

# Does a third year of emergency medicine training make a difference?

## *Historical cohort study of Queen's University graduates*

Ian Casson, MD, CCFP(EM) Marshall Godwin, MD, MSC, CCFP Glenn Brown, MD, CCFP(EM)  
Adina Birenbaum, MD Mohsin Dhalla, MPH

### abstract

**OBJECTIVE** To describe outcomes of a third-year residency (PGY-3) program in family medicine/emergency medicine in terms of its graduates' practice characteristics and their self-assessed preparedness for practising emergency medicine.

**DESIGN** A questionnaire was sent to graduates of Queen's University's family medicine residency programs.

**SETTING** Recent graduates' practices.

**PARTICIPANTS** All 30 graduates of Queen's University's Family Medicine/Emergency Medicine Program (PGY-3s) from 1988 to 1997 and 90 matched controls chosen randomly from among the 250 graduates of the 2-year family medicine residency program (PGY-2s) during the same period. Six of the 120 were excluded. Response rate was 89%.

**MAIN OUTCOME MEASURES** Current practice of family and emergency medicine, leadership activities in emergency medicine, self-assessment of preparedness to practise and to lead others at the end of training, self-report of frequency of emergency care situations in subsequent practice for which physicians felt unprepared by their training, and catchment population and "rurality" of location of current practice.

**RESULTS** Compared with controls, more PGY-3s practised and took leadership roles in emergency medicine in their hospitals and communities. At the end of their training, PGY-3s reported higher levels of preparedness for practising and providing leadership in emergency medicine. Both groups reported the same frequency of encountering emergency situations in subsequent practice for which they felt inadequately prepared. Both groups practised in communities of similar size and location.

**CONCLUSION** Graduates of Queen's University's third-year emergency medicine program appear to practise in accordance with their extra training.

### résumé

**OBJECTIF** Décrire les résultats d'un programme de résidence de troisième cycle (R3) en médecine familiale et médecine d'urgence en ce qui a trait aux caractéristiques de la pratique exercée par les diplômés ainsi qu'à leur préparation à l'exercice de la médecine d'urgence telle qu'ils l'évaluaient eux-mêmes.

**CONCEPTION** Un questionnaire a été envoyé aux diplômés de programmes de résidence en médecine familiale de la Queen's University.

**CONTEXTE** La pratique médicale chez les récents diplômés.

**PARTICIPANTS** L'ensemble des 30 diplômés du programme de médecine familiale et médecine d'urgence (R3) de la Queen's University de 1988 à 1997 et 90 sujets de contrôle jumelés parmi les 250 diplômés du programme de deux ans (R2) au cours de la même période. Six des 120 sujets ont été exclus. Le taux de réponse s'élevait à 89%.

**PRINCIPALES MESURES DES RÉSULTATS** La pratique actuelle de la médecine familiale et d'urgence, les activités de leadership en médecine d'urgence, l'auto-évaluation de la préparation à la pratique et à diriger les autres à la fin de la formation, la fréquence des situations d'urgence dans la pratique subséquente pour lesquelles les médecins ne se sentaient pas bien préparés, d'après les intéressés, et le bassin de population et «ruralité» du lieu de la pratique actuelle.

**RÉSULTATS** Par rapport aux sujets de contrôle, un plus grand nombre de R3 pratiquaient la médecine d'urgence et exerçaient un rôle de leadership dans leurs hôpitaux et leurs communautés. À la fin de leur formation, les R3 signalaient un degré plus élevé de préparation à la pratique et à exercer un leadership en médecine d'urgence. Les deux groupes ont rapporté une même fréquence dans les situations d'urgence rencontrées dans la pratique ultérieure pour lesquelles ils se sentaient insuffisamment préparés. Les deux groupes exerçaient dans des communautés de taille et de situation géographique semblables.

**CONCLUSION** Les diplômés du programme de trois ans en médecine d'urgence de la Queen's University semblent exercer la médecine de manière conforme à leur formation supplémentaire.

*This article has been peer reviewed.*

*Cet article a fait l'objet d'une évaluation externe.*

*Can Fam Physician 2001;47:1227-1232.*

## RESEARCH

### Does a third year of emergency medicine training make a difference?

**T**wo-year family medicine residency programs in Canada provide "the opportunity to learn and experience the delivery of care in acute care settings, including the emergency department."<sup>1</sup> Does an additional year of training in emergency medicine make a difference in family physicians' future practice?

The College of Family Physicians of Canada (CFPC) accredits third-year programs to provide extra training in emergency medicine to "enhance the optimum delivery of emergency medical care to the Canadian public."<sup>1</sup> Canadian universities have more than 85 residency positions for a third postgraduate year in family medicine/emergency medicine programs. Third-year training programs in emergency medicine for family medicine residents have been identified as a priority in Ontario by heads of departments of family medicine<sup>2</sup> and by hospital chief executive officers.<sup>3</sup>

Graduates of a 2-year Canadian family medicine residency program (PGY-2s) have been surveyed about their comfort in exercising skills in emergency medicine at the end of training and in their current practice settings.<sup>4</sup> They have also been surveyed about factors affecting their choice of undertaking emergency practice or not.<sup>5</sup> We found no published studies, however, on the activities of family medicine graduates of a third year of emergency medicine training in Canada.

We report a survey of the graduates of Queen's University's Family Medicine/Emergency Program (PGY-3s) from 1988 to 1997. The program has among its goals to prepare family physicians with extra competence in emergency medicine (beyond that of PGY-2s) who can provide leadership in emergency care in their communities and hospitals. At Queen's, both the PGY-2 program and the PGY-3 program aim to train physicians to practise in small- and medium-sized communities. The choice of questions for the survey reflects those goals.

Survey results describe the practice characteristics and self-assessment of the graduates. Its design permits comparisons between the two groups and

**Dr Casson** is an Assistant Professor in the Department of Family Medicine at Queen's University in Kingston, Ont, and is Director of the Family Medicine/Emergency Medicine Residency Program. **Dr Godwin** is an Associate Professor and Director of Research, and **Dr Brown** is an Assistant Professor and Residency Program Director, in the Department of Family Medicine at Queen's University. **Dr Birenbaum** is a family medicine resident, and **Mr Dhalla** is a medical student, at Queen's University.

generation of hypotheses for further testing, but not conclusions about causal relationships between extra training and outcomes measured.

## METHODS

We surveyed all 30 graduates of Queen's University's PGY-3 program from 1988 to 1997. Each PGY-3 graduate was matched with three PGY-2 graduates for sex and year of completion of training. There were approximately 250 PGY-2 graduates during the 10 years of the study. A table of random digits was used to choose control subjects. The total sample consisted of 120 residents: 30 PGY-3 graduates and 90 PGY-2 graduates. The following specific outcomes were measured.

- Was emergency medicine (part-time or full-time) part of physicians' current practice? Part time was defined as family medicine with emergency department shifts or coverage.
- Were physicians taking leadership roles in emergency medicine, such as development of protocols, standards of care, or quality assurance for their emergency departments; emergency department administration; organization and teaching of emergency medicine continuing education; and disaster planning and organization or support of prehospital care or ambulance services?
- How well prepared did physicians feel at the end of their training to practise emergency medicine, to be involved in leadership and administrative roles in emergency departments, and to participate in disaster planning and support prehospital care in their communities?
- How often had physicians encountered emergency care situations over the course of practice for which they felt unprepared by their training?
- How large were the communities in which physicians were currently practising?

Regarding community size, data were collected that allowed calculation of a community's "rurality" index.<sup>6</sup> This index includes community population, catchment area population, distance from larger centres, number of generalist physicians and specialists, and whether there is a hospital. A score higher than 10 is considered rural. For questions on preparedness at the end of training, physicians were asked to place marks on visual analogue scales ranging from 0—not at all prepared to 10—totally prepared. For the question on lack of preparedness for emergency situations, the scale ranged from 0—never to 10—frequently.

No appropriate measures tested for validity or reliability were identified during the literature review, except for the rurality index, so questions were developed specifically for this survey. The questionnaire

was pretested on five physicians. A reminder postcard was sent 1 week after the first mailing; 3 weeks later, nonrespondents received reminder phone calls.

Data were analyzed using SPSS for Windows, version 8. Categorical variables were compared as relative risks (RRs) with 95% confidence intervals (CIs) and *P* values. Differences between the means of continuous variables for each group were compared with *t* tests for independent variables (yielding *P* values and 95% CIs).

Sample size for the PGY-3 graduates was limited to the total number of graduates in the 10-year study period. Therefore, the study had 80% power to detect an RR of 2.0, given an expected event rate of 30% among PGY-2 graduates, an  $\alpha$  of .05, and 1:3 matching of subjects with controls.

The study was approved by Queen's University's Faculty of Health Sciences Research Ethics Board.

## RESULTS

Of the 120 physicians who received questionnaires, five had undertaken specialty residencies after their PGY-2 residency training and one did not enter practice. They

were excluded. Of 114 eligible physicians, 102 (89%) responded: 27 (90%) of the 30 PGY-3s and 75 (88%) of the PGY-2s. One questionnaire from a PGY-3 was not included in the analysis because it contained ambiguous responses. **Table 1** shows differences between the two groups on the outcomes measured as categorical variables.

### Current practice

The PGY-3 physicians were twice as likely to include emergency medicine in their current practices as PGY-2s were: 58% of PGY-3s were involved in full-time emergency practice compared with 7% of PGY-2s; and 39% the PGY-3 group were involved in part-time emergency practice compared with 37% of the PGY-2 group. The relationship between extra training and current emergency practice was the same for those who had completed residency more than 5 years before the survey (RR 2.9, 95% CI 1.7 to 4.9) and those who had finished within the past 5 years (RR 1.8, 95% CI 1.4 to 2.4).

Among more recent PGY-3 graduates, there were more full-time than part-time emergency physicians (67% and 33%, respectively). Among PGY-3s who had

**Table 1. Differences in outcomes between PGY-3 and PGY-2 graduates**

OUTCOME		PGY-3* N (%)	PGY-2† N (%)	RR‡ (95% CI) P VALUE
Any emergency medicine included in practice	Yes	25 (96)	33 (44)	2.1 (1.7-2.9) .001
	No	1 (4)	42 (56)	
Involved in development of protocols, standards of care, etc, for the emergency department	Yes	21 (81)	20 (27)	3.0 (2.0-4.5) .001
	No	5 (19)	54 (73)	
Involved in emergency department administration	Yes	12 (46)	13 (17)	2.7 (1.4-5.1) .007
	No	14 (54)	62 (83)	
Involved in organizing and teaching continuing medical education programs in emergency medicine	Yes	12 (46)	6 (8)	5.8 (2.4-13.8) .001
	No	14 (54)	69 (92)	
Involved in disaster planning in community	Yes	8 (31)	14 (19)	1.6 (0.8-3.4) .269
	No	18 (69)	61 (81)	
Involved in organization of prehospital care or ambulance services	Yes	11 (42)	9 (12)	3.5 (1.6-7.5) .003
	No	15 (58)	66 (88)	
Practising in a community with a rurality index >10	Yes	10 (39)	32 (43)	0.9 (0.5-1.6) .819
	No	16 (61)	43 (57)	
Practising in a community with a drawing population of ≤100 000	Yes	19 (73)	40 (53)	1.4 (1.0-1.9) .08
	No	7 (27)	35 (47)	

\*Residents who completed an extra year of training in emergency medicine after the regular 2-year residency program.

†Residents who completed only the 2-year residency program.

‡Relative risk of the presence of the factor if a resident had the extra year of training in emergency medicine.

## RESEARCH

### Does a third year of emergency medicine training make a difference?

graduated more than 5 years before the survey, there were similar numbers of full- and part-time emergency physicians (46% and 46%, respectively). One physician (8%) had stopped practising emergency medicine.

#### Leadership roles

The PGY-3 graduates were more likely than PGY-2s to be involved in development of standards, in administration of their emergency departments, in organizing or teaching emergency medicine, and in organizing prehospital care services. The PGY-3s were not more likely to be involved in disaster planning, although the power to detect this difference was only 20%.

It is possible that these differences were simply related to the fact that PGY-3s were more likely than PGY-2s to be practising emergency medicine rather than that they had completed an extra year of training in emergency medicine. Therefore, we controlled for whether or not they practised emergency medicine using logistic regression. The extra year of training remained a significant factor for involvement in organizing prehospital care (odds ratio [OR] 3.3, 95% CI 1.04 to 10.4,  $P = .04$ ), and organizing and teaching continuing medical education programs in emergency medicine (OR 4.1, 95% CI 1.3 to 13.5). It did not remain a significant factor, however, in development of standards or in involvement in emergency room administration. These activities were positively related to practising emergency medicine regardless of whether a physician had done the extra year of training.

#### Preparedness for practice

**Table 2** shows differences between the two groups in terms of feeling prepared for various aspects of

emergency medicine practice. The PGY-3s were more likely to feel prepared to practise emergency medicine at the end of their residency training. They were also more likely to feel prepared to undertake leadership and administrative roles in emergency medicine. When physicians reported how often they felt unprepared for emergency situations, however, PGY-2s and PGY-3s reported similar frequencies. This was true also for physicians who actually practised emergency medicine; mean visual analogue scale score for PGY-3s was 2.4, and for PGY-2s was 3.0 ( $P = .3$  in a  $t$  test for independent samples).

#### Practice location

**Table 1** shows there was no significant difference in the rurality of the communities in which PGY-3s and PGY-2s practised or in the proportion of PGY-3s (73%) and PGY-2s (53%) who practised in communities with hospital catchment populations of  $\leq 100\,000$ .

## DISCUSSION

Training in emergency medicine and supply of emergency physicians are current issues. Canadian family medicine/emergency medicine program directors are working together to develop detailed learning objectives for their residents. Valid measures of the achievement of these objectives and the effectiveness of such training programs are lacking. Availability of training in advanced skills for family physicians is a concern of the Society of Rural Physicians of Canada. The issue of supply of physicians to staff emergency departments is in the news and is the subject of government reports, such as the Scott Report in

**Table 2. Comparison of PGY-3 and PGY-2 graduates on how prepared they felt for various tasks:**  
*Visual analogue scales ranging from 0—not at all prepared to 10—totally prepared and 0—never to 10—frequently were used.*

PREPAREDNESS	PGY-3 MEAN (SD)	PGY-2 MEAN (SD)	MEAN DIFFERENCE (95% CI)	P VALUE
Degree to which physician felt prepared to practise in an emergency room when first entering practice	7.7 (1.1)	5.4 (2.3)	2.3 (1.4-3.3)	.001
Degree to which physician felt prepared to take a leadership role in an emergency department when first entering practice	5.2 (2.9)	2.8 (2.4)	2.4 (1.2-3.5)	.001
Degree to which physician felt prepared to take a leadership role in disaster planning or prehospital care when first entering practice	3.7 (2.1)	2.5 (2.3)	1.2 (0.2-2.2)	.02
How often physician felt unprepared to deal with emergency situations since starting practice	2.4 (2.4)	3.0 (2.7)	-0.6 (-2.0-0.7)	.353

Ontario.<sup>7</sup> All these concerns require good information on which to base decisions.

In the absence of other published reports, this study is useful in demonstrating one attempt to evaluate a family medicine/emergency medicine training program.

### Current practice

Results show that almost all PGY-3 graduates currently practise emergency medicine, either full-time or as part of their family medicine practice. In contrast, fewer than half of PGY-2s practise emergency medicine. This difference is likely due to self-selection into the PGY-3 program of physicians planning to practise emergency medicine.

Almost all PGY-3s graduating more than 5 years before the survey were still practising emergency medicine at the time of the survey. There were, however, more physicians practising full-time emergency medicine among more recent PGY-3 graduates than among earlier PGY-3 graduates. This difference might be due to the tendency of individual graduates to shift from full-time to part-time practice over their careers or it might be due to a change in preferred or available practices in the latter half of the study period. From the perspective of the goals of this particular training program, part-time emergency practice is consistent with the practice patterns of physicians in small- and medium-sized communities, where they usually provide care in many settings, including offices and emergency departments.

### Leadership roles

Our results indicate only modest success for the program's goal of enhancing the capacity for leadership among PGY-3 graduates compared with PGY-2 graduates. The difference between the two groups was partly due to the fact that more PGY-3s were practising emergency medicine, but it might also have been partly due to the effect of the PGY-3 program itself. Teaching administrative skills and skills required to develop standards of care is not easy in the course of a year. These results might provide incentive either to reassess the program's goals or to modify its content.

### Preparedness for practice

At the end of their training, PGY-3s felt more confident about the prospect of practising emergency medicine and about some aspects of providing leadership than PGY-2s did.

Despite apparent increased confidence, however, the groups were similar in how often they had faced emergency situations they felt uncomfortable handling. If the lack of difference is not due to the low power of

this sample size to avoid missing a true difference, the similar results of the two groups seem counterintuitive (at least to PGY-3 program directors). The similarity might be accounted for by differences in the acuity or volume of the emergency medicine practices chosen by the PGY-3s compared with those of PGY-2s. It could also be that the PGY-2 program is just as useful as the PGY-3 program for helping physicians feel prepared for emergency situations. These hypotheses could be better tested by matching residents not only for year of graduation but also for volume and acuity of practice and by developing valid measures of competence.

Results of preparedness for various roles at the end of the training also show that graduates of both programs felt relatively more prepared for emergency practice than for assuming leadership roles, and less prepared for providing leadership in prehospital care or disaster planning. For PGY-3s in particular these results should provide incentive for more emphasis in the latter two areas, given the goals of the program.

### Practice location

The apparent similarity between the groups in terms of rurality index is consistent with Queen's University's PGY-3 program's selection process and objectives. Because of the sample size, the power to detect a statistical difference, if one truly exists, is only 4%, but the results for the two groups (37% and 43%) are, for practical purposes, quite similar. It is interesting that the extra year of specialized training does not change residents' choice of size of community in which to practise. Graduates of this program, which is oriented to rural practice, continue to choose rural practice whether or not they have an additional year of emergency medicine training.

There is apparently more divergence between the groups in practice location by catchment area population (73% of PGY-3s practised in areas  $\leq 100\,000$ , compared with 53% of PGY-2s). One explanation might be that more PGY-3 graduates practise in medium-sized communities where emergency departments tend to be staffed by full-time emergency physicians, a practice pattern that recent PGY-3 graduates of this program seem to prefer.

### Limitations

This study was not designed to permit conclusions about causal relationships between extra training and outcomes measured. The differences between PGY-2 and PGY-3 graduates could be due to their practice preferences before the PGY-3 year or to their experiences, including electives, in the 2 core years of family medicine. Even if results are interpreted just on the level of a



## RESEARCH

### Does a third year of emergency medicine training make a difference?

descriptive study, they are limited by lack of validity or reliability data for this questionnaire. In particular, it is questionable whether self-assessment of preparedness is likely to be a valid measure of a training program's effectiveness or of clinical competence.<sup>8,9</sup> Unfortunately, measures that could be considered criterion standards, such as directly observed physician behaviour or patient outcomes, are more difficult to acquire.

This study was limited to one program; its generalizability to other programs is limited. Some conclusions are hampered by insufficient power to detect statistically significant differences. In the absence of other published program evaluations, however, this study is a first example that could lead to larger, more informative studies.

## CONCLUSION

Results of this study describe the practices and self-assessment of graduates of a third-year residency program in emergency medicine for family physicians in comparison with those of graduates of a core 2-year program. A high proportion of Queen's University's Family Medicine/Emergency Medicine Program (PGY-3) graduates undertake and continue to practise emergency medicine up to 10 years in the small- and medium-sized communities to which the training program is oriented. Results also show a high proportion of PGY-3 graduates involved in leadership activities in emergency medicine.

Compared with PGY-2s, PGY-3s reported feeling more prepared for practising emergency medicine and for providing some aspects of leadership in emergency medicine. There was, however, no difference between groups in how often they felt unprepared to deal with actual emergencies. These seemingly contradictory observations warrant further study with more valid measures than those based on self-report.



### Contributors

**Drs Casson and Godwin** developed the project. **Dr Brown** contributed to survey design. **Dr Birenbaum** managed data collection. **Drs Godwin and Casson and Mr Dhall** analyzed the data. All the authors contributed to writing the article.

### Competing interests

None declared

**Correspondence to:** Dr Ian Casson, Department of Family Medicine, 220 Bagot St, PO Bag 8888, Kingston, ON K7L 5E9; telephone (613) 549-4480; fax (613) 544-9899; e-mail ric@post.queensu.ca

### Editor's key points

- Third-year graduates of Queen's University's emergency medicine program (PGY-3s) were twice as likely over 10 years to include emergency work in their practices as graduates of the 2-year program (PGY-2s) were.
- These PGY-3s were also more likely to be involved in administration of emergency departments, in organizing continuing medical education, and in community emergency services.
- The PGY-3s reported better preparedness for emergency practice, but were not different from PGY-2s in the number of times they felt unprepared for emergency situations in their practices.
- The PGY-3s and PGY-2s practised in similarly sized and located communities.

### Points de repère du rédacteur

- Les diplômés du programme de trois ans en médecine d'urgence (R3) de la Queen's University étaient deux fois plus susceptibles, sur une période de 10 ans, d'inclure l'exercice de la médecine d'urgence dans leur pratique que les diplômés du programme de deux ans (R2).
- Il était également plus probable que ces R3 participent à l'administration des départements d'urgence, à l'organisation de la formation médicale continue et aux services d'urgence dans leur communauté.
- Les R3 ont signalé être mieux préparés à la pratique de la médecine d'urgence, mais ne se distinguaient pas des R2 quant au nombre de fois où ils ne s'étaient pas sentis bien préparés à une situation d'urgence dans leur pratique.
- Les R3 et les R2 exerçaient dans des collectivités de taille et d'emplacement similaires.

### References

1. College of Family Physicians of Canada. *Residency program accreditation and certification*. Mississauga, Ont: College of Family Physicians of Canada; 1997.
2. Wilson R, Rosser WW, Forster J, Hennen B, McAuley R. *Towards improving health care delivery for Ontario citizens: third-year residency positions in family medicine*. Paper prepared for the Council of Ontario Faculties of Medicine. Toronto, Ont: Council of Ontario Faculties of Medicine; 1996.
3. Lloyd S, Streiner D, Shannon S. Family medicine residency programs. Evaluating the need for different third-year programs. *Can Fam Physician* 1994;40:273-8.
4. O'Connor HM, Davidson JR. Emergency medicine skills. Are primary care physicians adequately prepared? *Can Fam Physician* 1992;38:1789-93.
5. Owens H, Allen R, Cohen E. Who will practise emergency medicine? Survey of family medicine graduates. *Can Fam Physician* 1993;39:1356-65.
6. Leduc E. Defining rurality: a general practice rurality index for Canada. *Can J Rural Med* 1997;2:125-31.
7. Ontario Medical Association. *Report of the fact finder on the issue of small/rural hospital emergency department physician services*. Toronto, Ont: Ministry of Health, Ontario Medical Association, Ontario Hospital Association; 1995.
8. Gordon MJ. A review of the validity and accuracy of self-assessments on health professions training. *Acad Med* 1991;66:762-9.
9. Morton D, Regehr G, Hodges B, McNaughton N. Using videotaped benchmarks to improve the self-assessment ability of family practice residents. *Acad Med* 1998;73:1201-6.