Summer 2004 / Été 2004

Other Issues

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Traditional Iraqi carpet

Purchased in Irbil, Northern Iraq,
November 2003
See also the report by Len Kelly and
colleagues on their November 2003 trip to Iraq (**page 178**).

Photo by Len Kelly, 2003

Preserving the "team" in "teamwork"

John Wootton, MD
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Scientific Editor

CJRM 2004;9(3):141

If ever there was an overused "buzzword," it is "teamwork." It's a brave soul who dares to raise objections to participating in a "team effort," and unless I'm careful, this editorial, in spite of the fact that it has not yet explained itself, risks having raised the hackles on many a neck already!

It should first be said that teamwork is what rural physicians do best, and that it has always been present, if unacknowledged. When I first started practice in rural Quebec, survival would have been unthinkable without the teamwork evident among the doctors, nurses and other staff. This state of affairs is undoubtedly present and thriving in many more places than I personally know.

So what's the problem? In 20 years of practice I have seen my team grow, and change from 4 FPs to 17 serving a catchment area of 15 000. Paradoxically the fondest wish of small teams (to grow and share the burden -- whatever it is -- with others) sows the seeds of future instability at the same time. A colleague illustrated this to me recently on the back of a napkin:

- a group of 2 has 1 relationship to maintain
- a group of 3 has 3 relationships to maintain
- a group of 4 has 6
- a group of 5 has 10
- and a group of 10 has 42 relationships to maintain.

'Nuff said.

Thinking about teams in this way reveals behaviours that are potentially destructive. For instance, why is it that as the number of physicians available for a call schedule increases beyond a certain point, the difficulty in covering an unanticipated hole in the schedule goes up, rather than down?

I suggest that it is because larger teams lose the capacity to look after the team as a whole. Members of large groups participate in order to reduce the personal burden of the activity in question, usually call of some kind. Although there is nothing wrong with seeking

balance in one's life, it is easy to lose track of the fact that if you are part of a group that is responsible for the health care of a defined population (as is the case in most rural areas) you are also responsible for the health of the group providing that care. Without this you will succeed in discharging your responsibilities only when historical accident provides such a superabundance of resources (financial or human) as to obviate the necessity for the flexibility that sustains smaller groups.

Are there strategies to minimize these negative tendencies? Perhaps large groups should be subdivided into smaller groups, which function to some extent independently. This divides both the work and the groups. Whatever the approach (and the solutions are likely to be very site specific), it is certain that unless there is a common, defined and explicit will to support the group as a whole, teamwork cannot be sustained and relationships among colleagues risk deteriorating into a quagmire of rules, regulations and special circumstances. It won't work better that way -- it won't work, period!

Conserver «l'équipe» dans le «travail d'équipe»

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CJRM 2004;9(3):142

S'il y a une «expression dans le vent» dont on a abusé, c'est bien le «travail d'équipe». Brave celui qui osera s'opposer à participer à un «effort d'équipe»! Si je manque de prudence, cet éditorial, même s'il ne s'est pas encore expliqué, risque d'avoir hérissé déjà beaucoup de lecteurs!

Il faut d'abord dire que travailler en équipe, c'est ce que les médecins ruraux font le mieux. Cela a toujours été le cas, même si on ne l'a pas reconnu. Lorsque j'ai commencé à pratiquer en milieu rural au Québec, il aurait été impensable de survivre sans le travail d'équipe manifeste entre les médecins, les infirmières et les autres membres du personnel. Cette situation existe certainement à beaucoup plus d'endroits que j'en connais personnellement et y est florissante.

Quel est le problème, alors? En 20 ans de pratique, j'ai vu mon équipe grossir et passer de 4 à 17 MF desservant un bassin de 15 000 personnes. Le plus cher désir des petites équipes (grossir et partager le fardeau -- quel qu'il soit -- avec quelqu'un d'autre) porte aussi en soi le germe de l'instabilité future, ce qui est paradoxal. Un collègue m'a illustré récemment ce phénomène en griffonnant au verso d'une serviette de table :

- un groupe de deux personnes a une relation à maintenir;
- un groupe de trois en a trois;
- un groupe de quatre en a six;
- un groupe de cinq en a dix;
- un groupe de 10 en a 42.

Vous voyez ce que je veux dire.

Penser ainsi au travail d'équipe révèle des comportements qui peuvent se révéler destructeurs. Pourquoi se fait-il, par exemple, que lorsque le nombre de médecins disponibles pour établir un horaire de garde augmente au-delà d'un certain point, il devient plus difficile et non plus facile de couvrir une absence imprévue?

À mon avis, c'est parce que les grosses équipes perdent la capacité d'aborder l'équipe comme un tout. Les membres de grands groupes participent afin de réduire le fardeau personnel que leur impose l'activité en cause, habituellement une période de garde. Même

s'il n'y a rien de mal à chercher à établir
un équilibre dans sa vie, il est facile d'oublier que si vous faites partie d'un groupe responsable des soins de santé d'une population déterminée (comme dans le cas de la plupart des régions rurales), vous avez aussi une responsabilité à l'égard de la santé des membres du groupe qui dispensent les soins en question. Sinon, vous ne réussirez à vous acquitter de vos responsabilités que lorsqu'un accident historique offrira une telle abondance de ressources (financières ou humaines) que la flexibilité qui permet aux groupes plus petits de survivre ne sera plus nécessaire.

Y a-t-il des stratégies qui permettent de réduire au minimum ces tendances négatives? Il faudrait peut-être subdiviser les gros groupes en groupes plus petits et jusqu'à un certain point autonomes. Ce qui subdiviserait à la fois le travail et les groupes. Quelle que soit la démarche (et les solutions seront probablement très différentes selon les endroits), il est certain que sans une volonté commune, définie et claire d'appuyer le groupe comme un tout, il est impossible de maintenir un travail d'équipe, et les relations entre les collègues risquent de se dégrader en une fondrière de règles, règlements et circonstances spéciales. Ce qui ne fonctionnera pas mieux mais ne fonctionnera tout simplement pas!

President's message: Donut-defined rurality

Trina Larsen Soles, MD
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April saw a very successful 13th Annual Rural and Remote Medicine Conference in Quebec City. "Mastering Many Skills / La maîtrise de plusieurs compétences" brought 300 rural doctors together to experience rural-specific CME. I met doctors from across Canada, from a wide variety of practice situations, and wondered about what we have in common. What exactly makes us rural doctors?

One of the challenges for those of us working in rural medicine is trying to explain to people what rural really means. If we can't tell bureaucrats and governments what rural is, then how can we convince them to give us the resources we need? *Webster's* defines "rural" as "having to do with the country." Canada Post defines rural as having a zero as the second digit of your postal code. Some define rural as having a core population of less than 10 000. Others define it as an area where the population served is larger in the outlying area around a community than within the community itself.

An added layer of complexity is generated by the term "remote." Remote is easier to define and usually means a place 3 or 4 hours from the next largest community or higher level of care. Our Canadian terrain and climate mean access times for one community may vary greatly with the season and the weather, which may further complicate the issue.

I have found the extremes easy to define. The problem lies with the in-betweens. My personal rating scale is influenced by retail opportunities. If your community has a Costco you are not rural. You may be northern, or isolated, but you cannot be rural. Canadian Tire is usually okay -- you can still be rural. Home Hardware? Definitely rural. In the past a McDonald's meant urban, but new mini McDonald's have sprung up in smaller towns, competing with the ubiquitous Dairy Queen and A&W, which were the mainstay of small town fast food. Tim Hortons is more problematic. You can probably still be rural with a Tim Hortons coffee and donut franchise, but definitely not if you have Starbucks!

In reality, "rural" is a continuum. Rural is not just where you practise, but how you practise. It is an attitude about how you do medicine. In rural medicine it is important to do the best you can, with the tools and skills present in your community. Rural is knowing what you can't do, and how to access care for your patients who need more than you can provide. Rural medicine is dynamic and challenging and has the potential to be the best job in the world. The only real challenge is to convince governments and universities to give us the tools and the people we need to do our job.

That is why it is important to define rural. We must be able to articulate who we are in order to convince the bureaucrats to provide the resources -- both human and material -- to effectively perform our job. This is why we have the SRPC. Our challenge is to work together to accomplish this goal.

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Message de la présidente : La ruralité : de la périphérie au centre

Trina Larsen Soles, MD
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La 13e Conférence annuelle sur la médecine en milieu rural et éloigné, tenue en avril à Québec, a connu un franc succès. La conférence avait pour thème «La maîtrise de plusieurs compétences / Mastering Many Skills» et a réuni 300 médecins ruraux pour leur permettre de vivre l'EMC spécifique au milieu rural. J'ai rencontré des médecins de toutes les régions du Canada, de toutes sortes de milieux de pratique et je me suis demandé ce que nous avions en commun. Qu'est-ce qui, exactement, fait de nous des médecins ruraux?

Un des défis que doivent relever ceux d'entre nous qui travaillent en milieu rural consiste à essayer d'expliquer ce que veut vraiment dire le mot rural. Si nous ne pouvons faire comprendre aux fonctionnaires et aux gouvernements ce qu'il veut dire, comment alors pouvons-nous les convaincre de nous donner les ressources dont nous avons besoin? Dans Le Petit Robert, «rural» veut dire «qui concerne la vie dans les campagnes». Pour Postes Canada, rural signifie avoir zéro comme deuxième chiffre de votre code postal. Pour certains, rural veut dire qui compte une population de base de moins de 10 000 habitants. D'autres considèrent qu'il s'agit d'une région où la population desservie est plus importante en périphérie d'une communauté qu'à l'intérieur de celle-ci.

Le thème «éloigné» ajoute une strate de complexité. Il est plus facile à définir et signifie habituellement un endroit situé à trois ou quatre heures de route de la grande ville ou du niveau de soin supérieur les plus proches. La géographie et le climat du Canada signifient que les temps d'accès pour une communauté peuvent varier énormément en fonction de la saison et de la température, ce qui peut compliquer encore davantage la question.

J'ai trouvé les extrêmes faciles à définir. Le problème se trouve entre les deux. Les possibilités d'achat au détail jouent sur mon échelle d'évaluation personnelle. Si votre communauté a un Costco, ce n'est pas une communauté rurale. Elle se trouve peut-être dans le Nord ou est peut-être isolée, mais elle ne peut être rurale. Canadian Tire, ça va habituellement -- vous pouvez quand même être rural. Home Hardware? Certainement rural. Dans le passé, un McDonald's signifiait un milieu urbain, mais de nouveaux mini McDonald's font leur apparition dans des petites villes pour faire concurrence aux omniprésents Dairy Queen et A&W, sur lesquels reposait la restauration rapide de la petite ville. Tim Hortons est plus problématique. Vous pouvez quand même probablement demeurer rural avec une franchise de beignes et café Tim Hortons, mais certainement pas avec Starbucks!

En réalité, le mot «rural» représente un continuum. Ce n'est pas où vous pratiquez, mais comment vous le faites. C'est une attitude face à la façon de pratiquer la médecine. En médecine rurale, il importe de faire de votre mieux avec les outils et les compétences qui existent dans votre communauté. Rural veut dire savoir ce que vous ne pouvez pas faire et savoir où trouver les soins pour les patients qui ont besoin de plus que ceux que vous pouvez
leur offrir. La médecine rurale est dynamique et stimulante et pourrait être le meilleur emploi au monde. Le seul défi réel consiste à convaincre les gouvernements et les universités de nous donner les outils et les ressources humaines nécessaires pour faire notre travail.

Voilà pourquoi il importe de définir le mot rural. Nous devons pouvoir préciser qui nous sommes afin de convaincre les fonctionnaires de nous fournir les ressources -- tant humaines que matérielles -- dont nous avons besoin pour faire efficacement notre travail. Voilà pourquoi nous avons la SMRC. Notre défi consiste à conjuguer nos efforts à cette fin.

Correspondance: Dr Trina Larsen Soles, CP 1170, Golden BC, V0A 1H0

OBITUARY

CJRM 2004;9(3):145

Joseph Daniel Johnston, BSc, MD, FACS, FRCSC 1947 -- 2003

The Johnston family, Woodstock, NB, and rural surgery grieve the unexpected death of Dr. Joe Johnston on Dec. 18, 2003. As an integral part of a large family of 12 siblings and probably the largest medical family in Canada (seven doctors -- 4 rural) Joe sought to be individualistic, charismatic, different. Not for him the mundane or routine -- he chose to be a rural surgeon, where he would be part of an essential team, yet have his own space. He did hips, scopes, cesareans, pacemakers, orthopedics and trauma -- whatever was most needed in his community. In the rural and remote areas of Canada he sought risk, diversity, adventure and wilderness -- the essence of a rural Canadian Doc.

Joe's search for adventure led him around the world. He worked in Rhodesia, hiked through Afghanistan and worked in Alice Springs, Australia. He graduated from Dalhousie Medical School in 1972 and returned to do surgery, where he met and married Cathy McShane. Along with his wife he also leaves behind two daughters, Katie and Theresa.

After becoming a surgeon Joe sought the challenge and adventure of the Northwest and went to Whitehorse for 6 years. In 1987 he moved to Woodstock. His colleague, Dr. Mike Chandra, and OR staff called him "a keen and exceptionally gifted surgeon" who "was willing to face the many challenges as a rural surgeon like his father many years before. . . . he had a special ability to leave a memorable impression with each and every person who had the honour to meet him. . . . Through a life-long quest of learning, he constantly kept abreast of new and innovative surgical techniques. His uniquely diverse abilities provided his patients the opportunities to undergo procedures rarely performed outside larger centres."

But at the heart of Joe's life were people; life just didn't exist without his family, his friends, his colleagues, his community and his place in God's playground -- the great outdoors. Performing was a big part of Joe's personality -- who can forget his impersonation of Elvis at the SRPC conference in Kelowna? And some of his best performances were in the Woodstock "Operating Theatre." But Joe performed for a reason. He kept things stirred up because it was important for him to see that everyone was having a good time. For him it was always about people enjoying other people.

He will be remembered fondly for his eclectic interests, his

infectious sense of fun and for his diverse surgical skills. Thanks Joe -- thanks for the joy, the friendship and for making that difference in the lives of all who knew you. You will be missed.

Mary Johnston, BSc, MSc, MD

Discharges against medical advice: a community hospital's experience

Heidi Seaborn Moyse, MD, CCFP
William E. Osmun, MD, CCFP

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Objectives: To understand the characteristics of patients who leave hospital against medical advice (known as "discharges against medical advice" [DAMA]) in a small community hospital and to study how these patients compare to current literature on the topic. To evaluate chart documentation pertaining to such discharges.

Methods: A retrospective chart audit was performed, covering a 2-year period, on patients who had discharged themselves against medical advice. The data were compared to the general patient population of the same period. Evaluation of DAMA documentation was also conducted by chart survey.

Results: The rate of DAMA in the study hospital was found to be 0.57%, and the average length of stay was 2.8 days. Patients who leave hospital against medical advice differ from the general patient population: they include a higher proportion of males ($p = 0.007$), demonstrate a different age distribution ($p < 0.001$), have shorter stays in hospital ($p < 0.001$), and have a considerably greater frequency of substance abuse ($p < 0.001$) and psychiatric conditions ($p < 0.001$) associated with their admissions. DAMA documentation was included in the charts of 81.6% of patients involved, but only 22.9% of these charts included documentation with respect to patient competency.

Conclusion: Patients who leave hospital against medical advice represent a high-risk population: they suffer a greater incidence of mental illness and substance abuse. Potential interventions are limited, but influence strategies may have a role. Early identification of patients at risk may facilitate this process, thereby decreasing the occurrence of DAMA and improving health outcomes. More consistent and comprehensive documentation is needed for these patients.

Objectifs : Comprendre les caractéristiques des patients qui quittent l'hôpital à l'encontre de l'avis de leur médecin (en anglais, discharges agains medical advice, ou DAMA) dans un petit hôpital communautaire et comparer ces patients aux publications courantes sur la question. Évaluer la documentation contenue dans les dossiers des départs en cause.

Méthodes : On a procédé à une vérification rétrospective, portant sur deux ans, des

dossiers de patients qui étaient partis de leur propre chef, à l'encontre de l'avis de leur médecin. On a comparé ces données à celles de la population générale des patients au cours de la même période. On a aussi évalué la documentation des départs en question en analysant les dossiers.

Résultats : On a constaté que le taux de ces départs dans l'hôpital à l'étude s'établissait à 0,57 % et que le séjour durait en moyenne 2,8 jours. Les patients qui quittent l'hôpital en dépit de l'avis de leur médecin diffèrent de la population générale des patients : ils comportent un pourcentage plus élevé d'hommes (p = 0,007), leur distribution selon l'âge diffère (p < 0,001), leur séjour à l'hôpital est plus court (p < 0,001) et ils ont beaucoup plus souvent des problèmes de toxicomanie (p < 0,001) et psychiatriques (p < 0,001) liés à leur admission. La documentation du départ était incluse dans le dossier de 81,6 % des patients en cause, mais seulement 22,9 % des dossiers en question comportaient de la documentation sur l'aptitude du patient.

Conclusion : Les patients qui quittent l'hôpital à l'encontre de l'avis de leur médecin représentent une population à risque élevé. Ils présentent une incidence plus élevée de problèmes de maladie mentale et de toxicomanie. Les interventions possibles sont limitées, mais les stratégies d'influence peuvent avoir leur place. L'identification rapide des patients à risque peut faciliter le processus, réduire ainsi l'occurrence de DAMA et améliorer les résultats. Il faut documenter le cas de ces patients de façon plus uniforme et complète.

At the time this work was completed, Dr. Seaborn Moyse was a 2nd-year family medicine resident in the Rural and Regional Program of the University of Western Ontario, London, Ont.

Dr. Seaborn Moyse has just completed the CCFP-Emergency Medicine Program at the University of Toronto, Toronto, Ont.

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Introduction

Patients who leave the hospital against medical advice, referred to as "discharges against medical advice" (DAMA), are both a concern and a challenge for individuals in the health care field. Patient non-compliance has the potential to result in harm to the individual's health. Professional liability is also a concern for physicians caring for these patients.

Despite the widespread nature of this problem, there has been little study devoted to it. Interest in this area has generally focused on large urban hospitals and on specific patient groups, such as the general medicine service or psychiatric patients.

Previous studies have demonstrated a variety of results. A recent Canadian study by Hwang and colleagues[1] investigated rates and predictors of readmission among patients from a general medicine service who left hospital against medical advice (AMA). They found it difficult to predict those at risk for readmission, but did note a significantly higher risk of

readmission within 2 weeks of the discharge. This study noted a significantly higher occurrence of a history of alcohol or drug abuse in those patients who left hospital AMA, with a prevalence of 70% in this group. Additionally, being male and having a history of alcohol abuse were determined to be significantly associated with readmission to hospital within 15 days.

In a study done in Baltimore, 1.0% of all discharges were found to be AMA, with an average length of stay of 2.3 days. Substance abuse and male gender were found to be strongly associated with DAMA, and readmissions within 30 days were found to be much more common.[2]

The prevalence of DAMA in a study involving Delaware hospitals was found to range from 0.8% to 1.2% of all discharges.[3] From the general medical service of Rhode Island Hospital, this rate was 2.2% during a 6-month period studied, and the average length of stay for these patients was 3.9 days.[4] Data published from a study in Australia indicated a DAMA frequency of 1.5% of separations from hospital.[5]

A large study done in a general medical service of an urban teaching hospital in Boston identified patients who left hospital AMA as being younger, more often male and more often having no personal attending physician, when compared to a control group. In this group, 54% of patients were readmitted during the 12-year study period.[6]

The objective of this study is to identify characteristics of hospital patients who discharge themselves AMA. This study will also examine the chart documentation related to DAMA, as well as the rate of return to the hospital and that of previous DAMA in this population. Interventions will be proposed to limit legal liability and the incidence of DAMA.

Methods

Study site

Strathroy Middlesex General Hospital (SMGH) is a community hospital in rural southwestern Ontario. It serves a catchment area of approximately 35 000 people, who live in the northwestern region of Middlesex County, the eastern region of Lambton County and in the municipality of Strathroy, which has a population of approximately 12 000. SMGH has a capacity of 87 beds, of which 55 are acute care and 32 are chronic care, and provides medical, surgical, psychiatric, obstetric, gynecologic and pediatric inpatient care, as well as emergency services.

Study sample

A retrospective chart review was performed on consecutive discharges from SMGH between Apr. 1, 2000, and Mar. 31, 2002. During this time, there were a total of 6186 discharges; of these discharges, 35 were identified as DAMA. These 35 were compared to the remaining 6151 discharges for analysis.

The discharge was chosen as the unit of analysis and, therefore, patients who were involved in 2 DAMA or, similarly, in 2 or more formal discharges during the study period were counted as 2 or more outcomes accordingly. Also, deaths were not excluded from the formal discharge data due to difficulty extracting this data from the summary reports and statistics.

Data collection

Charts of patients who left hospital AMA were audited manually, and data were collected on age, gender, diagnosis, length of stay in hospital, discharge date, whether the attending physician was the patient's family physician, and the diagnosis of substance abuse and/or of a psychiatric condition related to the admission. Data on age and length of stay were then grouped using the Canadian Institute for Health Information categories for analysis purposes.

The same data were collected for the group of patients who had been formally discharged. This was done using a variety of methods. Most information was gathered either from discharge analysis summary reports or from the hospital's computerized medical record system. The prevalence of substance abuse and of psychiatric diagnoses was determined from extensive manual review of hospital admission data, arranged by ICD-9 (*International Classification of Diseases*, 9th rev) classification. Unfortunately, the proportion of patients who were admitted with their family physician as their attending physician and who were formally discharged was unavailable from the system for comparison purposes. Therefore, 6 months of printed discharge data were manually reviewed to arrive at an estimate of this proportion for all admissions.

In addition to the information already identified for comparison, further observations were noted for the DAMA group by manual chart review. The presence of DAMA documentation (i.e., an AMA form, signed by the patient), documentation with respect to competency of the involved patients and any prior indication of DAMA noted during the admission in the progress notes, were recorded during the data acquisition. The charts were also reviewed for previous DAMA from the study hospital and for return visits to the hospital, either for readmission or to the emergency department, within 3 months of discharge.

Statistical analysis

Characteristics of the 2 patient groups, those with a record of DAMA and those with formal discharges, were compared using the chi-squared test. Significance of these characteristics was established by the determination of p values < 0.05. Descriptive data and frequencies were also tabulated for the DAMA group.

This study was approved by the Office of Research Ethics of the University of Western Ontario, London, Ont.

Results

There were a total of 6186 discharges from SMGH during the 2-year period studied. Of these, 35 (0.57%) were DAMA. Thirty-two patients accounted for these 35 discharges, with 3 patients each being involved in 2 DAMA during this time.

The average length of stay of DAMA patients was 2.8 days, compared to 5.2 days for the rest of the hospital admissions during the study period ($p < 0.001$).

Patients who left hospital AMA were more likely to be male ($p = 0.007$) and within the 35- to 49-year-old age group ($p < 0.001$) (**Fig. 1**). The length-of-stay distribution of patients leaving hospital AMA was significantly lower than for other admissions ($p < 0.001$) (**Fig. 2**). DAMA patients were also noted to have a high incidence of substance abuse and of psychiatric conditions associated with their admission, which was statistically significant when compared to the formal discharge group ($p < 0.001$). There was no significant difference found between patient groups with respect to discharge month or day of the week (**Fig. 3**).

Of the patients who were DAMA, a standard AMA form was completed by the patient in 81.6% of the cases, but only 22.9% of their charts included any comment with respect to evaluation of patient competency. Over one-third (34.3%) of this patient population had some prior indication of the DAMA, such as threatening to leave or significant conflict with staff.

Chart review of this patient group also revealed that 28.6% of these patients had had a previous DAMA from our hospital. Almost half (48.6%) of these patients returned to this hospital, either for readmission or to the emergency department, within 3 months of their discharge.

Data revealed that 42.9% of DAMA patients had their family physician as the attending physician during their hospital stay. It is important to note, however, that some of these patients left prior to the physician's first visit. In a 6-month period, of the 1629 patients admitted to SMGH, 80.6% were attended by their family physician, a statistically significant difference from the DAMA patient group ($p < 0.001$).

Results specific to the DAMA group of patients are included in **Table 1**.

Discussion

Patients who leave the hospital AMA create a challenge for individuals in the health care field. This type of patient non-compliance limits appropriate and comprehensive hospital treatment, thereby putting patients' health at risk. This is a universal problem, plaguing both rural and urban hospitals. This study found a DAMA rate of 0.57%. Previous studies of urban hospitals[2-5] have also demonstrated higher rates of DAMA than was found in this community hospital. Whether or not this rate compares to other rural or community hospitals is unknown at this time due to the scarcity of data available.

This research cannot draw any conclusion regarding reasons for the lower rate of DAMA in our hospital when compared with the literature. However, contributing factors may include familiarity in a small community, limited options for hospital or doctor shopping, or family physicians who care for their patients in-hospital as the attending physicians.

In accordance with previous studies, those patients who left hospital AMA were more often male and had a significantly different age distribution, with a mean age of 46.2 years. The length-of-stay distribution for DAMA patients is consistently skewed toward the shorter stay, with the average length of stay of the non-DAMA group almost double that of the DAMA patients in this study, at 5.2 days and 2.8 days, respectively. The admissions of these individuals frequently were related to substance abuse and psychiatric conditions, characteristics previously determined to be associated with an increased rate of DAMA. This indicates a particularly vulnerable patient population that is placing additional non-compliance barriers in the way of their health.

There does not seem to be a seasonal influence on DAMA or a significant relationship to a particular day of the week. However, these findings are based on the small sample size available and these factors might prove to be contributory in a larger study.

Although the identified characteristics more common with DAMA patients are limited, they nevertheless may help in identifying those patients at risk. If patients are identifiable, the opportunity for intervention exists. "Changing the behaviour of a competent adult in a free society requires exercising influence but not control."[7] A recent article by Redelmeier and Cialdini[8] discussed 7 principles of influence (reciprocation, concession, consistency, endorsement, liking, authority and scarcity), which are accepted and used in psychology and in the business world, and applied them to medical practice. They reviewed

fundamental human ingrained responses that are the foundation of most influence strategies. These have a strong effect on behaviour without the need for conscious deliberation, and forces in society are already employing such influence on individuals, with both positive and negative effects. Just as advertisers use deadlines to create a sense of urgency in consumers, and contract negotiators structure their demands to allow room for concessions, physicians who identify patients at risk of DAMA can make use of similar psychological techniques to encourage patients to remain in hospital until deemed ready for formal discharge. Knowledge and understanding of these principles provides the tools for physicians in their effort to help patients alter their behaviour toward making beneficial choices. As the authors discuss, this skill may be necessary in the medical field so that staff can provide effective care.[7]

Unfortunately, the short length of stay of patients who leave hospital AMA offers a limited time for influential strategies to be effective. Also, given the abbreviated length of stay of this patient population, other strategies of intervention may prove very difficult to design. It is, therefore, important to target those individuals with any indication of DAMA during their hospital stay in an attempt to decrease their risk of such non-compliance by communicating extensively with respect to all facets of care, while avoiding conflict, and providing a caring and accepting environment for the patient.

Comprehensive documentation has become increasingly important, including that pertaining to DAMA. As with any form of patient non-compliance, the record-keeper must be especially conscientious with respect to documentation. This will assist in defending against liability implications.

Many hospitals have a release form for patients to read and sign prior to leaving hospital AMA, relieving the hospital and medical staff of any responsibility related to the patient's decision or its consequences. However, as with any medical document, the patient must be determined to be competent at the time of its completion to validate the form and signature. In this study, despite the presence of completed release forms in the charts of most DAMA patients, less than 25% of the charts included any record of a physician assessment of patient competency. One challenge that arises is that patients may not always decide to leave hospital when a physician is available to assess competency, thereby making this assessment difficult to fulfill at times. Nevertheless, comprehensive documentation should be encouraged and reinforced.

Limitations

This study has a number of limitations. The conclusions drawn may not be generalizable to other hospitals because the study was conducted at a small community hospital. As a retrospective study, it is unable to provide insight as to reasons for patients leaving hospital AMA. Data with respect to return to hospital within the 3-month period are exclusive of other hospitals in the region, as is the data pertaining to previous DAMA. The small sample size, despite using all DAMA within a 2-year time period, is also a limitation. However, the results are still clinically relevant, considering the small overall incidence of DAMA.

With respect to intervention strategies, this study in no way identified those patients who may have been threatening to leave and were successfully persuaded in some way to not leave AMA. Methods used by staff members in these situations would be interesting to investigate.

At this point, further study is needed to investigate these discharges and the involved patients, in both urban and rural settings. Also, a prospective study with patient follow-up would certainly provide an added dimension to this research.

Conclusion

Patients who leave hospital AMA are a concern both in small community and large city hospitals. They share common characteristics in both settings. These patients tend to be male, with substance abuse or psychiatric problems. Based on this small study, community and urban hospitals differ with respect to the rate of patients leaving hospital AMA, with a lower rate of occurrence in the community hospital. Attempts by physicians to identify these patients on admission and modify their treatment approach may decrease these discharges and improve health outcomes. Comprehensive documentation, including competency assessment, is essential in these situations and requires further attention.

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Dr. Seaborn Moyse's article won the Society of Rural Physicians of Canada's Rural Resident Research Award 2003 for the best research by a rural resident.

Fig. 1. Age distribution, using the Canadian Institute for Health Information age categories, of patients with formal discharges versus those with discharges against medical advice (DAMA).

Fig. 2. Length-of-stay distribution, using the Canadian Institute for Health Information categories, of patients with formal discharges versus those with discharges against medical advice (DAMA).

Fig. 3. Weekday of discharge distribution of patients with formal discharges versus those with discharges against medical advice (DAMA).

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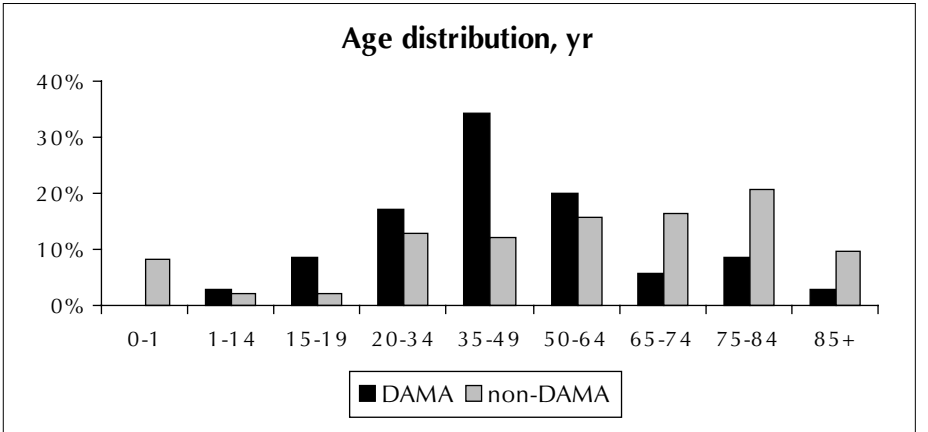

Fig. 1. Age distribution, using the Canadian Institute for Health Information age categories, of patients with formal discharges versus those with discharges against medical advice (DAMA).

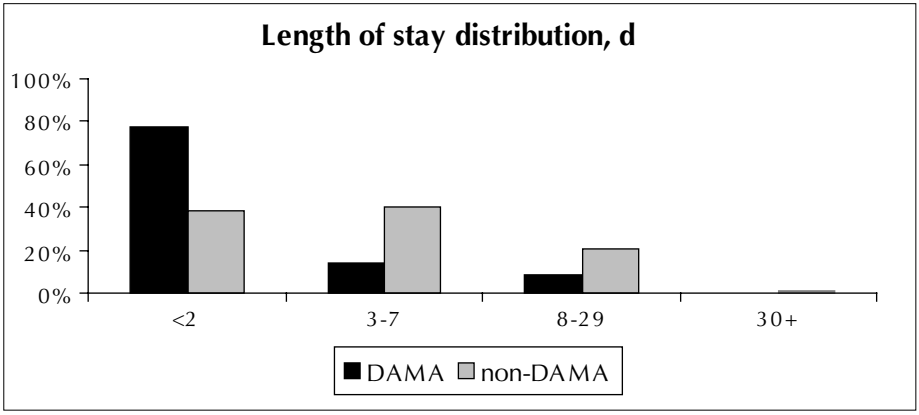

Fig. 2. Length-of-stay distribution, using the Canadian Institute for Health Information categories, of patients with formal discharges versus those with discharges against medical advice (DAMA).

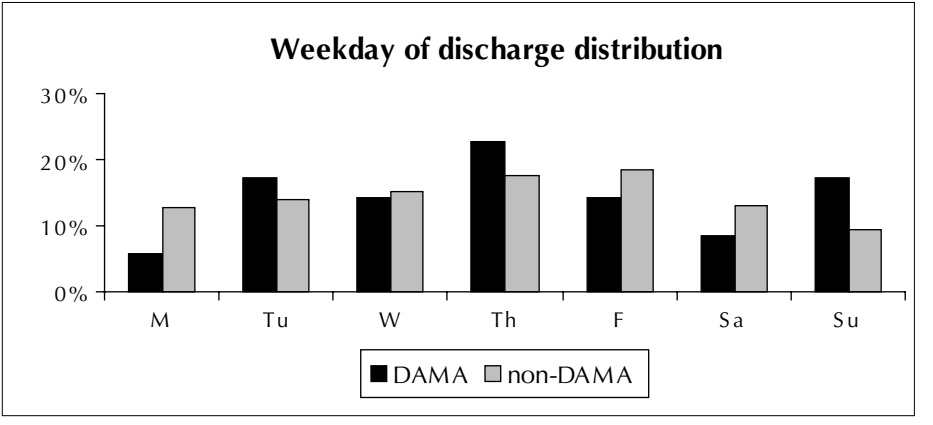

Fig. 3. Weekday of discharge distribution of patients with formal discharges versus those with discharges against medical advice (DAMA).

Table 1. Summary statistics of discharges against medical advice (DAMA) documentation and of chart survey

Information from chart survey	Absolute value	Proportion of patients who left hospital against medical advice, %
DAMA documentation present	31	81.6
Prior indication of DAMA	12	34.3
Previous DAMA	10	28.6
Patient's level of competency recorded	8	22.9
Attending physician was patient's family physician	15	42.9
Patient returned to hospital within 3 months	17	48.6

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Rural community and health care interdependence: an historical, geographical study

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The relationships between rural health care and community development were examined over time, for the case-study area of Huron and Perth counties in Southwestern Ontario. The underlying premises were that an historical-geographic study could provide both a perspective on the development of rural health services and explore the interdependent relationship between rural community and health care. The research concentrated on examinations of the 2 key elements of rural health care, namely the rural practitioner and the community hospital. Detailed reconstruction revealed that, over time, both physicians and hospitals moved from a marginal to a central position and identity within the community, in parallel with the stages of community development in the 19th and 20th centuries, with hospitals emerging as major foci of rural sustainability. In the last 2 decades, the strength of the area's rural community health system was successfully marshalled to offset the potentially negative aspects of provincial health care restructuring. This reinforced both the perception and the reality of the interdependence of health services and communities in the predominantly rural area.

On a étudié les liens entre les soins de santé ruraux et le développement communautaire au fil du temps dans la région visée par l'étude de cas (comtés de Huron et de Perth, dans le sud-ouest de l'Ontario). Les prémisses sous-tendant l'étude étaient les suivantes : une étude historicogéographique pourrait à la fois dégager un point de vue sur le développement des services de santé ruraux et explorer la relation d'interdépendance entre la communauté rurale et les soins de santé. La recherche a porté avant tout sur l'étude de deux éléments clés des soins de santé en milieu rural, soit le praticien rural et l'hôpital communautaire. Une reconstruction détaillée a révélé qu'au fil du temps, les médecins et les hôpitaux se déplacent de la périphérie vers le centre pour acquérir une identité à l'intérieur de la communauté -- évolution correspondant aux stades de développement communautaire des XIX et XX^{e} siècles -- les hôpitaux devenant des plaques tournantes importantes de la viabilité rurale. Au cours des deux dernières décennies, on a mobilisé avec succès la force du système de santé communautaire rural de la région pour compenser les aspects négatifs possibles de la restructuration des soins de santé mise en œuvre par la province. Cette évolution a renforcé à la fois la perception et la réalité de l'interdépendance entre les services de santé et les communautés dans la région avant tout rurale.

Introduction

The study reported upon here is concerned with health in Canadian rural communities. Taking an historical-geographical perspective, it proposes that health should be examined from the dual perspective of medical (i.e., health care issues) and geographical systems (i. e., space-time considerations). This would address adequately the change in dynamics of rural health care in Canada and the relationship between health services and rural system sustainability.

In the recent past, the study of the problems related to rural health have been examined from either a medical perspective (for example, by physicians who are concerned about the status of rural practice[1-5]) or by geographers, who are interested in the changing spatial and temporal dimensions of health needs in rural areas and how they are different from those found in urban centres.[6-8] However, neither approach on its own presents a complete picture or basis for assessment. Consequently, this study seeks to *integrate* the 2 fields in an attempt to understand how a rural health care system has evolved, and to address its relationship to rural community development.

The term "healthy community" can be used to refer to the self-reliance, resilience, social cohesion and ability of the rural community to be self-sufficient in response to the social, political and economic stresses that are often unique to rural areas.[9] For example, Troughton[10] suggested that a healthy rural community should be defined not only in terms of its self-sufficiency, and thus its ability to provide meaningful employment or alleviate problems of poverty, but also in terms of the availability of both formal and ancillary health and social services in the community.

In rural communities in Canada, access to health care services is an important component in the self-sufficiency of a community and of its long-term viability, as acknowledged by Meredith's community viability criteria[11] and Troughton's model[12] for rural sustainability, which includes variables such as quality of life, social services, adequate number of goods and services, local employment, community self-determination and agro-ecosystem sustainability. Although it is acknowledged that providing health care services is difficult in a rural area, particularly in relation to urban counterparts, the ability to provide equitable levels of care is paramount. The development and maintenance of quality health care services ensures that rural residents have equitable levels of access to care so that their needs may be met in their own communities. As Mann[4] states, rural hospitals play an important role in the provision of health services. They cannot be identified as scaled-down versions of urban hospitals, and should not be viewed as such in the arguments for closure because they provide a basic set of services that are tailored to the needs of the community, including emergency care, maternity care and inpatient treatment of common medical problems.

In addition, the network of hospital infrastructure and personnel in rural areas provides stability in terms of direct economic activity and the community's ability to attract economic investments, as well as contributing to community security and sense of place, pride and accomplishment.[13,14] In contrast, rural hospital closures (such as occurred in 52 Saskatchewan communities) lead to issues of rural residents losing their sense of place because a significant part of their community identity was tied to a rural hospital. Following the closures, 2 types of community depression were evident: economic depression that follows hospital closure, and mental depression as a result of the loss of sense of place, loss of identity and sense of failure because a community health institution was closed and the community could not do anything to control it.[7] Similar threats have faced hospitals in rural Ontario, including the case-study area of Huron-Perth.

Rural health, especially in its current manifestation, is comprised of a large set of inter-

related elements. However, the 2 key components have long been the individual rural practitioner and the rural community hospital. The former can be traced back to the early settlement periods, and hospitals become prominent in the first half of the 20th century. Together, practitioners and local hospitals are perceived by rural residents as the most important elements of their rural health system. Consequently, this study focused its attention on the changing presence and roles of doctors and hospitals within the 2 counties.

Methods

Huron-Perth case study

The adjacent counties of Huron and Perth in Southwestern Ontario were chosen for the study for 2 reasons: together they remain among the most rural-agricultural counties in Ontario, and until very recently they were administered jointly by a single health service administration. Out of a joint population of 133 376 (2001), only one centre, Stratford (29 676) in Perth County, is over 10 000, and Goderich, the Huron County seat, has just 7604 inhabitants. Between 1980 and 2002, the joint Huron-Perth Health Partnership administered health services for the 2 county areas.

The eras of development and their associated characteristics of the sequence of rural systems that comprise the temporal sequence of rural community development in Southwestern Ontario were researched. This resulting sequence (**Table 1**) provided the background against which the growth of rural health in Huron-Perth was investigated, particularly the role and numbers of rural physicians and the growth of rural hospitals. It was hypothesized that the development of these key medical elements would reflect the underlying stages of regional development.

Despite the obvious significance of doctors and hospitals, information about them, especially prior to the last few decades, was difficult to assemble on a common base. The study required attention to historical records, many of which were fugitive or only available in local archives. Similarly, more recent hospital information was only available at each individual site.

Doctor information was obtained through a mixture of census data (from 1851 on) from the Medical Registrar for Upper Canada (1867-1954) and the Ontario Medical Directory (1964-present). This sequence of data was compiled at regular intervals, identifying the pattern of local communities in which doctors practised over time. The information was supplemented by reference to local historical documents, including primary county, township and community histories, historic atlases, minutes of meetings, and newspaper articles relating to doctors' roles in community development and health care.

Early information on both private and public hospitals was, likewise, obtained from archival sources. In the more recent past, the individual records of each of the 8 public hospitals were studied, and supplemented by external reports (e.g., government reports such as those of the Health Services Restructuring Commission [2000]). In each case, the investigation involved reconstructing the phases of doctor and hospital activity, including the sequential mapping of their locations, the tabulating in measures (including population per physician), hospital beds and specific facilities and services offered, over time.

Findings

Table 1 sets out the criteria for and characteristics of rural community sustainability. Each criterion can be related, directly and/or indirectly to the provision and maintenance of rural health personnel and facilities.

Historically, the 2 counties had their beginnings in the settlement of the Huron Tract by the Canada Land Company in the 1830s. Settlement, which included additional areas of the Queen's Bush, saw the rapid establishment of an agrarian rural system, based on several thousand individual farmsteads and numerous small service settlements within the 27 contiguous townships of the two counties.[15] This rural farm system population peaked in the 1880s, witnessed a modest decline in the first half of the 20th century, but has climbed back to over 130 000 through the growth of Stratford and the dozen or so smaller towns and larger villages. Since 1950, agriculture has undergone major restructuring, which has resulted in fewer, larger, more specialized farms, and some "decoupling" of farm and non-farm communities.[10] Nevertheless, the farm population still accounts for over 15% of the total, and both counties are among the top half-dozen in Ontario in annual gross farm receipts.

Rural health system development

The results of the study are divided into 3 parts. First is the development of what we term a "physician-based system" that evolved in the 19th century in concert with the growth and peaking of the rural-agrarian community, and which has reconfigured in the 20th century alongside the hospital system. The development of the latter "doctor-hospital system," is dealt with as the second set of findings, with an emphasis on community interdependence. Finally, reference is made to the response of this community health system to the pressures of urban-oriented health restructuring in the 1990s and the issue of rural community sustainability.

The physician-based system

Pioneer settlement and early medicine

Clearing and development of the heavily forested Huron Tract (Huron and Perth counties) began in the 1830s with the Canada Company, led by John Galt and Dr. William "Tiger" Dunlop. Most initial activity focused on clearing the land and the development of a dispersed farming community for whom wheat became the dominant economic crop.[15] A large number of small communities developed as rural service centres for their surrounding nearby farm population. At this time, doctors were few and many were poorly trained or even "quacks." The population was suspicious, and many preferred to rely on traditional remedies. Midwifery was practised by local women.[16-18]

Era of rapid expansion

Between the 1840s and 1880s both farm and non-farm settlements and their populations expanded to reach a peak in the 1880s.[19] Formative elements included the development of the railway system (a key ingredient in the growth of Stratford and some smaller centres), Confederation (1867), and the shift from wheat to more stable, mixed-livestock types of farming. This period also witnessed the growth in numbers and the acceptance of physicians. This was facilitated by legislation, in particular *The Medical Act* of 1865, which helped to regulate medical practice and standards for medical education, including the establishment of the medical school in London at the University of Western Ontario (first graduating class, 1883). Doctors themselves became valued members of the community; many assumed significant administrative and political roles. In 1891, the first public hospital in the study area, located at Stratford, was opened. Figure 1 maps the distribution of physicians in the 2 counties in 1892. The numbers had risen substantially over the previous decades, peaking at 126 physicians in 1892, an increase of 113 over 1851. Mapping of earlier distributions had shown even greater dispersion,[20] but **Figure 1** shows the beginnings of a concentration of doctors in the larger incorporated towns and villages.

Figure 1 and **Figure 2** depict the changing population and distribution of physicians in Huron-Perth in this relatively early period of settlement and expansion. After the peak population was reached in Huron-Perth in 1891, the number of physicians continued to increase for some time before following a decline similar to that of the general population. For example, in 1937 (**Fig. 2**), the emergence of a pattern of fewer practising physicians that leaned toward concentration in larger communities was evident (1941 pop., 93 436). **Figure 3** shows the distribution of physicians in the post-war era (1964), when the population of the 2 counties had risen to over 110 000. In response to the growth of the population in the study area at this time, the number of physicians also increased, although by this point their growth was directed toward the rural centres that had hospitals.

Figure 4 shows the contemporary pattern of doctors and the location of the 8 community hospitals. The obvious concentration reflects the linkage of both GPs and specialists attached to the hospitals, as well as the greater mobility of rural populations. Currently, the population per physician for all doctors is 981, and the population per specialist is 1827. These ratios contrast with those present in the urban centres of London and Kitchener-Waterloo, where the population per physician in London is 767 and 1014 in Kitchener-Waterloo, and the population per specialist is 263 and 1259 respectively. The population per GP could be considered average, but there is concern over a shortage of physicians in several communities (e.g., Exeter, West Perth, Wingham).

The doctor-hospital system

Era of rural dominance

In the 19th century, hospitals were regarded as "places of last resort," where people went to die rather than be cured, and where provision was oriented to indigents rather than those who could afford to be treated at home.[21,22] However, around the turn of the century some individuals, including both doctors and local philanthropists (e.g., IODE) established private hospitals. Many had a maternity function, and several were located in the doctors' own residences. Gradually, these hospitals established a better reputation for success, and were superceded, on an individual community basis, by public institutions. Private hospitals began to spring up in the late 1870s, initially in Stratford, and they continued to be the key source of hospital service until the 1930s. It is important to acknowledge, however, that their piecemeal growth in Huron-Perth was related to a range of community conditions and needs.

The growth of public hospitals in 8 of the larger settlements (1 city and 7 incorporated towns) in the 2 counties began as early as 1891, as previously indicated, in Stratford. For a time, many other neighbouring communities did not deem it necessary to have public hospitals of their own, because Stratford could provide the service if necessary. Over the next half century, however, the 8 communities that currently have hospitals began to erect new structures for public use (e.g., Seaforth, Listowel, and St. Marys and Exeter) or to adopt a public approach to existing private facilities (e.g., Clinton, Goderich, Wingham). In all cases, the establishment and operation was based on continuing community support, including fund-raising. Latterly, the hospital was seen as the most appropriate and tangible war memorial.

By the post World War II period, rural hospitals were established as among the most important local institutions, a source not only of employment and medical expertise, but an emblem of civic pride, and they enjoyed widespread community financial and volunteer support. For example, between 1960 and 1985 all hospitals enjoyed a period of expansion of facilities.[23] Although the period was one of urban expansion and relative rural decline, the interdependence of health service and community reached its peak. Thus, we can trace the development of physicians and hospitals within the rural setting, from suspicion to widespread acceptance and as adjuncts to sustainable rural communities.

Urban-oriented health restructuring

The period of rural adjustment

The period between 1960 and the 1980s has been identified as the most active period of rural-agricultural restructuring in southern Ontario. Major changes included a rapid reduction in the number of farm operations and their associated population. Fewer, larger, more highly capitalized and specialist operations became the norm in Huron-Perth. These changes affected the traditional agricultural service role of many communities, reinforcing some (e.g., Hensall) but diminishing the role of many of the smaller places. The non-farm population assumed a majority role, and there was growth, again concentrated in the larger settlements, notably Stratford and St. Marys, Clinton, Seaforth, Exeter, Goderich, Wingham and Listowel.

The rural restructuring supported the consolidation of both physician populations and hospitals. While the former experienced some decline, the hospitals enjoyed a period of physical and functional growth, aided by a combination of public and locally subscribed funding, thus consolidating their role in the rural system. Notwithstanding their consolidated role in the rural system, in the mid-1970s and early 1980s the rural health system, and especially its hospital component, came under attack from the provincial Ministry of Health. In Huron-Perth, this began as early as 1976 when then Health Minister, Frank Miller, attempted to close the hospital at Clinton, following the closure of the military base at nearby Vanastra. Public opposition to the closing was high, and a court injunction was sought.[24]

Again, in the 1990s, cuts to health care funding at the local level were implemented through the *Social Contract Act* (1993), resulting in "Rae Days" and pressure for increased accountability and justification for each inpatient day. In effect, the hospital system was attacked from the twin aspects of there being too many hospitals (i.e., duplication of services) and rising costs (i.e., a search for financial savings). The model being applied was that of the shift to the large, multi-functional city hospital, examples of which had existed proximal to Huron-Perth in London and Kitchener-Waterloo.

In 1996, the Hospital Services Restructuring Commission (HSRC) was established in conjunction with the *Restructuring and Savings Act*, Bill 26 (1996) to provide central control of downsizing, service rationalization and closure of hospitals. Bill 26 and its regulations essentially gave sweeping powers to the HSRC and the Minister of Health to reorganize Ontario's health system by "Direction."[25] This centralization of control by edict was perceived as a major threat to rural communities, creating a great tension between community health needs versus the needs of the overall health system, its services and facilities. In response to the system-driven health care restructuring goals, local communities in Huron-Perth initiated a study that indicated that financial losses would result from hospital closures, in addition to fears about reduced access to health care services.[14]

A resultant loss of physicians was an additional concern, since changes during this restructuring stage began to influence the ways in which rural health practice was conducted. Many rural physicians began to leave rural areas to practise more "normal" tasks and hours, many citing "burnout" and lack of opportunity for professional enrichment.[26,27] These vacancies have left some communities underserviced with respect to physicians (i.e., increasing the population per physician). In Huron-Perth, through the Underserviced Area Program, the shortfall is calculated at 8 GPs for the communities of Exeter, West Perth, Zurich and Wingham.

In response to the mandate to restructure provided through the HSRC, in 1998 the 8

hospitals of Huron-Perth joined together as a network to create the Huron-Perth Hospitals Partnership (HPHP), a system dedicated to efficiency and maintaining services at all 8 sites. The HPHP quickly made significant progress in the integration of its hospitals, programs and services, in the development of new technology in support of services delivery, and in the establishment of linkages with community organizations and the London Health Sciences Centre.[28-30] The governance model provided veto power for each of the 8 boards. At the time of its creation, the provincial government commended the 8 hospitals in the HPHP for their vision and leadership in taking steps toward integration and coordination through their linkages and the appointment of a single CEO.

However, with the implementation of the HPHP, and a single CEO, conflicts between the issues of local autonomy and control versus centralized management soon appeared. Indeed, such issues as budgeting are among the factors that contributed to the eventual dissolution of HPHP in 2003. In July of 2002, the Stratford General Hospital announced it would be withdrawing from the partnership, and in doing so, could secede from the partnership in one year (i.e., July 1, 2003). Eventually, other members of the partnership announced that they, too, would be pulling out of the partnership. With the dissolution of the HPHP in July 2003, 2 new hospital alliances have been formed, and 2 hospitals have chosen to return to operating as separate units. For example, the Huron-Perth Health Alliance was formed through an agreement with the Stratford, St. Marys, Clinton and Seaforth hospitals (south-central Huron-Perth), and the Listowel and Wingham hospitals (north Huron-Perth) formed an alliance. Goderich's Alexandra Marine and General Hospital and Exeter's South Huron Hospital currently operate as individual entities.

Currently, the status of health care in Huron-Perth is in a state of flux. Nevertheless, the strong network of primary and ancillary health services that developed within the past 20 years is integral in providing quality care in a rural setting and will remain strong. Despite the difficulties experienced in adopting a system-wide planning relationship, but in keeping with the rural tradition to adjust to changing social, cultural and economic conditions, the hospitals and communities in the study area have responded by providing community-driven and community-oriented approaches to hospital administration and governance (e. g., the HPHP) and by focussing on community involvement and support of health ancillary services. The latter include long-term care facilities, home care and public health services and volunteerism (e.g., ladies' auxiliary, Meals-on-Wheels).

The strong linkages between rural development and society have fostered the evolution of the health care system. In the time period from the initial acceptance of health care to the present, it has been shown by our study that the role of the local community has been very important. Local funds, volunteer hours and planning were integral in the construction of local hospitals and the expansion of services and facilities over time.[23,24] Thus, it is evident that the hospital represents a key *cultural* institution in that the hospital is a living entity, one that mirrors the history of the local society. In a sense, the rural hospital is a living memorial to the community and its residents, whose role extends beyond the provision of locally based health services by expressing community identity and sense of place.

The ability of rural people to care for their own appears to be entrenched in rural culture and society; the history of Huron-Perth is punctuated by stories of communities and neighbours working together to construct simple barns and dwellings, or to build community institutions and facilities. Furthermore, the desire for the rural residents of the study area to be cared for in their communities is also important. Donations of time and money have been significant in maintaining and improving the breadth of health care services and technologies available.

This study found that health care and related institutions (e.g., the physician and the hospital) are vital components in maintaining self-sufficient, sustainable communities (i.e., the community is able to satisfy almost all relevant demands of its households).

Furthermore, the health care services are closely tied to the community identity in Huron-Perth communities. As a result, issues of local autonomy versus external system control have become very important, particularly in the wake of health care restructuring. Many other rural communities are similar in their historical/geographic community and health services development. Health care services will continue to be a vital component of successful, sustainable rural communities. In the development of both health care systems and rural communities, the important interplay and interdependency identified in this study must be incorporated into the planning and implementation development process.

Summary / Conclusions

There has been a parallel and strongly interdependent development of health care and rural communities. In the late 1800s, GPs became accepted and scattered throughout the 2 counties. Hospitals began early in the 1900s as charitable institutions and often were seen as a "place of last resort." Particularly in the period since World War II, the rural hospital became the significant focal point and vital access centre for much of rural communities' health care needs, as well as the entry point for transfer to tertiary care not available within the region. Local community citizens donated significant time and money, particularly for needed capital, building and equipment costs beyond that provided by the provincial health care system, and were connected to the hospital through the hospital board and administration/management who lived and worked within their communities. In the recent past, however, much of this local autonomy has been eroded. In the 1990s rural communities faced physician shortages and the downsizing and threat of closure of small hospitals. This provided tension between local community-driven health care and system-controlled health care. In addition, hospitals provided major economic and employment benefits to the community. Health care restructuring provided an external system force of disruption to the complex inter-dependent relationship of rural health care and community development.

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Table 1. Development eras and characteristics of the rural system[20]

Stage of development	Characteristics of the rural system	Characteristics of the rural health system
Settlement period: Pioneer (1790–1840)	Land survey Land clearing and early settlement	Initially no professional health services
Settlement period: Extensive rural settlement and growth (1840–1900)	Era of extensive rural settlement and rapid growth Growth of rural non-farm nucleated settlements Linkages established to larger urban places through railroad, trade	*Doctor-centred system* Few ancillary health workers or facilities Reliance on the local physician, travelling specialists, asylums, midwifery, private hospitals
Era of rural dominance (1880–1945)	Rural population is dominant, stable vis-à-vis urban areas (i.e., greater population) Rural system is centred on an extensive agrarian economy and lifestyle	*Rural physician–hospital centred system* Accented by construction of local cottage and public hospitals Dispersed pattern of physicians
Rural decline, rationalization and adjustment (1945–present)	Adjusting to loss of dominance with respect to urban areas Agricultural restructuring Farm consolidation, rising incidence of off-farm income Continued rural farm population decline Increasing rural population through non-farm development	*Urban hospital-centred system* Focus on centralized facillities in local urban centres and larger urban centres Restructuring of health care system Hospital closures, service reductions Shortages of general practitioners, specialists

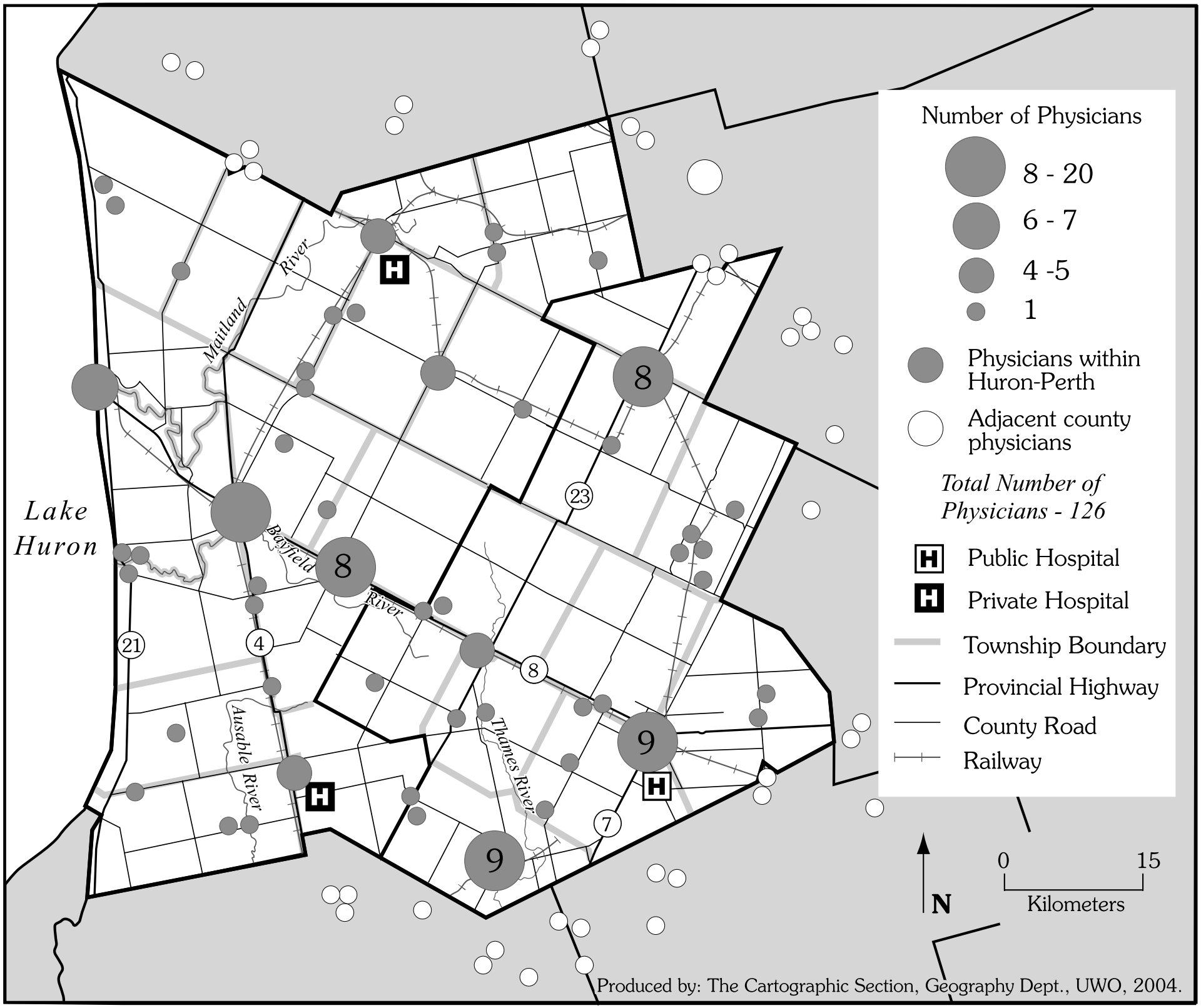

Fig. 1. Distribution of physicians and hospitals, 1892

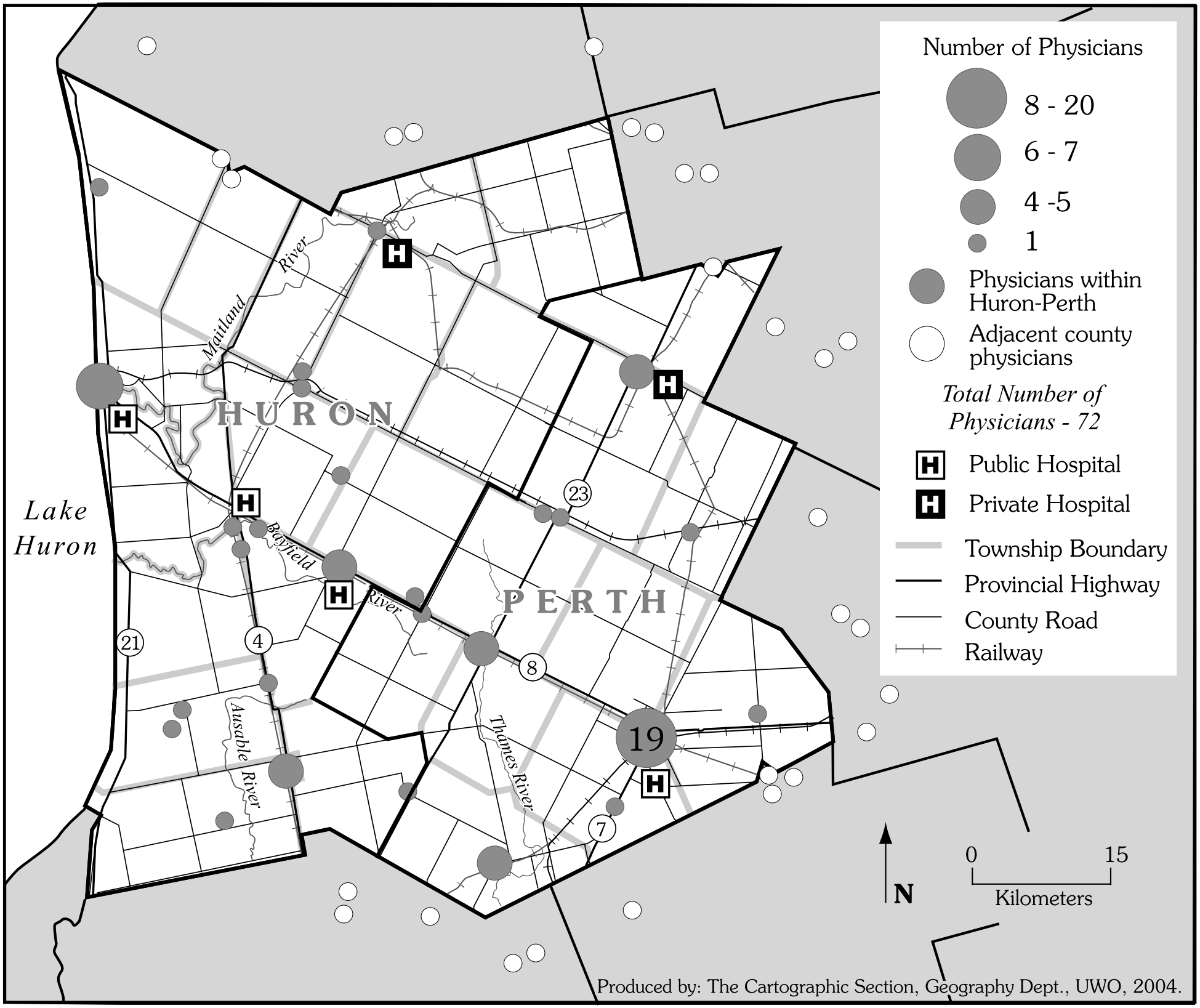

Fig. 2. Distribution of physicians and hospitals, 1937

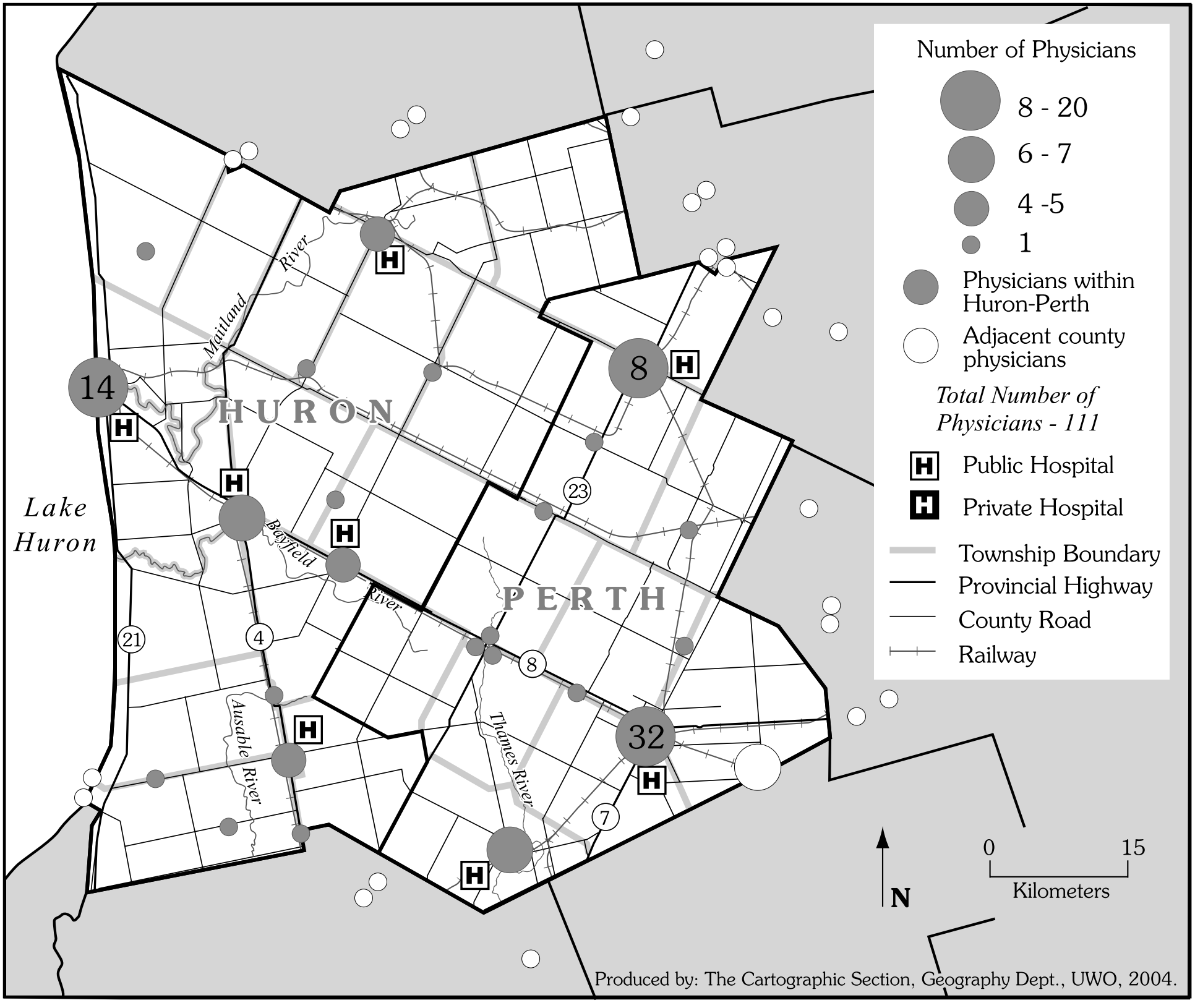

Fig. 3. Distribution of physicians and hospitals, 1964

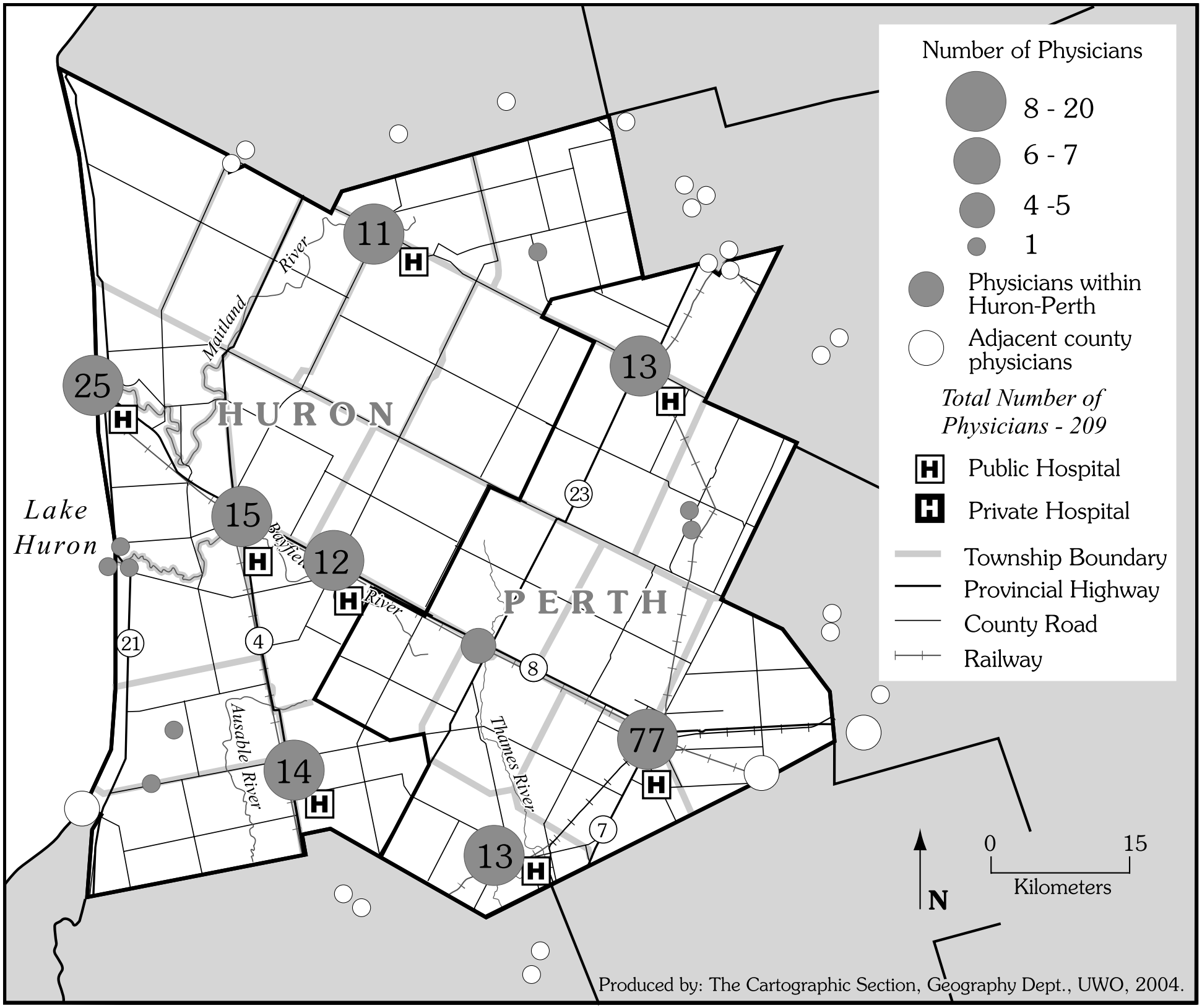

Fig. 4. Distribution of physicians and hospitals, 2002

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Having a regular doctor: rural, semi-urban and urban differences in Newfoundland

Maria Mathews, PhD
Alison C. Edwards, MSc

CJRM 2004;9(3):166

Introduction: Recent studies suggest that 23% of adult Newfoundlanders do not have a regular doctor. Using data from the 1995 Newfoundland Panel on Health and Medical Care study, we examined the urban, semi-urban and rural differences in the characteristics of adult (age 20 and over) Newfoundlanders who did and did not have a regular doctor.

Methods: We used $*^2$ tests and logistic regression to analyze data from 11 789 respondents from randomly selected households in Newfoundland. The dependent variable was "Have a regular doctor" (Yes / No). The independent variable was "Place of residence" (Urban / Semi-urban / Rural) and covariates included socio-demographic and health-related variables.

Results: Fifteen percent (1771) of Newfoundlanders did not have a regular doctor. Of these, the largest proportion of respondents without a regular doctor lived in rural communities (74.4%); were male (62.6%); were 20-29 years old (28.7%); married (68.8%); of high socio-economic status (44.7%); working full-time (35.3%); had excellent or good health (83.0%); had no chronic illness (40.3%), disability (93.3%) or impairments to activities of daily living (98.0%); and were in excellent or good emotional health (90.7%). Compared to their urban counterparts, residents of semi-urban communities were as likely (odds ratio 1.03; 95% confidence interval [CI] 0.84-1.26) not to have a regular doctor and residents of rural communities were 4.03 (95% CI 3.50-4.65) times more likely than their urban counterparts not to have a regular doctor.

Conclusion: In 1995, fewer adult Newfoundlanders than previously estimated did not have a regular doctor. Rural residents were more likely not to have a regular doctor than residents of either urban or semi-urban communities.

Introduction : Des études récentes indiquent que 23 % des Terre-neuviens adultes n'ont pas de médecin attitré. À partir de données tirées de l'étude menée en 1995 par le Groupe d'étude sur la santé et les soins médicaux de la province, nous avons analysé les différences des caractéristiques des Terre-neuviens adultes (20 ans et plus) de milieux urbains, semi-urbains et ruraux qui avaient et n'avaient pas de médecin attitré.

Méthodes : Nous avons utilisé des analyses *[2] et la régression logistique pour analyser des données provenant de 11 789 répondants de ménages choisis au hasard à Terre-Neuve. La variable dépendante était : «a un médecin attitré» (oui/non). La variable indépendante était le «lieu de résidence» (milieu urbain/semi-urbain/rural) et les covariables incluaient des variables sociodémographiques et reliées à la santé.

Résultats : Quinze pour cent (1771) des Terre-neuviens n'avaient pas de médecin attitré. De ce nombre, le pourcentage le plus important des répondants sans médecin attitré vivaient dans des communautés rurales (74,4 %), étaient de sexe masculin (62,6 %), avaient de 20 à 29 ans (28,7 %), étaient mariés (68,8 %), de situation socioéconomique élevée (44,7 %), travaillaient à plein temps (35,3 %), étaient en excellente ou en bonne santé (83,0 %), n'avaient pas de maladie chronique (40,3 %), d'incapacité (93,3 %) ou de limitation des activités de la vie quotidienne (98,0 %) et étaient en excellente ou en bonne santé affective (90,7 %). Comparativement à leurs homologues urbains, les résidents des communautés semi-urbaines étaient aussi susceptibles (coefficient de probabilité 1,03; intervalle de confiance [IC] à 95 % 0,84-1,26) de ne pas avoir de médecin attitré et les résidents de communautés rurales étaient 4,03 (IC à 95 %, 3,50-4,65) fois plus susceptibles que leurs homologues urbains de ne pas avoir de médecin attitré.

Conclusion : En 1995, moins de Terre-neuviens adultes qu'on l'avait estimé auparavant n'avaient pas de médecin attitré. Les résidents des milieux ruraux étaient plus susceptibles de ne pas en avoir que ceux des communautés urbaines ou semi-urbaines.

Background

Recent reports estimate that between 14% and 30% of Canadians do not have a regular doctor (i.e., a family doctor or general practitioner [GP]).[1-3] Using data from the National Population Health Survey (NPHS) (1994-95), Talbot and colleagues[1] reported significant regional variations: almost 23% of Newfoundlanders did not have a regular doctor and were 4.35 times more likely than Ontarians not to have a regular doctor. Various factors have been suggested to contribute to diminishing physician supply, including the graying of the physician population, decreasing medical school enrollment, fewer physicians choosing to specialize in family medicine, and the "brain drain" (i.e., the exodus of doctors to the United States).[4-6]

Hutten-Czapski[7] estimated that there is nearly a 4-fold difference in physician-to-population ratios between urban (1:193) and rural (1:797) communities in Canada. Onerous workloads have long been cited as discouraging doctors from working in rural communities. For example, recent studies report that family doctors and GPs who worked in smaller centres worked longer hours[8] and had more demanding on-call schedules[9] than their counterparts in larger centres.

Understanding intra-provincial rural-urban differences in physician distribution is an important step in developing and evaluating human resources policies.[10] In 1995 we conducted a population-based telephone survey of a random sample of households in Newfoundland as part of the Newfoundland Panel on Health and Medical Care.[11,12] With approximately 42% of the population living in rural areas, this data set provides an opportunity to validate the findings of the study using data from the NPHS[1] and explore the rural-urban distribution of family doctors and GPs in the province. This article examines the characteristics of Newfoundlanders who do not have a regular doctor. We hypothesized that residents of rural communities are more likely not to have a regular doctor than residents of either semi-urban or urban communities.

Methods

We used data from the 1995 population-based telephone health survey from the Newfoundland Panel on Health and Medical Care. We surveyed a random sample of households selected by random digit dialing on the island of Newfoundland (pop. 523 000). In selected households, all adults 20 years or older were interviewed, with a response rate of 84.8%. Details about the design and the results of the survey can be found in a paper[11] and on a Web site.[12] The survey covered the non-institutionalized population who had a telephone and were covered by the provincial health insurance plan. It excluded members of the armed forces, the Royal Canadian Mounted Police, and foreign and out-of-province students. Students with parental homes elsewhere in the province were also excluded. These individuals would have been included in the survey if their parental home had been randomly selected.

Our dependent variable was "Have a regular doctor" (Yes / No). Respondents who either did not have a regular doctor or whose doctor frequently changed were coded as not having a regular doctor. The independent variable in the study was "Place of residence" and was coded as urban, semi-urban or rural. Respondents who lived in a community of 100 000 or more residents were coded as "urban," those who lived in communities of 10 000 to 99 999 were coded as "semi-urban," and those who lived in communities of less than 10 000 were coded as "rural."

Our control variables captured socio-demographic and health-related factors.

The socio-demographic variables considered were the following: sex; age (20-29, 30-39, 40-49, 50-59, 60-69 and >=70); marital status (Married/Common-law or Unmarried [i.e., single, living common-law <1 yr, separated, divorced or widowed]); socio- economic status (derived from combining the education variable with the income adequacy variable and coded into 3 levels: Low, 1-3; Mid, 4-6; and High, 7-9); and employment status (Full-time [i.e., year-round employment], Part-time/Seasonal, Not working [i.e., looking for employment, laid off or on strike] and All Others [i.e., retired, keeping house, students, unable to work]).

Health-related variables included self-reported health status (Excellent, Good, Fair or Poor); self-reported presence of a disability; activities of daily living score (the sum of 8 questions grouped into 3 categories: No Limitations, 0; Some, 1-3; and Many, 4-8); number of chronic conditions (0, 1, 2 or >=3); and self-reported emotional status (Excellent, Good, Fair or Poor).

We analyzed unweighted data using the SPSS (version 11.5). We used frequencies to describe the characteristics of the study sample and $*^2$ tests to identify differences between people who had and did not have a regular doctor. To test our hypothesis, we used multiple logistic regression, which allowed us to look at the association between place of residence and not having a regular doctor, after controlling for other significant predictors. Univariate logistic regression was used to identify significant (p ¾ 0.01) control variables to include in the multiple logistic regression. Collinearity between explanatory variables was examined a priori. Large standard error values, indicative of multicollinearity, were not found in any of the regression models. Finally, we used $*^2$ tests to identify differences in the characteristics of urban, semi-urban and rural Newfoundlanders without regular doctors.

Results

Table 1 summarizes the characteristics of the 11 789 respondents in the sample, of which 85% (10 018) had a regular doctor and 15% (1771) did not. The largest proportion of

respondents lived in rural communities, were female, under the age of 50, married, of middle socio-economic status and worked full-time. The majority reported good or excellent emotional and general health, had one or no chronic illness, were disability free, and had no difficulty with activities of daily living.

Compared to those with a regular doctor, a larger proportion of residents without a regular doctor lived in rural communities, were male, of younger age, unmarried, of lower socio-economic status, worked seasonal or part-time jobs or did not work at all (**Table 2**). In terms of health, a larger proportion of those without regular doctors reported either excellent or good health, none or one chronic illness, and no disability or impairment to their activities of daily living than those who had a regular doctor. Although a larger proportion of individuals without regular doctors reported good emotional health than their counterparts with a regular doctor, a smaller proportion reported excellent health.

In univariate logistic regression, compared to those who lived in an urban centre, residents of semi-urban centres were as likely to not have a regular doctor and rural residents were 3.80 times more likely to not have a regular doctor (**Table 3**). Women were less likely than men, and married people were less likely than unmarried people to not have a regular doctor. Respondents who were in the older age groups or of higher socio-economic status had a lower likelihood of not having a doctor than those who were in the lowest age group or socio-economic status respectively. With the exception of emotional status, for the health variables, generally respondents in poorer health categories had lower likelihood of not having a regular doctor than respondents in better health categories. However, compared to those with excellent emotional health, those with good emotional health were more likely not to have a regular doctor while those with either fair or poor emotional health were as likely to not have a regular doctor. After controlling for significant covariates (**Table 4**), residents of semi-urban communities were just as likely not to have a regular doctor, compared to their urban counterparts, and residents of rural communities were 4.03 times more likely not to have a regular doctor.

Almost three-quarters of those who did not have a regular doctor lived in rural communities. To gain a better understanding of Newfoundlanders without regular doctors, we also looked at rural and urban differences in their characteristics (**Table 5**). Compared to their urban or semi-urban counterparts, larger proportions of rural residents without a regular doctor are female, married, have low socio-economic status, and have seasonal/ part-time jobs or no job at all. Relative to their urban counterparts, larger proportions of both semi-urban and rural Newfoundlanders without regular doctors are in the older age groups (50 and older). In terms of health, smaller proportions of rural residents without regular doctors are in the healthier categories (e.g., almost twice the proportion of rural residents without regular doctors reported fair health or emotional status or had 3 or more chronic illnesses than either their urban or semi-urban counterparts).

Discussion

Using data from the 1995 Newfoundland Panel of Health and Medical Care, we found that roughly 1 in 7 (15%) adult Newfoundlanders did not have a regular doctor, significantly less than the estimate based on data from the 1994-95 NPHS, which suggested that roughly 1 in 5 (23%) adult Newfoundlanders did not have a regular doctor.[1] Both studies surveyed all adult members of randomly selected households on the island portion of the province, although the Newfoundland Panel of Health and Medical Care used a larger sample than the NPHS. Nonetheless, this substantial difference underlines the importance of independently validating results.

While other studies suggest that residents without regular doctors are more likely to be young, male, well-off, and healthy, our study showed significant rural-urban differences in the characteristics of people without regular doctors. We found that unlike their urban and

semi-urban counterparts, larger proportions of rural residents without regular doctors are older, and female. Moreover, rural residents without regular doctors also reported poorer health. These findings suggest that unlike rural residents, for whom not having a regular doctor is related to access, for urban or semi-urban residents it may also be a matter of personal choice. We also found that larger proportions of rural residents without a regular doctor come from lower socio-economic status and did not have full-time employment. However these findings likely reflect the nature of rural areas (fewer professionals, higher unemployment, and seasonal industries) rather than income-related restrictions to doctors.

In our study, we categorized respondents who either said they "did not have a regular doctor" or "doctor often changes" as not having a regular doctor. By including those whose doctor frequently changes, our definition of "no regular doctor" implies that continuity of care and not solely access to a doctor is an integral component of primary care. This interpretation is consistent with the philosophy of family medicine as described by the College of Family Physicians of Canada as well as primary care researchers.[13-15] Supplementary analysis of the characteristics of respondents who said that they did not have a regular doctor and those whose doctors often change show that there were no significant differences between these groups on the variables included in this study (data not shown).

Although the study used a large, randomly selected sample, our findings may underestimate the number of individuals without a regular doctor in the province. Since we used a telephone survey, we will have excluded individuals without a telephone who are more likely to be of lower socio-economic status and more likely not to have a doctor. Telephone coverage for the area surveyed is close to 98%. Our survey was also limited to the island of Newfoundland and excluded residents of Labrador, where there are many small, isolated communities. Further study is also needed to assess the impact of not having a regular doctor on health service utilization and long-term health outcomes. Moreover, studies with more recent data (such as the Canadian Community Health Survey) may highlight the impact of the decrease in medical school enrolment in Canadian universities in the 1990s.[6,16,17] and the effectiveness of the various initiatives in Newfoundland and Labrador[5] on physician distribution.

Conclusion

In 1995, roughly 1 in 7 (15%) of adult Newfoundlanders did not have a regular doctor. Place of residence was the strongest predictor of not having a regular doctor. Residents of rural communities are less likely to have a regular doctor than residents of either semi-urban or urban communities.

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Table 1. Socio-demographic and health-related characteristics of the study sample (*n* = 11 789)

Variable	Total sample, %	Variable	Total sample, %
Socio-demographic		***Health-related***	
Place of residence*		**Health status**	
Urban	33.5	Excellent	21.5
Semi-urban	28.5	Good	57.9
Rural	38.0	Fair	18.1
Sex		Poor	2.5
Male	46.5	**Chronic conditions**	
Female	53.5	None	27.1
Age		1	26.0
20–29	21.6	2	18.9
30–39	23.6	≥3	28.0
40–49	23.7	**Disability**	
50–59	13.1	No	85.7
60–69	9.4	Yes	14.3
≥70	8.6	**ADL score**	
Marital status*		0 (no limitations)	94.6
Unmarried	27.5	1–3 (some)	4.5
Married	72.5	4–8 (many)	0.9
Socio-economic status*		**Emotional status**	
1–3	39.2	Excellent	43.9
4–6	42.1	Good	46.8
7–9	18.8	Fair	8.5
Employment status		Poor	0.8
Full-time	39.5	**Regular physician**	
Seasonal/part-time	12.0	Yes	85.0
Not working*	11.9	No	15.0
All others	36.6		

ADL = activities of daily living
*Please see Methods section for definition of these variables.

Table 2. Differences in characteristics of Newfoundland adults who have (*n* = 10 018) and do not have (*n* = 1771) a regular physician

Variable	Regular physician, %	No regular physician, %	*p* value*
Socio-demographic			
Place of residence†			<0.001
Urban	36.5	16.8	
Semi-urban	30.1	8.8	
Rural	33.4	74.4	
Sex			
Male	43.7	62.6	
Female	56.3	37.4	
Age			<0.001
20–29	20.3	28.7	
30–39	23.2	25.5	
40–49	23.6	24.0	
50–59	13.7	10.2	
69–69	9.7	7.7	
≥70	9.5	3.8	
Marital status†			<0.001
Unmarried	26.9	31.2	
Married	73.1	68.8	
Socio-economic status†			<0.001
1–3	38.2	44.7	
4–6	42.2	41.2	
7–9	19.6	14.1	
Employment status			<0.001
Full-time	40.2	35.3	
Seasonal/part-time	10.8	18.7	
Not working†	10.5	20.2	
All others	38.5	25.7	
Health-related			
Health status			<0.001
Excellent	21.2	23.4	
Good	57.6	59.6	
Fair	18.5	16.0	
Poor	2.7	1.0	
No. of chronic conditions			<0.001
0	24.8	40.3	
1	25.8	27.1	
2	19.4	15.9	
≥3	30.0	1.0	
Disability			<0.001
No	84.4	93.3	
Yes	15.6	6.7	
ADL score			<0.001
0 (no limitations)	94.0	98.0	
1–3 (some)	4.9	1.9	
4–8 (many)	1.0	0.1	
Emotional status			0.006
Excellent	44.5	40.2	
Good	46.1	50.5	
Fair	8.5	8.5	
Poor	0.8	0.7	

ADL = activities of daily living
*When $p < 0.05$ the *p* value refers to statistical significance between properties observed for individual categories within a variable.
†See Methods section for definition of these variables.

Table 3. Univariate logistic regression analysis predicting whether respondents did *not* have a regular physician (*n* = 11 789)

Variable	OR	95% CI	*p* value*	Nagelkerke's R^2†
Socio-demographic				
Place of residence‡§			0.000	0.087
Semi-urban	1.00	0.82–1.23	0.994	
Rural	3.80	3.32–4.34	0.000	
Sex§			0.000	0.032
Female	0.46	0.42–0.52	0.000	
Age§			0.000	0.020
30–39	0.78	0.68–0.90	0.000	
40–49	0.72	0.62–0.83	0.000	
50–59	0.53	0.44–0.64	0.000	
69–69	0.56	0.46–0.69	0.000	
≥70	0.29	0.22–0.37	0.000	
Marital status†§			0.000	0.002
Married	0.81	0.73–0.90	0.000	
Socio-economic status‡§			0.000	0.006
4–6	0.84	0.75–0.93	0.001	
7–9	0.62	0.53–0.72	0.000	
Employment status§			0.000	0.038
Seasonal/part-time	1.97	1.70–2.28	0.000	
Not working‡	2.20	1.90–2.55	0.000	
All others	0.76	0.67–0.86	0.000	
Health-related				
Health status§			0.000	0.005
Good	0.94	0.83–1.06	0.297	
Fair	0.78	0.66–0.92	0.003	
Poor	0.32	0.19–0.52	0.000	
No. of chronic conditions§			0.000	0.035
1	0.65	0.57–0.74	0.000	
2	0.50	0.43–0.58	0.000	
≥3	0.34	0.30–0.40	0.000	
Disability§			0.000	0.017
Yes	0.39	0.47–0.32	0.000	
ADL score§			0.000	0.009
1–3 (some)	0.37	0.26–0.53	0.000	
4–8 (many)	0.10	0.03–0.42	0.001	
Emotional status§			0.006	0.002
Good	1.21	1.09–1.35	0.000	
Fair	1.11	0.91–1.34	0.306	
Poor	1.05	0.58–1.91	0.861	

OR=odds ratio; CI=confidence interval; ADL=activities of daily living
*p values refer to whether each variable as a whole is significant in regression analysis and if so, which individual categories are significantly different from the reference categories. †Refers to the amount of variation that the variable explains. ‡See Methods section for definition of these variables. §Reference categories: Place of residence: Urban; Sex: Male; Age: 20–29; Marital status: Unmarried; Socio-economic status: 1–3; Employment status: Full-time; Health status: Excellent; No. of chronic conditions: 0; Disability: No; Activities of daily living score: 0 (no limitations); Emotional status: Excellent.

Table 4. Multivariate logistic regression analysis predicting whether respondents from rural and semi-urban centres did *not* have a regular physician (*n* = 11 789)

Variable	Adjusted OR*	95% CI	*p* value
Place of residence			<0.001
Urban	Reference category	N/A	N/A
Semi-urban	1.03	0.84–1.26	0.786
Rural	4.03	3.50–4.65	<0.001

OR = odds ratio; CI = confidence interval; N/A = not applicable.
*Adjusted for Employment status, No. of chronic conditions, Sex, Age and Disability.

Table 5. Characteristics of Newfoundland adults who do *not* have a regular physician

Variable	Urban, % n = 298 (16.8%)	Semi-urban, % n = 155 (8.8%)	Rural, % n = 1318 (74.4%)	p value*
Socio-demographic				
Sex				<0.001
Male	71.1	71.6	59.6	
Female	28.9	28.4	40.4	
Age				0.025
20–29	34.6	30.3	27.2	
30–39	25.5	25.2	25.6	
40–49	23.8	17.4	24.8	
50–59	6.7	12.9	10.7	
69–69	8.1	10.3	7.4	
≥70	1.3	3.9	4.4	
Marital status†				<0.001
Unmarried	40.3	40.0	28.1	
Married	59.7	60.0	71.9	
Socio-economic status†				<0.001
1–3	22.1	30.0	51.3	
4–6	42.6	44.7	40.5	
7–9	35.3	25.3	8.2	
Employment status				<0.001
Full-time	58.1	49.0	28.6	
Seasonal/part-time	11.4	10.0	21.3	
Not working†	9.1	14.8	23.4	
All others	21.5	25.2	26.7	
Health-related				
Health status				<0.001
Excellent	30.9	26.5	21.4	
Good	58.4	62.6	59.6	
Fair	10.1	9.7	18.1	
Poor	0.7	1.3	1.0	
No. of chronic conditions				0.002
0	44.0	48.7	38.5	
1	30.5	23.4	26.8	
2	14.8	17.5	15.9	
≥3	10.7	10.4	18.7	
Disability				0.014
No	96.3	96.1	92.3	
Yes	3.7	3.9	7.7	
ADL score				0.269
0 (no limitations)	98.7	99.4	97.6	
1–3 (some)	1.0	0.6	2.3	
4–8 (many)	0.3	0.0	0.1	
Emotional status				0.019
Excellent	42.9	43.7	39.2	
Good	52.0	49.0	50.4	
Fair	4.4	5.3	9.8	
Poor	0.7	2.0	0.6	

ADL = activities of daily living
*When $p < 0.05$ the p value refers to statistical significance between properties observed for individual categories within a variable.

Experiencing chemical warfare: Two physicians tell their story of Halabja in Northern Iraq

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Dale Dewar, MD
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On March 16, 1988, Saddam Hussein attacked his own people, blanketing them with deadly chemicals, cluster bombs and artillery fire. Five thousand Kurdish residents of Halabja, a rural community in northern Iraq, died that day, in the largest recorded chemical warfare incident in history.[1]

In November 2003, a 4-person rural medical education team from the Society of Rural Physicians of Canada[2] visited Northern Iraq. As a part of our mission to deliver continuing medical education to rural Kurdish physicians we visited Halabja, a community of 25 000 people 12 to 16 kilometres from the Iranian border.

The team interviewed **Dr. Sabah Abde Hawrami**, the present director of the Halabja General Hospital, about the effects of the chemical warfare, seen in Halabja today. Back in Canada, we also interviewed **Dr. Narmin Ibrahim**. She was in Halabja when the Iranians attacked and Saddam Hussein responded with chemical aerial attacks.

View Halabja images from article

The interviews

[In Iraq, physicians are called by their given name, and we have chosen to respect this practice.]

Dr. Narmin Ibrahim

Dr. Narmin: March 1988 I was doing my second year [of a rotating internship] . . . we had to do a 1-year rural ER rotation. I chose Halabja because I really liked it. However, I knew it was the borderline between Iraq and Iran. At that time there was war between these 2 countries. . . . Halabja was the site of some bombing by the Iranian government, but I like the community. My family did not like this idea, but I didn't care. I went.

Q: What kind of medicine were you practising?

Dr. Narmin: It was general medicine. I had a clinic every day. I had my own inpatients in the morning from 7:30 to 8:30. After that I was going to my clinic and seeing all sorts of patients: prenatal, deliveries and general medical patients. There were six physicians, one dentist and one pharmacist.

Q: What happened March 16, 1988?

Dr. Narmin: Everything was quiet, and we were all very worried because the Iranian bombing had been intense and now there was nothing. . . .

Every patient in the hospital, even the injured patients, they all ran away . . . and the hospital became empty. Iranians had occupied government buildings so I knew right away that Halabja was taken over.

In the evening I saw all the Halabja people. All of them had packed their things and were heading into the mountains. But we didn't want to go to Iran, so we stayed there overnight.

We were just about to have lunch [when] the first [chemical] attack happened. The sound of the bombardment was so loud that it caused all the windows to break. . . . We ran into the outdoor basement cellar. The next attack was on the house [which] was . . . demolished.

The sound was so loud, I seriously thought that I was dead. It became very dark, and the smoke came in . . . we reached for each other:

"Are you alive? Are you alive? Yes. Yes we are all alive."

We ran to another house and stayed in the basement . . . A neighbour's sister came . . . she was burned by chemicals . . . she told him that most of her family [was] gone. Her daughter dropped dead in front of her. . . .

Crossing the border into Iran

Every 10 minutes there was an attack. We started walking . . . There were so many people, and the planes just came and rained them with chemical and poison and guns. It was

horrible. Many chemically injured patients were with us; some of them had been blinded. We all had some chemical on our skin. I had blurred vision but I wasn't blind. We all had shortness of breath. The people, especially the blind ones, all attached themselves to one another by holding onto belts and ropes so that no one would get lost.

We were so happy when we reached the Iranian border, but there, nothing was different. The planes were still on us. . . . the Iranian soldiers couldn't do anything about it -- nothing.

There was a river between Iraq and Iran, and there was a floating bridge. . . . people at the back pushed the rest right over into the water . . . some families lost their kids just in front of them. The water just took their babies.

We kept walking, walking, walking until it was late night and a big truck picked us up [and] we reached Hassen, where we stayed in a deserted elementary school. . . .

In Iran

The Iranians put us in one room and gave us each one blanket. You couldn't turn over. Before I was in my own bedroom, now I am rooming with 35 other people in a one-room schoolhouse with a single bathroom. We stayed there 20 days.

Then we were taken to a camp near Hassen. From our medical team from Halabja, a pharmacist, surgical resident and I were working. We did 24 hours of call for deliveries -- everything, basically.

Even though the situation was horrible and I cried lots, in the end I realized I am a doctor, I am not handicapped. I have to prove myself, even to the Iranian government. I can do something. So I worked very hard there. . . ."

After escaping back to Iraq, eventually Dr. Narmin emigrated to Canada and graduated from a rural family medicine residency program.

Dr. Sabah Abde Hawrami

We also interviewed Dr. Sabah Abde Hawrami, a urologist who grew up in Halabja and is the present director of the Halabja General Hospital. His family was at home during the chemical destruction of his home town in 1988. He was away at medical school and was not permitted to return until 1991, when the US-led No-Fly-Zone allowed some degree of safe return for the inhabitants of this region. They returned to a broken town with no services and houses in shambles.

Halabja today

Q: What is the situation in Halabja today?

Dr. Sabah: Daily in our hospital we see 200 patients suffering from different problems. We face chemical victims who are suffering COPD [chronic obstructive pulmonary disease] and

some malignancies due to the effect of the chemical attacks of 1988.

Five thousand people died and another 10 000 people suffered from [the] effects of chemical gas poisoning. Even now . . . patients . . . die because of forming COPD, because of malignancy . . . even some young die from carcinoma [of the] rectum. As you know, very rare in young age.

My family was present here in Halabja during chemical bombardment. They survived, but still my sister and one of my brothers suffer from skin lesions. . . . You find at least one member in each family suffering.

Q: Are the social structures still strong, and are people getting back to a normal life?

Dr. Sabah: From 1991 until 2002 we are afraid another time Saddam Hussein will return. So we have become free really from April 7, 2003, when Saddam's regime [was] destroyed. Between 1991 and 2003 people here, mentally, they are not stable . . . [and are] afraid to undergo another attack.

Q: How did that affect the patients here?

Dr. Sabah: When we see patients with chemical poisoning, or other patients, we see that they are mentally not stable and . . . they are suffering more from psychological problems. [A] neurosis . . . an anxiety from Saddam's regime.

Q: It has been 7 months since the fall of the central government. Is this a good time to be in Halabja?

Dr. Sabah: I think for my people and Iraq in general, especially in Kurdistan, [they are] becoming happy . . . and we know that the patients rarely come in with psychological problems.

Perspectives from beyond Halabja

Sixteen years later a methodical testing of soil and water has yet to take place in Halabja. The cocktail of chemical and biological weapons used against as many as 250 Kurdish villages[3,4] is thought to include mustard gas, sarin, tabun, VX and aflatoxin.[5]

Congenital abnormalities in Halabja are 4 to 5 times greater than in the post-atomic population of Hiroshima.[4] Cardio-respiratory illnesses, blindness, skin abnormalities and neuro-psychiatric disorders are accompanied by rare and aggressive cancers and infertility.[5]

A 2001 strategy of support for post-exposure research and treatment has been suggested by Dr. C. Godsen (University of Liverpool) and the Washington Kurdish Institute[3] and includes urgent medical needs and primary health care research, and the development of an Iraqi postgraduate medical program for chemical and biological weapon exposure.

When we visited Halabja in the Fall of 2003, the hospital was still short of rudimentary treatment and investigative technologies, but the medical staff were keen and bright learners and remained optimistic for a brighter future.

Iraq sits on 60% of the world's known oil reserves yet presently suffers a 10% infant

mortality rate.[6] (Canada's is less than 0.4%.) One can only hope that once governance and public order in central Iraq are settled, appropriate caregiving can be made available -- particularly in those areas subjected to the worst horrors of modern warfare. In addition, the international community must invest in further clarifying the residual effects of chemical warfare on the soil, water and the inhabitants of Northern Iraq.

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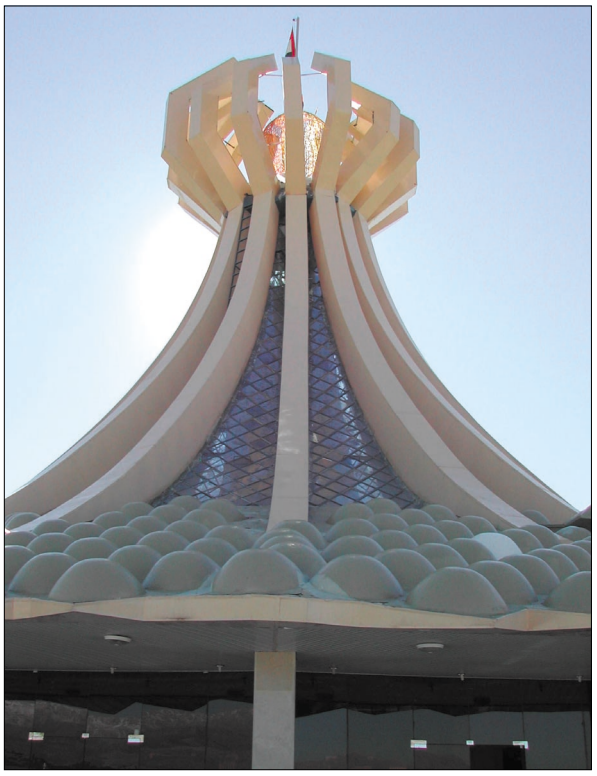

Karl Stobbe

Len Kelly

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Clockwise, from top left: 1. Halabja Monument honouring the 5000 dead. 2. In 1988, thousands came to this well to wash their eyes after the gas attacks, and died here. 3. Hilltop commemoration site, with coauthor Len Kelly overlooking Halabja and the mountains of Iran. 4. Present day housing in Halabja. 5. Halabja town square cornerstone, reproducing the famous photo of a man protecting his grandchild from the gas attacks. 6. Sign at entrance to Halabja Monument telling Baathists (Saddam Hussein's political party) not to enter. 7. Diorama in Halabja Memorial Museum, recreating scenes from the 1988 chemical attacks.

The "frequently" normal chest x-ray

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Among the most frequent diagnostic tests performed in rural areas is the chest x-ray (CXR) (**Fig. 1 above**). In spite of its familiarity to rural physicians, the interpretation of a routine CXR is by no means straightforward, and understanding the 3D reality of the thorax via the 2D radiological image (lateral and PA) is by no means second nature.

This article is intended to review basic concepts, and hopefully will be of use both to those who are aware that they are "spacially challenged" as well as to those who are, but have not yet admitted it.

Technical issues

First, ensure that the image you will be interpreting does not suffer from technical flaws. It should have been taken in full inspiration. Check this by confirming that the posterior aspects of the 9th or 10th ribs and the anterior aspects of the 5th or 6th ribs are visible above the diaphragms.

Check that the film is well centred, by noting that the spinous process is equidistant between the medial ends of both clavicles.

Check that left and right are correctly indicated on the film, and that it is not excessively over-penetrated (too black) or under-penetrated (too white).

The routine

As with other xrays, the CXR should be approached in a systematic fashion. There are, after all, images of bone, soft tissues, vessels, air spaces and bronchi, not to mention extra-thoracic elements such as the upper abdomen. We can all remember the stories (apocraphal or not) of the "normal" CXR where evident rib erosions or air under the diagphram was missed by the anxious house officer.

Follow this order in examining the film:

- bones: clavicle, shoulder, ribs
- mediastinum
- parenchyma
- hila
- diaphragms and upper abdomen.

Bones (**Fig. 2**)

- Follow each rib from its origin at the vertebral body to its cartilagenous end. Fractures may be evident, although special rib views that align the ribs more evenly may be necessary.
- The clavicle is also visible, as is the scapula, the AC joint, and the shoulder.

The mediastinum (**Fig. 3**)

This crowded region requires care in interpreting. It is rich in lymph nodes and fat, the latter outlining some important anatomical structures. Landmarks include pre-vascular spaces (thymic area), the paratracheal line, and the aorto-pulmonary window.

It is important to measure the width of the mediastinum (particularly in trauma), which should not be greater than 8 cm.

A "shifting" of the mediastinum may have clinical significance, although it is most often an artifact due to a film that is taken slightly obliquely .

The apex (**Fig. 4**)

Close inspection on a viewbox (or with a bright light) will reveal vessels that fill both apices. If a pneumothorax is present, the crescent of air at the apex will be uniformly black.

TB (which may not be as rare as we imagine) may be picked up as an infiltrate in the apex.

In congestive heart failure the increased venous pressures result in "redistribution," which is seen as vessels that are more prominent than expected at the apex.

The hilum (**Fig. 5**)

This is another crowded area in which images are a superposition of venous, arterial and bronchial elements. A prominence of this region generally indicates either lymphadenopathy or a vascular problem such as pulmonary hypertension.

The image of pulmonary edema, which results in massive engorgement of the venous elements of the lung, may be particularly evident at the hilum, where vessels may appear to "fan out."

The heart (**Fig. 6**)

The cardiac silhouette should occupy about 50% of the thoracic cavity.

If it exceeds this it suggests either a valvular problem, or prominence of a ventricle or

atrium. Rarely, an apparent cardiomegally may be due to a pericardial effusion.

No conclusions should be drawn from the finding of an apparently enlarged heart on a portable film: the image is created with the "camera" much closer to the patient, which artefactually increases its relative diameter.

The parencyma of the lung (**Fig. 7**)

Is there an infiltrate or not? This is probably the greyest of grey zones, with images of pulmonary infiltration ranging from vague "increased bronchial markings" to frank pie-shaped lobar pneumonia. In between are the shadows that justify your radiologist's training.

Review the anatomy of the lobes and segments of the lung, if only to impress your friends.

When abnormalities of the parenchyma are found, they may be classified as purely alveolar, purely interstitial, or mixed. The former will lead you toward diagnoses that are defined by the type of fluid occupying the alveolar spaces:

- pus - infectious causes
- water - cardiac causes
- blood - traumatic causes.

The latter will suggest fibrosis, the early signs of acute pulmonary edema, an atypical pneumonia (viral or mycoplasma), lymphangitic carcinomatosis or even a chronic pneumonia.

Comparing the two sides of an x-ray (as well as comparing the current film to older films) is a useful way to define an abnormality. If in doubt, it is always best to indicate your best guess in a documented preliminary interpretation that is communicated to your radiologist. He or she will then be alerted to the clinical path you have started down, and either confirm it, or correct it, or draw your attention to some element that you missed.

The diaphragm (**Fig. 8**)

A routine CXR done in your department by an experienced technician will be done in inspiration. This flattens the diaphragms. Films done under other less well controlled circumstances may appear to show elevated diaphragms, but are simply films taken in expiration.

Air fluid levels above the diaphragm (e.g., in a newborn) may indicate a diaphragmatic hernia. Other causes of elevated hemidiaphragms should be sought in the abdomen.

The lateral (**Fig. 9**)

A lateral view along with the PA is needed to (mentally) reconstruct a 3D image of the thoracic cavity. Certain lesions are only seen on lateral view as they may be masked on the PA.

Summary

An organized approach to CXR interpretation will take you most of the way toward your goal, which is to lead you to a well grounded differential diagnosis or, in the case of a normal CXR, to rule out a variety of possibilities. Working in collaboration with your radiologist, your own interpretations will allow you to institute treatment in a timely fashion, and the subsequent radiological review will serve to confirm, or correct, initial impressions. Over time this process will improve your skill, and your patients will reap the benefits.

A few "pearls"

Pediatric pathology

- In patients <2 yrs old the majority of pneumonias are viral.
- They present as atalectasis and "air trapping."
- They also present as "round" infiltrates.
- Mediastinum may appear widened due to the persistence of the thymus.

Neoplasms

- Neoplasms require a high index of suspicion.
- Any nodular image or mass, or persistent pneumonia suggests the need for further investigation.

Pulmonary embolus (PE)

- Radiological image is not diagnostic.
- In the majority of cases the image may be completely normal, or only show indirect signs.
- If the clinical history and physical examination are suggestive of PE, other investigations will be required, such as a V/Q scan (if available). A negative test eliminates the diagnosis, but any other result will require further testing.
- The investigation of choice is a "multi-slice" CT scan.

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Fig. 1. Routine PA CXR.

Fig. 2. Examine bones first.

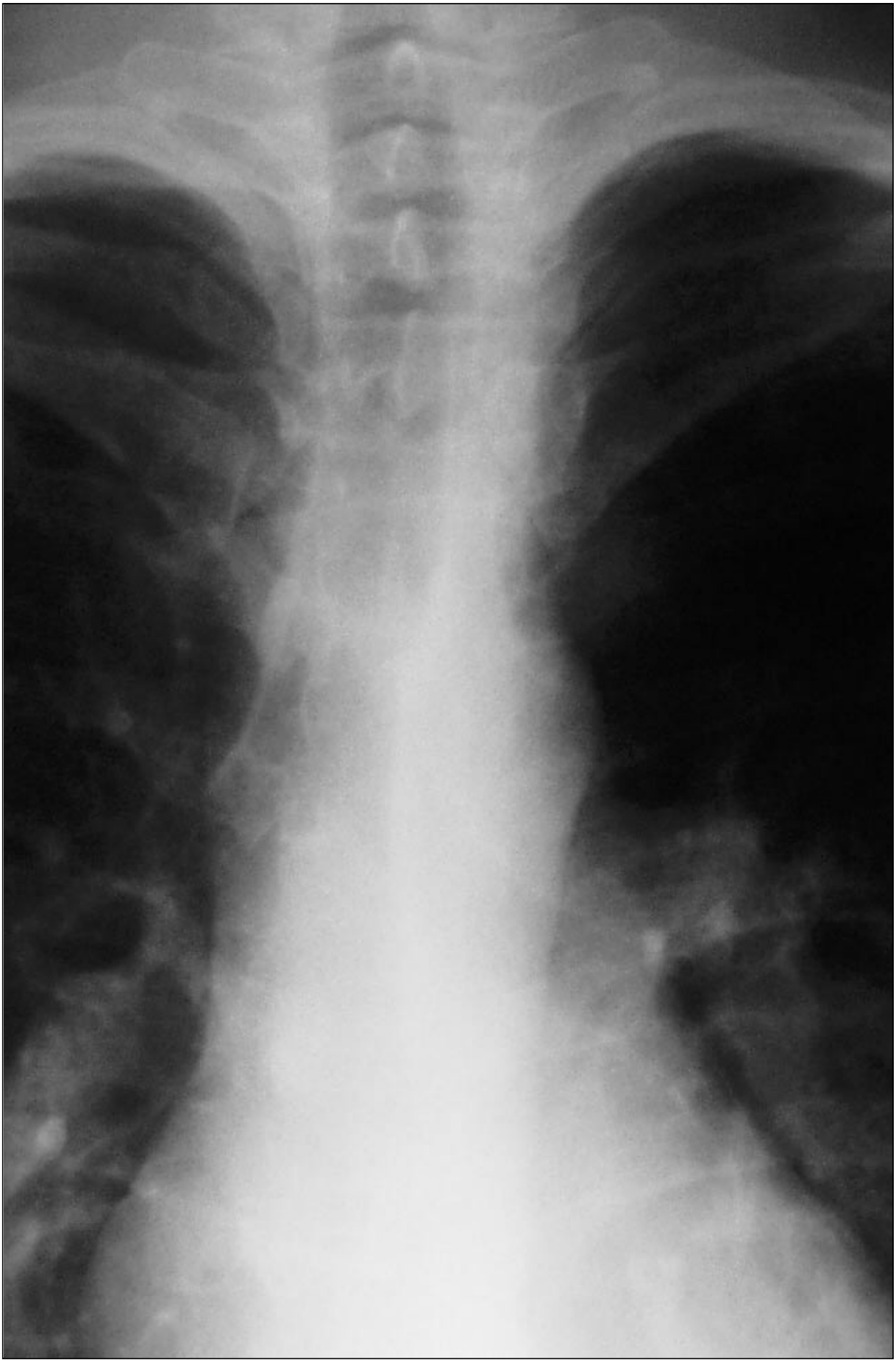

Fig. 3. Examine the mediastinum.

Fig. 4. Study the apices.

Fig. 5. Next, examine the hilum.

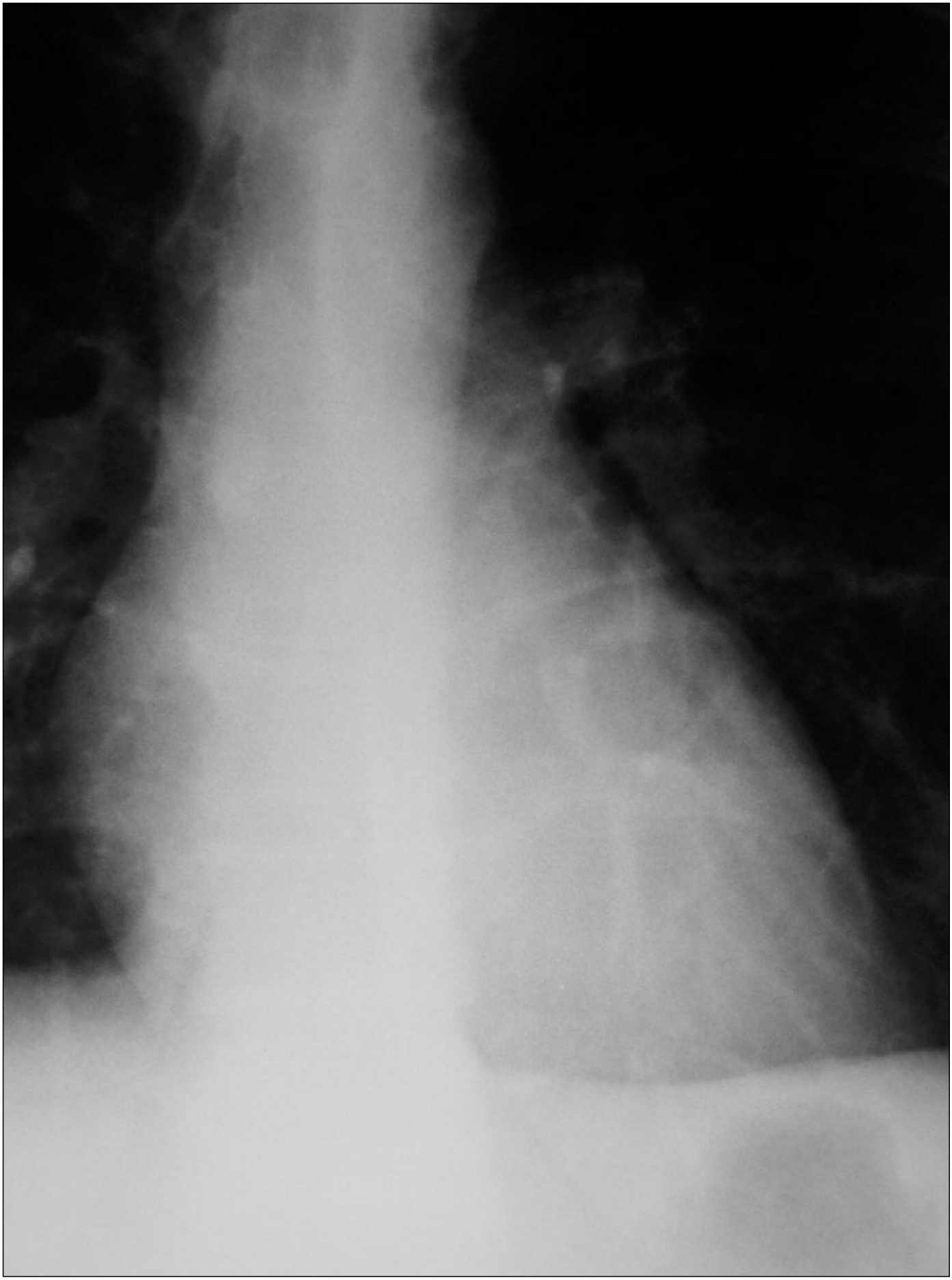

Fig. 6. Study the heart.

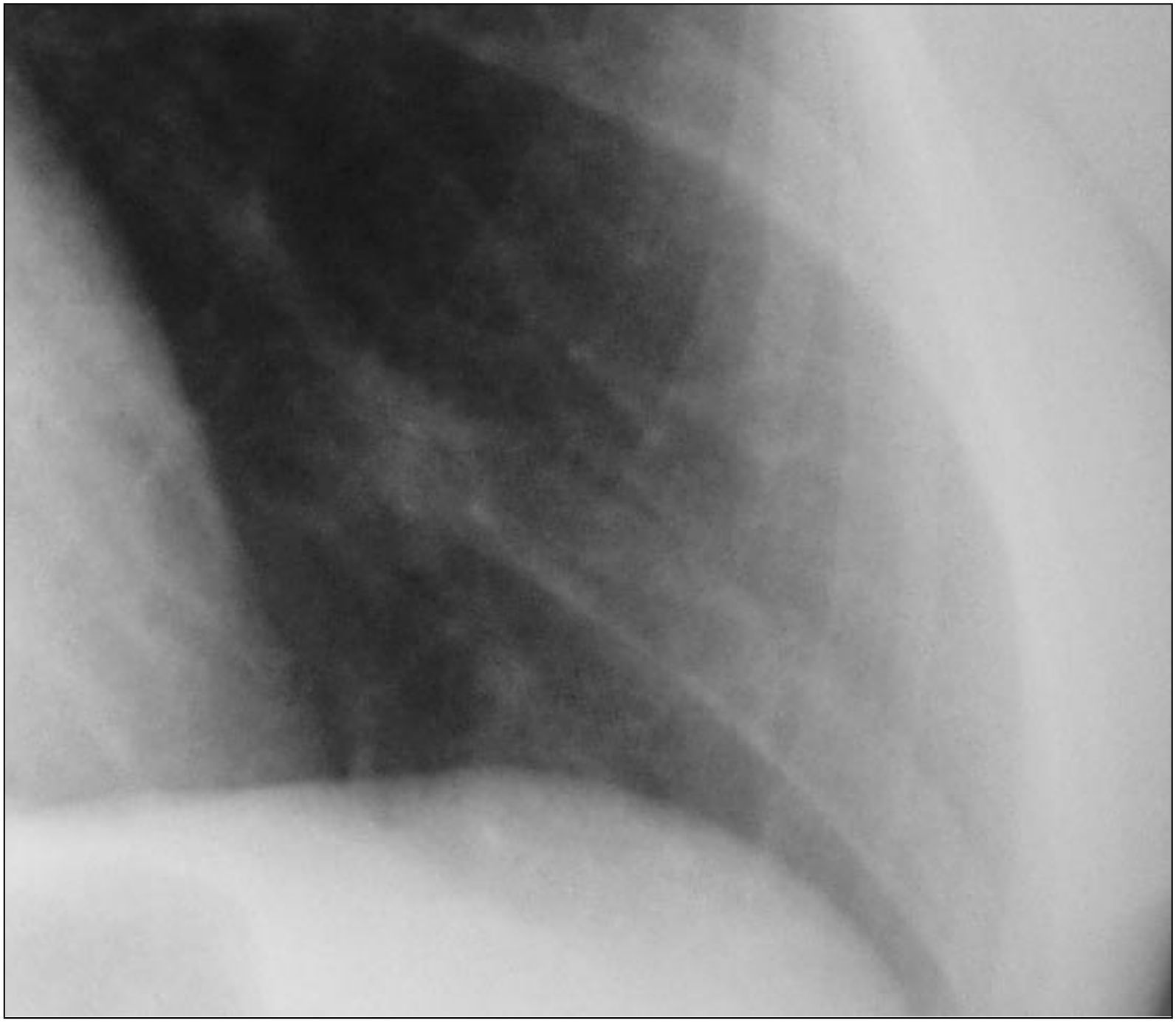

Fig. 7. The parencyma of the lung.

Fig. 8. Next, examine the diaphragm.

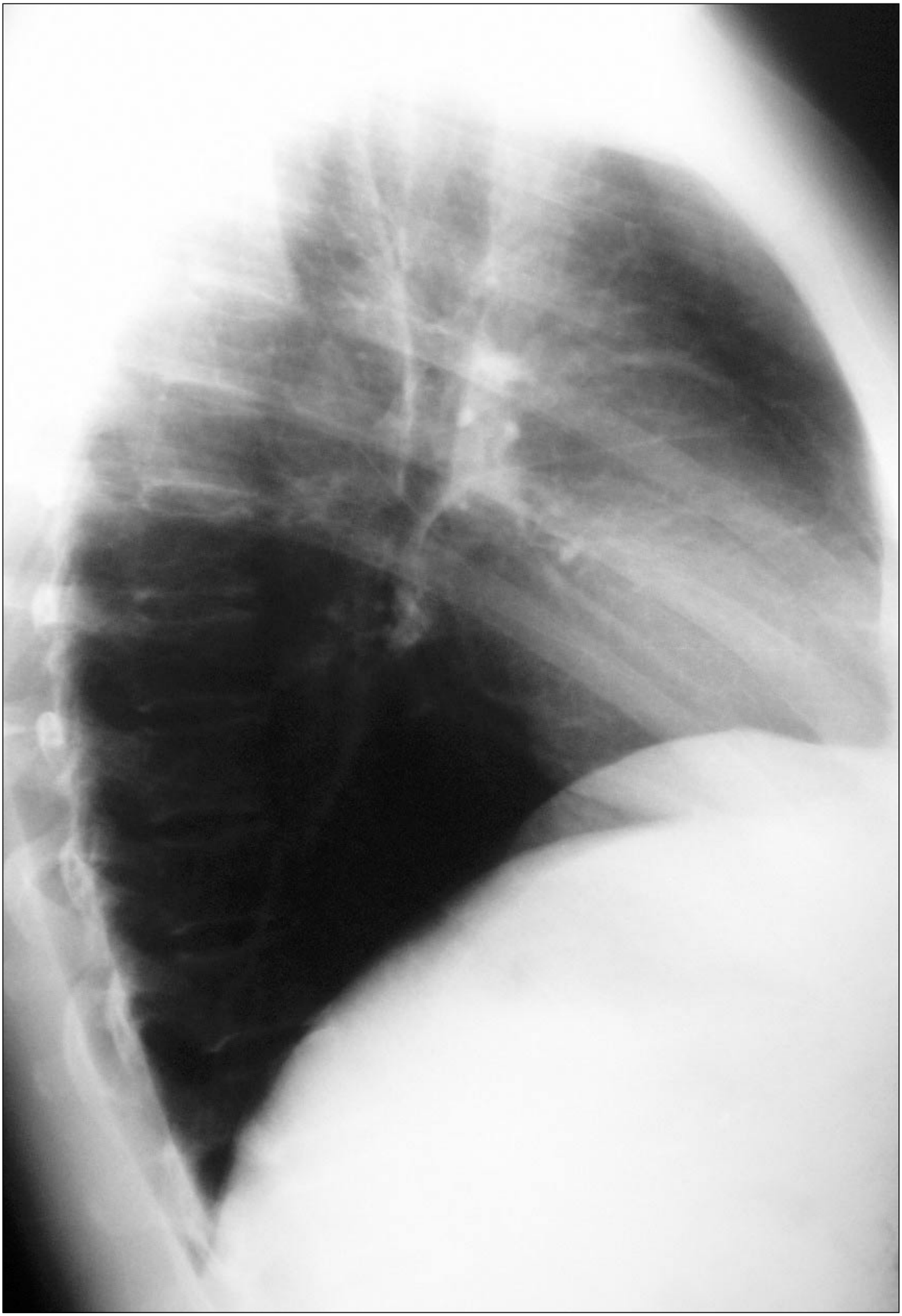

Fig. 9. The lateral view.