How well do paediatric residency programmes prepare residents for clinical practice and their future careers?

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CONTEXT Educators across Canada are presently discussing whether the current 4-year residency programmes adequately prepare paediatricians for their future careers. Studies carried out in the USA have repeatedly shown areas of weakness in residency training, but there are no studies looking at the overall adequacy of training across Canada.

OBJECTIVES To assess practising paediatricians' perceptions of the adequacy of their residency training as preparation for clinical practice and to assess practising paediatricians' opinions about the required mandatory length of training.

METHODS A questionnaire based on previous studies was sent to 434 paediatricians certified between 1999 and 2003, asking for their opinions of their preparedness for practice in the broad areas of paediatrics and in the professional roles of the doctor-specialist.

RESULTS Overall, 239 (55%) paediatricians replied, 96% of whom indicated they were 'adequately' or 'very well' trained. Areas in which opinions on training were positive included emergency medicine, neonatology, endocrinology, haematology/oncology, neurology, infectious diseases and respirology. Areas where preparation was considered to have been less adequate included gynaecology, child psychiatry, behavioural psychology, surgical specialties, orthopaedics and adolescents. With respect to the roles of the doctor-specialist, strengths of training included the areas of medical expert, collaborator, ethics and professionalism, and communicator. Respondents felt they were less adequately prepared for the role of a medical expert dealing with palliative care, for dealing with bereaved parents and as manager of an office practice. Despite these weaknesses, 80% felt that 4 years of training was sufficient.

DISCUSSION The results of the study are comparable with those of previous studies carried out in the USA and reinforce the need for regular programme assessment. This study will hopefully lead to the improvement of current paediatric residency programmes and enhanced education and training of future paediatricians. Although overall satisfaction with training was high, paediatric programmes need to make some changes by providing more appropriate training with less tertiary care, hospital-based training and more community and ambulatory-based experiences.

KEYWORDS paediatrics/ *education; *internship and residency; *career choice; pharmacy/ *education; rural health; United States; cohort studies; interprofessional relations; longitudinal studies.

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INTRODUCTION

At present, there is ongoing discussion within individual paediatric training programmes and at the Royal College of Physicians and Surgeons of Canada (RCPSC) as to whether current paediatric training programmes adequately prepare residents for clinical practice and their future paediatric careers. Clinician-educators often state that with 'academic half-days'

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Overview

What is already known on this subject

Surveys of US paediatricians have shown consistent weaknesses in residency training programmes.

What this study adds

Canadian paediatricians are satisfied with their 4-year training programmes and feel they are adequately prepared for practice but there are important areas with inadequate amounts of or inappropriate training.

Significant and valid differences in opinion exist between community-based generalist paediatricians and university-based subspecialists.

Suggestions for further research

This study should be repeated following proposed changes in Canadian postgraduate training to include specific training for the CanMEDS roles, clearer definition of core competencies and greater flexibility in programmes. Similar studies could be included in the survey and accreditation/evaluation process of postgraduate medical education programmes.

and mandatory post-call regulations, residents do not have enough clinical experiences to adequately achieve the educational objectives of training. Doctors-in-training often comment that they are not ready for many of the practical aspects of medicine. Residents remark that they are comfortable caring for acutely ill patients in an inpatient setting, but do not feel comfortable managing general paediatric or chronic care issues. Despite many years of training and preparation, newly qualified paediatricians often feel ill prepared for various aspects of clinical practice. In 1996 the RCPSC outlined extensive *Objectives of Training and Training Requirements in Pediatrics* according to the 7 CanMEDS roles of the doctor-specialist: medical expert, communicator, collaborator, health advocate, manager, scholar and professional.[1] Many paediatric medical educators wonder whether it is possible to achieve all of these objectives within current residency programmes.

Surveying recently qualified doctors' opinions of their professional education and their preparedness for practice is an established way to review medical education programmes.[2] Repeated studies of paediatric residency programmes in the USA have shown deficiencies in the areas of developmental paediatrics, behavioural problems, ambulatory and community paediatrics, continuity care, pharmacology, adolescent medicine and paediatric orthopaedics.[3–14] Other studies have suggested that residents have more experiences in neonatology, intensive care and bone marrow transplantation than is necessary for their future careers.[15,16] However, these are all US studies and training programmes in the USA have a different focus compared with Canadian programmes. US paediatric residencies are 3-year programmes designed to prepare primary care paediatricians, whereas Canadian training requires 4 years and is designed to prepare paediatric consultants.[7,8,17–19]

There have been similar concerns in the UK and Europe about the length of training and preparation for practice. In 1 questionnaire survey, junior doctors expressed concerns that specialist registrar training was considered to be narrow and inflexible, with service work taking priority over training needs. Some respondents in this qualitative study feared that they would not be competent to practise as consultants.[20] There are proposals that medical specialty training should be shorter, more focused and flexible to meet specific needs and career goals.[21,22] There are also mandatory requirements that training programmes and the working conditions of residents be consistent with the European Working Time Directive.[23–25] However, there have been no evaluations as to whether residents subject to these changes are adequately prepared for clinical practice and to fulfil their career goals.

At present, only 1 Canadian programme has attempted to evaluate the graduates of its paediatric residency.[26] The areas of weakness found in this study included child psychiatry, research, rural paediatrics, adolescents, office-based paediatrics, dermatology and child development. The strengths of the programme included resuscitation, neonatology, haematology/oncology and intensive care medicine. The respondents, however, felt that the neonatal experience was excessive. There are 4 other limited Canadian studies. Veale *et al.*[27] and Thompson *et al.*[28] found that practising paediatricians felt that they

needed further training in developmental and behavioural paediatrics. Ward *et al.* found that senior paediatric residents felt insufficiently trained to evaluate and manage cases of suspected abuse.[29] Korczak and Katzman found that paediatric residents did not feel confident with adolescent and gynaecological problems.[30] However, these 4 studies were restricted to comments about specific areas of paediatrics. They did not address whether the findings were due to insufficient duration of training or to inappropriate training experiences. In addition, they did not attempt to address the question of what can be taken out of the curriculum if more training in some areas of paediatrics is needed.

Asking the opinions of recently certified paediatricians on both the strengths and weaknesses of training programmes will help to evaluate the current curricula in the 16 paediatric programmes in Canada. To date, no study in Canada has attempted to look at all aspects of paediatric training for all residency programmes across the country. The results of the study may lead to improvement of the current programme through recommendations to programme directors as well as the enhanced education and training of future paediatricians. The results may also help to address the question of whether 4 or 5 years of training should be required for paediatric certification in Canada. This study may also serve as a model for evaluation of postgraduate training, whether for individual programmes or nationwide.

The objectives of the current study were to assess whether recent graduates of paediatric residency programmes felt in retrospect that they had been well prepared for practice in specific clinical areas and how important it would be to increase or decrease training in various clinical areas, or modify training experiences in paediatrics.

METHODS

A 5-page questionnaire was designed using 3 US studies and the British Columbia study.[8,9,17,26] Revisions were made following advice from educational researchers and colleagues at the Canadian Pediatric Society (CPS) and the Pediatric Specialty Committee. The survey was pilot-tested among residents and modified accordingly. The questionnaire was translated into French for paediatricians from the 3 francophone universities. The RCPSC sent questionnaires to 434 paediatricians who had been certified by the RCPSC in the previous 5 years (1999–2003). An e-mail reminder was sent out after 1 month and a repeat mailing was sent out after another month to those who had not returned the questionnaire.

The questionnaire asked for demographic data and details regarding the individual's training and current practice. The survey assessed paediatricians' perceptions of how well they felt they had been prepared for clinical practice, including:

1 broad areas of clinical practice, and
2 the 7 CanMEDS roles of the RCPSC.

Respondents were asked to describe their level of preparedness on a scale of 1–6, where 1 = not at all, 2 = inadequate/not enough time, 3 = inadequate/inappropriate experience, 4 = adequate, 5 = very well and 6 = too much. The questionnaire allowed for qualitative comments about specific areas of training and asked paediatricians to comment on how the training might be improved. Finally, paediatricians were asked for their opinions regarding the length of training required for certification in paediatrics.

RESULTS

Of the 434 questionnaires sent out, 239 were returned (55% response rate). Of the respondents, 28% were male and 72% female; 49% were general paediatricians and 51% paediatric subspecialists; 41% were community-based and 59% university-based. We excluded 31 respondents who were still in training, 14 who trained outside Canada and 1 who was exclusively doing research.

Paediatricians' responses regarding the adequacy of training in broad areas of practice are presented in Table 1. For analysis, responses 1, 2 and 3 were combined as 'inadequate' and responses 4, 5 and 6 were combined as 'adequate'. Overall, 96% of paediatricians felt adequately trained. Areas highlighted as those in which they were well trained included emergency medicine, neonatology, endocrinology, haematology and oncology, neurology, infectious diseases, respirology, nephrology, gastroenterology, cardiology, general surgery and rheumatology. However, graduates felt less than adequately trained in gynaecology, child psychiatry, behaviour, surgical subspecialties, adolescent medicine, dermatology, nutrition, allergy and immunology, metabolic diseases, and genetics.

Chi-square analysis was used to assess differences between groups. There were no differences in

Table 1 Paediatricians' preparedness for specific paediatric problems (rank order)

Paediatric topics	1 Not at all	2 Inadequate Not enough	3 Inadequate Inappropriate experience	4 Adequate	5 Very well	6 Too much	Overall Adequate
Emergency	0	3	2	82	105	1	188 (97%)
Neonatology	0	3	7	56	102	26	184 (96%)
Endocrine	0	3	4	103	83	0	186 (96%)
Haematology and Oncology	0	5	6	100	74	8	182 (95%)
Neurology	0	4	11	132	46	1	179 (93%)
Infectious diseases	1	9	4	89	87	1	177 (93%)
Respirology	3	5	9	117	57	1	175 (91%)
Nephrology	3	9	8	128	44	0	172 (90%)
Gastro Intestinal/Gastroenterology	2	8	9	119	53	0	172 (90%)
Cardiology	0	6	22	120	44	3	167 (87%)
General surgery	5	9	12	136	28	2	166 (86%)
Rheumatology	2	19	14	118	39	1	158 (82%)
Development	1	30	26	96	40	3	139 (73%)
Genetics	7	37	18	111	17	1	129 (69%)
Metabolic disease	6	35	32	105	18	0	123 (64%)
Allergy and Immunology	4	46	27	99	17	0	116 (61%)
Nutrition	13	45	27	99	10	0	109 (57%)
Dermatology	4	55	30	96	11	0	107 (56%)
Adolescent medicine	6	44	43	91	12	0	103 (54%)
Orthopaedics	19	49	31	85	8	0	93 (49%)
Surgical specialties	39	33	27	77	6	1	84 (46%)
Behaviour	16	63	43	73	7	1	81 (42%)
Psychiatry	26	57	44	58	9	0	67 (36%)
Gynaecology	39	63	43	45	6	0	51 (27%)
Finally, how would you rate your overall sense of preparedness?	0	5	4	122	65	0	187 (96%)

overall perceptions of preparedness between general paediatricians and paediatric subspecialists ($P \leq 0.05$); there were no differences in overall perceptions of preparedness between community-based and university-based paediatricians ($P \leq 0.05$). However, compared with paediatric subspecialists, general paediatricians were less satisfied with respect to their training in child development (64% versus 82%), behavioural paediatrics (32% versus 52%), and child psychiatry (25% versus 46%). Similarly, compared with university-based paediatricians, community paediatricians were less satisfied with respect to their training in child development (63% versus 80%), behavioural paediatrics (29% versus 52%) and child psychiatry (26% versus 43%). Interestingly, more university-based paediatricians (23/111) than community-based paediatricians (3/81) felt they had too much training in neonatology.

Paediatricians' responses regarding the adequacy of training with respect to the specific CanMEDS roles are presented in Table 2. Strengths of training included preparing paediatricians for the roles of medical expert, communicator, collaborator, scholar and professional. Weaknesses included preparing paediatricians for the role of the medical expert dealing with palliative care and with death and bereaved families, and as the manager of an efficient office practice.

Recommendations made by paediatricians for mandatory length of training are presented in Table 3. Despite the perceived inadequacies reported by participants and the fact that most did not feel they had had too much training in any area, only 20% of graduates felt that the duration of training should be extended to 5 years. Only 2% felt that 3 years of training, similar to training in the USA, was adequate, and 78% felt that 4 years was adequate. There were no significant differences between general paediatricians and paediatric subspecialists, nor between community-based and university-based paediatricians.

Qualitative comments were equally important. Most paediatricians were very satisfied with their training, especially in dealing with acutely ill, hospitalised patients, but felt their training was lacking in some subspecialties and in ambulatory care practice. Overwhelmingly, many wanted less training in tertiary care centres and more ambulatory, community-

Table 2 Paediatricians' preparedness for the RCPSC CanMEDS roles

Paediatric skill	1	2	3	4	5	6	Adequate
Medical expert providing anticipatory guidance, well child care	4	37	24	89	43	1	133 (70%)
Medical expert dealing with child and youth maltreatment/abuse	5	45	30	90	22	1	113 (60%)
Medical expert dealing with the chronic care of complex problems	0	16	13	92	66	6	164 (86%)
Medical expert dealing with palliative care	9	67	48	49	17	0	66 (35%)
Medical expert dealing with death and bereaved parents	6	48	35	76	26	0	102 (54%)
Procedural skills	0	14	8	88	81	2	171 (90%)
Communicator – working successfully with difficult patients/families	3	12	8	86	80	4	170 (89%)
Communicator – working successfully with cultural or socioeconomic differences	1	14	17	90	71	1	162 (84%)
Collaborator – working as a member of a team	0	1	3	52	134	3	189 (98%)
Manager – learning principles of quality management	16	35	20	87	33	1	121 (64%)
Manager – managing an efficient office practice	67	60	45	11	5	1	17 (9%)
Health advocate for individual patients	8	18	24	103	41	0	144 (75%)
Health advocate for disadvantaged children or child health issues	11	34	33	88	27	0	115 (60%)
Scholar – ability to carry out a research project	7	23	30	88	44	2	134 (70%)
Scholar – ability to critically appraise literature	2	14	15	103	58	5	166 (86%)
Professional and ethical issues	0	14	3	99	76	2	177 (92%)

1 = not at all; 2 = inadequate, not enough training; 3 = inadequate, not appropriate experience; 4 = adequate; 5 = very well; 6 = too much time was spent in this field.

Table 3 Pediatricians' recommendations for mandatory length of training (199 respondents)

Years of training	*n*	%
Three years	**4**	**2%**
3	3	
2 core + 1 elective/subspecialty	1	
Four years	**156**	**78%**
3 core + 1 elective/subspecialty	126	
4 core	30	
Five or more years	**39**	**20%**
3 core + 2 elective/subspecialty	16	
4 core + 1 elective/subspecialty	20	
5 core	3	

based, office practice with opportunities for a longitudinal experience. Some reinforced the importance of electives to complete their preparation for practice, while others stressed the importance of the fourth year to provide training appropriate for their future careers, such as community experiences or in continuity clinics. Some commented on the need for more flexibility in their training programmes.

DISCUSSION

In Canada and across the world there is ongoing discussion about proposals to change postgraduate medical education. Doctor-specialists are expected not only to acquire knowledge about relevant diseases and good clinical skills, but also to develop competence in other professional roles, such as those of communicator, collaborator, health advocate, manager and scholar. Given the now mandatory time off following on-call rotations and mandatory time away from clinical experiences for formal teaching sessions, educators are concerned that residents may not be able to achieve the stated objectives in the current length of training. In North America there are discussions about lengthening training, while in the UK training is being shortened. The study indicates that Canadian paediatricians feel they have been adequately prepared for clinical practice and that their training does not need to be extended.

This is the first Canadian study to look at all the specific medical topics of a specialty and at the 7 CanMEDS roles of the specialist. Our findings are similar to those of studies of US paediatric programmes[8,9,14,15,17] and the previous study carried out at a Canadian centre.[26] Overwhelmingly, newly qualified paediatricians were satisfied with their training and felt they had been adequately prepared for their careers. Recent graduates felt they had received excellent training in most of the paediatric subspecialties, with only a few weak areas, specifically in gynaecology, child mental health/psychiatry, surgical subspecialties, and behavioural, developmental and adolescent medicine. An additional issue explored by this survey involved asking paediatricians for the bases of their perceptions of inadequate training. As can be seen from Table 1 and in the written comments, paediatricians felt that they were not well prepared because their training programmes did not include some important areas of paediatrics, but also because the experiences were inappropriate for their practice and future career. Training on a subspecialty

ward in a tertiary care, highly specialised academic health science centre may not be appropriate for the community-based practising paediatrician.

We included both general paediatricians practising in the community and university-based paediatric subspecialists, as both are required to complete 4 years of training. There were significant and important differences that validate the survey. General paediatricians and community-based paediatricians felt less adequately prepared in developmental paediatrics and child behaviour and mental health compared with paediatric subspecialists and university-based paediatricians. This reflects what they do in practice and the changing nature of paediatric practice in North America, where there is a shift towards more community-based, ambulatory care of children instead of inpatient, tertiary care paediatrics. With respect to excessive training, it was primarily the university-based paediatric subspecialists in centres where there are full-time neonatologists who felt that they had too much training in neonatology, and not the community-based general paediatricians who provide community-based newborn care.

This study is unique in that we asked for paediatricians' opinions of their preparedness to fulfil the 7 CanMEDS roles of the doctor-specialist as defined by the RCPSC. These are not dissimilar to the 6 general practitioner core competencies outlined by the American Board of Medical Specialties. Paediatricians must not only provide excellent patient care as medical experts, but must be communicators, collaborators, health advocates, managers, scholars and professionals. Although these roles have only recently been described, it should be noted that paediatricians felt that they were adequately prepared as medical experts, communicators, collaborators, health advocates, scholars and professionals. The 3 roles for which they felt inadequately prepared were those of the medical expert dealing with palliative care, the medical expert dealing with death and the bereaved family, and the manager of an office practice. There are no similar studies available for comparison, but a previous study of doctor preparedness for practice also noted inadequacy in preparing residents in practice management issues.[2] Canadian residency programmes now recognise that they have to formally include office practice management, collaborator, communicator and health advocacy skills training, as well as specific topics such as death and dying, palliative care and child abuse into the curriculum with seminars or workshops. However, programme directors can take some satisfaction in the fact that respondents reported that they had learned about ethics, critical appraisal and research methodology.

This study, with the many written comments from respondents, also highlights the need for flexibility and for designing training programmes to fit the career goals of trainees, with more opportunities for ambulatory and community-based experiences and longitudinal continuity care experiences. Certainly, there are basic core competencies that all specialists must achieve, but training programmes with electives or community-based and ambulatory experiences may better prepare specialists to fulfil their career goals. Training and clinical experiences should be determined by the educational objectives of training and by the career goals of residents and not by the service requirements of the teaching hospital.

Even with 4 years of training, Canadian paediatric programmes have similar weaknesses to those reported in the USA, where training programmes last 3 years. Despite these perceived inadequacies and the fact that few respondents felt they had had too much training in any area, most paediatricians did not feel they needed more training than the presently required 4 years. Despite the concerns of educators that mandatory academic half-day teaching sessions and mandatory post-call requirements will reduce clinical experiences, 96% of respondents were satisfied with their training and 80% felt that 4 years was adequate. The areas of weakness are important and paediatric programmes will have to address these perceived deficiencies and perhaps provide more flexibility in programmes designed to meet residents' career goals.

This study focuses on 1 specialty, but the methodology could be replicated in other specialties to establish whether practising specialists feel they have been adequately prepared for their careers. In Canada, the RCPSC sets out objectives of training and training requirements, but the 16 programmes individualise the experience and duration of exposure for their residents based on the institution's expertise and available preceptors in the field. When educational programmes are surveyed and accredited by the RCPSC, they are assessed to see whether they meet the accreditation standards set by the college and whether faculty staff and trainees are satisfied with the programme. This type of study could serve as a form of programme evaluation, that is, as a survey of qualified graduates of programmes to see whether they feel they were well trained for their careers and to ensure that appropriate education is taking place.

There are a number of limitations to this study.

1 One limitation may concern the response rate, which, at 55%, is slightly lower than those of similar studies and may limit the generalisability of the results. However, the respondents are probably comparable with paediatricians across Canada as the percentages of women and men are similar to estimates of the sex of the surveyed group and those in training[31] and the percentages of paediatric specialists and general paediatricians are similar to those in practice.[32]
2 We combined the responses of generalists and subspecialists, whereas many US studies surveyed only primary care paediatricians. However, both groups need to complete the core paediatric training and the opinions of both groups are important. Although there were few significant differences in responses between these groups, their answers may differ as the populations they serve and problems they face differ significantly.
3 This study asked paediatricians about their perceived preparedness for practice, which is not exactly the same as their actual tested preparedness for practice. If paediatricians have not encountered many problems in any particular area, they may not recognise how well or how poorly they were trained for practice.
4 Our responses depended on self-reporting, which is subject to recall bias and memory effect. However, our results are very comparable with those of similar published studies.
5 To evaluate the adequacy of a residency programme, we could have determined the success of trainees in certification examinations. However, we chose to survey those who had been certified in paediatrics and therefore those who had passed their examinations. A survey of those who were not successful in certification examinations might yield quite different results.

This study provides important information for medical educators. Most paediatricians felt that they had been well trained, but there are weaknesses and deficiencies that must be addressed, not by lengthening the training programmes, but by providing experiences that may better match the career goals and future practices of paediatric residents. The ongoing challenge for residency programme directors is to provide flexibility in educational experiences, and to balance primary and tertiary care experiences as well as outpatient and inpatient experiences, while simultaneously ensuring that all certified paediatricians acquire the core competencies of paediatrics.

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