

Pediatric Neurology Training in Canada: Current Status and Future Directions

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ABSTRACT: Background: Child neurology training in Canada has changed considerably over time, with increasing requirements for standardized teaching of the fundamentals of child neurology and the CanMEDS competencies. We sought to determine the current status of child neurology training in Canada as well future directions for training. **Method:** A web-based survey was sent to program directors (PD's) of active pediatric neurology training programs. General questions about the programs were asked, as well as about success at the Royal College of Physicians and Surgeons of Canada (RCPSC) exam, breakdown of rotations, views on CanMEDS roles and questions on the future of pediatric neurology. **Results:** 9/9 PD's completed the survey. 96.5% of all trainees successfully passed their RCPSC exam from 2001-2006. Breakdowns of the number and type of rotations for each year of training were provided. All CanMEDS roles were deemed to be important by PD's and programs have developed unique strategies to teach and assess these roles. 92.6% of trainees chose to go into academic practice, with the most popular subspecialty being epilepsy. All PD's favour joint training sessions particularly for neurogenetics and neuromuscular disease. Overall, PD's suggest recruitment for future child neurologists at the medical student level but are divided as to whether we are currently training too few or too many child neurologists. **Conclusions:** This survey provides a view of the current state of pediatric neurology training in Canada and suggestions for further development of post-graduate training. In particular, attention should be given to joint educational programs as well as urgently assessing the manpower needs of child neurologists.

RÉSUMÉ: La formation en neurologie pédiatrique au Canada : situation actuelle et nouvelles orientations. Contexte : La formation en neurologie pédiatrique au Canada a changé considérablement au cours des années. Les exigences concernant l'enseignement standardisé des aspects fondamentaux de la neurologie pédiatrique et le Cadre de compétences CanMEDS ont augmenté considérablement. Nous avons examiné la situation actuelle de la formation en neurologie pédiatrique au Canada ainsi que les nouvelles orientations dans ce domaine. **Méthode :** Nous avons effectué un sondage en ligne auprès des directeurs de programmes (DP) de formation en neurologie pédiatrique. Le sondage incluait des questions générales sur les programmes ainsi que sur le taux de succès à l'examen du CRMCC, la répartition des rotations, le point de vue sur les rôles CanMEDS et des questions sur l'avenir de la neurologie pédiatrique. **Résultats :** Tous les DP (9/9) ont complété l'enquête. Le taux de succès des résidents à l'examen du CRMCC a été de 96,5% entre 2001 et 2006. La répartition du nombre et du type de rotations au cours de chaque année de formation a été colligée. Tous les rôles CanMEDS étaient considérés comme importants par les DP et ils ont développé leurs propres stratégies pour enseigner et évaluer ces rôles. La grande majorité des résidents, soit 92,6%, ont choisi la pratique en milieu universitaire et la sous-spécialité la plus populaire était l'épilepsie. Tous les DP étaient en faveur de sessions de formation conjointes, particulièrement dans le domaine de la neurogénétique et des maladies neuromusculaires. En général, les DP suggèrent de recruter les futurs neuropédiatres chez les étudiants en médecine. Cependant, l'opinion est partagée à savoir si le nombre de résidents actuels en neuropédiatrie est trop faible ou trop élevé. **Conclusions :** Cette enquête fournit un aperçu de l'état actuel de la formation en neurologie pédiatrique au Canada ainsi que des suggestions concernant son développement futur. Les programmes de formation communs en neurologie pédiatrique ainsi que l'évaluation des besoins en main-d'œuvre dans ce domaine devraient faire l'objet d'une attention particulière.

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Child neurology training in Canada has changed considerably in the last half century. Originally no formal training was available with most pediatric neurology patients being seen by interested adult neurologists or pediatricians. As time passed, more formal training programs were established, usually beginning after one had completed some training in adult neurology or general pediatrics¹. Currently, most programs in Canada offer five year training programs, allowing trainees to pursue pediatric neurology training directly out of medical school². Currently ten such programs exist across the country, each accepting between one and three trainees per year.

While the Royal College of Physicians and Surgeons of Canada (RCPSC) has mandatory requirements for adult and pediatric neurology training in Canada³, these guidelines are

relatively general allowing for considerable variation amongst programs. The RCPSC has also adopted the CanMEDS framework to ensure that essential physician competencies (Medical Expert, Communicator, Collaborator, Scholar, Health Advocate, Manager, Professional)⁴ are addressed in residency training. This framework has been integrated into the Royal

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College's accreditation standards, objectives of training, and final in-training evaluations.

In 2001, Canada had five pediatric neurology training programs and was graduating approximately two to three pediatric neurologists per year⁵. In comparison, there are currently ten programs² potentially graduating ten new child neurologists per year; the question thus arises as to whether we are training too many, too few, or just the right amount of child neurologists.

To help examine these issues, a national survey of all program directors (PD) in child neurology was designed to determine the following: 1) how adequately programs prepare trainees for the Royal College Exam in Neurology, 2), how individual programs are structured and how different programs address the RCPSC requirements and 3) general impressions on the future of child neurology in Canada including whether we are training too few or too many trainees.

METHODS

A web-based survey was developed (see Appendix) using an online survey creation tool (www.surveymonkey.com) and was sent to PD's of the nine active pediatric neurology programs in Canada at the time of the survey (University of British Columbia, University of Calgary, University of Alberta, University of Saskatchewan, University of Toronto, University of Ottawa, McGill University, Université de Montréal, Dalhousie University). Although there are currently ten active pediatric neurology training programs in Canada, at the time of the survey, McMaster's program was not fully underway, and thus was not included. Questions in the survey covered the number of trainees in the program, proportion of trainees from Canada and abroad, success on the RCPSC examination, rotations available to trainees, call, composition of educational components of their program, views on CanMEDS roles, career choices of trainees, and perceptions on the future of child neurology in Canada. Surveys were emailed in Dec. 2006-Jan

2007. Email reminders were sent at two and six weeks after the initial email.

RESULTS

Demographics

All (9/9) active programs responded to the survey. Program directors had been practicing neurology for an average of 13 years (range 3-28), with most having served as PD's for an average of 5.7 years (range 1.5 – 18 years). Two PD's had a Master's in Education.

The average number of full-time equivalent pediatric neurologists at the PD's institutions was 7.7 (range 2.5 -12). Eight out of nine programs had a five year program with entry directly after medical school. Seven had a three year program with entry after three years of pediatrics.

Trainee Profile and Royal College Examination results

Over the past five years prior to the survey, 54 trainees were enrolled in five year programs. Of these, 38 were Canadian medical graduates (CMG's, trainees who had attended medical school in Canada), six were international medical graduates (IMG's, trainees who had attended medical school in other countries but who were now citizens or landed immigrants of Canada and who intend to practice in Canada) and ten were foreign medical graduates (FMG's, trainees who had attended medical school in other countries and who intend to return to their country of origin to practice)⁶.

Only seven programs responded to questions regarding success on the RCPSC examination in neurology. Of the seven programs who responded 24 CMG, one IMG and two FMG attempted the RCPSC exam; only one FMG was not successful (96% success rate) (See Table 1).

With respect to three year programs, there were 13 trainees enrolled in the five years prior to the survey (6 CMG, 7 FMG). Of the six programs that responded to questions regarding the

Table 1: Number of trainees enrolled in five year and three year programs child neurology training in Canada, the number attempting the Royal College Examination and the number successful at the Royal College Examination (2001-2006).

	Number of trainees	Number attempting Royal College Exam	Number unsuccessful at the Royal College Exam
5 year program	38 CMG	24 CMG	1 FMG
	6 IMG	1 IMG	
	10 FMG	2 FMG	
3 year program	14 CMG	14 CMG	None

CMG: Canadian Medical Graduate; IMG: International Medical Graduate; FMG: Foreign Medical Graduate

Table 2: Rotations designated as mandatory in over 40-50% of programs in the years of general pediatric training and dedicated neurology training

Mandatory rotations in General Pediatrics years (in min of 40-50% of programs)	Average Length of Rotation	Mandatory rotations during years of Pediatric Neurology training (in min of 40-50% of programs)	Average Length of Rotation
General Pediatrics	> 3 months	Pediatric Neurology Clinics	>3 months
Neonatal Intensive Care Unit	2 months	Pediatric Neurology Ward	> 3 months
Pediatric Intensive Care Unit	1-2 months	Adult Neurology	3-12 months
Child Development	1-2 months	Neuromuscular	3 months
Child Psychiatry	1 month	Epilepsy	3 months
		Neuropathology	1-3 months
		Pediatric Neurosurgery	1-2 months
		Research	3 months
		Rehabilitation Medicine	1 month

RCPSC examination, 14/14 CMG's who took the RCPSC exam passed and no FMG's took the exam.

Structure of Programs

Rotations

All five year programs have their pediatric neurology trainees spend some time in general pediatrics rotations; 57% do two years of general pediatrics, whereas 43% do one year. All those who do two years rotate for at least one month as ward senior. All programs have their trainees attend the general pediatrics academic half-day during their general pediatrics years. Rotations done in more than 40-50% of programs are listed in Table 2. Of note, variation was noted in the length of adult neurology rotations with lengths ranging from 3-12 months (median six months).

Trainees in all programs take home call, excluding the time spent during their general pediatric years. Call averages between one in three to one in four nights on call per month amongst programs. Seventy-one percent of programs have trainees receive calls directly from parents, whereas the remainder take calls only from other physicians. All PD's agree or strongly agree that being on call is an important part of education and only 37% believe being post call is a significant problem in their program.

Education

All programs require trainees to attend an academic half-day. Forty two percent only attend the half-day organized by the adult neurology program associated with their university. Fifty-eight

percent of programs have their trainees attend both the adult neurology half-day as well as a dedicated pediatric academic half day. Eighty-five percent of programs have regular didactic teaching sessions in addition to the academic half-day. On average trainees receive a mean of 2.25 hours (range one to three hours) per week of didactic teaching. A majority (86%) of PD's feel there is adequate time for teaching and most (75%) do not feel that protected time takes away from clinical learning.

Evaluation

All programs have formative evaluations for trainees. All programs use OSCE's (observed structured clinical encounters) as an evaluation tool; 86% have trainees do both adult and pediatric OSCE's, with only one program having trainees only do an adult neurology OSCE. All programs also utilize observed histories and physicals. Most programs do one to two of these per year (median 2, range 1-12). All programs have their trainees do the Residency in-training examination (RITE) offered by the American Academy of Neurology. Most (71%) of programs use written exams in evaluation, up to two times per year. The majority of programs (85.7%) do not use simulators in teaching and learning, but one program uses them for practicing lumbar punctures and resuscitation.

CanMEDS roles

All PD's agree or strongly agree that CanMEDS roles are important for trainees. Various strategies for teaching and assessing the various non-Medical Expert CanMEDS roles were offered by PD's (see Table 3).

Table 3: Examples of strategies given by program directors on how to teach and assess the various CanMEDS competencies

CanMEDS Role	Examples of strategies for teaching and assessing
Communicator	<ul style="list-style-type: none"> • Direct observation of resident/patient interaction • Observed histories and physicals • Didactic session on dictating consult letters
Collaborator	<ul style="list-style-type: none"> • Collaborating with allied health care on research projects
Manager	<ul style="list-style-type: none"> • Having trainees responsible for organizing, rounds, journal club etc. • CMA sessions on how to start a practice • Organizing continuity clinics • Didactic sessions on the manager role
Health Advocate	<ul style="list-style-type: none"> • Having residents participate in developing patient handouts • School visits by residents • Involvement with a camp for children with special needs
Scholar	<ul style="list-style-type: none"> • Participation in research projects • Research courses • On-line statistics course
Professional	<ul style="list-style-type: none"> • Formal courses on ethics • Graded responsibility (ie position of chief resident)

Future of Child Neurology Training

With respect to future training needs, respondents felt that joint cross-country teaching sessions, held either via teleconference or in conjunction with the annual Canadian Neurological Sciences Federation Meeting would benefit trainees. Topics suggested included neurogenetics (100% of respondents) and neuromuscular disease (75% of respondents). All PD's also felt that trainees would benefit from learning about the CanMEDS roles in a joint environment as well.

The majority of respondents (86%) feel that with regards to recruitment in our profession, we should be targeting undergraduate medical students. Suggested strategies for recruitment of medical students include increased teaching of pediatric neurology at the undergraduate level, the creation of student interest groups, and giving presentations to medical students regarding a career in child neurology.

Program directors estimate approximately 78% of their trainees plan to subspecialize with only a minority planning to go into general or community practice. Details of career choices of recent graduates are listed in Table 4.

When asked about future demand for child neurologists, 63% feel that demand will increase, 25% feel that it will stay the same and 12% feel it will decrease. Program directors are split regarding the current number of training positions in child neurology: 29% feel there are too many, 42% feel there are two few and 29% feel there is just the right amount (Figure 1).

DISCUSSION

Overall, most programs have a format that is conducive to meeting the Royal College training guidelines with respect to

mandatory rotations³. Although there may be some debate as to the required amount of time pediatric neurology trainees must spend in adult neurology, most programs do the minimum of six months that is required by the RCPSC³. Training programs appear to maintain a high standard, as the vast majority of trainees successfully pass the Royal College examination in neurology.

Recently limitations on work duty hours for residents have become the subject of heated debate, particularly with the recent decision to limit resident work hours in Quebec⁷. With limitations in work hours, concerns regarding patient safety must be balanced with concerns about adequate education for trainees⁸. Because child neurology trainees do home call, the issue of restricting work duty hours should have a lesser impact on our training programs.

The data presented regarding the academic half-day are in line with those described in Canadian adult neurology training programs⁹. All training programs engage in assessment and evaluation of trainees using a variety of methods, although very few utilize simulation. Simulation is growing in popularity as a tool in medical education^{10,11}, and is especially useful in teaching and re-enforcing skills that trainees may not be frequently exposed to or skills that involve high stakes. As such, further research is needed regarding the utility and usefulness of simulation in child neurology. Particular areas that could be studied include the determination of brain death or the administration of intravenous thrombolytics, as both skills are important for trainees to know, but are simultaneously ones where they potentially may have little exposure.

It is mandatory that all RCPSC accredited training programs teach and evaluate the CanMEDS competencies. Although the RCPSC publishes information on how to approach the evaluation of these topics¹² each program needs to tailor the teaching of these roles specifically to the field of child neurology. Although examples are presented from across the country of teaching and learning strategies for the CanMEDS roles, child neurology programs should consider looking into

Table 4: Future Career plans of trainees in pediatric neurology who have completed training between 2001-2006

Percent of Trainees Subspecializing	78%														
Percent of Trainees working in an academic health sciences centre	92.6%														
Career Paths	<table border="0"> <tr> <td>Clinician-Teacher</td> <td>65%</td> </tr> <tr> <td>Clinician-Investigator/Scientist</td> <td>25%</td> </tr> <tr> <td>Clinician Educator</td> <td>8%</td> </tr> <tr> <td>Clinical Administrator</td> <td>2%</td> </tr> </table>	Clinician-Teacher	65%	Clinician-Investigator/Scientist	25%	Clinician Educator	8%	Clinical Administrator	2%						
Clinician-Teacher	65%														
Clinician-Investigator/Scientist	25%														
Clinician Educator	8%														
Clinical Administrator	2%														
Most popular Subspecialties (out of 17 trainees choosing to subspecialize)	<table border="0"> <tr> <td>Epilepsy</td> <td>6</td> </tr> <tr> <td>Stroke</td> <td>3</td> </tr> <tr> <td>Neurophysiology</td> <td>2</td> </tr> <tr> <td>Neuromuscular</td> <td>2</td> </tr> <tr> <td>Neurogenetics</td> <td>2</td> </tr> <tr> <td>Neonatal Neurology</td> <td>1</td> </tr> <tr> <td>Neuro-intensive Care</td> <td>1</td> </tr> </table>	Epilepsy	6	Stroke	3	Neurophysiology	2	Neuromuscular	2	Neurogenetics	2	Neonatal Neurology	1	Neuro-intensive Care	1
Epilepsy	6														
Stroke	3														
Neurophysiology	2														
Neuromuscular	2														
Neurogenetics	2														
Neonatal Neurology	1														
Neuro-intensive Care	1														

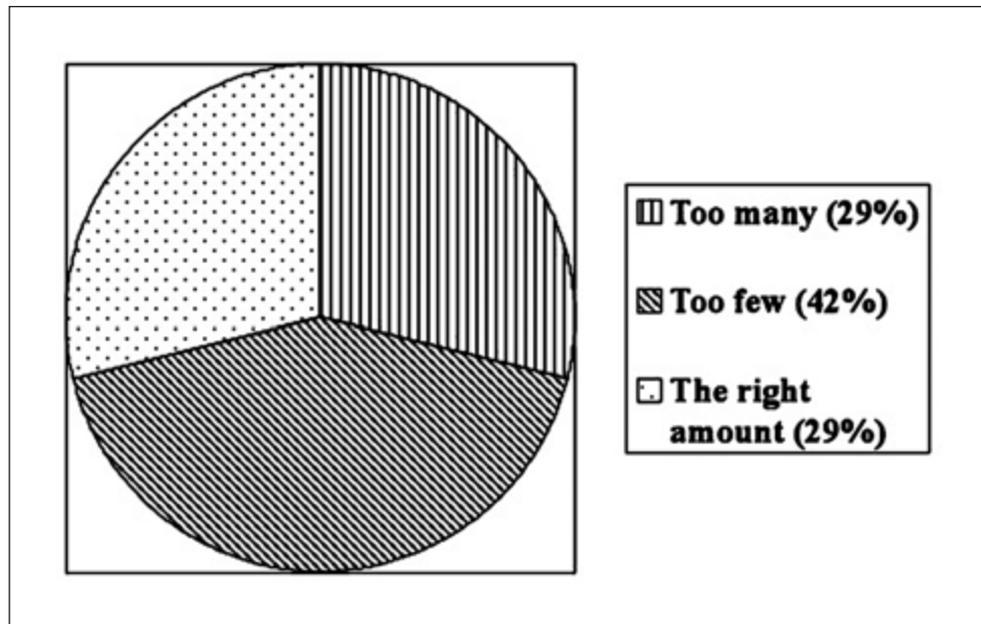


Figure: Percentage of child neurology program directors who feel there are currently too little, just the right amount, or too many child neurology training positions in Canada.

ways to further share their resources and ideas across programs. This may be through a web-based shared repository or via national courses or conferences.

Similarly, PD's noted that certain subjects such as neurogenetics and neuromuscular disease might be best addressed by joint teaching sessions for trainees from across the country. This would not only help encourage discussion amongst trainees from different centres, but would also allow for trainees from across Canada to be exposed to content experts whom they might not have exposure to locally. Such interactions have already been initiated; the Canadian Child Neurology Association (CACN) holds cross-Canada rounds several times per year and the Canadian Neurological Sciences Federation offers a resident course at its annual meeting, although the latter is geared to all neurology trainees, not simply those in child neurology.

The largest concern facing the field of child neurology is with respect to manpower. A 2005 study by Keene and Humphreys⁵ found that the average age of the practicing pediatric neurologist was 51 years and that the proportion of physicians over age 55 was 35%. They concluded that with the aging of pediatric neurologists in Canada, in addition to the possible demands for new services, the recruitment of new members of the profession was needed. A US study¹³ in the same year found that the numbers of pediatric neurologists were not increasing as fast as other pediatric subspecialties and also found that child neurologists felt their patients were more complex and severely impaired as compared to those seen in other subspecialties. The authors felt that child neurologists were more likely to face workforce shortages as compared to other pediatric subspecialties.

With respect to recruitment of future child neurologists, it has been shown that medical schools that produce the most child neurologists have stronger neuroscience curricula¹⁴ and thus in Canadian medical schools, attention should be paid to strengthening ties between neurology divisions and neuroscience teaching in the medical undergraduate curriculum, including early exposure to pediatric neurology. Many trainees in child neurology state that their interest in the specialty was piqued by a mentor in the field¹⁵. Thus, once again, early exposure to child neurology faculty members in the first few years of medical school would aid in the recruitment of trainees into pediatric neurology training programs.

However an important fact to bear in mind is that the data from the study from Keene and Humphreys was collected in 2001, when there were five Canadian training programs and it was estimated that Canada was graduating two to three pediatric neurologists per year⁵. Currently however, there are ten programs in Canada and even if we conservatively estimate that ten pediatric neurologists are graduating per year (one per program), this represents a significant increase from ten years ago. The discrepancies we found regarding PD opinions on whether we are graduating too many or too few trainees may be as a result of this significant increase in trainee numbers. Although this study does not purport to be a true manpower survey, the opinions of PD's may serve as a barometer for the current manpower issues facing child neurology in Canada.

This study indicates that most trainees are choosing to subspecialize and are practicing in academic health science centres. Increasingly, salaries for pediatric specialists at academic health science centres are from "alternate funding plans" (AFP's). The number of AFP positions at these centres are

usually dictated by the provincial government. Thus even though many centres may be able to sustain additional child neurologists due to increasing patient numbers and long waiting lists, there may be a shortage of salaried positions for these individuals.

Thus in order to fully grasp the direction child neurology training should proceed in, a number of things should occur. Firstly, a repeat manpower survey is urgently needed to examine the number of graduating residents, retiring physicians and possible future child neurology physicians. Should this determine a shortage of future available positions a number of measures may need to be taken including lobbying provincial governments for more child neurology positions in AFP's and encouraging more trainees to pursue general community neurology. Only as a last resort should consideration be made to decreasing the number of training programs in Canada.

CONCLUSIONS

This survey provides a view of the current state of pediatric neurology training and indicates a relative consistency of quality and content amongst training programs. In the future, attention should be given to joint educational programs as well as urgently assessing the manpower needs of child neurologists.

ACKNOWLEDGEMENTS

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See Appendix on Following Pages

Appendix (1 of 3)

1. Introduction

This survey is intended to examine the current status of pediatric neurology postgraduate training in Canada. Your help as a program director is greatly appreciated. The results will be disseminated at future Canadian Neurology meetings.

2. General Questions

1. What is the university your program is affiliated with?
2. How many years have you been practicing pediatric neurology?
3. How many years have you been program director?
4. Do you have a Masters or PhD in education?
No Yes – Masters Yes- PhD

5. What is the total number of full time equivalent (FTE) pediatric neurologists at your institution?

3. 5 year program

6. Do you have a 5 year pediatric neurology residency training program at your institution (i.e. one where trainees enter the program immediately after medical school)?

Yes No

4. 5 year program

The following page contains some questions regarding success/failure of trainees at the Royal College Exam. Please note that the details of success/failure of trainees at individual programs will NOT be published or distributed. The data will ONLY be presented as a SUMMARY of all programs. The following questions apply to your 5 year training program only. (Subsequent sections will deal with your institution's 3 year program, if applicable).

7. Over the past five years, how many trainees have you had in your 5 year residency program? Please divide responses into the following categories:

Canadian Medical Graduates (CMG) (Canadian citizens who did medical school in Canada, intend to practice in Canada).
International Medical Graduates (IMG) (Canadian citizens or landed immigrants who have done their medical studies in another country, but who plan to practice in Canada).
Foreign Medical Graduates (Are not Canadian citizens or landed immigrants, have done their medical training in another country and plan to return to their home country to practice medicine).
CMG IMG FMG

8. Over the past five years in your 5 year program how many trainees in each of the following groups have attempted the RCPS(C) certification exam in neurology?

Canadian Medical Graduates (CMG) (Canadian citizens who did medical school in Canada, intend to practice in Canada).
International Medical Graduates (IMG) (Canadian citizens or landed immigrants who have done their medical studies in another country, but who plan to practice in Canada).
Foreign Medical Graduates (Are not Canadian citizens or landed immigrants, have done their medical training in another country and plan to return to their home country to practice medicine).
CMG IMG FMG

9. Over the past five years in your 5 year program how many trainees in each of the following groups have successfully passed the RCPS(C) certification exam in neurology?

CMG IMG FMG

5. Rotations

The following questions apply to your 5 year training program only.

10. Approximately how many years of general pediatrics do trainees in your 5 year program do?

1 year 2 years Greater than 2 years

11. Do trainees in your program act as the ward senior during their pediatric training?

Yes No

12. When trainees are doing primarily pediatric rotations, do they attend the general pediatrics academic half day?

Yes No

13. Consider the first 12 years of your 5 year training program, when residents are primarily doing their pediatric rotations.

Are the following rotations mandatory or elective (select "Not Applicable" if the rotation is not a rotation done by residents in your program or if the rotations do not occur during the "pediatric" portion of their training)? If it is considered a mandatory or elective rotation, please indicate the average length of rotation.

	Mandatory/Elective /Length	
General Pediatrics (Ward/Clinical Teaching Unit)	Pediatric Neurology (Ward/Consults and/or clinics)	Neonatal Intensive Care Unit (NICU)
Pediatric Intensive Care Unit (PICU)	Child Development	Child Psychiatry
Community/Outpatient	Pediatrics	Pediatric Anesthesia
Pediatric Orthopedics	Pediatric General Surgery	Pediatric Neurosurgery
Rehabilitation	Medicine/Physiatry	Palliative Care
General Radiology	Neuroradiology (Adult or combined adult/pediatric)	Pediatric Neuroradiology
Pediatric Cardiology/Pediatric Respiriology	Pediatric Nephrology	Pediatric Rheumatology
Pediatric Gastroenterology	Pediatric Endocrinology	Genetics
Metabolics	Combined Genetics/Metabolics	Research
Other (please specify)		

6. Rotations

Now consider the last 34 years of your 5 year pediatric neurology training program, when trainees are mainly doing neurologyrelated rotations.

14. Are the following rotations mandatory or elective (select "Not Applicable" if the rotation is not a rotation done by residents in your program or is not usually done in the last 3 years)? If it is considered a mandatory or elective rotation, please indicate the average length of rotation.

	Mandatory/Elective/ Length	
Pediatric Neurology Ward	Pediatric Neurology Clinics	Pediatric Neurology Clinics and Ward (Combined Rotation)
Neuromuscular (Including EMG/NCS)	Epilepsy (including EEG)	Child Development
Pediatric Stroke	Pediatric Demyelinating Diseases	Pediatric Movement Disorders
Rehabilitation/Physiatry	Palliative Care	Neuroradiology (Adult or combined adult/pediatric)
Pediatric Neuroradiology	Neuropathology	Pediatric Neurosurgery
Genetics	Metabolics	Combined Genetics/Metabolics
Neurooncology	Research	Other (please specify)

7. 3 year program**15. Does your institution offer a 3 year program in pediatric neurology (ie one that is for trainees who have completed 3 4 years of general pediatrics prior to pursuing neurology training)?**

Yes No

8. 3 year program

The following page contains some questions regarding success/failure of trainees at the Royal College Exam. Please note that the details of success/ failure of trainees at individual programs will NOT be published or distributed. The data will ONLY be presented as a SUMMARY of all programs.

The following questions apply to your 3 year training program only.

16. Over the past 5 years of your 3 year program, what is the total number of trainees who would be considered:

Canadian Medical Graduates (CMG) (Canadian citizens who did medical school in Canada, intend to practice in Canada).
International Medical Graduates (IMG) (Canadian citizens or landed immigrants who have done their medical studies in another country, but who plan to practice in Canada).
Foreign Medical Graduates (Are not Canadian citizens or landed immigrants, have done their medical training in another country and plan to return to their home country to practice medicine).
CMG IMG FMG

Appendix (2 of 3)

17. Over the past 5 years in your 3 year program how many trainees in each of the following groups have attempted the RCPS(C) certification exam in neurology?

CMG IMG FMG

18. Over the past 5 years in your 3 year program how many trainees in each of the following groups have successfully passed the RCPS(C) certification exam in neurology?

CMG IMG FMG

9. Rotations 3 year program

Please complete the following questions as they apply to the breakdown of rotations in your 3 year program. *NB If you previously answered this question for your 5 year program and the breakdown of rotations in your 3 year and 5 year programs are similar, please skip to the next page.*

19. Are the following rotations mandatory or elective (select "Not Applicable" if the rotation is not a rotation done by residents in your program)? If it is considered a mandatory or elective rotation, please indicate the average length of rotation.

Mandatory/Elective/ Length	Pediatric Neurology Ward	Pediatric Neurology Clinics
Pediatric Neurology Clinics and Ward (Combined Rotation)	Neuromuscular (Including EMG/NCS)	Epilepsy (including EEG)
Child Development	Pediatric Stroke	Pediatric Demyelinating Diseases
Pediatric Movement Disorders	Rehabilitation/Physiatry	Palliative Care
Neuroradiology (Adult only or combined pediatric and adult)	Pediatric Neuroradiology	Neuropathology
Pediatric Neurosurgery	Genetics	Metabolics
Combined Genetics/Metabolics Research	Neurooncology	Other (please specify)

10. Adult Neurology

20. What is the total number of months of adult neurology trainees complete in your program?

21. Please indicate the breakdown of when trainees in your 5 year program do their adult neurology rotations and the number of months done per year (leave blank if you do not have a 5 year program).

13 months	46 months	79 months	1012 months
First Year	Second Year	Third Year	Fourth Year Fifth Year

22. Please indicate the breakdown of when trainees in your 3 year program do their adult neurology rotations and the number of months done per year (leave blank if you do not have a 3 year program).

13 months	46 months	79 months	1012 months
Third Year	Fourth Year	Fifth Year	

11. On call Responsibilities

23. During the time your trainees are exclusively doing pediatric neurology (and not when they are doing general pediatrics or adult neurology), how frequently are the residents on call (ie 1 in 3, 1 in 4)?

24. During the time your trainees are exclusively doing pediatric neurology (and not when they are doing general pediatrics or adult neurology), do they have in house call or home call?
In house call Home call

25. When your trainees are on call for pediatric neurology, do they take calls directly from parents?

Yes No

12. Teaching and Evaluation

Fifth Year

26. Do your pediatric neurology trainees attend an adult neurology academic half day or do your trainees have a dedicated pediatric neurology half day?

Adult Neurology HalfDay Pediatric Neurology HalfDay Both

27. Apart from the academic half day, do you have other formal teaching specifically directed towards pediatric neurology trainees?

Yes No

28. If you answered yes to question 27, how many hours per week of dedicated pediatric neurology teaching sessions do you offer (leave blank if not applicable)?

29. Do you offer OSCE's for your trainees? If so are they specifically designed for pediatric neurology trainees or do your trainees do the adult neurology OSCE?

Yes, Pediatric neurology specific OSCE
Yes, Adult neurology OSCE
Yes, we do both
No, we do neither

30. How many observed histories and physicals do your trainees do per year?

31. Do your trainees take the RITE exam (American Academy of Neurology In training exam)?

Yes No

32. Apart from the RITE exam, do your trainees have multiple choice/written exams?

Yes No

33. If you answered yes to question 32, how many times a year do your trainees have written exams (apart from the RITE exam)?

34. Do you use simulators in evaluating and training your residents and fellows? (Select all that apply).

Yes, for lumbar puncture training.
Yes, for resuscitation training.
No, we do not use simulators.
Other (please specify)

13. CanMEDS

Please check the answer that best describes your feelings regarding the current program at your institution.

35. In your opinion, the CanMEDS roles play an important part in preparing residents for future practice.

Strongly Disagree Disagree Agree Strongly Agree

36. In your opinion, residents feel that the CanMeds roles are an important part of their pediatric neurology training.

Strongly Disagree Disagree Agree Strongly Agree

37. Being on call is an important part of the pediatric neurology training experience.

Strongly Disagree Disagree Agree Strongly Agree

38. Trainees missing parts of their rotations because of being post call is a significant problem.

Strongly Disagree Disagree Agree Strongly Agree

39. There is an adequate amount of protected academic time offered to residents.

Strongly Disagree Disagree Agree Strongly Agree

Appendix (3 of 3)

40. This academic didactic time may take away from their overall clinical learning.

Strongly Disagree Disagree Agree Strongly Agree

14. CanMEDS

The following topics are thought to be skills that pediatric neurologists must learn in order to meet the demands of practice after graduation. We wish to determine how IMPORTANT you feel these areas are in the pediatric neurology training experience.

Please answer to the best of your current knowledge according to the following key:
1. Not Important 2. Somewhat Important 3. Important 4. Very Important

41. CanMEDS Roles: PROGRAM DIRECTOR'S Views

1. Not Important 2. Somewhat Important 3. Important 4. Very Important

Complex chronic care (Medical Expert)	Dealing with death and bereaved parents (Medical Expert)
The medical aspects of palliative care (Medical Expert)	Teaching skills (Medical Expert) Procedures / Technical skills (Medical Expert)
Working with difficult patients/families (Communicator)	Working with cultural differences (Communicator)
Working with socioeconomic differences (Communicator)	Working as a member of a team (Collaborator)
Learning principles of quality management (Manager)	Managing an efficient office practice (Manager)
Conflict Resolution (Manager)	Effective use of resources (Manager)
Patient advocacy (Health Advocate)	Advocate for disadvantaged infants/children (Health Advocate)
Ability to carry out a research project (Scholar)	Ability to critically appraise literature (Scholar)
Professionalism & Ethical issues (Professional)	

15. CanMEDS**42. Many programs use direct modeling of behaviour to teach the nonmedical expert CanMEDS roles (ie residents observe the attending staff acting in a professional manner, acting as a collaborator, etc.) Apart from modeling these behaviours, please list one way your program teaches each CanMEDS role listed below.**

Communicator Collaborator Manager Health Advocate Scholar Professional

16. Future of Child Neurology in Canada**43. Considering all trainees completing your program in the last five years, what percentage of your trainees subspecialize? What percentage go into general pediatric neurology practice?**

Subspecialize General Pediatric Neurology Practice

44. Considering all trainees completing your program in the last five years, what percentage of your trainees now work in an academic health centre? What percentage have a community practice?

Academic Health Centre Community Practice

45. Out of all trainees completing your program in the last 5 years who practice at an academic health science centre, approximately what percentage chose or plan to choose the following career paths?

ClinicianTeacher	ClinicianEducator
ClinicianAdministrator	Clinician Investigator or Scientist (> 50% of time devoted to research)

46. Please list the 3 most popular subspecialties chosen by trainees who have completed your program in the last 5 years.

Epilepsy (Clinical)	Neuromuscular	Neurophysiology
Neurogenetics	Stroke	Movement Disorders
Demyelinating Disease	Child Development/Behaviour	Neonatal Neurology
Neurooncology	Headache	Other (please specify)

47. Looking at graduates from the past 5 years from your program, how many have completed the following graduate degrees during their residency/fellowship?

Masters/PhD in Science (Basic or Clinical Research) Masters/PhD in Epidemiology Masters/PhD in Education

48. Do you feel the demand for child neurologists in the next 5 10 years will increase, decrease or stay the same?

Increase Decrease Stay the same

49. With regards to the current number of training positions in child neurology across Canada, do you feel there are too many, too few or just the right amount?

Too many Too few Just the right amount

50. Out of the following three groups, which one should we focus our attention on to recruit individuals to become future child neurologists?

Medical Students Pediatric Residents Adult Neurology Trainees

51. Please list two examples of things that we, as child neurology program directors, can do to help stimulate interest in our specialty amongst these groups?**52. Would you favour joint teaching sessions with trainees from all pediatric neurology programs in Canada?**

Yes No

53. If you answered yes to question 52, which of the following would you prefer as a way to administer these sessions (Select all that apply)?

Conduct sessions at the annual meeting of the CNSF	Conduct sessions at another convenient time during the year
Conduct sessions via video teleconference	Other (please specify)

54. If you answered yes to question 52, what Medical Expert areas do you think would benefit most from joint teaching sessions (Select all that apply)?

Neuromuscular Disease	Inborn Errors of Metabolism	Neurogenetics	Epilepsy
Pediatric Stroke	Pediatric Movement Disorders	Pediatric Demyelinating Disease	Behavioural/Developmental Pediatric Neurology
Neonatal Neurology	Pediatric Neurooncology	Pediatric Headache	Other (please specify)

55. If you answered yes to question 52, what nonMedical Expert CanMEDS areas do you think would benefit most from joint teaching sessions (Select all that apply)?

Collaborator	Communicator	Scholar	Health Advocate
Manager	Professional	Instruction on how to teach residents to be teachers	Other (please specify)

17. Concluding Questions**56. Please list the 3 most significant challenges you face in your role as program director.****57. Would you favour the creation of an email/internetbased Listserv to allow for easy communication and sharing of materials by pediatric neurology program directors across Canada?**

Yes No

58. If surveys similar to this one are performed in the future, what other questions would you have for pediatric neurology program directors in Canada?

18. Thank you for completing our survey!