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Rural is as rural seems

John Wootton, MD

CJRM 2002;7(1):5

A central theme, revisited in nearly every issue of CJRM, is a consideration of the dynamics of rural living. Behind much of the debate about recruitment and retention, for instance, lies a central question about how life in rural Canada is perceived by those who live and work there and by those who might join them.

Dr. Jim Montgomery, at Malaspina College in Nanaimo, BC, has looked at this question in a range of rural professionals other than physicians.[1] He discovered themes amazingly similar to those that physicians have been exploring so eloquently in these pages; that training is inadequate and often inappropriate; that they are often cut off and isolated from colleagues who do not support them; that their "scope of practice" is far broader than their colleagues', and inadequately compensated. Sound familiar?

In his research Montgomery found professionals who were happy in their rural settings and those who were not. Many expressed reasons for their state of mind, and through their comments two distinct groups emerged that largely predicted satisfaction in a rural setting. There were those who saw rural as "different," who successfully balanced the lack of urban amenities against rural pluses, and there were those who saw rural as "deficient," who evaluated their rural environment as a function of what it did not have, and valued less those things it did have. Is it possible that this innate value system also explains much of the dissatisfaction and turnover experienced by rural physicians?

This perspective was well expressed in a commentary[2] in the Globe and Mail from a medical student, who titled his piece "Why I will refuse to be a rural doctor." In it he says: "My habits are city habits, my pleasures are city

pleasures, my life is a city life. It is not easy to give those things up for some tiny town where you cannot even find The Globe and Mail." In the same essay he hints at the cause of his condition: "I grew up in a small town, but my entire adult life has been in the city."

These illuminating comments should give us pause. Recruiting rural students into medicine, although it may help, will not be a complete solution. If we maintain training programs mostly in urban centres we guarantee that physicians in training will indeed spend their "entire adult life" in that setting, guaranteeing as well that their choice of partner will seal the contract with the city. If we are to aim seriously to produce physicians who do not see the "differences" of rural practice in a negative urban-centric light, we need to recognize that the system as it currently exists is perfectly designed to achieve the opposite.

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Perception de la vie rurale

John Wootton, MD

CJRM 2002;7(1):6

L'étude de la dynamique rurale constitue un thème prépondérant abordé dans presque tous les numéros du JCMR. La question centrale sous-tendant le débat sur le recrutement et le maintien en poste, par exemple, concerne plutôt la façon dont la vie en milieu rural au Canada est perçue par les personnes qui habitent ces régions et y travaillent et par les professionnels qui pourraient se joindre à elles.

Le Dr Jim Montgomery, du Collège Malaspina, de Nanaimo (C.-B.), a abordé cette question avec un éventail de professionnels non médecins établis en région rurale[1]. Il a relevé des thèmes étonnamment semblables à ceux que les médecins ont exploré avec tant d'éloquence dans nos pages : la formation est insuffisante et dans bien des cas, inadaptée, les professionnels sont souvent exclus et isolés de leurs collègues, qui ne leur offrent pas d'appui, «l'étendue de la pratique» des professionnels est souvent beaucoup plus grande que celle de leurs collègues, et la rémunération est insuffisante. Ça vous dit quelque chose?

Dans sa recherche, Montgomery a trouvé des professionnels qui étaient heureux en milieu rural et d'autres qui ne l'étaient pas. Bon nombre ont expliqué leur état d'esprit, et deux groupes distincts, grâce auxquels il est possible de prévoir dans une grande mesure la satisfaction en milieu rural, se sont dégagés de ces commentaires. Il y avait, d'une part, les professionnels qui considéraient que le milieu rural était «différent», et qui ont réussi à compenser l'absence de commodités urbaines par les avantages ruraux, et il y avait, d'autre part, les professionnels qui considéraient que le milieu rural était «insuffisant», et qui l'évaluaient en fonction de ce qui ne s'y trouvait pas tout en accordant moins d'importance aux choses qui s'y trouvaient. Est-il possible que cette

échelle intrinsèque de valeurs explique également une bonne partie du mécontentement des médecins ruraux et du roulement dans le milieu?

Un étudiant en médecine a habilement traduit ce point de vue dans un commentaire, paru récemment dans le Globe and Mail[2], qu'il a intitulé «Why I will refuse to be a rural doctor» (Pourquoi je refuserai de devenir médecin rural). Il déclare : «Mes habitudes sont urbaines, mes plaisirs sont urbains, ma vie est urbaine. Il n'est guère aisé de quitter tout ça pour habiter une toute petite ville où on ne peut même pas trouver le Globe and Mail.». Dans son exposé, il fait allusion à la source de sa condition : «J'ai grandi dans une petite ville, mais j'ai vécu toute ma vie d'adulte en milieu urbain.»

Ces commentaires éclairants devraient nous donner à réfléchir. Encore que le recrutement en médecine d'étudiants des milieux ruraux puisse aider, ce n'est pas une solution absolue. Dans la mesure où nous continuons d'offrir les programmes de formation principalement dans les centres urbains, nous faisons en sorte que les médecins en formation vivent effectivement toute leur vie d'adulte en milieu urbain — où ils trouveront assurément aussi leur partenaire, ce qui achèvera de sceller leur «contrat» avec la vie urbaine. Si nous aspirons sérieusement à former des médecins qui ne verront pas les différences de la pratique rurale sous un éclairage négatif et d'un point de vue avant tout urbain, il nous faut reconnaître que le système actuel est admirablement conçu pour parvenir précisément au contraire.

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President's message: Growth in rural doctor numbers in Canada

Peter Hutten-Czapski, MD
Haileybury, Ont.

CJRM 2002;7(1):7

The Society is 10 years old and we're gaining ground. It may not be much. It's not everywhere. It's certainly not enough. However, in 2000 Canada had 5% more rural GPs than in 1996 (Table 1). I'm just not sure how to explain it.

After all, in 2000 there were 15% (65) fewer students being matched into family medicine than in 1997.[1] It'll be later this year before the number of graduating medical students will begin to increase again. (It dropped by 6% [107] from 1996 to 2000).[2] Our numbers are supposed to be dropping like rocks.....

Why aren't they? Is it the federal government's funding of the Office of Rural Health in 1998? Alberta's funding of 2 rural medicine training programs? The rural medical schools in Northern Ontario and BC? The CFPC's rural curriculum and mandatory rural rotations? SOGC's endorsement[3] of rural maternity care with or without GP cesarean backup? CMA's policy[4] on Rural and Remote Practice Issues? The Quebec Health Minister, who charged medical schools to enroll a representative number of medical students from rural areas?

Most of these measures did not precede the rise in rural doctor numbers. All of them have yet to take full effect. The only thing that does precede the rise in numbers is the founding of the Society of Rural Physicians of Canada in 1992. The rise in the number of rural doctors may not be ours to claim, but there is a lot for which we can be proud. This year, at our 10th Rural and Remote Conference in BC, we will recognize those who have put in 10 or more years of service in rural medicine for their communities.

I invite you to Kelowna, Apr. 25–28. Come and learn some wilderness medicine, look at

memorabilia and take in a winery tour. Most importantly, come to meet other rural doctors like yourself.

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Table 1. No. of GP/FPs practising in communities with under 10 000 population / Tableau 1. Nombre d'OP–MF exerçant dans des communautés de moins de 10 000 habitants

Province	1996	1998	2000
Newfoundland / Terre-Neuve	309	254	268
Prince Edward Island / Île du Prince-Edouard	30	31	35
Nova Scotia / Nouvelle-Écosse	285	299	289
New Brunswick / Nouveau-Brunswick	240	243	240
Quebec / Québec	1293	1328	1343
Ontario	1051	1022	1016
Manitoba	273	306	342
Saskatchewan	244	230	276
Alberta	476	476	557
British Columbia / Colombie-Britannique	534	567	582
Northwest Territories / Territoires du Nord-Ouest	23	19	31
CANADA	4758	4775	4979

Source: Practice postal code of physicians from CMA Masterfile mapped by Statistics Canada to census metropolitan areas and census agglomerations. Courtesy Lynda Buske, CMA. / Code postal du cabinet du médecin tiré du fichier principal de l'AMC, établi par Statistique Canada en fonction des régions métropolitaines de recensement et des agglomérations de recensement. Gracieuseté de Lynda Buske, AMC.

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Message du président : Augmentation du nombre des médecins ruraux au Canada

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La Société a maintenant dix ans et fait des progrès — qui ne sont peut-être pas énormes, ni généraux, ni certainement suffisants. En 2000, le Canada comptait toutefois 5 % de plus d'omnipraticiens ruraux qu'en 1996 (voir le Tableau 1 à la page précédente). Je ne sais pas trop comment expliquer ce phénomène.

Après tout, en 2000, il y a eu 65 (15 %) jumelages d'étudiants en médecine familiale de moins qu'en 1997[1]. Le nombre de nouveaux médecins ne recommencera à augmenter de nouveau que plus tard cette année. (Il a diminué de 6 % [107] de 1996 à 2000[2].) Nos statistiques seraient censées dégringoler...

Pourquoi alors ne le font-elles pas? Parce que le gouvernement fédéral a financé le Bureau de la santé rurale en 1998? Parce que l'Alberta a financé deux programmes de formation en médecine rurale? À cause des facultés de médecine rurales du nord de l'Ontario et de la Colombie-Britannique? Parce que le Collège des médecins de famille du Canada a créé un programme d'études en médecine rurale et des stages ruraux obligatoires? Parce que la Société des obstétriciens et gynécologues du Canada a approuvé les soins maternels en milieu rural avec ou sans appui d'OP pour les césariennes[3]? À cause de la politique de l'AMC sur les enjeux de l'exercice de la profession en milieu rural et éloigné[4]? Parce que le ministre de la Santé du Québec a obligé les facultés de médecine à accepter un nombre représentatif d'étudiants en médecine des régions rurales?

La plupart de ces mesures n'ont pas précédé la montée du nombre des médecins ruraux. Elles n'ont pas encore fait sentir tous leurs effets. La seule chose qui précède vraiment la montée des statistiques, c'est la fondation de la Société de la médecine rurale du Canada

en 1992. Nous ne pouvons peut-être pas revendiquer le mérite de l'augmentation du nombre des médecins ruraux, mais nous avons une foule de raisons d'être fiers. Cette année, au cours de la 10e Conférence sur la médecine en région rurale et éloignée, en Colombie-Britannique, nous reconnaîtrons la contribution des médecins ruraux qui ont dix ans ou plus d'ancienneté dans leur communauté.

Je vous invite donc à Kelowna, du 25 au 28 avril, pour participer à nos célébrations. Venez vous informer un peu sur la médecine en milieu sauvage, jeter un coup d'œil sur des souvenirs et visiter des vignobles. Le plus important : venez rencontrer d'autres médecins ruraux comme vous.

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Beyond counting heads: some methodological issues in measuring geographic distribution of physicians

Raymond W. Pong, PhD
J. Roger Pitblado, PhD

CJRM 2002;7(1):12-20

The population-to-physician ratio is the most commonly used measure in research and in health services planning. It is a ratio that relates information on physician distribution with information on population distribution. Through an extensive review and assessment of available literature this article focuses on the "number of physicians" and the "number of people." First, how should physicians and patients or potential patients be counted. The second and related aspect is to decide whether or not the number is sufficient. In describing the geographic distribution of physicians, does headcounting suffice or does one have to go beyond counting heads? For example, many researchers have proclaimed the futility of trying to define the optimal population-to-physician ratio. It is important then that the future direction of research in this area go beyond counting heads and address, in a much more comprehensive manner, the complex inter-relationships between physician availability, utilization and health status.

Le nombre d'habitants par médecin est le critère de mesure utilisé le plus souvent en recherche et en planification des services de santé. Ce ratio établit un lien entre l'information sur la distribution des médecins et celle qui porte sur la distribution de la population. Dans le contexte d'une analyse et d'une évaluation poussées des publications disponibles, les auteurs de cet article traitent avant tout du «nombre de médecins» et du «nombre de personnes». Tout d'abord, comment faudrait-il compter le nombre des médecins et des patients ou des patients éventuels? Le deuxième aspect connexe consiste à déterminer si le nombre est suffisant. Lorsqu'on décrit la distribution géographique des médecins, suffit-il de les dénombrer ou faut-il aller plus

loin? Par exemple, beaucoup de chercheurs affirment qu'il est futile d'essayer de définir le nombre optimal d'habitants par médecin. Il importe alors que l'orientation future de la recherche dans ce domaine dépasse le dénombrement et porte de façon beaucoup plus complète sur les interrelations complexes entre la disponibilité des médecins, l'utilisation des services et l'état de santé.

Contents

Introduction

This is the second of 2 articles that seek to explore some of the conceptual and methodological complexities in the study of the geographic distribution of physicians. The first article[1] examined the "geography" aspect of physician distribution. This article looks at how physicians and people within a specified geographic area are, or should be, counted.

It was pointed out in the first article that information solely about where physicians are located is of limited use. What is of interest to most people is the spatial distribution of physicians relative to the spatial distribution of the population. This is why the population-to-physician ratio is the most commonly used measure in research and in health services planning. It is a ratio that relates information on physician distribution with information on population distribution. A typical population-to-physician ratio contains 3 pieces of information: the geographic area within which the physicians and people are located, the number of physicians and the number of people (see Appendix 1). Refinements of the population-to-physician ratio are attempts to conceptually clarify these 3 variables and to measure them more accurately.

"Geographic area" was dealt with in some detail in the first article. The focus of the present article is on "number of physicians" and "number of people." Two aspects of this problem are discussed here. First, how should physicians and patients or potential patients be counted. The second and related aspect is to decide whether or not the number is sufficient: in describing the geographic distribution of physicians, does headcounting suffice or does one have to go beyond counting heads?

This article is based on an extensive review and a critical assessment of the

literature, which includes published and unpublished research studies, working papers and health service planning reports. An extensive literature search and review process was conducted. In particular, we examined how the geographic distribution of physicians was measured by researchers, identified the problems they had encountered and assessed the attempts to overcome these problems. For a more detailed description of the literature search and review process, readers should consult the original study upon which these 2 articles are based.[2]

Contents

Counting physicians

One way to make the population-to-physician ratio more meaningful and useful is to ensure a more accurate enumeration of medical practitioners. This is more than just counting all physicians in an area (which is not usually a difficult task because in Canada all physicians have to register with a provincial/territorial college of physicians and surgeons in order to practise medicine). By checking the list of registered physicians, one can get a fairly accurate picture of the number of physicians in a region. Also, local medical societies usually have a fairly up-to-date count of the number of physicians in the area.

Problems

What and how much do physicians do?

The more arduous task is to find out what the physicians do and how much they do. It is necessary to determine if the physicians are more or less identical in the production of clinical services. The simple population-to-physician ratio does not usually take into consideration such factors as number of hours worked, nonclinical work, productivity, varying activity levels and the effects of age or sex on workload and practice pattern. As a result, the ratio may over- or underestimate the supply of clinical services by physicians. In the final analysis, it is not the number of "warm bodies" that matters. What is important is the production of medical care.

Decline in hours worked

A number of studies have documented the gradual decline in the number of hours Canadian physicians work. For example, according to the 1990 survey on physician resources conducted by the Canadian Medical Association, physicians reported working, on average, 4.1 fewer hours per week in total activities in 1990 than in 1986, and 5.7 fewer hours per week than in 1982. For GPs/FPs, the figures are 44.8 hours in 1990, 46.9 hours in 1986 and 51.5 hours in 1982. This represents a 13% decrease in hours of work in less than 10 years. Specialists reported working 48.5 hours per week in 1990, 4.6 hours less than in 1982.[3] There is also some anecdotal evidence that younger doctors or more recent graduates prefer to work shorter hours in order to have a more "normal" lifestyle. For all intents and purposes, less hours of work, unless counterbalanced by enhanced efficiency, means less human resources available. Surprisingly, of the studies reviewed that examine changes in population-to-physician ratios over time, none has factored the decline in hours of clinical work into the calculations.

Gender composition and retirement factors

In Canada, as well as in many other industrialized nations, the proportion of female physicians in the medical workforce is rising steadily. Currently about half of the students in Canadian medical schools are women. Many studies[4–8] have shown that male and female physicians tend to have different practice profiles and female physicians typically work less hours per week and less weeks per year than their male counterparts. The implications for physician workforce planning and medical practice of the changing sex composition in the Canadian physician workforce have been examined by Adams[9] and Reamy and Pong.[10] It is also known that as physicians approach retirement age they tend to reduce their workload. Additionally, physicians differ in their involvement in nonclinical work such as research, teaching and administration. For example, it has been well documented that physicians affiliated with medical schools tend to spend more time on such activities. Results of the 1997 National Family Physician Survey commissioned by the College of Family Physicians of Canada and conducted by the Centre for Rural and Northern Health Research show that 83.2% of a family physician's time was spent on direct patient care and 16.8% on related activities including research, teaching and administration.[11] Therefore, when examining physician availability, it is necessary to consider the effects of age, sex and type of activity on the production of clinical services.

Specialty mix

Another issue that needs to be considered is specialty mix. Magee[12] has employed specialty mix to derive an index of "rurality." Werner and coworkers[13] have raised concerns about possible errors associated with the use of a single population-to-physician ratio that includes different specialties. The question is whether the physicians included in the denominator of the ratio are sufficiently homogeneous in terms of specialty to permit addition without introducing distortions. If the specialties included are heterogenous and if different regions have very different specialty combinations, the ratios may not be comparable. Their research shows that primary care specialties (i.e., general and family practice, internal medicine, pediatrics, obstetrics/gynecology and general surgery) differ significantly in terms of total hours of work, allocation of time to different activities, productivity and number of patient visits. It may, therefore, be necessary to make adjustments to the denominator, like using weighted averages, as a refinement of the population-to-physician ratio.

Specialty substitution

Related to specialty mix is specialty substitution, which refers to physicians in one specialty providing clinical services that are typically rendered by physicians in other specialties. This is possible because the scopes of practice of different specialties overlap to a considerable extent. Specialty substitution is particularly prevalent in rural communities, where specialists are few and far between. Rural family physicians may perform some medical procedures which, in major urban centres, would typically be done by specialists. Similarly, general surgeons may perform some orthopedic surgeries if orthopedic surgeons are not available locally, internists may do some cardiology work if there are no cardiologists, and so forth. A study by Roos and colleagues[14] has shown the extent of specialty substitution in general surgery in Manitoba. The Saskatchewan Working Group on Physician Need,[15] for example, has acknowledged that noncertified specialists have been a main source of supply of specialist services in that province, particularly in communities other than Regina and Saskatoon. However, few studies have taken the issue of specialty substitution into account when describing physician distribution, possibly due to difficulties in obtaining pertinent and reliable data.

Discipline substitution

A similar problem and an even more daunting task is discipline substitution, which refers to providers in one discipline substituting for those in another. Discipline substitution and the effectiveness of some forms of substitution have been discussed extensively.[16–20] It is well recognized that some of what physicians do can be done by other providers such as audiologists, clinical pharmacists, clinical psychologists, midwives, nurse anesthetists, nurse practitioners, optometrists or podiatrists, in appropriate settings and in collaboration with physicians. As in the case of specialty substitution, the main problem in examining discipline substitution is the lack of reliable and system-wide data that can be used for research and planning purposes. Since most of the aforementioned categories of practitioners do not receive fee-for-service (FFS) reimbursement from provincial health insurance plans, the types and extent of their work that can be seen as substitution for physician services are not officially and systematically recorded, thus making meaningful analysis virtually impossible.

Given the growing interest in primary care reform across the country, which typically includes some form of multidisciplinary collaborative or team practice,[21–23] it may be difficult to ignore the potential effects of discipline substitution. Should a physician working alone and a physician working collaboratively with a nurse practitioner who takes over some of the less complex cases be counted as the same from the perspective of health workforce planning? Some earlier studies suggested that the productivity of physicians could be considerably augmented by teaming up with nurse practitioners. For instance, on the basis of the Burlington controlled trials, Spitzer[24] concluded that physician–nurse practitioner teams could assume responsibility for 41% more patients and increase the volume of services by 24% while holding cost constant. Similarly, in the United States, Golladay and coworkers[25] believed that the productivity of a physician could increase by as much as 74% by using a physician assistant.

The full-time equivalents approach

The above discussion shows the complexity in the seemingly simple task of counting physicians. One approach that has been introduced in order to more accurately reflect the availability of physician resources in an area is the use of the full-time equivalents (FTEs) technique. The use of FTEs is increasingly common in research studies and planning documents, suggesting that more and more people realize the shortcomings of simple headcounts and the need to use

more meaningful measures.[26–28]

Shortcomings of FTE

The national FTE methodology was used by the Federal/Provincial Working Group for the Development and Review of Medical Care Statistical Indicators in 1989 and was deemed to be a more appropriate measure of physician activity. The original calculation of national FTEs was based on fee payment data, which captured the number of services provided and the fee schedules. Because the calculation relied on payment data, the FTEs were problematic in a number of ways. For instance, radiology and laboratory specialists were excluded because most of them were not on FFS. Similarly, other non-FFS physicians and some clinical services that were not funded through FFS were not included in the FTE estimates. A more detailed discussion of the national FTE methodology can be found in the report of the National Ad Hoc Working Group on Physician Resource Planning.[27]

New Brunswick FTE

New Brunswick has introduced a modified FTE methodology with a view to overcoming some of the problems in the national FTE methodology. The New Brunswick methodology is more comprehensive in nature as it includes radiology and pathology and non-FFS payments, which represent about 11% of physician payments in that province. However, some limitations remain. For example, specialty designation is based on certification and not actual profile of practice; uncertified specialists are not captured and all nonclinical services such as community medicine, hospital administration and research are not captured.[29]

Major improvements in the FTE methodology are expected because the Canadian Institute for Health Information will soon be collecting data on non-FFS physicians for those provinces able to provide such data. This would enable, for instance, the inclusion of radiology and laboratory specialists in the FTE calculation. In addition, it will change the base year from 1985/86 to 1992/93 and revise the benchmarks used in the FTE methodology in order to reflect changes in fees over time.[30]

FTEs versus headcounts

The Advisory Panel on the Provision of Medical Services in Underserviced Regions[31] has used both headcounts and FTEs in its analysis. It has found that in 1989/90, 16.8% of GPs/FPs were in rural communities. But this percentage was 18.2% when FTEs were used. Since the rural physician FTE count is higher than the number of GPs/FPs, this suggests that physicians in rural practice were providing more services than average or that they were working longer hours than average. The New Brunswick Department of Health and Community Services[29] has also used the FTE methodology in its physician workforce planning. A comparison of FTEs to the traditional headcounts reveals that the 1078 FTEs in 1989/90 represented 1123 physicians, a difference of 4%. Although the FTE approach is superior to the headcount approach, the former still does not take into consideration such factors as specialty mix, specialty substitution and discipline substitution.

Counting patients

Even more difficult than counting physicians is counting patients or potential patients. Again, the problem is not so much the enumeration of people in a defined geographic area as it is the estimation of the medical care requirements or utilization by the population. It is well known that certain population groups, such as the elderly and women, consume more medical care than others. It is important, therefore, to make sure that the numerator in the population-to-physician ratio adequately reflects the service consumption patterns of the population, not just the population size. Two communities with an identical number of residents but with different demographic structures and health characteristics could have very different medical care needs or utilization patterns. This is particularly pertinent when analyzing rural and northern regions where the health status of the residents is generally below the national or provincial norm.[32–35]

Refining the ratio

Realizing this, the National Ad Hoc Working Group on Physician Resource Planning,[27] among others, has recommended several improvements to the

population-to-physician ratio methodology, including adjusting the population for age–sex composition. Age–sex standardization can be seen as an initial step in adjusting the numerator of the ratio. Additional adjustments are possible, such as by taking into account variations in health status or morbidity among populations, even though the additional data requirements could be substantial.

The Expert Panel on Physician Resources,[26] in its report on physician workforce planning in Ontario, has adjusted the population component of the population-to-physician ratio by factoring into the calculations all-cause standardized mortality ratios as a proxy for morbidity. The need to take the health status or health care needs of a population into consideration is also implicit in the definition of the Index of Medical Underservice (IMU). IMU is used by the United States federal government to define Medically Underserved Areas. Unlike other measures of underservicing which tend to rely solely on the number of physicians and population size, IMU adds to the primary care physician-to-population ratio a measure of poverty in the area, the age structure of the population and a crude measure of health status or outcome.[36,37]

Roos and colleagues[14] used 3 approaches, including the population-to-general surgeon ratio approach and the population needs-based approach, to analyze the needs for general surgeons in southern Manitoba. The needs-based approach took into account the age structure and various health characteristics (e.g., premature death rate, indices of general health and physical function and a socioeconomic risk index) of the population.

All this represents various attempts to refine and elaborate the population-to-physician ratio for research and planning purposes. Ideally, one should modify both the numerator and the denominator of the ratio in order to more accurately reflect physician distribution, as well as medical care provision and consumption, as exemplified by a study by Coyte and collaborators.[38] In this study of the availability of GPs/FPs in Ontario, Coyte and collaborators have introduced the notion of "physician density," which is the ratio of practice-intensity equivalent GPs/FPs to use-intensity equivalent residents. A "practice intensity equivalent index" is calculated, using age-specific OHIP (Ontario Hospital Insurance Plan) fee service claims in 1990. Not unlike the FTE methodology discussed earlier, this index affords an opportunity to adjust the supply of GPs/FPs to reflect variations in service provision. Similar methods are used to adjust the size of the population for patterns of health care use. While there was on average 1 GP/FP per 1000 people in 1990, densities for individual counties ranged from a low of 0.33 in the Sudbury District to a high

of 1.74 in Frontenac. After adjusting for both practice intensity and the population's utilization patterns, the revised densities ranged from a low of 0.35 in the Sudbury District to 1.61 in Frontenac. Although considerable disparities in GP/FP availability persist, the difference has narrowed by more than 10% after adjustments.

Identifying physician maldistribution

Thus far, we have studiously avoided using the term "maldistribution" when describing the geographic distribution of physicians. Instead, we have chosen to use the more prosaic phrase "geographic distribution of physicians." This is because, as Ginzberg[39] has cogently pointed out, unless there is a concept of acceptable distribution, the prefix "mal" does not make sense. Something is bad only in relation to something that is not bad. However, there is strong temptation to use the term "maldistribution" when describing the uneven distribution of physicians. Not content with merely describing the geographic distribution of physicians, many studies have made comparisons with respect to the availability of physicians, with a view to identifying doctor-shortage areas or maldistribution. There are 2 main types of comparison: Comparing the population-to-physician ratio in one area with an ideal or optimal ratio and comparing the ratios in 2 or more areas.

Comparing observed distribution with "optimal" distribution

For both research and planning purposes, it is often useful to be able to identify areas or communities as underserviced or experiencing a maldistribution problem. The most common method used is to compare the observed or actual distribution of physicians with some standard that can be an "ideal" population-to-physician ratio, an "optimal" ratio recommended by some experts or authoritative bodies, a "required" number of physicians or an "objective" standard of adequate medical care.

If the number of physicians required to serve the population of an area can be ascertained, it could enhance health service planning capability. The required

number of physicians, along with other data, can then be used to construct various indices. As an illustration, the ratio of the number of FTE physicians who reside in an area to the number of physicians required constitutes an index of distribution of medical resources. The ratio of the number of FTE physicians serving a population to the number required is an index of access to services. Using these indices, Piché[40] has examined physician resources in various regions of Quebec. With an index of distribution of 1.56, the Montreal region has 56% more FTE specialists than are required to serve its population. The Lanaudière–Laurentides and North Shore regions, by contrast, have the fewest FTE specialists with only 40% and 43%, respectively, of the numbers required. On the other hand, regional disparities are considerably less pronounced with respect to GPs/FPs.

Some US and Canadian solutions

In the US, various measures of underservice have been introduced by the federal government. For example, the US Bureau of Health Manpower has defined the Critical Medical Shortage Area as an area that has a ratio of resident population to FTE nonfederal, primary care physicians greater than 4000:1.[41] The Health Professional Shortage Area designation is used to identify locations in which to place physicians under the National Health Services Corps Program. A county, a subcounty unit or an aggregation of counties is seen as underserviced if the population-to-primary care physician ratio in the area is greater than 3500:1.[37]

The Medically Underserved Area designation is used by the US federal government to identify areas where health maintenance organizations could receive federal assistance. The IMU is the mechanism for determining Medically Underserved Area status. The IMU is considered by most researchers as a more sophisticated index than conventional population-to-physician ratios since it takes into consideration 4 factors:

- population-to-primary care physician ratio;
- infant mortality rate;
- proportion of the population aged 65 or over; and
- proportion of the population with an income below the poverty line.

The IMU score for an area is the sum of the weighted value for each factor. Values of the index range from 0 to 100, with lower scores indicating higher

levels of medical underservice. Unlike other designations of underserviced areas, the IMU attempts to measure underservice by considering both medical care demand and supply.[36,42]

Other commonly used criteria include the ratio of 191 doctors per 100 000 population and other specialty-specific ratios recommended by the Graduate Medical Education National Advisory Committee (GMENAC), which used a needs-based approach to define the requirements.[43] In Canada, the most often cited physician "requirements" are those recommended by the National Committee on Physician Manpower,[44] the Federal/Provincial Advisory Committee on Health Manpower[45] and the Royal College of Physicians and Surgeons of Canada.[46] In addition, various provincial ministries of health or task forces have come up with their own recommended population-to-physician ratios for medical workforce planning purposes.

Problems

The problem with identifying an area as overserviced or underserviced by comparing its population-to-physician ratio with an optimal ratio is that nobody seems to know how to objectively set an optimal ratio that accurately reflects local medical care needs. Many experts have proclaimed the futility of trying to define the optimal population-to-physician ratio.

"...[T]here is no easy way — possibly no way — of gaining agreement among the experts, much less among the public, as to the criteria that should be used to assess whether a particular number of physicians is within the range of the social optimum. The answers fall in the complex realm of political economy in which each of many interest groups — the medical profession, the scientific-educational establishment, hospitals, health delivery organizations, federal and state legislators, consumer groups, and still other parties to the debate — has a perspective on the issue limited by their particular concerns and knowledge."[47]

"It is important to state unequivocally at the outset that there is no technically correct or optimum number of physicians... In our view the past and continuing debate over the 'right' or 'optimum' number of physicians (or physician:population ratio) has not been constructive, has perpetuated the myth that better data or methodologies will resolve disagreements and has impeded a long overdue refocusing of attention on more fundamental and logically prior decision about the goals and structure of the health care system itself."[48]

Ratios such as the Critical Medical Shortage Area ratio of 4000:1 are mostly arbitrary in nature and are designed for administrative convenience with very little empirical basis. Even the use of widely endorsed ratios, such as the GMENAC population-to-physician ratios, has been questioned. For example, it has been common practice to apply the GMENAC ratios to local areas. However, as Connor and cohorts[49] have correctly observed, the nation was the unit of analysis in the GMENAC study, but these recommended national ratios are applied by some people to subnational areas with no appropriate adjustments. In Canada, the National Ad Hoc Working Group on Physician Resource Planning[27] has similarly warned against adopting national population-to-physician ratios to local use.

Comparing physician distributions in different areas

Another approach is to compare population-to-physician ratios of different areas. Areas that have a substantially lower ratio than others or that have ratios substantially below the national or provincial norm are often assumed to have insufficient physicians. Alternatively, some may conclude that maldistribution of physicians exists if areas exhibit widely divergent ratios. "Maldistribution" in this case implies that the situation deviates from a normative pattern. Although such comparisons can be done by eyeballing the ratios, researchers have developed more sophisticated indices for this purpose.

Gini Index

While it is easy to distinguish perfect equality from inequality, when one level of inequality is used as a standard to assess another, different measures are needed. The Gini Index and other indices of spatial distribution are often used to assess the difference between two distributions.[50] It is useful to point out that the Gini Index builds on the population-to-practitioner ratio. A Gini Index is merely a descriptor of the relationship of 2 geographic distributions — that of the practitioners and that of the population.[51] The Gini Index has been used to compare geographic distributions of physicians among regions or over time. A prime example is Brown's use of Gini-style indices to evaluate the spatial patterns of health practitioners in Alberta.[52]

Location quotient

Another index is the location quotient, which treats the ratio of physicians in a given geographic unit to the total number of physicians in all geographic units compared to the ratio of population in a given geographic unit to the total population of all geographic units. It signifies whether an area is underserviced or overserviced as compared to all areas. A value of 1.0 means that an area has exactly the number of physicians its population warrants, given its share of the total population. A value of less than 1.0 denotes an under-representation with respect to physicians, while a value greater than 1.0 indicates a situation of over-representation. Anderson and Rosenberg[53] have employed location quotients to study the distribution of physicians in Ontario over time.

Coefficents of variation

Other researchers have used coefficients of variation to quantify inequalities with respect to geographic distribution of physicians. One commonly used approach is to compare the best-served region with the worst-served region within a province/state or country. Another approach, at the level of a province/state, is to compare the population-to-physician ratio in a rural area with that in an urban area.[54]

Problems

Whether the comparisons are between an observed population-to-physician ratio and an optimal ratio or between 2 or more observed ratios, the problem is the same, namely, an objective basis for determining physician requirement or underservice is often difficult to establish. Regional differences in physician supply, in and of themselves, do not provide sufficient grounds for deciding if there is an over- or undersupply of physicians, except in extreme situations. As Morrow[51] has maintained, in order to move from the concept of "unevenness," as revealed by such indicators as the Gini Index, to the concept of "maldistribution," many factors have to be considered. It is of interest to note that in Ontario, the designation of a community as "underserviced" by the Underservice Area Program of the Ministry of Health requires the assessment of several factors in addition to the population-to-physician ratio. These include population size and structure, financial impact analysis, previous recruitment efforts, socioeconomic status of the area, local demand for services and additional health service needs and resources.[55]

Future directions

The empirical results of the analyses presented by Pitblado and Pong[2] clearly show that physicians in Canada are not evenly distributed and that the uneven distribution is particularly acute with respect to specialist physicians in rural and remote areas. However, it is also argued that the uneven distributions or "maldistributions" that are portrayed are based on assumptions that can be contested and on indices that can be improved with additional data inputs. Designations of physician shortage or maldistribution have to be made against some standards of adequacy. Unfortunately, such universally accepted standards have yet to be developed.

Images presented by population-to-physician ratios may be oversimplified or even misleading. This is because simple headcounts of physicians and people within an arbitrarily defined area often obscure the underlying complexity of the situation. A more realistic assessment of the geographic distribution of physicians requires a better understanding of the conceptual and methodological aspects of measuring physician and population dispersion. The first step in advancing this area of research, as well as policy and program development in rural medical care, is to enhance our ability to more accurately describe the geographic distribution of physicians and to take into account factors that impinge on care-providing and care-seeking behaviours.

There may be no single, "correct" means of examining the geographic distribution of physicians. And there may never be one. It may be far more preferable to focus on goal-specific measures that treat local, relatively small geographical areas in detail and restrict the use of population-to-physician ratios to the analyses of national and provincial/territorial overviews. However, the tools that we do use and that have been reviewed in this and our previous paper[1] must be applied with the knowledge that geography, physician counts and population counts are not simple measures. Future work should include refinements to the concepts of specialty substitution, full-time equivalent, distance in terms of access, and the potential impacts of electronic "travelling" or telehealth. All must address, in a much more comprehensive manner, the complex interrelationships between physician availability, utilization and health status. We are convinced that such work is possible, will be policy-

relevant, will be enabled by the new workforce and health survey databases that are coming on-stream and will be enhanced by continuing critical assessments of our current measures.

In addition, it may be necessary for researchers to communicate with policy-makers and health care planners. It behooves researchers to ensure that policy-makers and health care planners are aware of what a population-to-physician ratio means, how it is derived, its inherent shortcomings and how it should be interpreted. Otherwise, population-to-physician ratios may continue to be used in a simplistic or even erroneous manner.

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Appendix 1. Population-to-physician ratio

The population-to-physician ratio in an area is typically expressed as:

$$\frac{\text{No. of persons}}{\text{No. of physicians}} = \text{No. of persons per physician}$$

The number of people residing in an area need not necessarily be the total population. For instance, if the denominator is the number of geriatricians, the numerator could be the number of people aged over 65 in the area. Similarly, if the denominator is the number of obstetricians/gynecologists, the numerator could be the number of women in the area.

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Development of a cancer care curriculum for rural practice

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Objective: To survey rural family physicians to determine what topics should be included in a Family Practice Cancer Care Curriculum for family practice residents planning to practise in rural regions.

Design: A self-administered mail-in questionnaire. Respondents were asked to rank a variety of cancer care topics from 0 (not at all important) to 6 (extremely important) in terms of what they believed a graduate of a family medicine training program needed to know to provide cancer care to a rural community.

Setting: Rural communities in northwestern and part of northeastern Ontario as identified by the Northwestern Ontario Regional Cancer Centre's Community Cancer Care Program Directory of Services.

Participants: Family physicians in the above rural communities who were present in the community during the survey period (the first 2 weeks of August 1999). Eighty-one surveys were distributed.

Results: The response rate was 71.6%. In terms of broad categories, 3 categories stood out as being more important than the others: Prevention/Screening/Early detection, Supportive care, and Technical capabilities. In terms of individual topics, a list of topics that may be included in family practice cancer curriculum was generated.

Conclusions: We were able to identify broad categories and individual topics that should be part of a family practice cancer care curriculum for rural cancer care. A list of individual topics and their importance, as perceived by the study population, was developed. We hope that this will aid in further study and eventual development of a family practice cancer care curriculum.

Objectif : Effectuer un sondage auprès des médecins de famille ruraux pour déterminer les matières à inclure dans un programme d'études en cancérologie pour médecins de famille à l'intention des résidents en médecine familiale prévoyant exercer la profession en milieu rural.

Concept : Questionnaire postal auto-administré. On a demandé aux répondants de classer un éventail de sujets reliés au traitement du cancer et de leur attribuer une cote variant de 0 (aucune importance) à 6 (importance extrême) par rapport à ce qu'un diplômé d'un programme de médecine familiale devrait selon eux connaître pour dispenser des soins en cancérologie dans une communauté rurale.

Contexte : Communautés rurales du nord-ouest et d'une partie du nord-est de l'Ontario selon le répertoire des services du programme communautaire de traitement du cancer du Northwest Ontario Regional Cancer Center.

Participants : Médecins de famille des communautés rurales susmentionnées qui étaient présents dans la communauté au cours de la période de sondage (les deux premières semaines d'août 1999). On a distribué 80 questionnaires.

Résultats : Le taux de réponse s'est établi à 71,6 %. On a dégagé trois catégories générales plus importantes que les autres : prévention, dépistage et détection précoces, soins de soutien et capacités techniques. Pour ce qui est des sujets individuels, on a produit une liste de sujets que l'on pourrait inclure dans un programme sur le traitement du cancer en médecine familiale.

Conclusions : Nous avons pu définir de grandes catégories et des sujets qui devraient faire partie d'un programme d'études en cancérologie pour médecins de famille en milieu rural. On a établi une liste de sujets et leur importance selon la population visée par l'étude. Nous espérons que ces résultats aideront à étudier plus à fond et à établir un jour un programme d'études en cancérologie pour médecins de famille.

Introduction

In recent years a decentralization of cancer care has occurred; certain aspects of that care have been transferred from the traditional regional cancer care centres to the communities where the patients live. This has obvious benefits to patients who receive some cancer treatments and follow-up at their local hospital or even at home, thus decreasing the need for trips to the regional cancer centre. Nowhere is this more evident than in northwestern and parts of northeastern Ontario, where travel times to the Northwestern Ontario Regional Cancer Centre (herein referred to as the regional cancer centre) in Thunder Bay can be more than 5 hours, depending on weather and road conditions. These travel times and the burden of being away from home while ill make regular trips to Thunder Bay for chemotherapy or follow-up a sometimes unbearable trial for the cancer patient. Over the last several years the regional cancer centre has made incredible strides in overcoming these difficulties through the development of a Community Cancer Care Program (CCCP).[1,2] This CCCP allows for the training of designated family physicians in communities throughout northwestern and parts of northeastern Ontario, to permit them to coordinate and deliver chemotherapy as well as to undertake follow-up of certain cancer patients in their own community. Through the CCCP, oncologists, nurses, pharmacists and other staff of the regional cancer centre provide clinical support to these "designated family physicians."

In light of this expanded role of rural family physicians, it was decided that a curriculum should be developed for family practice residents interested in practising in rural areas. Additionally, it was assumed that the development of a Family Practice Cancer Care Curriculum would also allow for the development of continuing medical education modules for family physicians already practising in these rural areas. This would benefit all rural family physicians in the ongoing care of their cancer patients. This survey is the first step in the development of this curriculum.

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Methods

The survey questions were provided by the principal author (D.M.), who was a designated family physician in the CCCP. Additional input was obtained from other designated family physicians within the program.

In collaboration with various oncologists (both medical and radiation), family physicians and nurses who provide cancer care and the administrative staff of the regional cancer centre, the content and organization of the survey were finalized.

The survey had 2 components: demographics and curriculum content. The curriculum was divided into 8 categories: Prevention/Screening/Early detection; Basic science; Surgical oncology; Radiation oncology; Medical oncology; Supportive care; Technical capabilities; and Administration. In each category a number of topics were included. Respondents were asked to rank each topic from 0 to 6 (0 = not at all important; 6 = extremely important).

Eighty-one surveys were sent to rural family physicians in northwestern and part of northeastern Ontario. The towns to which the surveys were sent were identified by the regional cancer centre's CCCP, Directory of Services. Through phone contact to the clinics and hospitals of the area, we determined which physicians were in town during the first 2 weeks of August, and only sent surveys to those physicians who were not away on holidays. We surveyed both designated physicians and non-designated physicians. Non-responders were followed up at 2 and 3 weeks after the initial mailing with reminder letters.[3]

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Results

Fifty-eight (71.6%) of the 81 surveys were returned. The demographic data showed the typical broad range of responsibilities of rural family physicians:

- 98.3% of respondents did emergency practice;
- 60.3% did obstetrics;
- 19.0% did general practioner anesthesia;

- 19.0% did general practitioner surgery;
- 75.9% did home visits; and
- 1.7% to 6.9% did other duties (e.g., coroner, palliative care, pediatrics, administration and endoscopy).

In terms of training, 62.1% of the respondents stated that they received no cancer care training during their residency, whereas 37.9% stated they did receive some training.

Means and 95% confidence intervals (CIs) were calculated for the 8 broad categories. The mean rankings were as follows: Prevention/Screening/Early detection, 4.8; Basic science, 3.6; Surgical oncology, 4.0; Radiation oncology, 3.8; Medical oncology, 4.1; Supportive care, 4.6; Technical capabilities, 4.6; Administration, 4.0. Taking into account the 95% CI of each mean, it can be seen that Prevention/Screening/Early detection, Supportive care and Technical capabilities were ranked most highly.

Means and standard deviations are summarized in Table 1 for the individual topics. Table 2 outlines the recommended list of topics, based on the results of our survey, to be included in a Family Practice Cancer Care Curriculum.

Discussion

From this data some initial suggestions on what should be included in an Family Practice Cancer Care Curriculum can be made. The first suggestion is that special attention should be given to the 3 broad categories of Prevention/Screening/Early detection, Supportive care and Technical capabilities in the development of the curriculum.

The second suggestion is that a list of highly ranked individual topics should be included in this curriculum (see Table 2).

In closing, it is hoped that this initial survey will provide the basis from which further study and eventual development of an Family Practice Cancer Care Curriculum will be possible. Examples of such further study could include:

patient perspectives on curriculum items, financial/resource requirements of such a curriculum, and implications of rural cancer care programs (i.e., Does cancer care training affect level of patient care in a rural community?).

It should be noted that cancer care outreach is not unique to Northwestern Ontario. Programs exist across Canada[4,5] as well as in several US states.[6–11] It is hoped that an eventual curriculum would have far reaching implications for providing cancer care close to home by well trained family physicians, as well as assist the family physicians who are already providing cancer care in rural environments.

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Table 1. Means and standard deviations of individual topics

	Mean (SD)
Prevention/Screening/Early detection	
Evidence-based data for prevention guidelines (Knowing the etiologies of different kinds of cancer)	4.75 (1.39)
Prevention strategies (e.g., smoking cessation, sun exposure, routine health issues, occupational hazards)	5.09 (1.17)
Techniques to counsel patients about the importance of prevention so they are willing to modify their lifestyles	4.70 (1.31)
Knowing what populations are at risk for different kinds of cancer	4.32 (1.06)
Screening guidelines of common cancers	5.27 (1.00)
Knowledge of the efficacy of screening procedures	4.72 (1.18)
Knowing how to interpret the results of screening tests	5.00 (1.08)
Identifying early signs and symptoms of different kinds of cancer	5.21 (1.11)
Knowing what tests to pursue if cancer is suspected	5.00 (1.12)
Implementing community education programs in prevention and early detection	3.98 (1.43)
Basic science	
Biology of tumours	3.11 (1.51)
Patterns of tumour spread	4.26 (1.25)
Staging systems	3.48 (1.45)
Clinical trials and how they run	3.13 (1.38)
Genetics of cancer: hereditary aspects	4.16 (1.56)
Surgical oncology	
Knowing what cancers can be treated with surgery as cure, adjuvant, or palliation	4.30 (1.36)
Staging and prognosis	3.77 (1.30)
Being able to explain to patients how surgical procedures for common cancers are done	3.89 (1.28)
Knowing the indications of common surgical procedures	4.02 (1.27)
Post-operative care: knowledge of the surgical complications and their management	4.25 (1.20)
Nutritional support for the surgical oncology patient	4.04 (1.34)
Radiation oncology	
Knowing what cancers can be treated by radiation as cure, adjuvant, or palliation	4.33 (1.41)
Indications of common radiotherapy procedures	3.98 (1.38)
Side effects of radiation and their management	4.75 (1.17)
Dosing routines and length of treatments	2.46 (1.42)
Knowing how to assess tumour response to radiotherapy	2.86 (1.38)
Post-treatment care	4.47 (1.23)
Tour of the facility so the family doctor can inform the patients what to expect	3.18 (1.42)
Recognizing the oncological emergencies that can be treated with radiation	5.11 (0.99)
Knowledge of advances in radiotherapy (e.g., high dose rate brachytherapy, conformal RT, seed implants for prostate cancer)	3.40 (1.18)
Medical oncology	
Knowing what cancers can be treated by chemo/hormonal agents as cure, adjuvant, or palliation	4.27 (1.26)
Pharmacology of chemotherapeutic and hormonal agents	3.73 (1.38)
Dosing routines of chemo/hormone therapy	3.00 (1.45)
Side-effect control during and after chemo/hormone therapy	4.95 (1.12)
Monitoring of chemo/hormone therapy (e.g., when to do blood tests, what to watch for)	4.84 (1.16)
Assessing tumour response to chemo/hormone therapy	3.30 (1.45)
Oncological emergencies resulting from systemic therapy	5.36 (0.96)
Administering chemo/hormone therapy to patients with pre-existing medical illness	3.86 (1.43)
Knowing how to inform and advise patients who wish to receive alternative medical treatments	3.98 (1.33)
Supportive care	
Understanding your own values and beliefs regarding cancer	4.16 (1.58)
Doctor–patient communication (e.g., breaking bad news, family issues, comorbid mental illness)	5.13 (1.15)
How to address specialists' interpretations/comments to patients in a sensitive and understandable manner	4.64 (1.29)
How to facilitate a family conference	4.38 (1.29)
Pain and symptom management	5.66 (0.61)

Table 1 continued on next page ……..

Table 1. Means and standard deviations of individual topics (cont'd)	
	Mean (SD)
Supportive care (cont'd from previous page)	
Palliative care issues for the patient and the family	5.29 (0.81)
Caregiver (MD/RN) support during palliative care	4.58 (1.13)
Cross cultural supportive care (e.g., speaking with First Nations people, various cultural beliefs of cancer)	4.18 (1.28)
Spiritual aspects of illness, grief, death	4.23 (1.32)
End of life issues such as refusal of life support measures, DNR orders, planning for home death	4.91 (1.24)
End of life legal issues such as wills, funerals, power of attorney	4.21 (1.34)
Knowing how to access community resources (financial, counselling, support groups, legal aids)	4.32 (1.25)
Technical capabilities	
Bone marrow aspiration/biopsy	3.82 (1.62)
Managing complications of central lines	4.05 (1.48)
Thoracentesis	4.54 (1.11)
Paracentesis	4.22 (1.29)
Cutaneous biopsies	5.02 (1.15)
Chest tube insertion and pleurodesis	4.40 (1.26)
Fine needle aspiration biopsy for breast lumps	4.10 (1.54)
Basic radiological interpretation of chest and skeletal x-rays	5.13 (1.11)
Indirect laryngoscopy (recognizing what is normal and abnormal)	4.00 (1.71)
Systematic approach to breast examination (recognizing what is normal and abnormal)	5.31 (1.02)
Knowing how to properly perform a prostate examination (recognizing what is normal and abnormal)	5.35 (0.91)
Knowing how to perform a PAP smear properly	5.38 (1.07)
Administration	
Managing time between regular clinical duties and administering chemotherapy	3.25 (1.53)
How to work with other health care professionals, cancer centre, etc., to coordinate cancer care	4.11 (1.44)
Knowing the roles of staff at the cancer centre and how they can help	3.86 (1.31)
Knowing how to bill for services provided to cancer patients (to allow for proper remuneration)	3.70 (1.61)
Knowing how to develop a record system so that the doctor and his or her colleagues can easily access the cancer patient's medical information (e.g., medical history, treatment schedules, test results)	4.32 (1.42)
Communication between the designated family physician and the patient's family doctor with respect to who provides what care to the patient	4.54 (1.42)

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Table 2. Recommendations of items to be included in a Family Practice Cancer Care Curriculum

Prevention/Screening/Early detection	**Medical oncology**
Evidence-based data for prevention guidelines	Side-effect control during and after chemo/hormone therapy
Prevention strategies (e.g., smoking cessation)	Monitoring of chemo/hormone therapy (e.g., when to do blood tests, what to watch for)
Techniques to counsel patients about the importance of prevention	Oncological emergencies resulting from systemic therapy
Knowing what populations are at risk for different kinds of cancer	**Supportive care**
Screening guidelines of common cancers	Doctor–patient communication (e.g., breaking bad news, family issues, co-morbid mental illness)
Knowledge of the efficacy of screening procedures	Pain and symptom management
Knowing how to interpret the results of screening tests	Palliative care issues for the patient and the family
Identifying early signs and symptoms of different kinds of cancer	**Technical capabilities**
Knowing what tests to pursue if cancer is suspected	Cutaneous biopsies
Implementing community education programs in prevention	Basic radiological interpretation of chest and skeletal x-rays
Basic science	Systematic approach to breast examination
Patterns of tumour spread	Knowing how to properly perform a prostate examination
Genetics of cancer: hereditary aspects	Knowing how to perform a PAP smear properly
Radiation oncology	
Knowing what cancers can be treated by radiation	
Indications of common radiotherapy procedures	
Side effects of radiation and their management	
Post-treatment care	
Recognizing the oncological emergencies that can be treated with radiation	

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Remote general practice: diagnosis of appendicitis

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Objective: To determine the diagnostic value of an elevated white blood cell (WBC) count in the diagnosis of acute appendicitis.

Design: A retrospective descriptive study.

Setting: Al-Ain Hospital and Tawam Hospital in Al-Ain Medical Health District, Abu Dhabi.

Subjects: All patients over the age of 15 years who were referred by Primary Health Care Clinics (PHCC) and admitted to the surgical wards of Al-Ain and Tawam Hospitals, between Jan. 1 and Dec. 31, 1995, with a provisional diagnosis of acute appendicitis. The study is based on 445 patients referred by PHCC to Tawam and Al-Ain Hospitals.

Results: Surgery was performed in 268 cases. Of those subjected to surgery, 16 were found to have a normal appendix and the remaining 252 were found to have various degrees of acutely inflamed or perforated appendices. The WBC count was greater than 12 000 in all of the 252 cases where the diagnosis of acute appendicitis was confirmed at operation. Equally in those patients who were not operated upon but who were provisionally diagnosed with appendicitis and had non-specific abdominal pain, the WBC count was less than 12 000. WBC count, nausea, rebound, and rigidity were the only significant predictors of acute appendicitis.

Conclusion: The results suggest that determining the patient's WBC count, a simple test, could be of value to general practitioners in deciding when a patient should be referred urgently for a surgical opinion. This applies particularly for physicians who practise in a remote area at a distance from a hospital.

Objectif : Établir la validité diagnostique d'une leucocytose élevée pour diagnostiquer l'appendicite aiguë.

Conception : Étude descriptive rétrospective.

Contexte : L'hôpital d'Al-Ain et l'hôpital Tawam du district de santé d'Al-Ain (Abu Dhabi).

Sujets : Tous les patients de plus de 15 ans chez qui un diagnostic provisoire d'appendicite aiguë avait été posé à une clinique de santé primaire, et qu'on avait référés au service de chirurgie de l'hôpital d'Al-Ain ou de l'hôpital Tawam, où ils ont été admis entre le 1er janvier et le 31 décembre 1995. L'étude porte sur 445 patients référés par des cliniques de santé primaires vers l'hôpital Tawam et l'hôpital d'Al Ain.

Résultats : On a pratiqué une chirurgie dans 268 cas. On a constaté que chez 16 des patients ayant subi une chirurgie, l'appendice était normal, tandis que dans les 252 autres cas, on a observé divers degrés de perforation ou d'inflammation aiguë de l'appendice. La leucocytose était supérieure à 12 000 chez les 252 cas dont le diagnostic d'appendicite aiguë a été confirmé lors de la chirurgie. De plus, chez les patients qui n'ont pas subi de chirurgie mais qui avaient reçu un diagnostic provisoire d'appendicite et souffraient de douleurs abdominales non spécifiques, la leucocytose était inférieure à 12 000. La leucocytose, la nausée, la douleur après palpation et la rigidité étaient les seuls prédicteurs importants de l'appendicite aiguë.

Conclusion : Les résultats indiquent que la détermination de la leucocytose du patient, examen facile, pourrait servir aux omnipraticiens lorsqu'ils doivent décider si on référer de toute urgence un patient pour une consultation en chirurgie. Cette conclusion intéressera particulièrement les médecins qui pratiquent en région périphérique, loin d'un hôpital.

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Introduction

Acute appendicitis is a common surgical condition, and the diagnosis is made primarily on the basis of the history and the physical findings, with additional assistance from laboratory examinations.[1] Although most patients with acute appendicitis can easily be diagnosed, for many of them the signs and symptoms are variable and a firm diagnosis can be difficult. This is particularly true when the appendix is in the retrocecal or the retroileal position. The percentage of appendectomies performed where the appendix is subsequently found to be normal varies between 15% and 50%,[2] and postoperative complications can occur in up to 50% of these patients.[3] However, at the other end of the spectrum, nowhere are general practitioners more seriously criticized than when they fail to recognize appendicitis and the patient subsequently presents to hospital with generalized peritonitis. Moderate leucocytosis, ranging from about 12 000 to 18 000 per cubic millimetre, is the rule in acute appendicitis, and it seemed reasonable to examine this finding in greater detail to determine how pathognomonic leucocytosis is for the diagnosis. Several studies have shown a total leucocyte count in suspected acute appendicitis to give valuable information to guide the surgeon.[4–10] Overall, a white blood cell (WBC) count as a diagnostic tool is claimed to be reliable by some[7,11,12] and unreliable by others[13–15] in patients with suspected appendicitis.

The aim of this retrospective study was to determine the diagnostic value of an elevated WBC count in the diagnosis of acute appendicitis.

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Materials and methods

Study design

During the 12-month period from January to December 1995, all patients over the age of 15 who were admitted to the surgical wards at Al-Ain and Tawam hospitals with a diagnosis of suspected appendicitis were included in this study. These 2 hospitals serve the Al-Ain district, which is part of the Abu Dhabi Emirate, United Arab Emirates (UAE). This district has a population of approximately 300 000. A total of 445 patients presented with suspected appendicitis during the study period. All patients were examined by a surgeon, who recorded the clinical signs and symptoms. In all cases the surgeons ordered a complete blood count at presentation and the decision regarding surgical intervention was made on the basis of clinical and laboratory findings. All removed appendices were subjected to histological examination. The medical records were used to extract data relating to the age, sex and nationality of the patients. A data collection sheet was designed to collect the required clinical information, which included the WBC count.[4,9,10,16] Operative findings relating to the appendices were recorded as normal or acutely inflamed. Pathology findings were recorded as normal or acutely inflamed. The general surgeons working in both hospitals gave their opinion regarding the diagnostic value of WBC count in acute appendicitis. Before commencement of the study, ethical approval was sought and granted by the Ministry of Health/UAE University Ethical Committee.

Statistical methods and analysis

The data were analyzed using the Statistical Packages for Social Sciences (SPSS). A logistic regression model was constructed that included the acute appendicitis status (0 for normal, 1 for acute appendicitis) as the dependent variable and a series of covariants: age, sex, duration of pain, location of initial pain, nausea, vomiting, rigidity, guarding, rebound tenderness, body temperature and WBC count. These covariants were then entered into a multiple logistic model and allowed to compete in a stepwise fashion. The level $p < 0.05$ was considered as the cut-off value for significance.

Results

As shown in Figure 1, 445 patients with a provisional diagnosis of acute

appendicitis were admitted during the study period. Surgery was performed in 268 cases. Of those patients subjected to surgery, 16 were found to have a normal appendix and the remaining 252 were found to have various degrees of acutely inflamed or perforated appendices. The WBC count was greater than 12 000 in all cases in which the diagnosis of acute appendicitis was confirmed at operation. Equally, in those patients not operated upon, the WBC count was less than 12 000. In the 16 patients operated upon and where the appendix was found not to be inflamed, the WBC count was greater than 12 000 in 9 and less than 12 000 in 7.

The gender distribution showed a considerable preponderance of males; 75% of all admitted patients were male. Of the patients with confirmed acute appendicitis, 59.4% of the males had a high WBC count, whereas only 45.5% of the females had a high WBC count.

The WBC count was > 12 000 in all of the age groups where the diagnosis of acute appendicits was confirmed at operation. The age range was much as would be expected in a series of patients with appendicitis. The most females were in the younger age group (14–25 years), while most males were in the younger and middle age group (14–25 and 26–35 years).

Table 1 shows all diagnostic variables in appendicitis that showed significant differences. As can be seen from this table, a diagnostic screening test was performed for sensitivity (%) and specificity (%) for variables used to try to establish the diagnosis of acute appendicitis in the prospective study of 445 patients.

Table 2 shows that WBC count, nausea, rebound and rigidity are the only significant predictors of acute appendicitis after adjusting for age and sex. The most significant predictor was WBC count with a relative risk of 6.22, a 95% confidence interval of 3.48–11.11 and a p value of 0.0001.

In answer to the question "On a scale of 1 (not important) to 5 (very important) how would you rate the importance of the WBC count in reaching a diagnosis in suspected appendicitis?" 7 surgeons chose the number 5, 5 surgeons chose the number 4 and 5 surgeons chose number 3. In answer to the question "If the results of your clinical examination strongly suggest a diagnosis of appendicitis but the WBC count is normal or low, what action would you take?" 12 surgeons said they would operate immediately and 5 said they would observe

further. Seventeen of the 20 surgeons responded to the survey.

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Discussion

There is no sure laboratory test that confirms or excludes the diagnosis of acute appendicitis. Nevertheless, it is worth noting that all patients proven to have acute appendicitis in this study had a leucocytosis while those rejected for surgery did not. Of the patients who were operated on but had a normal appendix, about half had a leucocytosis. Thus, only 3% of those patients subjected to surgery following the diagnosis of acute appendicitis had a leucocytosis when the appendix was normal. This suggests that a leucocytosis is an important feature in the diagnosis of appendicitis, although it cannot be regarded as a positive finding in the absence of clinical signs.

In this study the association between leucocytosis and appendicitis was particularly strong. The distribution of age of these patients was normal; however, the population pyramid in the UAE shows a large preponderance of males in the 20–40 age range due to the influx of expatriate workers, and this is reflected in the gender ratio of appendicitis cases.[17] Appendicitis is easier to diagnose in males than in females, but it is uncertain whether the preponderance of males in the study population influenced the findings in the study. Also, the Al-Ain hospitals serve a wide rural district, therefore patients may be more advanced on presentation to hospital because of the long distances some have to travel to get to a hospital.

The responses to the questions put to the surgeons suggest that although they always estimate the WBC count, they place most faith on their clinical judgement. The finding of a high WBC count is consistent with previous reported studies,[7,11,12,16,18] but this study has shown how consistent the WBC count can be, both in patients proven to have appendicitis and those who do not have appendicitis. While this is unlikely to influence the practices of surgeons, it has relevance for remote practitioners because obtaining a WBC count is a simple procedure that can easily be carried out in a rural doctor's office. This test could be of great value when attempting to diagnose appendicitis because patients with this condition can deteriorate very quickly and the journey to

hospital in many cases can take considerable time.

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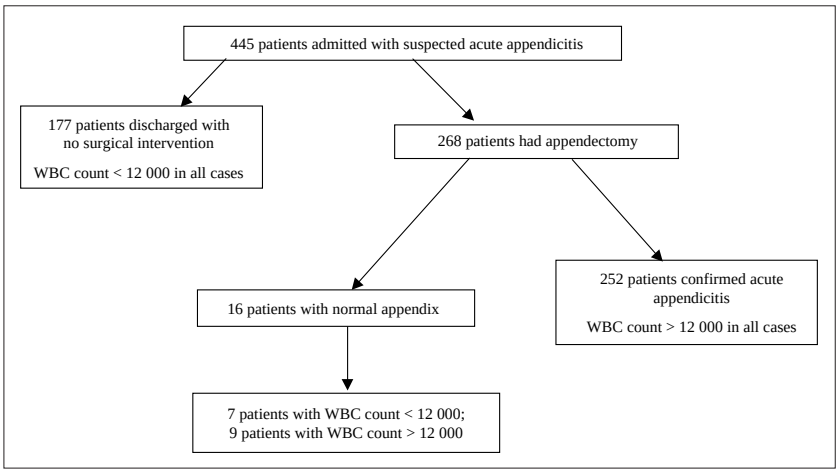

Fig. 1. Patient outcome in relation to white blood cell (WBC) count

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Table 1. Diagnostic test for sensitivity and specificity for variables used to try to establish the diagnosis of acute appendicitis in the study of 445 patients

Variables	Sensitivity (%)	Specificity (%)	Positive predictive value	Negative predictive value
Male sex	76.0	56.0	49.0	81.0
WBC count > 12 000	68.7	63.3	73.9	57.1
Body temperature > 37.1ºC	71.6	67.2	76.8	61.0
History > 48 hours	72.9	56.2	68.3	73.7
Guarding	63.2	77.1	67.1	48.2
Rebound	56.0	70.6	74.3	80.0
Rigidity	59.8	54.5	86.2	90.2
Tenderness	60.1	60.6	84.2	88.4
Positive Murphy's sign	61.6	54.2	67.1	72.8
Bowel sounds	72.5	63.0	78.2	83.4

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Table 2. Results of stepwise logistic regression analysis of acute appendicitis associated with signs and symptoms

Variables	Regression coefficient B	Standard error of B	Relative risk	95% confidence interval	*p* value
WBC count	1.8286	0.296	6.22	3.48–11.11	0.0001
Rebound	1.0996	0.2211	2.99	1.94–4.63	0.0001
Rigidity	1.0393	0.3607	2.82	1.39–5.73	0.0040
Nausea	0.5633	0.2155	1.75	1.52–2.67	0.0090

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No-scalpel vasectomy as performed by a general practitioner/surgeon between 1990 and 1999

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Background: Compared to the relatively large incision required to expose the vas in the traditional vasectomy, the no-scalpel technique involves a small puncture. This paper describes one general practitioner/surgeon's experience performing the no-scalpel vasectomy (NSV) over a 10-year period in an office practice in Banff, Alberta.

Methods: Data were collected on men who had an NSV between October 1990 and December 1999. Sociodemographic information and surgical complications were recorded at the time of the procedure, which was carried out in either the physician's office or at a rural hospital. Follow-up information was gathered by examination, by telephone, or by contact with the patient's own doctor.

Results: Sample mean age was 37 years. A total of 666 vasectomies were performed, 662 using the no-scalpel technique. Six hundred and thirty-three NSVs were performed in the physician's office, and 29 were performed in the hospital. Complications included hematoma (0.7%) infections (1.6%), epididymitis (5.1%) and granuloma (2.2%). There were 5 known failures. Forty-two percent of the patients failed to have post-vasectomy checks for azoospermia. Noncompliance with this follow-up was associated with older age and lower occupational class.

Conclusions: NSV is an effective method of delivering the vas deferens and is easily performed by the physician in an office setting. It provides a safe and simple contraceptive option with few complications.

Contexte : Comparativement à l'incision relativement importante qu'il faut pratiquer afin d'exposer le canal pour effectuer une vasectomie traditionnelle, la technique sans scalpel nécessite une perforation minuscule. Ce document décrit l'expérience d'un omnipraticien–chirurgien ayant pratiqué pendant dix ans la vasectomie sans scalpel (VSS) dans un cabinet de médecin à Banff (Alberta).

Méthodes : On a recueilli des données sur des hommes qui ont subi une VSS entre octobre 1990 et décembre 1999. Les données sociodémographiques et les complications chirurgicales ont été consignées au moment de l'intervention, qui a été réalisée dans le cabinet du médecin ou à un hôpital rural. On a réuni de l'information de suivi au cours d'un examen, par téléphone ou en communiquant avec le médecin même du patient.

Résultats : Les sujets du groupe échantillon avaient en moyenne 37 ans. On a pratiqué au total 666 vasectomies, dont 662 au moyen de la technique sans scalpel. Six cent trente-trois VSS ont été pratiquées dans le cabinet du médecin et 29, à l'hôpital. Les complications ont inclus l'apparition d'un hématome (0,7 %), une infection (1,6 %), une épididymite (5,1 %) et un granulome (2,2 %). Il y a eu cinq échecs reconnus. Quarante-deux pour cent des patients n'ont pas fait vérifier leur azoospermie après la vasectomie. On a établi un lien entre l'inobservation de ce suivi, l'âge plus avancé et la catégorie professionnelle moins élevée.

Conclusions : La VSS est une façon efficace de dégager le canal déférent et elle est facile à exécuter par le médecin en cabinet. Il s'agit d'une méthode anticonceptionnelle sans danger et simple entraînant peu de complications.

Contents

Introduction

While oral contraceptives are a very popular method of contraception in Canada, recent reports indicate that male sterilization is on the rise.[1] One reason for this trend may be the increasing acceptability of the no-scalpel

vasectomy (NSV) to both patients and practitioners alike.[2,3] The NSV was developed in China by Dr. Li Shunqiang in 1974 with the intent of improving acceptance of vasectomy as a permanent contraceptive choice for men in that country.[4] It was introduced to other countries in 1986.[5] The no-scalpel technique has been described as somewhat more difficult to learn and as demanding a higher skill level relative to the traditional method.[5,6] However, advantages frequently attributed to the technique include fewer surgical and post-surgical complications, decreased operating and recovery times and avoidance of the usual surgical incision.[7]

The purpose of this paper is to describe the complications experienced by the NSV patients of a rural general practitioner/surgeon over a 10-year period. Sociodemographic factors associated with compliance at post-vasectomy semen checks are also examined.

Contents

Methods

The first author (I.R.M.) is a member of a group practice in the rural setting of Banff, Alberta. This practice serves approximately 12 000 patients, both from Banff and outlying areas. In addition to general family medicine services offered by the clinic, this author performs a wide range of general surgical procedures (e.g., appendectomies, varicose vein surgery, laparoscopic tubal ligation). Between October 1990 and December 1999, 666 vasectomies were performed. The majority of these were done in the office setting.

Procedure

Prior to the procedure, patients were given a comprehensive information package outlining the procedure, possible complications and after-care.

The main difference between the traditional vasectomy method and the NSV is the way in which the vas is delivered. This latter method has been described in detail by many authors.[5,8,9] In brief, following appropriate anesthesia, the vas is isolated and grasped through the scrotal skin using an extracutaneous vas

fixation clamp. The skin and underlying tissue are then punctured down to the vas, using dissecting forceps. The vas is skewered and manoeuvred out of the wound. At this point the vas is occluded in the physician's preferred manner, and the 2 ends are repositioned back into the scrotum. The procedure is repeated with the second vas using the same puncture site. Usually, no skin suture is required.

Local anesthetic or a para vasal nerve block is used. After 1.0 cm of the vas is excised, the ends are sealed with diathermy to a depth of 2.0 cm.

Post procedure

Patients were strongly encouraged to contact the physician if they experienced any problems after the procedure. They were advised to use other forms of contraception for their next 25 ejaculations and to have a semen analysis before resuming unprotected intercourse.

Sociodemographic information

Information on the patients' sociodemographic characteristics (age, marital status, occupational class, number of children) was collected at the time of their procedure. Information on complications (hematoma, infection, epididymitis, granuloma) and follow-up checks was collected by examination or by telephone, or by contact with the patients' doctors.

Complications

Hematoma

A mass near the vasectomy site, or bleeding causing a swelling under the wound in the scrotum. Onset within 24 hours of surgery.

Infection

Localized inflammation and tenderness with erythema or discharge. Onset within a few days of surgery.

Epididymitis

An inflammation of the epididymis involving all or most of that structure and principally that structure. Onset variable.

Spermatic granuloma

A persistent, hard, well-defined nodule. Onset 14–21 days after surgery.

Failure

Live sperm present in the semen analysis at follow-up.

Results

Of the 666 vasectomies performed, 662 were done using the no-scalpel technique. Due to problems isolating the vas, 4 were performed using the traditional, incisional technique. Of the 662 procedures, 29 were performed in the hospital. This was primarily due to this subset of men being extremely nervous and requiring sedation intravenously, or to the men having other surgeries performed at the same time. Mean age of the men was 37 years (standard deviation [SD] = 6; range 22–58 years). Of the 637 men for whom there was marital data, most were married or common-law (n = 590; 93%), 27 (4%) were divorced or separated and 20 (3%) were single. On average the men had 2 children (SD = 1; range 0–9). Of the 647 men for whom there was occupational data, 97 men (15%) were in professional occupations, 215 (33%) managerial or technical, 171 (27%) skilled, 92 (14%) partly skilled and 72 (11%) unskilled. Occupational classifications were based on a system used in the UK.[10]

One hundred and thirteen men (17%) had been referred by physicians and 544 (82%) were self-referred, having heard about the procedure through family or friends (n = 367; 55%) or media (n = 177; 27%). The source of 9 men is unknown.

The author began offering the NSV procedure late in 1990. The median number

of NSVs performed per year from 1991–1999 was 71 (interquartile range [IQR] 51–82).

Follow-up data on complications for the NSV group (n = 662) was available for 548 men (83%). These are summarized in Table 1.

Data for follow-up sperm checks was available for 527 (79%) NSV patients. Forty-two percent (220/527) of these patients refused or failed to comply with the recommended post-vasectomy checks for azoospermia. Factors associated with not having a follow-up included greater mean age ($p < 0.01$) and lower occupational class (skilled, partially skilled or unskilled vs. professional, managerial or technical; $p = 0.02$). Marital status and number of children were not significantly associated with having a follow-up sperm check.

Discussion

Several studies have reported on complications associated with the NSV,[2–4,11–17] however, there is substantial variation in the way in which such complications were defined, the manner in which they were assessed and the time period for which they were recorded. It has been suggested that only certain complications arising shortly after the procedure may be attributed to the method of accessing the vas (e.g., infection, bleeding, hematoma) while complications occurring later (e.g., epididymitis, sperm granuloma, failure) are more likely due to the manner in which the vas ends are treated.[12,18]

Complication rates for infection and hematoma appear to be the most consistently reported across studies of NSV. Hematoma rates have varied from 0% to 2.2% and infection rates have varied from 0% to 0.91%.[3,4,13,14] Overall complication rates, which have included sperm granulomas, epididymitis, "painful nodules" and vasal fistula, have ranged from 0.002% to 4.4%.[3,12,13]

Consistent with previous reports, the NSV procedure employed in this practice resulted in successful sterilization for the majority of patients. Complication rates for hematoma or infection were similar to previously reported rates for

NSV[3,4,13,14] and compare favourably to rates associated with the traditional method.[19] Complication rates for epididymitis, granuloma and failure are consistent to those reported for vasectomies regardless of the method of vas access used.[18,19]

One of the main difficulties encountered with the NSV is isolation of the vas.[5,7] Sokal and colleagues reported problems in 8.1% of NSVs compared to 4.6% of cases using the traditional method.[11] Although difficulty locating the vas has been reported for this technique, less than 1% of procedures had to be converted to open traditional vasectomy for this reason in this series.[11] It is noteworthy that in the current series, all 4 men in whom this difficulty was observed were markedly obese.

A few studies have compared the incidence of complications and adverse effects following the NSV to those following the traditional incisional method.[2,11,12,15–17] Regardless of the study design, across investigations that have compared the significance of the differences, the NSV has either compared favourably to the traditional method[2,10,16,17] or there has been virtually no difference in the incidence of adverse effects between the 2 techniques,[11,12,17] depending on the outcome assessed. Three of the studies reporting superior outcomes for NSV reported fewer infections[11,16,17] and 2 reported fewer hematomas.[11,16]

Martinez-Manautou and coworkers reported on the introduction of the NSV at the Mexican Social Security Institute.[15] Although they did not assess the significance of the differences in complication rates between the 2 techniques, the trend overall was for more complications to be associated with the traditional technique (28.1% vs. 15.5%). In their report, slightly more pain (8.7% vs. 8.3%) and "other" complications (3.5% vs. 1.6%) were associated with the NSV. The definition of "other" complications is unknown. The authors stated the complications observed with the no-scalpel technique would be reduced as there are always more complications in the early phase of training of a surgical technique.

Finally, the success of a vasectomy is assessed on the basis of post-vasectomy semen analysis to confirm azoospermia. Noncompliance with this follow-up procedure in men who have undergone NSV has varied between 15% and 50%.[3,11,14] It is disconcerting that 42% of patients in this study, for whom follow-up data were available, failed to have post-vasectomy checks for

azoospermia. Previously, noncompliance was found to be associated with family income and a similar association was found with occupational class in the present series. Compliance with semen analysis has been positively associated with years of marriage and family income.[14] It has been suggested that noncompliance may be associated with embarrassment at providing a specimen.[3] Alternatively, this may be due to patients perceiving the risk of surgical failure or of a subsequent pregnancy to be low.

Strengths of the present series include the fact that the same physician conducted all surgeries and that complication rates were based on actual follow-up contact with the patients or their doctors. This study is limited by the fact that the follow-up did not necessarily include a physical exam and thus the description of problems encountered may have been misclassified. Moreover, follow-up with the series was not complete, and this may have resulted in an underestimate of the complication rates. Similarly, the low compliance with post-vasectomy sperm counts may have resulted in an underestimate of the failure rate.

Supervised, hands-on training is recommended for learning this procedure. It has been recommended that physicians who already perform vasectomies need to complete 5 to 10 NSVs to become comfortable with the technique and those without such experience need to complete 10 to 15 procedures to become competent.[3] Reading, viewing instructional videos and attending education sessions would also assist in learning the procedure.[3]

Conclusion

The results of this study provide further evidence demonstrating that the NSV is a safe and effective method of permanent contraception and is easily performed in an office setting. This is of particular value to the rural patient whose access to such minor surgical procedures may otherwise be limited to large centres. Further evaluation of the procedure, including comparison to the incisional method, in controlled trials and economic assessment may serve to further establish NSV as the method of choice for the vasectomy procedure.

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Table 1. Complications observed in the no–scalpel vasectomy

Complication	*n*	%	95% CI
Hematoma (*n* = 548)	4	0.7	0.19–1.90
Infection (*n* = 548)	9	1.6	0.75–3.10
Granulomas (*n* = 548)	12	2.2	1.14–3.80
Epididymitis (*n* = 548)	28	5.1	3.42–7.30
Failure (*n* = 527)	5	1.0	0.30–2.20

CI = confidence interval

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The occasional diving accident

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With over 200 000 certified scuba divers in Canada, even the most remote lake may be host to a scuba diving accident. SCUBA (self-contained underwater breathing apparatus) refers to the gas storage tank and "regulator," which are designed to feed gas to divers at their ambient pressure. It is this breathing of gas mixtures at higher than normal "hyperbaric" pressures that entails a variety of health problems not normally seen by most physicians.

The steps to handling a diving problem are outlined here.

Step 1:
Understand the mechanism of injury

When handling a diving injury it is imperative to understand the mechanism of injury and the resources available to you. In the human body, the fluids are at a pressure equivalent to the surrounding or "ambient" pressure. When diving down to 34 feet of fresh water (equal to 33 feet of salt water) the pressure that surrounds the diver is double the pressure exerted by the atmosphere at the surface. At 68 feet the pressure triples, and so on. When pressure is exerted on gases, they compress. (Fluids transmit pressure but do not change in volume themselves.) A fixed amount of gas subjected to a doubling in the ambient pressure would compress to half of its previous volume and, correspondingly, when the pressure is halved the volume doubles. (You may remember this as "Boyle's Law.") Therefore, a 10-cc bubble of gas in the colon of a diver would compress to 5 cc at a depth of 34 feet of water. Conversely, if the bowel bacteria produce 10 cc of gas while our subject is at 34 feet the bubble would expand to 20 cc as he or she swims to the surface. These volume and pressure

changes may lead to a variety of medical problems — some minor, some potentially fatal.

To obtain assistance with diving-related problems the phone number that is probably most useful for a rural physician is the Diver Accident Network (919 684-8111). This organization will provide a link between the injured diver and the most appropriate hyperbaric facility and can also provide advice or link the physician with someone who can provide medical advice.

Step 2:
Understand gas embolism

The most devastating problem seen with expanding gas volume involves the lungs. The SCUBA apparatus feeds air to the diver at his or her ambient pressure, so a 300-cc breath taken at 34 feet will expand to 600 cc at the surface. Therefore, as a diver surfaces, gas expanding in the lung must exit via the trachea, or it may rupture into the pulmonary vein and from there advance into the left ventricle and into the systemic circulation. This produces a "clot" made of air, which produces a stroke as effectively as any blood clot. This is known as arterial gas embolism (AGE) or air embolism (AE).

Since air embolism is the result of gas rupturing into the systemic circulation the symptoms are virtually always sudden and immediate upon surfacing, as one would see with a thrombus that leaves a damaged heart ventricle and then produces a stroke. Remember that a diver who is unconscious on surfacing has an air embolism until proven otherwise. As with strokes, the victim can survive a small air embolism, but many air embolisms produce very large volumes of air within the systemic circulation, and this will be immediately fatal. The key difference is that in this case the "clot" can be compressed and it can also be rapidly reabsorbed in a recompression chamber, so treatment (discussed below) involves breathing the highest possible concentration of oxygen and immediate transfer to a recompression chamber. Even small embolisms often lead to secondary drowning since the victim will suffer neurological impairment while still underwater. Air rupturing from the lungs can also produce pneumothorax and subcutaneous emphysema, and these signs should be carefully searched for in any serious diving accident.

Step 3:
Understand decompression sickness

The second broad class of serious diving accident also involves the effects of pressure on gases, although more indirectly. The amount of gas that can dissolve in a liquid is proportional to the pressure within the gas and the liquid. The higher the pressure and/or the longer the exposure, the more gas that will be dissolved. (You may remember this as "Dalton's Law.") If the pressure is let out quickly (as when you uncap a bottle of champagne), the gas comes out of solution quickly and bubbles form in the liquid.

If 5 cc of nitrogen (recall that the air we breathe contains 78% nitrogen) can dissolve in the body fluids at the surface, then 15 cc of nitrogen can be dissolved at 68 feet of depth. A diver who has been at 68 feet long enough will have to bring 10 cc of nitrogen out of solution from her or his body fluids as she or he ascends. Bubbles form when this process occurs too quickly.

Decompression sickness (DCS) is the name given to the symptoms and signs produced by air bubbles in a diver who has stayed too deep for too long. The exposure time required to produce DCS at various depths is available from diving tables, which will almost always be available from the diver or his or her companions. Approximately 10% of divers will develop DCS if they go to the limits of allowable exposure. In rough terms, the exposure required to produce symptoms is many hours at 30 feet of depth, or 60 minutes at 60 feet, or 10 minutes at 100 feet.

DCS is distinguished from air embolism in a number of ways. It takes time for the bubbles to come out of solution and for symptoms to occur. Usually there is a delay of 15 minutes or more after surfacing before symptoms commence. Remember that symptoms that occur within the first 10 minutes of surfacing are air embolism until proven otherwise. It is rare for symptoms of DCS to begin later than 12 hours after ascent. DCS usually begins with pain in the joints and difficulty walking (giving the syndrome its popular name of "the bends"), although more severe cases can affect the lungs, producing a choking sensation, or the spinal cord, producing focal neurological deficits. DCS is rarely fatal, but it is very important to recognize and treat it appropriately and quickly in order to avoid long-term neurological problems.

Step 4:
Recognize minor problems, recognize serious ones

Ear and sinus problems are very frequently encountered by scuba divers. As ambient pressure increases, water is pushed in against the eardrum. Recall that

fluids, although themselves not compressible, can transmit increased pressure, so veins and arteries dilate in the body's air spaces and sinuses and will exude plasma or blood, unless counterbalanced by corresponding increases in the air pressure in the body cavities. Excess water pressure may also rupture the eardrum inwards, and water can then rush into the middle ear.

As the diver ascends, the air within the middle ear will expand and if the space is shared by fluid or blood the eardrum may be stretched outwards. Or, if the pressure is high enough the eardrum may rupture outwards, or else blood in the sinuses may be forced into the nasopharynx. The diver may then complain of earache, deafness, vertigo or blood from the nose or ear.

These problems, including a ruptured tympanum, all tend to settle with time and analgesia. Pain usually resolves within 12 hours or so, and a ruptured drum usually heals within 5 days. Antibiotics are not indicated, and as long as the diver is otherwise well, recompression is not necessary.

Treatment of diving accidents

Diving accidents are difficult to treat for non-experienced physicians, and it is highly recommended that physicians obtain expert advice as soon as possible from the Diver Accident Network. Immediate transfer to a recompression chamber is vital in air embolism or DCS.For the rural physician, initial treatment of these two conditions is similar.

The unconscious diver

a. Get expert assistance stat!
b. Begin treatment with the usual A-B-C approach and provide oxygen at the highest concentration possible.
c. Check for pneumothorax and consider carbon monoxide poisoning (from a contaminated air source).
d. Transport the patient from the field supine.
e. The definitive treatment is recompression in a diving chamber along with hyperbaric oxygen.
f. Remember the possibility of hypothermia.

The conscious diver

a. Perform a detailed history, including length of the last dive, depth reached, exact history of dives in the last 72 hours, time of onset of symptoms, presence of joint pain and a physical examination, including careful neurological assessment.
b. Provide oxygen at the highest possible concentration, plus fluids.
c. Obtain advice if symptoms, signs or exposure are significant.

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A primer on rural medical politics: 3. Action in Ottawa

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The opportunity for women to have their babies in their own rural communities could be sustained if the joint position papers on Training for Rural Family Practitioners in Advanced Maternity Skills and Cesarean Section[1] and on Rural Maternity Care[2] were implemented nationally. The major impediment to acting on these papers is the inability of our medical system to deal effectively with a central tenet of rural medical services: a generalist primary care physician functioning on a fluctuating level of primary, secondary and tertiary care.

The division of powers in our political system frustrates innovation in rural health care. The provinces have the responsibility for the delivery of health care but, as we have seen, they are severely limited in their rural options.[3] The federal government tries to restrict itself to health promotion and prevention measures, all the while limiting the transfer of health care funds to the provinces, which in turn react suspiciously at any hint of federal incursion in the health care services field. This is not a good atmosphere in which to raise such topics as rural obstetrics, anesthesia, surgery, or any other broadly skilled generalist field, particularly if there is a need (which appears essential) for pan-Canadian approaches. The various federal and provincial health committees are not well structured for rural challenges. What other federal avenues are open?

Office of Rural Health

The Office of Rural Health (ORH) was created in 1998 by a political edict from federal Health Minister Allan Rock and strong input from the Society of Rural Physicians of Canada (SRPC). With a tiny staff and no recurring budget, the ORH has no policy-making mandate within Health Canada. It can take no

initiatives or even gain the Minister's ear without passing through a collection of intervening bureaucratic hierarchies. Indeed, its designated role is limited to providing a "rural lens" on other Health Canada policies having to do with prevention, promotion and determinants of health. The ORH would risk severe reprimand were it even to dip a toe into provincial waters. It has a hard row to hoe, but has nevertheless made strides in advancing the concepts of rural health delivery within a bureaucratically hostile environment. With SRPC advocacy, the National Liberal Rural Caucus (NLRC) was able to secure $50-million in the 1999 federal budget for "rural and community health." In the ineffable manner bureaucracies have of whittling down initiatives they distrust, this translated into $2-million nationally for the ORH to dispense over 2 years in a "Rural and Remote Health Innovations Initiative", providing, of course, that it did not shake any trees or show any hint of favouritism. This money has largely been spent, and no further funds are on the near horizon.

Special Advisor for Rural Health

Another problem facing the ORH is the relative dearth of institutions properly constituted to receive rural health funding. There is no end of community groups with local rural health agendas, but as far as organizations with an ability to make national systemic changes is concerned, the field is limited to a few players. Many of them are the very academic institutions that had been unable to make lasting changes despite decades of rural health grants. Early on, the ORH made a conscious decision to help those academic centres that had demonstrated a strong rural interest but were usually without a faculty of medicine. These and others came together at a Rural Health Summit in Prince George, BC, in 1999. Their efforts, combined with SRPC political work, created a Special Advisor for Rural Health within the new and powerful Canadian Institute for Health Research. These and other initiatives of the ORH may result in a much needed and well funded research capability for rural health care.

The ORH has also been able to make the case within Health Canada for a rural voice to be included at the table during discussions and planning on the national health care front. So, when Allan Rock and many of the provincial health ministers asked to meet with the major medical organizations to discuss national physician numbers, the ORH hosted the conference. The SRPC presented in stature and time equal to the umbrella organization of the bemused medical groups (Canadian Medical Forum, Task Force 1). Similarly, the SRPC has been hoisted onto the management committee of Task Force 2 on Models

of Care. (More on these fearful sounding bodies in future issues — they have nothing to do with US naval warfare.) Lastly, the SRPC has been able to present directly to such groups as the Senate's Kirby Committee and the House of Commons Finance Committee, and a presentation to the Romanow Commission is in the works. Physicians are generally regarded with some suspicion by government officials, but the ORH has gone a little way to recognizing the SRPC as not being self-serving.

The ORH has now grown in size and has better acceptance within Health Canada, but only by keeping its head down and behaving according to the rules of its restricted mandate. It still needs strong political support from the Minister of Health, the NLRC and the Secretary of State for Rural Development, not to mention a stable, recurrent yearly budget. Then it has to be accepted by the provinces. Even with such support, funding and acceptance — by no means guaranteed — it will not be able to do anything directly about national implementation of the rural obstetrics joint position papers.[1,2]

Ministerial Advisory Council

There is some hope on the federal scene. A Ministerial Advisory Council (MAC) has been announced and had its first meeting Oct. 26, 2001. This should not be confused with the purely bureaucratic Advisory Committee on Rural Health that the SRPC has proposed. The MAC represents a way for a cabinet minister to formally seek advice independent of the bureaucracy, although the officials still have a support role. It has some 20 members with an expertise in rural health who are drawn from the community or the professions. The ORH serves a secretariat role to the MAC (thus giving the ORH something else to do, other than being a lens, now that the grant money has dried up). There is a budget substantial enough for the MAC to ask questions, contract research, seek answers and suggest policy to the minister. This could include policies of practical use for rural women wishing to bear children in their own communities. The MAC could also breathe life into a National Rural Health Strategy with, say, $300-million per year recurrent federal money going to the provinces. This money would specifically be earmarked for rural health care issues. Some would go to the universities for training programs, some to the communities for local needs and the rest would be used for addressing national systemic changes.

All federal political parties have a rural caucus made up of members of parliament and senators from rural ridings. The NLRC has produced a

document called "Toward Development of a National Rural Health Strategy", which leaned heavily on SRPC analysis and suggested solutions. The federal Cabinet also has a Secretary of State for Rural Development with a cross-cutting mandate that is well aware of the importance of proper health care to the economic development of Canada's rural communities. Some provincial officials are becoming more approachable and more realistic about accepting a pan-Canadian approach. A number of national rural community organizations have sensed the same, and other federal political parties have lent an ear.

So, there is hope after all for the joint position papers' recommendations[1,2] for rural childbearing women, if all these governments and bureaucratic and advisory structures come together with vision, will and cooperation. It's just not that easy — a big task, but possible. And the first question all the government and community groups ask is "What do the medical organizations and universities have to say about all this? Are they on side?"

We were hoping they wouldn't ask — but that is the subject of the next few articles.

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We invite physicians to speak out on issues that concern them. Please send Podium submissions to Suzanne Kingsmill, Managing Editor, CJRM, Box 1086, Shawville QC J0X 2Y0; cjrm@fox.nstn.ca

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Rural Life Skills 101

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Travelling locum

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There's been a lot of discussion about how to solve the problem of physician shortage in rural areas. One recurring and well recognized solution is the need to provide educational and social exposure to rural areas early in training.

To address the clinical issues, many steps have been taken at medical schools and in residency programs to improve the opportunity to practise in a rural setting. There has also been a growth in rural skills CME training for those already in practice.

What has not been pursued very well is the need to appropriately expose and train people for actually living in rural areas as opposed to simply working in them. All physicians (even in the most underserviced areas) have a life outside the hospital. It is important that new physicians are ready to make the most of this rural life.

To help achieve this goal we offer a list of life skills courses that communities and rural groups can offer to trainees and new graduates interested in rural medicine.

Steak, Pie, Soup and
More Moose 101

The motto of this course is "Live rural ... cook rural." Participants must bring their own moose (freezer space provided).

Toronto Bashing 101

Coming naturally to most (including native Torontonians), this course will be more of an opportunity to simply exchange your best slurs and worst stories of the city that Canada is rumoured to revolve around.

The end-of-term group project will include designing a Web site devoted to jokes about Toronto's decision to call in the military to clear snow.

Zen and the Art of Snowmobile Maintenance 101

Offered only in the Winter (August–June), this course will be a rural adaptation of a timeless literary classic.

Liquors of the North 101

Develop a sophisticated palate for the homemade wines of rural areas. Wines tasted are those recommended by an expert panel of frequent 2 a.m. visitors to rural emergency rooms.

(Optional liver function testing is offered at the time of course registration, and thiamine/vitamin K is supplied by the provincial liquor licence boards.)

Fish Gutting 101

Although this is an Introductory Level course, "Fish Gutting 101" assumes a working knowledge of the core skill sets of Untangling knotted reels, Getting worms on hooks, and Steadying a beer on the boat gunnel during swells. (For those not yet comfortable with these skills, please see "Fishing 101".)

This course focuses on the inevitable task at hand when a pleasant day on the water is spoilt by a fish taking your line. From Killing the fish, to Reclaiming your $30 lure, to Describing gutting and cleaning techniques, this course will also show you How to look busy when the job of cleaning the day's catch is being handed out.

Fishing 101

Whether you are joining a group of docs who just fish recreationally or a group that does all their CME at a fly-in fishing camp, this course will give you all the language and skills you need to fit in. An optional 2-day course covers Ice fishing as well.

(Participants will be strongly encouraged to also take the "How to look busy when the job of cleaning the day's catch is being handed out" portion of "Fish Gutting 101".)

Rural Flying 101

More of a support group for PTSD victims of small rural airlines and medivacs. No need to explain further — you know if you need this course.
(Transportation to this course provided by VIA.)

Your Life in a Box 101

This course is intended for locum physicians. By the end of the course you will be able to pack a complete set of textbooks, enough clothes for a maternity-length locum and equipment for 3 winter sports into an overhead carry-on.
(This course taught by author.)

Course participants may also be interested in an upcoming class: "Guide to Canada's Rural Hospital Cafeterias: the Good, the Bad, and the Salmonella."

By preparing new graduates to experience the riches of rural life, communities and rural groups will go a long way to helping their current recruitment and retention initiatives. Other suggestions for Rural Life Skills Courses welcomed at email address provided here.

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The new CMA Web site

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"I got my education, out behind the barn, I ain't a-fooling, no sir-ee. Passed each examination, out behind the barn, but it almost made a wreck out of me" — Little Jimmy Dickens, c. 1950

The Canadian Medical Association has revamped its Web site. Some of the site's most useful features for rural physicians are reviewed here.

Much of the material on the Web site is public. Any Canadian physician or medical student can register to use additional resources. A few sections are only available to CMA members. To register, click on "Sign Up Now" link on the home page. You will need to know your CMA registration number.

The major sections of the Web site are listed in the top menu on the home page, with subsections listed on the left. If you can't find what you're looking for, try "Search." If you discover an error or a bad link, use the "Contact Us" link to tell the Webmaster about it.

To get an overview of the new site, click on "Site Map" from the home page. (You may wish to print this page for later reference.) Described below are some of the sections listed on the "Site Map" page.

(Site Map) Home Page

My CMA Desktop: My Profile

Here, you can update your registration information or change your password.

CMA in Action:
Who We Are and What We Do

Information about the CMA's provincial divisions and affiliated specialist societies. There are also descriptions of various association activities.

CMA Community

Sections for special interest groups.

Stay Informed

Journals & Magazines

The electronic edition (eCMAJ) of the Canadian Medical Association Journal contains the full text of all articles back to 1995. There are links to the other journals published by the CMA, and to the full text of articles from Patient Care and Medical Post Feed (The Medical Post also has its own Web site).

Reference Books

Includes Cecil Textbook of Medicine and Nelson Textbook of Pediatrics.

Osler

Contains a link to over 40 online textbooks and other re

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You like us!
CJRM Survey results

CJRM 2002;7(1):48

CJRM recipients were invited to respond to an informal readership survey in September 2001. Of the 255 physicians from across Canada who returned the mail-in survey,

- 99% read CJRM.
- 91% are very or somewhat satisfied with CJRM.
- 92% read all or read selected articles in CJRM. They find the most important sections are practical information for clinicians (94%), photographs or drawings of procedures (89%) and medical education articles (89%).
- Rural physicians read CJRM more thoroughly than any national publication they receive. 31% of respondents read CJRM from cover to cover, whereas only 8% read other general interest medical publications from cover to cover.
- 32% of respondents said ads in medical journals are one of their top 3 sources for information about pharmaceutical products: 83% cited CME events; 55% cited visits from pharmaceutical reps, and 55% cited other physicians.
- 78% of respondents were GPs/FPs. When asked about their scope of practice,
    - 17% practise anesthesia;

    - 88%, emergency medicine;
    - 50% perform/assist in surgery;
    - 47% practise obstetrics; and
    - 80% practise psychiatry or psychotherapy.
    - 87% of respondents provide specialty medical services or are specialists. Yet, 35% indicated they don't receive or don't read specialty journals.

- 49% of respondents practise medicine more than 150 km from the nearest teaching hospital.

Thanks to all who participated.

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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 the following areas will be considered for publication.

- Original articles: research studies, case reports and literature reviews of rural medicine
- Commentary: editorials, regional reviews and 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 living, essays)
- Cover: artwork with a rural theme

Manuscript submission

Submit 3 hard copies of the manuscript and a copy on computer disk to Editor, Canadian Journal of Rural Medicine, Box 1086, Shawville QC J0X 2Y0; 819 647-2972, fax 819 647-2845, cjrm@fox.nstn.ca. 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 the 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 the following documents:

Digital Art Submission for Editorial Articles [PDF]
Postscript to PDF (Adobe Acrobat Distiller) [PDF]
Digital camera specifications[PDF format]

References

Please ensure that the 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.

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RuralMed

RuralMed is an Internet email discussion group dedicated to rural medicine. It was established by the Society of Rural Physicians of Canada in April 1995, with the cooperation of the McGill University Computing Centre. Although its focus is Canadian, its membership is international.

To participate in RuralMed you must be able to send and receive email. Subscription is by request to the listowner. Simply send a message to admin@srpc.ca.

Include your full name and email address. If you include a short biography it will be posted to the list as your introduction. You can also access both the RuralMed archives and a RuralMed subscription form through the SRPC home page.