

Pediatric manpower in Canada: a cross-country survey

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Health care costs and government cutbacks in Canadian training posts have caused concerns about physician manpower. To determine the present pediatric manpower situation a cross-country survey was undertaken of all pediatricians and their practice patterns. Of the 2060 recipients of a questionnaire 5% were found to not be pediatricians. Of the remaining 1960, 69% returned a completed questionnaire. Overall, 70% of the pediatricians were men, although among those less than 35 years of age 49% were women. Across Canada 37% of the pediatricians practised primary care, 25% secondary care and 38% tertiary care. There were wide regional differences in practice patterns, with large numbers of primary care pediatricians in Winnipeg, Toronto, Ottawa and the province of Quebec; few pediatricians in the Maritimes and the remainder of western Canada practised primary care. Non-Canadian graduates accounted for 33% of the pediatricians and represented a considerable proportion of tertiary care pediatricians. Cutbacks in numbers of pediatric training positions and restrictions on immigration of foreign pediatricians may lead to unexpected deficiencies in the availability of some types of pediatric practitioners, especially those in tertiary care.

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Comme les gouvernements, vu le coût des services sanitaires, diminuent le nombre des postes de formation post-doctorale au Canada, on s'inquiète des effectifs médicaux. Afin de savoir ce qu'il en est actuellement des pédiatres et de leur mode d'exercice, nous faisons un sondage dans l'ensemble du pays. De 2060 médecins censés être des pédiatres qui ont reçu le questionnaire 5% n'en sont pas. Il reste 1960 praticiens dont 69% l'ont retourné. De ceux-ci 70% sont des hommes; parmi ceux qui n'ont pas 35 ans 49% sont des femmes. Dans l'ensemble du pays 37% des pédiatres exercent en première ligne, 25% en deuxième, 38% en troisième. Mais ceci varie beaucoup selon la région. Ainsi il y a beaucoup de pédiatres de première ligne à Winnipeg, à Toronto, à Ottawa et au Québec, mais peu dans les Maritimes et le reste de l'Ouest. Le tiers de tous les pédiatres ne sont pas diplômés canadiens et représentent une bonne partie des praticiens de troisième ligne. La diminution du nombre des postes de formation et les barrières à l'immigration de pédiatres étrangers pourraient causer un manque de certains genres de pédiatres, particulièrement en exercice de troisième ligne.

The popular perception of physician manpower in Canada has shifted from that of a shortage to that of an impending or current surplus, a shift that has also occurred in the United States and Europe.¹⁻⁴ A physician surplus, especially in certain disciplines, was predicted by the US Graduate Medical Education National Advisory Committee (GMENAC);⁸ however, it has been suggested that the committee overestimated the surplus.⁵⁻⁷ Recommendations from the GMENAC report⁸ and a subsequent commentary from the American Academy of Pediatrics⁹ called for a reduction in the number of postgraduate pediatric

training posts, a decrease in the number of foreign medical graduates taking postgraduate training in the United States and a closer adherence to accreditation policies for pediatric residencies.

In Canada the response to this perceived surplus has varied from debate to cutbacks in numbers of training posts and immigration restrictions. For example, the number of postgraduate pediatric training posts in Nova Scotia has been cut by 35%, and the government of Ontario is implementing the same reduction over a 5-year period (James E. Boone: personal communication, 1988). These changes have been accompanied by significant barriers to the immigration of non-Canadian graduates to Ontario.

The ideal number of pediatricians in Canada has been debated for more than a decade.¹⁰⁻¹² The ideal ratio suggested for Canada in 1976 was 1 per 20 000 population,¹³ compared with 1 per 10 000 in the United States, where much of the primary care for children is provided by pediatricians, and 1 per 40 000 in Britain, where pediatricians function solely as consultant specialists.^{9,13} The resurgence of family practice in Canada, the restrictions on specialists who deliver primary care, the development of subspecialty pediatric practice and the increased survival rates among children with complex problems have led to some question about whether the "ideal" ratio for Canada is still valid.

There is a paucity of information to suggest what might constitute an appropriate number of pediatricians in Canada; hence, strategic planning for reductions in numbers of residency posts and for postgraduate training is very difficult, especially because unforeseen problems from such reductions might cause significant shortages in the numbers of academic and subspecialty pediatricians. We conducted a country-wide study to determine the current pediatric manpower situation in Canada.

Methods

A questionnaire on demographics, education and practice was developed by two of us (M.J.R. and R.H.A.H.) and critically reviewed by members of the Department of Epidemiology and Biostatistics at McMaster University, Hamilton, Ont. The questionnaire was then pretested on 10 volunteers to identify unclear and ambiguous questions. After suitable modification the questionnaire was mailed in stages to all pediatricians in Canada.

Pediatricians were identified from the membership list of the Canadian Paediatric Society, the pediatric sections of the provincial medical associations, the membership of all Canadian university departments of pediatrics and, when possible, the pediatric billing sections of the provincial ministries of health. The Department of National Health and Welfare was contacted to determine the number of pediatricians in the federal civil service.

The questionnaire was sent to all pediatricians in Ontario in February 1987 and to those in the

other provinces in April 1987. Both English and French questionnaires were sent to the pediatricians in Quebec and New Brunswick. Nonrespondents were sent a second questionnaire 3 months later.

Pediatricians were defined as having had at least 4 years of postgraduate training and as having successfully completed the specialty examinations of the Royal College of Physicians and Surgeons of Canada or the Professional Corporation of Physicians (Quebec). Primary care was defined as the care of unreferred or self-referred children, secondary care as pediatric consultations to primary care providers and the routine care of children with complex or chronic conditions, and tertiary care as subspecialty consultations as well as the routine care of children with conditions germane to that subspecialty.¹⁴

The questionnaires were reviewed and entered into data files on a 512K Macintosh Apple computer with an OVERVUE program (PROVue Corp., Huntington Beach, California). Data entry checks were performed on a randomly selected 10% of the questionnaires. In addition, any questionnaires with values outside the normal range for a particular response were checked. After data entry was complete all the data files were compiled in a VAX computer and analysed with a BMDP statistical package (BMDP Statistical Software Inc., Los Angeles). Chi-squared analysis was used for proportions and analysis of variance for continuous variables.

Results

A total of 2060 pediatricians, 1633 of whom were in active practice, were sent a questionnaire. Of those initially identified as pediatricians 5% (100) were subsequently discovered to not be pediatricians; most were in related fields (such as pediatric pathology or pediatric ophthalmology) or were family physicians with a special interest in pediatrics. Of the remaining 1960 pediatricians 1352 returned completed questionnaires, for a response rate of 69%. The ratio of pediatricians to population was 1:15 000.

Most of the pediatricians (70%) were men, but the sex distribution was highly age-dependent (Fig. 1): only 13% of the pediatricians aged 45 years or older were women, compared with 49% of those younger than 35 years. Most of the pediatricians (87%) were in practice; of those who were not, approximately one-third were undertaking further training, one-third had retired, and one-third had chosen other careers. Most of the practising pediatricians (83%) were practising full time, and the men were more likely than the women (84% v. 78%, $p < 0.05$) to be practising full time as opposed to part time.

Most of the pediatricians were located in central Canada (33% in Ontario and 27% in Quebec), 32% were in western Canada (the largest proportion being in British Columbia), and 8%

were in Atlantic Canada (most often Nova Scotia).

On average across Canada 37% of the pediatricians practised primary care, 25% secondary care and 38% tertiary care. There were considerable regional differences in practice patterns (Fig. 2). The practice pattern in Ontario was identical to the average pattern across Canada. In Quebec 62% of the pediatricians practised primary care, 15% secondary care and 23% tertiary care. The figures for Manitoba were 48%, 6% and 46% respectively. Less than 20% of the pediatricians in the remainder of western Canada and in Atlantic Canada practised primary care. There was also regional variation in practice patterns within the provinces. For example, in Ontario most of the primary care pediatricians were in Toronto, Ottawa and Kingston, whereas in Manitoba most were in Winnipeg.

Over 80% of the pediatricians were located in communities of more than 100 000 people. Most of those in smaller communities practised primary and secondary care; tertiary care pediatricians were more likely to be located in communities of more than 100 000 people. The largest proportion of secondary care pediatricians practised in communities of between 100 000 and 500 000 people.

Among the pediatricians aged 65 years or older almost 60% were in primary care, and less than 15% were in tertiary care (Fig. 3). Among those under 35 years of age more than 40% were

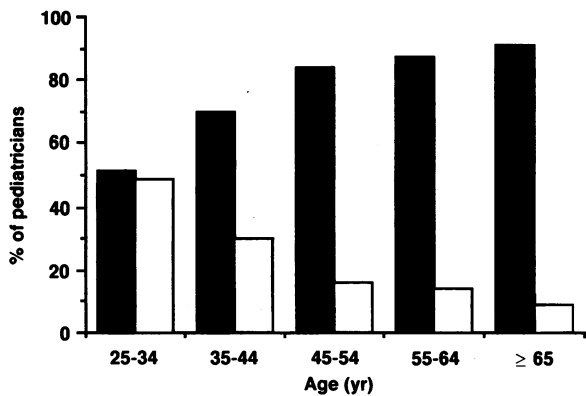


Fig. 1 — Distribution of male (black bars) and female (white bars) pediatricians in Canada, by age.

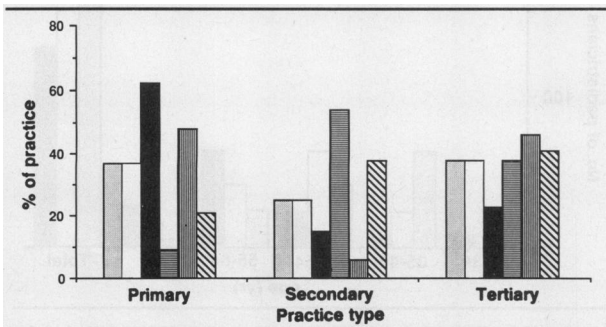


Fig. 2 — Patterns of pediatric practice in all of Canada (shaded bars), Ontario (white bars), Quebec (black bars), Atlantic Canada (horizontally striped bars), Manitoba (vertically striped bars) and remainder of western Canada (diagonally striped bars).

in tertiary care, and less than 35% were in primary care. There were no significant differences between the men and the women in age-dependent patterns of care.

Approximately one-third of the pediatricians were non-Canadian graduates. The overall practice pattern of this group was similar to that of the Canadian graduates, although the former group was somewhat more likely to practise secondary care and the latter to practise primary care. Many more of the graduates from the United States, Britain and Ireland than of the other non-Canadian graduates or the Canadian graduates (56% v. 28% and 37% respectively; $p < 0.05$) practised tertiary care (Fig. 4).

The respondents were asked their opinions on whether there were adequate, surplus or deficient numbers of pediatricians in their areas. A total of 43% of the pediatricians in primary and secondary care felt that there were adequate numbers in these fields, and 41% felt that there was a deficiency. Only 15% suggested that there was a surplus, and most of these respondents practised in urban areas with large numbers of primary care pediatricians.

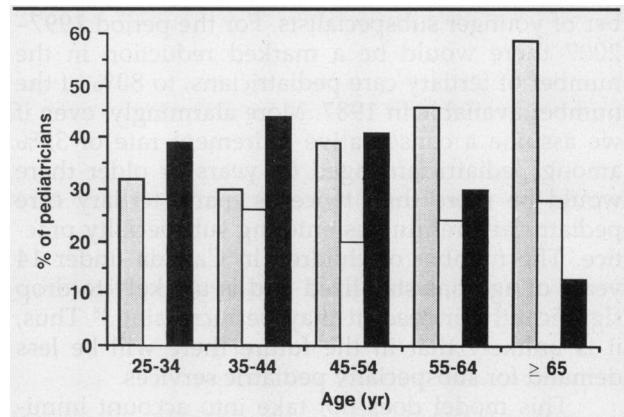


Fig. 3 — Age distribution of pediatricians practising primary (shaded bars), secondary (white bars) and tertiary (black bars) care.

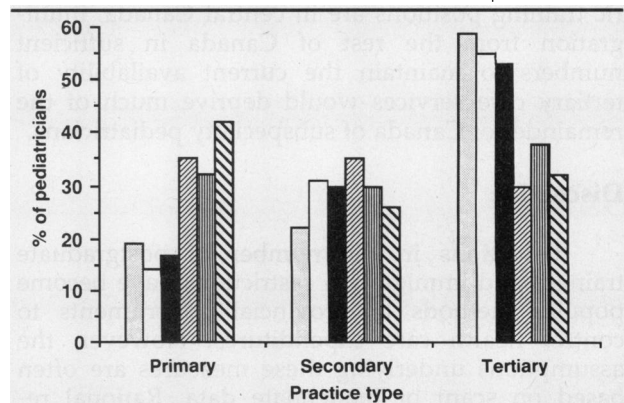


Fig. 4 — Practice patterns of graduates from United States (shaded bars), Britain (white bars), Ireland (black bars), other Commonwealth countries (diagonally lightly striped bars), Australia/South Africa (vertically striped bars) and other countries (diagonally darkly striped bars).

Most of the pediatricians in tertiary care (74%) noted that there was a deficiency in this field; they estimated, on average, that there was a shortage of five tertiary care pediatricians in their areas.

On the basis of the data from Ontario we projected for the next two decades the effect of a 35% reduction in the number of postgraduate pediatric trainees and the elimination of immigration on the availability of pediatricians in tertiary care (Fig. 5). We reduced the number of pediatricians under 35 years of age entering the manpower pool to account for these changes, using the demographic data for the pediatricians aged 25 to 34 years and subtracting the number of foreign graduates and one-third of the graduates who had done a pediatric residency in Ontario.

We also projected a 35% rate of retirement for the pediatricians aged 55 to 64 years, who would be 65 years of age or over in the next decade. This projection was based on the present percentage of pediatricians in active practice in Ontario versus the percentage of those retired and 65 years of age or over. For the period 1987-97 there would be a minor reduction in the total number of tertiary care pediatricians and a marked reduction in the number of younger subspecialists. For the period 1997-2007 there would be a marked reduction in the number of tertiary care pediatricians, to 80% of the number available in 1987. More alarmingly, even if we assume a conservative retirement rate of 35% among pediatricians aged 65 years or older there would be more than twice as many tertiary care pediatricians retiring as entering subspecialty practice. The number of children in Canada under 14 years of age has stabilized and is unlikely to drop significantly; indeed, it may be increasing.¹⁵ Thus, it is unlikely that in the future there will be less demand for subspecialty pediatric services.

This model does not take into account immigration of tertiary care pediatricians to Ontario from other provinces. However, given the large percentage of the total pediatric manpower pool in Ontario and the fact that most subspecialty pediatric training positions are in central Canada, immigration from the rest of Canada in sufficient numbers to maintain the current availability of tertiary care services would deprive much of the remainder of Canada of subspecialty pediatricians.

Discussion

Reductions in the number of postgraduate trainees and immigration restrictions have become popular methods of provincial governments to control health care expenditures. However, the assumptions underlying these measures are often based on scant or inadequate data. Rational restructuring of pediatric residencies and manpower planning requires an appreciation of the present manpower situation before the probable effect of such changes on the availability of various types of pediatricians can be projected.

In our study 5% of the practitioners identified

as pediatricians were not, in fact, pediatricians. Among the remainder 13% were not in practice, and 17% were in part-time practice. Thus, use of the numbers provided by the various official agencies may result in an overestimate of as much as 10% in the number of practising pediatricians.

A total of 80% of the pediatricians responding to our survey questionnaire were located in metropolitan areas, a percentage unchanged from that reported by Banister¹⁰ in 1970. In addition, the distribution of pediatricians across Canada was unchanged from that reported by Shah¹¹ in 1971.

In his nationwide survey Shah¹¹ found that 87% of Canadian pediatricians were men; roughly 10 years later Feldman, Milner and Punthakee¹⁶ reported a similar figure. Subsequently there has been a marked increase in the number of female pediatricians. Of our study group 70% were men, but there were more women than men entering pediatric training positions and practice. Women were also more likely than men to be in part-time practice; this situation will undoubtedly add to the manpower dilemma.

We found wide variation in practice patterns across Canada. Primary care pediatrics was largely confined to distinct geographic areas, perhaps in part owing to the availability of pediatricians. Manitoba, for example, with 1 pediatrician per 8000 population, had nearly twice the proportion of primary care pediatricians as the other three western provinces, in which there was 1 pediatrician per 15 000 population. However, in Ontario and Quebec, which had very similar ratios of pediatricians to population (1:16 000 and 1:14 000 respectively) the numbers of primary care pediatricians were very different. This variation may also have been due in part to different expectations of the patient populations, to billing restrictions of provincial health care plans for primary care by specialists or to historical patterns of care.

There was also an age-dependent variation in practice patterns, the younger pediatricians being much more likely than the older ones to practise

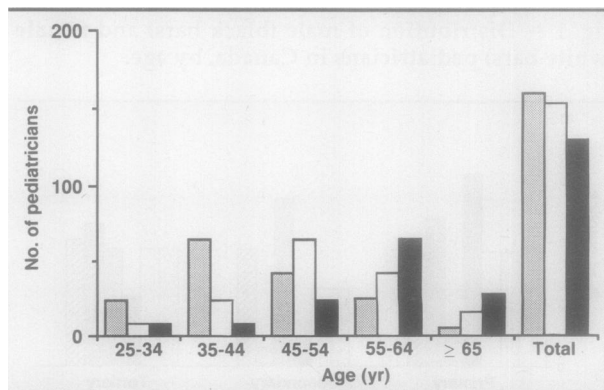


Fig. 5 — Projected effect of cutbacks of 35% in numbers of residency positions and elimination of immigration on availability of tertiary care pediatricians (by age) in Ontario over 20-year period. Estimates shown for 1987 (shaded bars), 1997 (white bars) and 2007 (black bars).

subspecialty or tertiary care pediatrics. This finding probably reflects the development of formal subspecialty training in pediatric training programs and the increasing sophistication of pediatric care.

Twenty years ago 80% of practising pediatricians were graduates of Canadian medical schools.¹⁶ One-third of our study group had graduated in other countries. This group has been targeted for decreases through immigration restrictions by government at the federal and provincial levels. As a whole the only difference between Canadian and non-Canadian graduates was the tendency of Canadian graduates to practise primary care and of non-Canadian graduates to practise secondary care. However, there was a considerable difference in practice patterns among the non-Canadian graduates. Graduates of US, British and Irish medical schools were twice as likely as all the other graduates to practise tertiary care pediatrics.

Most of the pediatricians in primary and secondary care thought that there were adequate numbers or only small shortages of pediatricians in their fields. However, 74% of the pediatricians in tertiary care reported a shortage in that field.

Our projections suggest that over the next 20 years there will be a dramatic reduction in the number of tertiary care pediatricians in Ontario, the number retiring exceeding the number entering practice by more than two to one. There are now 80 000 more children under 4 years of age in Canada than there were in 1976;¹⁵ thus, the requirement for pediatric services is unlikely to drop substantially. Although many of Canada's larger subspecialty training programs are in Ontario, graduates of these programs will not be produced in adequate numbers to maintain even the needs of Ontario. Given the shortage of tertiary care pediatricians identified in our study and that in-hospital pediatrics is becoming increasingly specialized there is likely to be a decrease in the availability of subspecialty pediatric care. Cutbacks in numbers of residency positions and recent changes in Canadian immigration laws will have a marked impact on the practice of pediatrics in Canada.

Concern over the optimal number of physicians is international, especially given that the supply of physicians increased by 120% between 1950 and 1979.¹⁷ The question of whether the numbers represent a surplus or are adequate must be judged on the basis of the practice patterns and population requirements of each country.

Previous reports on pediatric manpower in Canada have regarded pediatric practice as either primary care or referral-based.¹⁰⁻¹³ Indeed, 20 years ago 70% of Canadian pediatricians were engaged to some extent in primary care; however, at present there is roughly an equal distribution between primary, secondary and tertiary care pediatrics. Twenty years ago it was suggested that two or three full-time pediatricians might be required at each medical school; less than 5% of pediatricians practised tertiary care.¹⁰

The complexity of modern pediatric knowledge and the introduction of such "high technology" as bone marrow transplantation, intensive care units and renal dialysis into routine pediatric practice have necessitated the development of formal subspecialty training programs. The inclusion of subspecialty pediatricians in the manpower pool without consideration of the nature of tertiary care produces an unbalanced and inaccurate estimation of pediatric manpower. Tertiary care complements primary and general consultative pediatrics; it does not replace or duplicate them. The number of pediatricians in Canada has approximately doubled since 1968.¹⁰ However, when tertiary care pediatricians are excluded from the manpower pool the ratio of pediatricians to population becomes 1:30 000, a figure similar to that of 20 years ago.¹⁰ Although primary care can be delivered by various caregivers state-of-the-art subspecialty pediatric care can only be practised by well-trained and experienced pediatricians.

Our results indicate that, although the distribution is not ideal, pediatric manpower for primary and secondary care in Canada is probably in balance. However, there appears to be a shortage of tertiary care manpower. Because immigrant pediatricians provide a significant proportion of tertiary care pediatrics in Canada, severe restrictions in the numbers of postgraduate training programs and blanket restrictions on immigration without consideration of the positions for which these physicians are being sought are likely to result in a decreased availability of subspecialty pediatric care. This situation has grave implications for the ability of our health care system to provide state-of-the-art care for our youngest citizens in the years to come.

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Meetings

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Apr. 10-11, 1989: Paediatric Advanced Life Support Hospital for Sick Children, Toronto
Continuing Medical Education, Faculty of Medicine, Medical Sciences Building, University of Toronto, Toronto, Ont. M5S 1A8; (416) 978-2718

Apr. 12-14, 1989: Paediatric Update Hospital for Sick Children, Toronto
Continuing Medical Education, Faculty of Medicine, Medical Sciences Building, University of Toronto, Toronto, Ont. M5S 1A8; (416) 978-2718

Apr. 13-14, 1989: Les urgences
Hôtel Le Reine Élizabeth, Montréal
Annie Alberro, Service de formation continue, Fédération des médecins omnipraticiens du Québec, 1100-1440, rue Ste-Catherine ouest, Montréal, PQ H3G 1R8; (514) 878-1911, ou 1-800-361-8499 pour les indicatifs 514, 819, 418 et 613

May 1-2, 1989: Perspectives on the Frontal Lobes — Research, Remediation and Reintegration
Holiday Inn Downtown, Toronto
Barb Smith, Educational Services, Hugh MacMillan Medical Centre, 350 Rumsey Rd., Toronto, Ont. M4G 1R8; (416) 424-3851

May 2-6, 1989: Annual Review Course in Obstetrics and Gynaecology
King Edward Hotel, Toronto
Continuing Medical Education, Faculty of Medicine, Medical Sciences Building, University of Toronto, Toronto, Ont. M5S 1A8; (416) 978-2718

May 7-9, 1989: 44th Annual Meeting of the Canadian Life Insurance Medical Officers Association
Westin Bayshore Hotel, Vancouver
Dr. J. Dickson Cormack, medical vice-president, Canada Life Assurance Company, 330 University Ave., Toronto, Ont. M5G 1R8; (416) 597-1456

May 11-12, 1989: Mise à jour en thérapeutique
Hôtel Loews Le Concorde, Québec
Annie Alberro, Service de formation continue, Fédération des médecins omnipraticiens du Québec, 1100-1440, rue Ste-Catherine ouest, Montréal, PQ H3G 1R8; (514) 878-1911, ou 1-800-361-8499 pour les indicatifs 514, 819, 418 et 613

May 26-27, 1989: Quebec Medical Association 51st Annual Meeting
Ritz-Carlton Hotel, Montreal
Nicole Barré, 610-1010 Sherbrooke St. W, Montreal, PQ H3A 2R7; (514) 282-1443

May 31-June 3, 1989: Canadian Society of Plastic Surgeons 43rd Annual Meeting
Westin Hotel, Edmonton
Dr. Joseph A. Starr, secretary-treasurer, Canadian Society of Plastic Surgeons, 336-1333 Sheppard Ave. E, Willowdale, Ont. M2J 1V1; (416) 494-7422

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