit en sensibilisant davantage les intéressés et c'est pourquoi nous suggérons que les hôpitaux ruraux mettent en œuvre des protocoles afin de suivre leurs taux d'IN postopératoires.

Introduction

Individual caregivers and institutions must strive to identify and evaluate the quality of care in their milieu in order to rectify recurring problems and improve health care. Postoperative nosocomial infections (NIs) are the single most common class of complication that can reach excessive levels while attracting very little attention.[1] Many health care providers and organizations such as the US Centers for Disease Control and Prevention (CDC), the Joint Commission on Accreditation of Healthcare Organizations and the Surgical Infection Society, consider that periodic audits of postoperative NIs should be mandatory because surveys of this nature decrease infection rates by raising awareness of the issue.[2] Unfortunately, economic constraints make it difficult to perform such studies.

In this article, we compare postoperative surgical site infection (SSI) rates at the Pontiac Health Care Centre (PHCC), a rural hospital, to postoperative SSI rates obtained from large institutions such as the CDC, National Research Council, and large tertiary care centres. We also examine postoperative NI rates and various factors associated with increased risk of infection.

Definitions of postoperative surgical infections

In 1992, a standardized definition of SSIs was published by the Surgical Wound Infection Task Force. This definition includes: the presence of purulent drainage; spontaneous drainage of fluid from the wound, regardless of whether it is culture positive for bacteria; localized signs of infection for superficial sites or radiologic evidence of infection for deep sites; an abscess or other type of infection on direct surgical exploration; or a diagnosis of an infection by a surgeon.[3] Furthermore, SSIs have been categorized by the CDC into 3 categories: superficial, deep, and organ/space infections.[3] Superficial infections involve the skin or subcutaneous tissue; deep infections involve the muscle or fascia; and organ/space infections involve the body cavity such as the pleural cavity or liver bed.[4]

More than 30 years ago, the National Research Council developed a system for categorizing incisions based on the degree of contamination of the incision.[5,6] The original classification was based on 4 categories: clean, clean-contaminated, contaminated, and dirty; but the contaminated and dirty categories were later amalgamated and are referred to herein as "dirty" (Table 1[7,8]).

NIs are hospital-acquired infections that develop within a hospital or are acquired within a hospital.[9] The most common type of NI is urinary tract infection,[10] followed by pneumonia,[11] wound infection, and *Clostridium difficile*–associated diarrhea.[12] On surgical services, urinary tract infections are the most common, followed by SSI, lower respiratory infection and bacteremia.[9]

Surgical site infection risk factors

The Simple Multivariate Risk Index is a prediction equation for surgical wound infections based on 58 498 randomly selected hospitalized patients from the Study on the Efficacy of Nosocomial Infection Control (SENIC) database.[13] Several risk factors for increased infection rate were found. These factors were: abdominal operation ($p < 0.0001$), contaminated or dirty case by the traditional wound classification system ($p < 0.0001$), length of surgery >2 hours ($p < 0.0001$) and more than 2 medical diagnoses ($p < 0.0001$).[13] The original description of patient diagnoses includes the primary diagnosis for surgery. Since the original study, this description

was redefined to exclude the primary surgical diagnosis and renamed the Comorbidity Scale.[13]

The Composite Risk Score was developed by the National Nosocomial Infection Surveillance (NNIS) study, and it attempted to improve on the Simple Multivariate Risk Index.[13] The NNIS study comprises nearly 300 US hospitals, and the last published summary was of data collected between January 1990 and May 1999 and was published in June 1999. This study shows that the risk factors associated with an increased wound infection are a contaminated operation, a lengthy operation, and an American Society of Anesthesiologists (ASA) score of 3.[14] ASA scores are categorized into 4 classes: Class I — normal healthy person; Class II — patient with mild systemic disease; Class III — patient with severe systemic disease that limits activity but is not incapacitating; Class IV — patient with an incapacitating systemic disease that is a constant threat to life; and Class V — moribund patient who is not expected to survive 24 hours with or without surgery.[15] It is unclear whether the Composite Risk Score is more predicitive of SSI than the Simple Multivariate Risk Index.[1]

Literature review

We performed a literature review of journal articles published between January 1975 and January 2004 using HealthStar/Ovid HealthStar with the query of "nosocomial infection" combined with the query of "surgical wound infection" as the key words. We then limited the selection to "human" and "English" and obtained 170 citations. Of these studies, the United States,[14] Italy,[16] Germany[17,18] and France[7] were countries found to have national registries for nososocomial infections. In addition, the United States,[2,8,19] Belgium,[20,21] Ethiopia,[22] Czechoslovakia[23] and Latvia[24] were found to have surgical infection studies done at tertiary care centres. However, there were no published studies that specifically examined surgical infection rates at rural hospitals.

Methods

Setting

The PHCC is a rural hospital located in Shawville, Que. It has a population of about 1500 people and serves a catchment area of about 15 000. It is a 1-hr drive to Ottawa, Ont. The PHCC has 38 acute-care beds. There are 2 full-time general surgeons, 1 visiting gynecologist, 1 visiting otolaryngologist, and 2 visiting ophthalmologists who operate at the hospital. The study proposal was approved by the Council of Physicians, Dentists and Pharmacists of the PHCC.

Study population

A systematic chart review was carried out of all surgical interventions (n = 1144) performed in the operating room between October 2001 and March 2003 at the PHCC, as recorded in the operating room log book. Ophthalmological procedures (n = 261) were excluded from the study due to a high volume of cases and extremely low occurrence of infection. Surgeries not involving an incision (n = 5) such as dilatation and curettage and closed reductions were also excluded.

Variables of concern

For each case, a case number was assigned and in-

Table 1. National Research Council categorization of incisions

Category	Definition	Examples	Accepted infection rates
Clean	Wounds that are non-traumatic and/or do not enter the digestive, respiratory or genital urinary tract. These cases involve only the skin and sterile body spaces without breaks in sterile technique.	Breast surgery Inguinal hernia repair Carpal tunnel release	1%–5%
Clean-contaminated	Wounds in which the digestive, respiratory or genitourinary system is entered, without visible contamination and without obvious infection. These cases involve nonsterile viscera, which have a relatively low level of bacterial colonization.	Bilary surgery Bowel surgery with prepared bowel Hysterectomy Tonsillectomy	5%–10%
Dirty	Wounds in which there is visible contamination from a hollow viscous or are clinically infected. These cases involve exposure to high levels of bacteria.	Excision of perforated appendix/bowel Drainage of abscess	10%–40%

Information compiled from references 7 and 8.

patient and out-patient charts were reviewed to record the study variables. The type of procedure and the degree of contamination of each case was determined from the operative report. The duration of the surgery, as recorded by the nursing staff, and the ASA score, as recorded in the anesthesia record, were noted. The comorbidity factors were collected from admission histories, anesthesia records and discharge summaries. The occurrences of postoperative infections, as recorded in the patient charts, were noted. The minimum postoperative follow up for any case was 3 months.

Statistical analysis

Microsoft Excel 97 was used to calculate rates. The mean duration of length of surgery among patients with and without SSIs and with or without NIs in each contamination category were compared using Student's *t* test with 95% confidence interval (CI). Infection rates between patients with ASA Class I and patients with combined ASA Class II and III in each contamination category were compared using the chi-squared (χ^2) with 95% CI. Infection rates between patients with Comorbidity Scale 0 and those with combined Comorbidity Scale 1–6 in each contamination category were compared using the χ^2 with 95% CI. ASA scores II–III and the Comorbidity Scales 1–6 were combined in order to eliminate falsely elevated χ^2 values.

Results: Chart review and comparison to literature

A total of 831 cases were studied (Table 2). Variables recorded for the study are listed in Table 3.

Infection rates according to wound contamination category

The overall SSI rate was 5.54% (Table 4). SSI rates of 3%–5% are reported in the United States.[6] Lower SSI rates are also reported: a national Belgian study[20] reported an SSI rate of 1.47% and a multi-centre Italian study[16] found an SSI rate of 2.7%. However, Weiss and colleagues[2] showed that 70% of NNIS hospitals did not perform post-discharge SSI surveillance and that 13%–61% of infections only become apparent after discharge. Indeed, the Belgium and the Italian studies did not analyze post-discharge SSI infection rates. It is important to note that the omission of post-discharge infections will falsely decrease SSI rates. In our study, all post-discharge infections were included in the calculation of SSI rates.

SSI rates in clean cases was 3.50%, clean-contaminated cases was 6.77%, and dirty cases was 14.58% compared with rates of 1%–5%, 5%–10%, and 10%–40%, respectively.[6] Our relatively low rate of infection in dirty cases may be due to cautious perioperative surgical management of these cases. For example, patients with overwhelming sepsis due to abscesses are transferred preoperatively to tertiary care centres for ventilatory support and dialysis.

The overall postoperative NI rate was 6.62%. In hospitalized patients, the prevalence of NIs is 5%–10%.[25] The CDC determined that NI rates were greatest on surgical services.[26] Our overall postoperative NI rate is similar to those found in the literature.

Table 3. Variables recorded in the Post-operative Nosocomial Infection Rates study

1.	Case number
2.	Patient name and unit number
3.	Wound contamination classification
4.	Type of surgery
5.	Duration of surgery
6.	American Society of Anesthesiologists score
7.	Number of confounding medical problems
8.	Number of post-operative nosocomial infections
9.	Type of nosocomial infections

Table 2. Description of the 831 cases of surgical intervention chosen for the study, performed at the Pontiac Health Care Centre between October 2001 and March 2003

	Type of surgery							
Category	General	Gynecology	Urology	ENT	Orthopedic	Plastic	Vascular	Total
Clean	211	110	93	22	41	55	11	543
Clean-contaminated	113	22	2	49	2	2	2	192
Dirty	81	4	0	5	3	2	1	96
Total	405	136	95	76	46	59	14	831

ENT = Ear, nose and throat

Infection rates according to type of surgery

SSI rates were found to be highest in vascular cases because of the rate of infection in amputations due to arterial compromise (2 cases, data not shown) (Table 5). In their study, Hopf and coworkers[27] reported that host factors such as poor tissue oxygenation increase the risk of infection. The 12 cases involving venous compromise did not have any infections.

Urological cases had a high degree of SSIs (7.37%), considering that 98% of urology cases were clean cases (Table 2, Table 5). The majority of these cases were vasectomies. It is reported that the average infection rate ranges from 3.4%–38%.[26] We think that this higher infection rate is due to favourable conditions for bacterial proliferation.

General surgery also had a high SSI rate (7.16%) compared with the other surgical specialties (Table 2, Table 5) This can be explained by the high number (48%) of clean-contaminated and dirty cases. Indeed, SSI rates in general surgery clean cases were 3.79%, in clean-contaminated cases 7.96% and in dirty cases 14.81% (data not shown), all similar to reported rates in the literature.[6]

Ear, nose and throat (ENT) had an SSI rate of 2.63%, a low rate considering that only 29% of ENT cases were clean cases (Table 2, Table 5). We can relate this low infection rate to the high degree of oxygen tension in the richly vascular head and neck area.[27] In addition, the mean duration of ENT procedures is short (5 min), which minimizes infections.

Mean duration of surgery

Cases with SSIs were found to have an increased mean duration of length of surgery in all contamination categories (Table 6). However, there was no statistical significance among clean cases with SSIs and NIs. This is probably related to the very low prevalence of infection in clean cases. Indeed, the Simple Multivariate Risk Index study showed that surgery lasting longer than 2 hours increases risk of infection.[13] In our study, we found that the mean duration of surgery in all clean cases, non-infected clean-contaminated and dirty cases were all <2 hours. In contrast, the mean duration of surgery among infected clean-contaminated and dirty cases was >2 hours.

ASA score and Comorbidity Scale score

The rate of infection was found to be directly related to ASA scores in each contamination category (Table 7, Table 8). The Composite Risk Score shows that an ASA score of III increases the risk of infection.[13] In our study, ASA II and III rates were combined due to the limited number of patients with an ASA III score. An ASA score >I was associated with a statistically higher SSI rate in dirty cases and also a statistically higher NI rate in clean and dirty cases.

The Comorbidity Scale was associated with SSI rates in clean-contaminated cases and with NI rates in clean-contaminated and dirty cases. The Simple Multivariate Risk Index shows that a Comorbidity

Table 4. Surgical site and nosocomial infection rates, by wound classification category

	Category			
Type of infection	Clean *n* = 543	Clean-contaminated *n* = 192	Dirty *n* = 96	Total *n* = 831
Surgical site (and rate)	19 (3.50)	13 (6.77)	14 (14.58)	46 (5.54)
Nosocomial (and rate)	20 (3.68)	19 (9.90)	16 (16.67)	55 (6.62)

Table 5. Rates of surgical site and nosocomial infections based on surgical subspecialty

	Subspecialty							
Type of infection	General *n* = 405	Gynecology *n* = 136	Urology *n* = 95	ENT *n* = 76	Orthopedic *n* = 46	Plastic *n* = 59	Vascular *n* = 14	Total *N* = 831
Surgical site (and rate)	29 (7.16)	3 (2.21)	7 (7.37)	2 (2.63)	2 (4.35)	1 (1.69)	2 (14.29)	46 (5.54)
Nosocomial (and rate)	36 (8.89)	5 (3.68)	7 (7.37)	2 (2.63)	2 (4.35)	1 (1.69)	2 (14.29)	55 (6.62)

ENT = Ear, nose and throat

Table 6. Comparison of mean duration of length of surgery for patients with surgical site infection versus those without, and patients with nosocomial infection versus those without

Type of infection, and category	Patients with infection		Patients without infection		
	No. of cases	Mean duration, min (and SD)	No. of cases	Mean duration, min (and SD)	*p* value
Surgical site					
Clean	19	63 (39)	524	55 (46)	>0.2
Clean-contaminated	13	133 (95)	179	78 (60)	<0.05*
Dirty	14	130 (96)	82	82 (62)	<0.001*
Nosocomial					
Clean	20	65 (39)	523	55 (46)	>0.2
Clean-contaminated	19	129 (82)	173	77 (60)	<0.001*
Dirty	16	136 (92)	80	80 (60)	<0.001*

SD = standard deviation
* Significant at 95% confidence interval.

Table 7. Comparison of surgical site and nosocomial infection rates between patients whose charts indicated an American Society of Anesthesiologists (ASA) Class I or an ASA Class II–III score

Type of infection, and category	ASA Class I score		ASA Class II–III score		
	Patients with infection	Patients without infection	Patients with infection	Patients without infection	χ^2 value
Surgical site					
Clean	6	238	13	286	1.42
Clean-contaminated	4	94	9	85	2.29
Dirty	1	31	13	51	5.06*
Nosocomial					
Clean	7	237	13	286	8.03*
Clean-contaminated	6	92	13	81	3.20
Dirty	1	31	15	49	6.34*

*Significant at 95% confidence interval.

Table 8. Comparison of surgical site and nosocomial infection rates between patients whose charts indicated a Comorbidity Scale (CS) score of 0 or a CS score of 1–6

Type of infection, and category	Comorbidity Scale score 0		Comorbidity Scale score 1–6		
	Patients with infection	Patients without infection	Patients with infection	Patients without infection	χ^2 value
Surgical site					
Clean	8	304	11	220	2.25
Clean-contaminated	5	118	8	61	4.14*
Dirty	4	42	10	40	2.46
Nosocomial					
Clean	9	303	11	220	1.57
Clean-contaminated	8	115	11	58	4.42*
Dirty	4	42	12	38	4.04*

*Significant at 95% confidence interval.

Scale score of at least 2 increases the risk of infection.[13] We find that having a Comorbidity Scale score of 1 in these categories increases the risk of infection. Differences in infection rates in clean cases were statistically non-significant due to low infection rates in this category. We combined patients with comorbidities into 1 group.

Discussion: limitations of study

Loss of patients to follow up

We think that the loss of patients to follow up in our rural setting is quite low. In our institution, postoperative patients are seen by their surgeon according to a standard protocol 3 weeks after surgery, and the occurrence of infection during this time would be recorded. In addition, our institution facilitates accessibility to surgeons through the emergency department and clinics at any time after their surgery. Consequently, patients would rarely travel 1 hour to the next nearest hospital for another consult.[28] If patients required postoperative medical or surgical care at a tertiary care institution, they would be referred by their treating surgeons and this would be documented.

Small sample size

Our study population comprises roughly 1% of the number of cases in the SENIC and NNIS studies. When analysis of some subpopulations are made (i.e., infection rates according to type of surgery) the study numbers are small. Thus, conclusions drawn from these rates may be limited.

As well, due to a low number of infected cases in our study population, we combined patients with ASA scores II and III and Comorbidity Scale scores between 1 and 6 inclusively. The low number of infected cases in our study population could be related to the exlusion of infected cases that require prolonged intubation, invasive monitoring or dialysis. These cases are transferred preoperatively to a tertiary care centre.

Non-quantifiable risk factors for infections

Factors such as antibiotic prophylaxis and skin preparation[4] have been determined to be important in other studies, but are difficult to quantify retrospectively and are thus not included in various scoring or classification systems and were not analyzed in this study.

Acknowledgements: We thank the Pontiac Health Care Center Medical Records Department, the operating room nurses, and Anne Ireland for their support in keeping and retrieving medical records. We also thank the Council of Physicians, Dentists and Pharmacists for their support and encouragement, Dr. Keith Maclellan for critiquing the paper, and Dr. Jayanta Debnath for technical support.

Competing interests: None declared.

Conclusion

SSI rates and the NI rate at PHCC were comparable to multicentre rates. This study validates various factors that contribute to increased infection rates such as type of procedure, degree of contamination, duration of surgery, ASA score and Comorbidity Scale score as found in the Simple Multivariate Risk Index and the Composite Risk Score. In addition, the SENIC project suggests that raising awareness for infection control decreases infection rates. We suggest that other rural hospitals survey their postoperative infection rates and implement protocols adapted to the context of their institution to limit their infection rates.

References

1. Haley RW. Measuring the intrinsic risk of wound infections in surgical patients. In: *Problems in general surgery*. Hagerstown (MD): Lippincott Williams & Wilkins; 1993. p. 396-417.
2. Weiss CA, Statz CL, Dahms RA, et al. Six years of surgical wound infection surveillance at a tertiary care center: review of the microbiologic and epidemiological aspects of 20 007 wounds. *Arch Surg* 1999;134:1041-8.
3. National Nosocomial Infections Surveillance (NNIS) System report, data summary from January 1990–May 1999, issued June 1999. *Am J Infect Control* 1999;27:520-32.
4. Lizioli A, Privitera G, Alliata E, et al. Prevalence of nosocomial infections in Italy: result from the Lombardy survey in 2000. *J Hosp Infect* 2003;54:141-8.
5. Gastmeier P, Geffers C, Sohr D, et al. Five years working with the German nosocomial infection surveillance system (Krankenhaus Infektions Surveilance System). *Am J Infect Control* 2003;31:316-21.
6. Gastmeier P, Sohr D, Rath A, et al. Repeated prevalence investigations on nosocomial infections for continuous surveillance. *J Hosp Infect* 2000;45:47-53.
7. Prevalence of nosocomial infections in France: results of the nationwide survey in 1996. The French Prevalence Survey Study Group. *J Hosp Infect* 2000;46:186-93.
8. Malone DL, Genuit T, Tracy JK, et al. Surgical site infections: reanalysis of risk factors. *J Surg Res* 2002;103:89-95.
9. John JF Jr. Nosocomial infection rates at a General Army Hospital. *Am J Surg* 1977;134:381-4.
10. Ronveaux O, Mertens R, Dupont Y. Surgical wound infection surveillance: results from the Belgian hospital network. *Acta Chir Belg* 1996;96:3-10.

11. Mertens R, Jans B, Kurz X. A computerized nationwide network for nosocomial infection surveillance in Belgium. *Infect Control Hosp Epidemiol* 1994;15:171-9.

12. Habte-Gabr E, Gedebou M, Kronvall G. Hospital-acquired infections among surgical patients in Tikur Anbessa Hospital, Addis Ababa, Ethiopia. *Am J Infect Control* 1988;16:7-13.

13. Sramova H, Roth Z, Subertova V, et al. Prevalence of nosocomial infections in general surgery, orthopedic surgery and urological departments in the Czech Republic. *J Hyg Epidemiol Microbiol Immunol* 1991;35:271-80.

14. Dumpis U, Balode A, Vigante D, et al. Prevalence of nosocomial infections in two Latvian hospitals. *Euro Surveill* 2003;8(3):73-8.

15. Horan TC, Gaynes RP, Martone WJ, et al. CDC definitions of nosocomial surgical site infections. *Am J Infect Control* 1992;20:271-4.

16. Malangoni MA. Surgical site infections: the cutting edge. In: *Current opinion in infectious diseases*. Philadelphia (PA): Lippincott–Raven; 1998. p. 465-9.

17. Economou SG, Deziel DJ, Witt TR, et al. *Rush University review of surgery*. 2nd ed. Philadelphia (PA): WB Saunders; 1994. p. 117.

18. Cameron JL. *Current surgical therapy*. 6th ed. St. Louis (MO): Mosby; 1998. p. 1078-9.

19. Schwartz SI, Shires GT, Spencer FC. *Principles of surgery*. 6th ed. New York (NY): McGraw-Hill; 1994. p. 151.

20. Goldman L, Bennett JC. *Cecil textbook of medicine*. 21st ed. Philadelphia (PA): WB Saunders; 2000. p. 1585.

21. Bowton DL. Nosocomial pneumonia in the ICU — year 2000 and beyond. *Chest* 1999;115 (3 suppl):28S-33S.

22. Greenfield LJ, Mulholland M, Oldham KT, et al. *Surgery: scientific principles and practice*. 2nd ed. Philadelphi (PA): Lippincott–Raven; 1997. p. 174,176,1173-6.

23. Haley RW, Culver DH, Morgan WM, et al. Identifying patients at high risk of surgical wound infection: a simple multivariate index of patient susceptibility and wound contamination. *Am J Epidemiol* 1985;121:206-15.

24. Snow JC. *Manual of anesthesia*. 2nd ed. Boston (MA): Little, Brown and Company; 1982. p. 7.

25. Andreoli TE, Bennett JC, Carpenter CC, et al. *Cecil Essentials of medicine*. 3rd ed. Philadelphia (PA): WB Saunders; 1993. p. 691.

26. Walsh PC. *Campbell's Urology*. 7th ed. Philadelphia (PA): Saunders; 1998. p. 1343.

27. Hopf HW, Hunt TK, West JM, et al. Wound tissue oxygen tension predicts the risk of wound infection in surgical patients. *Arch Surg* 1997;132:997-1004.

28. Kirby E. Colonoscopy procedures at a small rural hospital. *Can J Rural Med* 2004;9:89-93.

Instructions for Authors

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

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

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

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

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

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

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

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

Country cardiograms case 29

Charles Helm, MD, CCFP

Tumbler Ridge, BC

Correspondence to:
Dr. Charles Helm,
Box 1690, Tumbler Ridge
BC V0C 2W0;
drchelm@pris.bc.ca

This article has been peer reviewed.

A 52-year-old male patient was brought to a rural British Columbia emergency department with a 1-hour history of chest pain. An ECG was taken as soon as possible (Fig. 1). What is the diagnosis, and what further study should be done?

For the Answer, see page 54.

Competing interests: None declared.

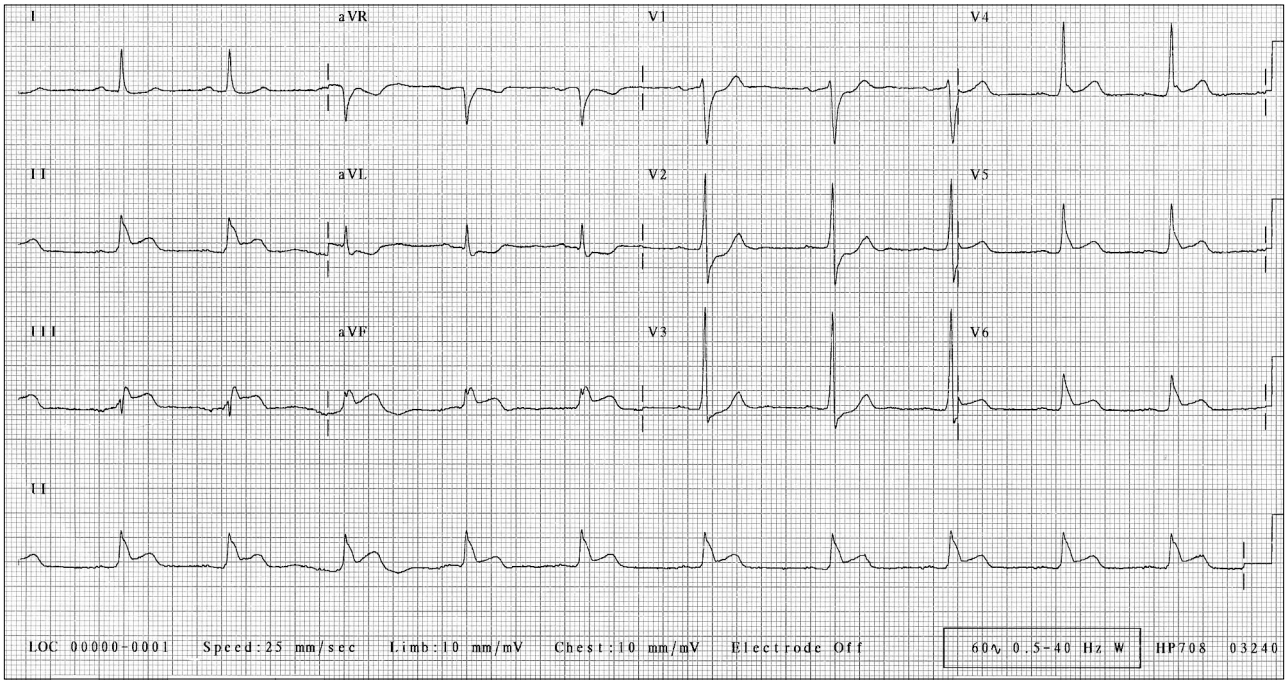


Fig. 1. Results of the first ECG, taken shortly after the patient's arrival in the emergency department.

Management of the occasional wrist ganglion

Harvey V. Thommasen, MD, MSc, FCFP

Clinical Associate Professor, Department of Family Practice, UBC Faculty of Medicine, Prince George, BC

C. Stuart Johnston, MB ChB, MSc(Eng) Civil, CCFP

Clinical Assistant Professor, Department of Family Practice, UBC Faculty of Medicine, Prince George, BC

Amy Thommasen, BSc(candidate)

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

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

This article has been peer reviewed.

The classic presentation of a ganglion cyst is that of a smooth, tense, fixed lump from which clear gelatinous fluid is aspirated. Treatment of ganglions includes: 1) reassurance, 2) aspiration, or 3) excision. Watch and waiting is a good option because so many resolve on their own and because recurrence is so common after aspiration and excision. Ganglia located on the dorsum of the wrist can be dealt with by most rural physicians. The method of management with the lowest risk of recurrence is surgical excision.

Un kyste ganglionnaire a habituellement l'apparence d'une masse fixe tendue et lisse dans laquelle on peut prélever un liquide gélatineux clair. Le traitement des ganglions consiste notamment à : 1) rassurer, 2) aspirer, 3) exciser. La surveillance et l'attente constituent une bonne option parce qu'un très grand nombre de ces kystes se résorbent naturellement et parce que la récurrence est très commune après l'aspiration et l'excision. La plupart des médecins ruraux peuvent traiter les ganglions situés au dos du poignet. L'excision chirurgicale constitue la méthode de prise en charge qui présente le risque le plus faible de récurrence.

Introduction

Ganglions are benign cysts that are found throughout the body, typically near a joint capsule, tendon or tendon sheath.[1–5] Ganglions are more common among women than men. The typical person presenting with a ganglion is in their 3rd to 6th decade of life. However, ganglions have been reported in people between 10 years and 80 years of age. The average size is around 3 cm, but ganglion cysts up to 10 cm in diameter have been reported. They can develop suddenly or gradually, and they can disappear as fast as they came on.

One study reported that 33% of dorsal ganglions and 45% of volar wrist ganglions resolve spontaneously by 6 years; and at 10 years 51% of dorsal ganglia and 63% of volar wrist ganglions spontaneously resolved. Children, particularly, have a high spontaneous resolution rate — up to 80%.[2,5]

Pain may be the presenting complaint, but most ganglions are painless. Pain, when present, usually suggests the cyst is putting pressure on a nerve or some other structure. Sometimes a lump may not be visible, and the only evidence the occult ganglia exists is chronic pain. Other people present because they are worried about malignancy, or they are worried about how the ganglion looks.[1,2]

On physical examination a ganglion typically feels smooth, fairly tense, and is fixed. It should not pulsate, and it should transilluminate if it is not too deep or too small. Differential diagnoses of a ganglion includes such things as an osteoarthritic spur, a giant cell tumour, lipoma, glomus tumour, Schwannoma, localized tenosynovitis, aneurysm, abscess and cancer.[1,2]

Clinical presentation and aspiration of thick, sticky, clear or slightly straw-coloured fluid using a large bore needle (18-G or larger) confirms the diagnosis. If aspiration is not possible or the ganglia is too small to palpate, ultrasound and magnetic resonance imaging can provide detailed information on size, shape, and depth of involvement.[1]

Treatment of ganglions includes: 1) reassurance, 2) aspiration, and 3) excision.[2,3,5–7] Because so many ganglions spontaneously resolve on their own, reassurance is a good option, especially if the presentation is classic, the ganglion is not changing, is small, and is not causing pain. The patient should be told that the recurrence rate after aspiration with a large bore needle may be as high as 80%, and recurrence after surgical excision may be as high as 20% in the wrist area and as high as 40% in the foot and ankle. Multiple aspirations with a wide bore needle appear to reduce the recurrence rate for wrist ganglia to as low as 20% and is worth considering. Some authorities advocate aspiration with injection of steroid into the empty cavity, but the evidence to support this practice is weak and so it is not a generally recommended practice.[2]

Aspiration of ganglia located on the dorsum of the wrist can be performed by most rural physicians. Surgical excision of ganglia — including dorsal wrist ganglia — should be referred to physicians with extra surgical training if circumstances permit. Although surgical excision of ganglions offers the best chance for cure, surgery is more commonly associated with accidental injury to nerves (numbness, dysesthesia) and blood vessels, as well as scar formation, tenderness and dysfunction.

Equipment and preoperative preparation of site

Equipment necessary for aspirating or excising a ganglion is summarized in Table 1.[8] Using sterile technique, clean the wound and surrounding area with an antiseptic skin solution (e.g., chlorhexidine 2% with 4% isopropyl alcohol [e.g., Dexidin 2 Solution] or Betadine Surgical Scrub [7.5% Povidone-iodine]), and then wash it off with sterile sodium chloride solution (0.9%). Make a decision about what kind of anesthesia will be used — local, Bier Block or general. The less blood the better if surgical excision is planned. Local anesthesia is all that is required for the aspiration technique.

Table 1. Equipment necessary for ganglion aspiration / excision

- Gloves
- Antiseptic skin preparation solution
- Sodium chloride solution (0.9%)
- 4″×4″ (10 cm × 10 cm) sterile gauze sponges
- Anesthesia equipment:
  - 5-cc syringe
  - 18-gauge needle for drawing up anesthetic
  - 30-gauge 0.5″ needle for infiltrating skin
- 27-gauge 1.5″ needle for deeper infiltration if required
- Local anesthetic:
  - e.g. 1% or 2% lidocaine hydrochloride with epinephrine (1:100,000)
- Suture set
- Scalpel with #11 blade
- Optional:
  - Metzenbaum scissors
  - Tissue retractors
  - Sterile elastic tourniquet
- Dressing materials

Aspiration

1. For local anesthesia over a dorsal wrist ganglion use 1% or 2% Lidocaine Hydrochloride with epinephrine (1:100 000) and a 30-gauge needle.
2. Remove the 30-gauge needle and attach an 18-gauge or 16-gauge needle to a 5-mL syringe.
3. Pierce the anesthetized skin and begin aspiration once through the epidermis skin layer (Fig. 1). Appearance of a thick, gelatinous, clear material confirms placement of the needle within the ganglion.
4. After fluid ceases to come back into the syringe,

Fig. 1. Aspiration of wrist ganglion.

pull out the needle, apply pressure until bleeding stops and cover with antibiotic ointment.

Surgical excision

1. Make a transverse incision over top of the ganglion.[9]
2. Dissect down to the ganglion capsule.
3. Slice through the ganglion capsule with the scalpel blade and squeeze out most of the clear gelatinous contents.
4. Grasp the ganglion capsule with hemostats, lift up, dissect around the rest of the ganglion.
5. Identify the "neck" where the ganglion arises from the radial–carpal or ulnar–carpal joint. Be aware that sometimes the neck may be at either end of the capsule, and not necessarily midline and directly under the initial skin incision site.
6. Ligate the neck with a 4–0 undyed absorbable suture (e.g., 4–0 Vicryl) and then excise the ganglion.
7. The entire ganglion should be removed, including the smooth joint capsule and all attachments to the joint capsule or ligaments.
8. Close up the wound as per any laceration. Consider closing the wound with an absorbable suture in children.

Wound care

1. Re-cleanse the wound area with saline-soaked sterile gauze and then dry off the area with sterile gauze, apply antibiotic ointment (e.g., Polytopic [Polymyxin B, Bacitracin] or Bactroban [mupirocin 2%]), and cover with a simple dressing and adhesive bandage.
2. Advise the patient to elevate the affected area as much as possible for the first 24 to 48 hours.
3. Remind the patient about the risk of infection and ask him or her to return if signs of infection arise — erythema, discharge, pain and swelling.
4. The patient should change the dressing daily and apply topical antibiotic ointment with each dressing change.
5. Nonsteroidal anti-inflammatory (NSAID) medication is usually all that is required for analgesia.
6. A routine follow-up appointment is recommended in 2 weeks to remove sutures and observe wound healing.

Acknowledgements: Dr. Thommasen received financial support from the Vancouver Foundation (Community-Based Clinician-Investigator Program) to do this project.

Competing interests: None declared.

References

1. Wu KK. Ganglions of the foot. *J Foot Ankle Surg* 1993;32:343-7.
2. Burke FD, Melikyan EY, Bradley MJ, et al. Primary care referral protocol for wrist ganglia. *Postgrad Med J* 2003;79:329-31.
3. Campbell D. Common problems of the hand and wrist. *Practitioner* 2003;247:800-4.
4. Busch CC, Cable BM, Dabezies EJ. Ganglions of the proximal interphalangeal joint. *Orthopedics* 2000;23:839-40.
5. Rozbruch SR, Chang V, Bohne WHO, et al. Ganglion cysts of the lower extremity: an analysis of 54 cases and review of the literature. *Orthopedics* 1998;21:141-8.
6. Wright TW, Cooney WP, Ilstrup DM. Anterior wrist ganglion. *J Hand Surg [Am]* 1994;19a:954-8.
7. Wright TW, Cooney WP, Ilstrup DM. Anterior wrist ganglion. *J Hand Surg [Am]* 1994;19(6):954-8.
8. Stewart C, Ruiz F, Winograd SM. Foreign body removal: a guide for ED physicians. *Emerg Med Rep* 1996;17:101-9.
9. Brown J.S. Excision of ganglion. In: *Minor surgery*. Chicago: Year Book Medical Publishers; 1986. p. 218.

Thank you Reviewers. Thank you Authors

We would like to extend a big thank you to all of our reviewers whose hard and insightful work not only helped to provide valuable feedback to our authors, but also helped to get us indexed in *Index Medicus*.

And to our authors, thank you for doing invaluable rural research without which this Journal would not exist, let alone be indexed!

Country cardiograms case 29: Answer

Charles Helm, MD, CCFP

Tumbler Ridge, BC

Interpretation

The ECG (Fig. 1, illustrated here and on page 49) shows normal sinus rhythm, rate 63 beats/min, with a normal P-R interval of 0.19 seconds, slightly wide QRS complexes (duration 0.115 sec) and normal QT interval. T waves appear normal. The striking abnormality lies in the ST segments, which are significantly elevated in inferior leads II, III and aVF. Reciprocal ST segment depression is seen in aVL. ST segments are also elevated in lateral leads V5 and V6 and to a lesser extent in V4. ST segment depression of at least 1 mm is present in V1–V3. Tall R waves are present in V2 and V3.

The diagnosis is acute ST elevation inferior myocardial infarction (or injury) with lateral and posterior extension.

Discussion

This ECG shows many of the features commonly associated with inferior myocardial infarction.

Remembering the right coronary artery anatomy and its variations is important. In addition to supplying the inferior wall of the left ventricle, several branches supply the right ventricle. Through the posterior descending artery the right coronary artery supplies the posterior wall of the left ventricle, and another branch supplies the AV node and Bundle of His.

It is therefore useful to look for patterns of infarction, which in the case of right coronary occlusion could include inferior and posterior changes, right ventricular changes and AV blocks. Lateral wall involvement (leads V5 and V6) is also commonly associated.

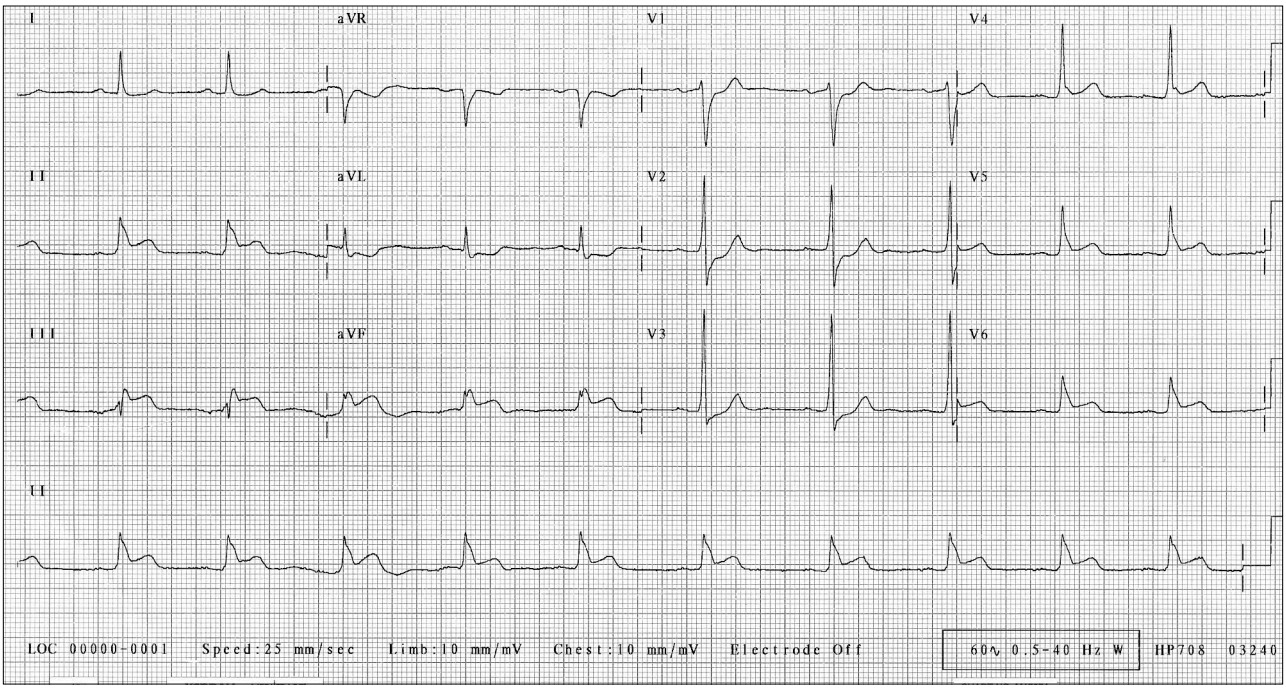


Fig. 1. Results of the first ECG, taken shortly after the patient's arrival in the emergency department.