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Niveau de préparation des diplômés à une carrière en médecine interne générale avant et après la reconnaissance de la surspécialité : objectifs atteints et besoins évolutifs dans le programme d'études

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Résumé de l'article

Contexte : Une enquête auprès des diplômés en médecine interne générale (MIG), publiée en 2006, a révélé d'importantes lacunes dans leur formation, menant à l'élaboration des premiers objectifs nationaux de formation en MIG en 2010. Le premier examen de certification en MIG a été organisé en 2014. La formation est à nouveau en train de changer avec l'introduction en 2019 de la compétence par conception (CPC) dans la formation en MIG. Cette étude vise à examiner les lacunes de formation préexistantes et émergentes avec la normalisation de la formation en MIG et à identifier les nouveaux besoins de formation pour éclairer la définition des programmes de formation selon l'approche fondée sur les compétences.

Méthodes : Les diplômés des 16 programmes canadiens en MIG entre 2014 et 2019 ont reçu par courriel un sondage inspiré de l'étude originelle publiée en 2006. Les diplômés ont été interrogés sur leur état de préparation et sur l'importance qu'ils accordaient à divers éléments de la pratique.

Résultats : Un grand nombre des lacunes décelées précédemment (différence entre les cotes d'importance et de préparation) ont été comblées dans des domaines cliniques spécifiques (médecine obstétrique et périopératoire) et par rapport à des compétences spécifiques (tests de stress à l'effort); dans certains domaines, comme les troubles liés à l'utilisation de substances psychoactives, les efforts doivent être poursuivis. Il est important de noter que des lacunes subsistent dans la préparation à certains rôles intrinsèques (par exemple, les compétences de gestionnaire).

Conclusion : L'élaboration d'un programme national de formation en MIG a permis de combler certaines lacunes en matière de formation, mais des carences subsistent. Notre étude fournit les données nécessaires pour répondre aux besoins évolutifs de nos diplômés.

Canadian Medical Education Journal

Original Research

A comparative analysis of graduate preparedness for a career in General Internal Medicine before and after national subspecialty recognition to inform curricular changes: have we met the mark?

Niveau de préparation des diplômés à une carrière en médecine interne générale avant et après la reconnaissance de la surspécialité : objectifs atteints et besoins évolutifs dans le programme d'études

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Abstract

Background: A survey of General Internal Medicine (GIM) graduates published in 2006 revealed large training gaps that informed the development of the first national GIM objectives of training in 2010. The first recognized GIM certification examination was written by candidates in 2014. The landscape is again changing with the introduction in 2019 of competency-by-design (CBD) to GIM training. This study aims to examine pre-existing and emerging training gaps with standardization of GIM curricula and identify new training needs to inform CBD curricula.

Methods: GIM graduates from all 16 Canadian programs from 2014 -2019 were emailed a survey modeled after the original study published in 2006. Graduates were asked about their preparedness and importance ratings for various elements of practice.

Results: Many of the previously identified gaps (difference between importance and preparedness ratings) have been resolved in specific clinical areas (obstetrical and perioperative medicine) and skills (exercise stress testing) although some still require ongoing work in areas such as substance use disorders. Importantly, gaps still exist in preparedness for some intrinsic roles (e.g. managerial skills).

Conclusions: The development of a national GIM curriculum has helped close some educational gaps but some still exist. Our study provides data needed to meet the evolving needs of our graduates.

Résumé

Contexte : Une enquête auprès des diplômés en médecine interne générale (MIG), publiée en 2006, a révélé d'importantes lacunes dans leur formation, menant à l'élaboration des premiers objectifs nationaux de formation en MIG en 2010. Le premier examen de certification en MIG a été organisé en 2014. La formation est à nouveau en train de changer avec l'introduction en 2019 de la compétence par conception (CPC) dans la formation en MIG. Cette étude vise à examiner les lacunes de formation préexistantes et émergentes avec la normalisation de la formation en MIG et à identifier les nouveaux besoins de formation pour éclairer la définition des programmes de formation selon l'approche fondée sur les compétences.

Méthodes : Les diplômés des 16 programmes canadiens en MIG entre 2014 et 2019 ont reçu par courriel un sondage inspiré de l'étude originelle publiée en 2006. Les diplômés ont été interrogés sur leur état de préparation et sur l'importance qu'ils accordaient à divers éléments de la pratique.

Résultats : Un grand nombre des lacunes décelées précédemment (différence entre les cotes d'importance et de préparation) ont été comblées dans des domaines cliniques spécifiques (médecine obstétrique et périopératoire) et par rapport à des compétences spécifiques (tests de stress à l'effort); dans certains domaines, comme les troubles liés à l'utilisation de substances psychoactives, les efforts doivent être poursuivis. Il est important de noter que des lacunes subsistent dans la préparation à certains rôles intrinsèques (par exemple, les compétences de gestionnaire).

Conclusion : L'élaboration d'un programme national de formation en MIG a permis de combler certaines lacunes en matière de formation, mais des carences subsistent. Notre étude fournit les données nécessaires pour répondre aux besoins évolutifs de nos diplômés.

The Canadian patient population is not only aging but getting increasingly complex with a mounting burden of chronic disease conditions requiring specialized care. In response to a growing societal need to train generalists who could not only take care of this population, but also patients with medical perioperative and obstetrical needs, General Internal Medicine (GIM) was recognized by the Royal College of Physicians and Surgeons of Canada (RCPSC) as a distinct subspecialty of internal medicine in 2010.[1,2]

GIM training in Canada has evolved a great deal in the last decade. Internal Medicine (IM) training involves three years of broad "core" IM training followed by subspecialty training in a focused area. Prior to 2010, the path to GIM licensure in most of Canada involved these three years of "core" IM training with a subsequent one or two years of training that was generally unfocused without clear objectives. This differed only in Quebec where two additional years of training were the norm. Nationally, this contrasted to all other medicine subspecialties (such as cardiology or infectious diseases) which had firm curricula. In many cases, GIM training was not standardized or generalizable between institutions. Consequently, the training did not necessarily meet societal needs or build on experiences of previous trainees leading many residents to seek further training after residency. In addition, "prestige and respect" of the discipline along with the availability of "fellowship program resources" are key factors in helping IM graduates decide which subspecialty to pursue following "core" IM training.[1] Until recently, despite tremendous need and advocacy, GIM training lacked the standardization, prestige and resources that comes with subspecialty recognition.

Recognition and subspecialty designation of GIM by the RCPSC appears to have had a significant impact. Between 2010 to 2013, the number of candidates ranking GIM as their first subspecialty choice, in the Medicine Subspecialty Match, more than doubled and has been the first choice amongst all candidate for several years running.[3] The first GIM certification examination was written by candidates in 2014 and by 2016, all but one Canadian medical school had an accredited GIM training program.

The prior lack of a consistent national curriculum in GIM may have left trainees feeling unprepared for their eventual career. A survey of GIM graduates from 1993 to 2001 published in 2006 indeed revealed that there were large perceived gaps in training in a number of areas, including perioperative care, obstetrical medicine, and preventative care, and trainees felt unprepared to manage a practice.[4] These trainees often sought training outside of residency to bridge these gaps.[4] These issues were all at the forefront when the national curriculum and objectives of training were developed by the inaugural GIM subspecialty committee.[5]

In July 2019, the GIM curriculum was reformed once more to reflect the shift to competency-based medical education and the implementation of the RCPSC competence-by-design (CBD) framework.[6] Given that most universities had graduated GIM cohorts between 2014-2019, we aimed to examine pre-existing and emerging training gaps by surveying graduates from these pre-CBD cohorts. We also aimed to identify new training needs to inform and help revise the proposed CBD curricula as a form of quality assurance.

Methods

Ethics

This study was reviewed and approved by the Ottawa Health Science Network Research Ethics Board.

Survey design

The 2021 survey was based on the previously published survey[4] to allow some comparisons but is not identical in either content or structure with changes that reflect current practice trends. Namely, medical conditions in the previous survey were included based on general training objectives and consensus in 2006. The study team reviewed these and added pain syndromes. The only condition that was removed was "immunological conditions" as we felt the term to be too vague. The number of procedures in the 2021 survey is less than the 2006 survey. In an effort to target the most widely and commonly practiced procedures, we only included those that at least 50% of the 2006 respondents reported using at least once per month,[4] all of the procedural skills deemed mandatory for GIM trainees,[7] along with newer practices such as the use of point-of-care ultrasound.

In the original study, respondents were asked to rank preparedness and importance on a 5-point Likert scale which included a neutral point. However, when data were presented, they were grouped in two categories that did not include the neutral respondents. Given that our goal is not to demonstrate statistical differences over the iterations but rather broad trends as a means of quality assurance, we removed the neutral options in the current version of the survey to force categorical decisiveness.

All investigators and members of the specialty committee in GIM, which include regional representatives (general internists in practice) and program directors from all Canadian programs, reviewed the 2021 survey.

Study population

Graduates from all 16 Canadian GIM programs from 2014-2019 were identified by their respective training program. Programs provided the study principal investigator with the available email addresses of graduates (with the exception of one program who preferred to disseminate the email participation request rather than provide email addresses).

Sampling

Voluntary – all graduates were invited to participate in the survey. Potential participants received an original invitation and two reminders in March 2021. We provided a draw for two gift cards as an incentive to participate.

Outcome measures

Demographic data were collected. Graduates were asked about their **preparedness** rating for various disciplines, conditions, procedures and skills on a 4-point Likert scale ranging "not at all prepared" to "well prepared"; and **importance** rating on a 4-point Likert scale ranging from "not at all important" to "very important". Graduates were also asked about key curricular elements and asked whether their program met their learning needs in these areas using a 4-point Likert scale ranging from "did not meet my needs at all" to "excelled in meeting my needs".

Data analysis

Demographic data and answers regarding program needs are presented with descriptive statistics. To align with the original study,[4] data are presented categorically (percentage of respondents) as low preparedness ("not at all prepared" and "somewhat prepared") and high preparedness ("prepared" and "very prepared") for the preparedness rating. Importance categories are presented as low importance ("not important at all" and "somewhat important") and high importance ("important" and "very important") for the importance rating. Similar to the 2006 study, gaps of > 20% between preparedness and importance for disciplines, conditions, procedures and skills deemed highly (> 50%) important are highlighted.

Results

Demographics

A total of 444 surveys were emailed and 131 were completed for a response rate of 29%. The response rate was significantly lower for francophone programs (20.1%; *n* = 31/154) vs the anglophone programs (45.4%; *n* = 100/290). There were respondents from all 16 programs. There was an increase in response per year of graduation from 2014 (3.1% of respondents) to 2019 (28.5% of respondents). As presented in Table 1, most recent graduates currently practice in larger groups and communities with the largest fraction of their time allocated to clinical work.

Table 1. Demographic data

	% respondents *(n 131)*
Practice Type	
Solo-practice	8.7
Small (1-5) group practice	15.1
Medium-sized (6-10) group practice	15.1
Larger (more than 10 people) group practice	61.1
Community Size	
<10,000 people	0.8
10,001 - 50,000 people	8.0
50,001 - 100,000 people	9.6
100,001 - 200,000 people	7.2
200,001 - 500-000 people	18.4
> 500,000 people	56.0
Primary hospital size (if applicable)	
<100 beds	9.6
100 to 200 beds	16.8
> 200 beds	73.6
Time commitment in practice (answers did not need to add up 100%)	
% clinical work	57.5
% education administration	10.0
% teaching	12.5
% research	7.5
% administration	4.2

Results by discipline

When asked the question "How important is knowledge in each of these medical disciplines for GIM training now?" respondents listed the same six disciplines in both iterations of the survey as most important (see Table 2). Similarly, graduates felt most prepared in these same six disciplines with the exception of endocrinology where 2021 graduates (87%) seemed better prepared than in the past (57%). In 2006, four disciplines were noted to have a gap of more than 20% between those ranked high in importance vs in preparedness whereas in the 2021 iteration of the survey, the only discipline with a gap of more than 20% was neurology.

Table 2. Preparedness and Importance rankings for disciplines. Gaps of more than 20% between scores of high preparedness and importance are bolded for disciplines deemed highly (> 50%) important

	Prepared or Very Prepared Rankings (% respondents)		Important or Very important ranking (% respondents)		Absolute Discrepancy between importance and preparedness	
	2006 Survey	2021 Survey	2006 Survey	2021 Survey	2006 Survey	2021 Survey
Cardiology	92.3	97.5	98.9	100.0	6.6	2.5
Clinical Pharmacology	35.7	53.2	67.0	67.6	**31.3**	14.4
Critical Care	73.5	86.1	85.5	91.5	12.0	5.5
Dermatology	7.7	6.3	20.7	25.4	12.9	19.0
Endocrinology	57.1	87.3	82.8	95.8	**25.6**	8.4
Gastroenterology	57.1	79.7	67.2	87.3	10.1	7.6
Geriatric Medicine	57.1	72.2	76.7	87.3	19.5	15.2
Hematology	62.1	79.7	72.8	87.3	10.7	7.6
Immunology and Allergy	8.2	7.6	17.2	19.7	9.0	12.1
Infectious Diseases	75.8	89.9	87.1	100.0	11.3	10.1
Nephrology	79.1	92.4	86.0	94.4	6.9	2.0
Neurology	49.2	40.5	75.7	83.1	**26.5**	**42.6**
Medical Oncology	26.5	24.1	34.7	36.6	8.1	12.6
Palliative Medicine	26.9	68.4	52.0	76.1	**25.0**	7.7
Physical Medicine and Rehabilitation	3.9	0.0	11.7	8.5	7.9	8.5
Respirology	85.2	89.9	92.1	95.8	7.0	5.9
Rheumatology	55.5	68.4	72.6	87.3	17.1	19.0

Results by conditions:

Participants were surveyed about 30 specific medical conditions about their perceived preparedness vs importance to GIM. Conditions spanned across all disciplines. Results are presented in Table 3. Of the conditions perceived to have high importance rating, two conditions had a gap of more than 20% in ranking of importance versus preparedness: pain syndrome (gap 61%; 69% important vs 9% prepared) and substance use disorders (gap 40%, 74% important vs 34% prepared). It is noteworthy that substance use disorders were also noted to be discrepant in the 2006 version of the survey (23%, 55% important vs 32% prepared) whereas pain syndrome was not included in that version of the survey.

Results by procedures

Participants were surveyed about 20 specific procedures with regards to their perceived preparedness vs importance to GIM. Results are presented in Table 4. The majority (> 50%) of respondents felt that most of the listed procedures were important or very important to the practice of GIM. Only two procedures had a gap of more than 20% in ranking of importance versus preparedness.

Results by specific skills

Participants were surveyed about 30 different specific skills spanning across the CanMEDS roles (Table 5). In the original survey, 14 skills deemed highly (> 50%) important had a gap of more than 20% between perceived importance and preparedness as compared to only seven skills in 2021.

Program meeting needs

Finally, participants were surveyed about key curricular elements and asked whether their program met their learning needs in these areas. As shown in Table 6, programs were able to meet the needs of their trainees in the vast majority of areas with few exceptions.

Table 3. Preparedness and Importance rankings for conditions. Gaps of more than 20% between scores of high preparedness and importance are bolded for conditions deemed highly (> 50%) important.

	Prepared or Very Prepared Rankings (% respondents)		Important or Very important ranking (% respondents)		Absolute Discrepancy between importance and preparedness	
	2006 Survey	2021 Survey	2006 Survey	2021 Survey	2006 Survey	2021 Survey
Acute MI /acute coronary syndromes	99.4	98.7	98.4	97.1	1.0	1.6
Acute renal failure	96.7	100.0	98.2	100.0	1.5	0.0
Alcoholism	61.0	79.2	73.1	89.9	12.1	10.6
Anemia	92.3	97.4	96.5	97.1	4.2	0.3
Angina	99.5	96.1	99.4	95.7	0.1	0.5
Arrhythmias	99.4	81.8	79.7	95.7	19.7	13.8
Arthritis	60.4	76.6	80.7	73.9	**20.3**	2.7
Asthma	85.7	83.1	91.8	73.9	6.1	-9.2
Cerebrovascular disease	82.9	69.1	90.0	87.0	7.1	17.9
Chronic obstructive pulmonary disease	93.4	98.7	95.9	97.1	2.5	1.6
Chronic renal failure	80.7	87.0	88.3	89.9	7.6	2.8
Congestive heart failure	98.8	98.7	99.4	100.0	0.6	1.3
Delirium	74.7	94.8	85.3	95.7	10.6	0.8
Dementia	48.9	66.2	70.4	76.8	**21.5**	10.6
Depression	15.5	9.1	49.4	39.1	33.9	30.0
Diabetes	92.9	94.8	98.3	100.0	5.4	5.2
Diabetic ketoacidosis	98.4	100.0	94.7	100.0	3.7	0.0
Electrolyte / acid base disorders	92.8	97.4	97.7	100.0	4.9	2.6
Headache	39.0	22.1	66.1	37.7	**27.1**	15.6
HIV / AIDS	40.1	31.9	53.8	31.9	12.7	20.2
Hyperlipidemia	73.6	77.9	88.9	72.5	15.3	5.5
Hypertension	90.7	98.7	97.7	100.0	7.0	1.3
Leukemia / Lymphoma	37.3	19.5	40.1	37.7	2.8	18.2
Liver disease	70.4	90.9	82.1	100.0	11.7	9.1
Malignancy	54.4	66.2	71.3	79.7	16.9	13.5
Overdose	73.6	67.5	81.2	84.1	7.6	16.5
Pain syndromes	NA	9.1	NA	69.6	NA	**60.5**
Substance abuse disorders	32.0	33.8	55.3	73.9	**23.3**	**40.1**
Thromboembolic disease	91.8	92.2	95.3	100.0	3.5	7.8
Thyroid dysfunction	69.2	83.1	89.4	88.4	**20.2**	5.3

Table 4. Preparedness and Importance rankings for procedures. Gaps of more than 20% between scores of high preparedness and importance are bolded for procedures deemed highly (> 50%) important

	Prepared or Very Prepared Rankings (% respondents)		Important or Very important ranking (% respondents)		Absolute Discrepancy between importance and preparedness	
	2006 Survey	2021 Survey	2006 Survey	2021 Survey	2006 Survey	2021 Survey
ACLS/CPR	95.0	93.6	92.2	91.7	2.8	1.9
Ambulatory blood pressure (ABPM) interpretation	NA	60.8	NA	63.0	NA	2.3
Ambulatory ECG (Holter) interpretation.	73.0	40.5	89.8	45.2	16.8	4.7
Arterial line insertion	NA	74.7	NA	58.9	0	15.8
Bag-Mask ventilation	NA	68.4	NA	67.1	NA	1.2
Cardioversion	58.7	49.4	69.9	61.6	11.2	12.3
Central line insertion with US guidance	NA	88.6	NA	82.2	NA	6.4
Eletrocardiogram (ECG) interpretation	NA	92.4	NA	100.0	NA	7.6
Endotracheal intubation	62.7	35.4	83.2	61.6	**20.5**	**26.2**
Exercise stress testing	50.9	59.5	73.3	54.8	**22.4**	4.7
Hemodynamic monitoring	64.2	77.2	68.1	72.6	3.9	4.6
Knee arthrocentesis	44.1	64.6	54.8	61.6	10.7	2.9
Lumbar puncture	85.6	73.4	91.1	82.2	5.5	8.8
Mechanical ventilation	63.7	43.0	77.0	54.8	13.3	11.8
Non-invasive mechanical ventilation	NA	72.2	NA	89.0	NA	16.9
Paracentesis	87.2	84.8	81.4	89.0	5.8	4.2
Point of care ultrasound (POCUS)	NA	39.2	NA	76.7	NA	**37.5**
Pulmonary function test interpretation	NA	60.8	NA	58.9	NA	1.9
Temporary pacemaker insertion	39.7	13.9	61.1	28.8	**21.4**	14.8
Thoracentesis	NA	68.8	NA	78.1	0	9.3

Table 5. Preparedness and Importance rankings for skills by CanMEDS roles compared between 2006 and 2021. Gaps of more than 20% between scores of high preparedness and importance are bolded for skills deemed highly (> 50%) important.

	Prepared or Very Prepared Rankings (% respondents)		Important or Very important ranking (% respondents)		Absolute Discrepancy between importance and preparedness	
	2006 Survey	2021 Survey	2006 Survey	2021 Survey	2006 Survey	2021 Survey
Medical expert						
History taking	100.0	100.0	99.4	100.0	0.6	0.0
Physical examination	98.3	100.0	99.4	91.4	1.1	8.6
Diagnosis of undifferentiated illness	91.5	96.1	98.2	100.0	6.7	3.9
Management of chronic illness	80.1	92.2	95.1	100.0	15.0	7.8
Care of multi-system disease	94.4	97.4	99.4	100.0	5.1	2.6
Care of critically ill patients	84.6	92.1	97.0	91.4	12.4	0.7
Recognize treatable rare diseases	55.9	72.7	74.7	84.3	18.8	11.6
Medical problems of pregnancy	37.5	72.7	75.8	74.3	**38.3**	1.6
Peri-operative care	55.9	92.2	92.8	91.4	**36.8**	0.8
Pain management	27.1	29.9	74.4	78.3	**47.3**	**48.4**
Develop problem-solving	94.9	98.7	99.4	100.0	4.5	1.3
Communicator						
Communication skills	87.0	98.7	97.0	98.6	10.0	0.1
Consultation skills	81.9	98.7	98.2	100.0	16.3	1.3
Collaborator						
Collaborate with non-physician caregivers	64.0	88.2	83.1	94.3	19.1	6.1
Leader/manager						
Administration skills	16.4	19.5	42.4	55.7	26.0	**36.2**
Set-up an office	2.8	9.1	69.1	52.9	**66.3**	**43.8**
Health advocate						
Choose cost effective treatments	45.5	40.3	78.9	75.7	**33.4**	**35.5**
Counsel regarding smoking	23.7	53.3	65.5	61.4	**41.7**	8.2
Counsel regarding exercise	25.4	49.4	70.9	70.0	**45.5**	**20.7**
Counsel regarding HIV testing	39.0	39.0	60.6	42.9	**21.6**	3.9
Counsel about domestic abuse	9.0	6.5	36.4	45.7	27.3	39.2
Counsel about substance abuse	17.0	29.9	50.0	71.4	**33.1**	**41.6**
Scholar						
Research skills	24.3	36.4	36.8	31.4	12.5	4.9
Develop life-long learning skills	85.2	81.8	98.2	98.6	13.0	16.7
Critical appraisal	66.1	79.2	87.4	91.4	**21.3**	12.2
Participate in quality assurance	22.5	41.6	58.4	67.1	**36.0**	**25.6**
Teaching skills	67.8	79.2	80.1	85.7	12.3	6.5
Professional						
Ethics	55.4	62.3	78.3	78.6	**22.9**	16.2
End-of-life issues	56.2	83.1	83.7	88.6	**27.6**	5.4
Compliance issues	36.7	63.6	78.3	82.6	**41.6**	19.0

Table 6. How well did program meet the needs of trainees? Items where fewer than 2/3 of respondents felt needs were met or excelled are bolded.

	Did not meet my needs at all (% respondents)	Somewhat met my needs (% respondents)	Met my needs (% respondents)	Excelled in meeting my needs (% respondents)
Flexibility	0.0	6.3	36.7	57.0
Acute care	0.0	0.0	50.6	49.4
Perioperative care	1.3	10.1	49.4	39.2
Peripartum care	0.0	21.5	62.0	16.5
Research Skills	**10.1**	**40.5**	**40.5**	**8.9**
Teaching Skills	3.8	26.6	53.2	16.5
Administrative/management skills	**31.7**	**49.4**	**16.5**	**2.5**
Mentorship	**15.2**	**32.9**	**31.7**	**20.3**
Career counseling	**8.9**	**39.2**	**32.9**	**19.0**
Wellness	3.8	25.3	53.2	17.7
Ambulatory care	3.8	24.1	48.1	24.1
Clinical teaching units	0.0	5.1	39.2	55.7
Critical care - ICU	0.0	12.7	59.5	27.9
Critical Care - CCU	6.3	22.8	55.7	15.2
GIM consultation services	0.0	3.8	36.7	59.5
Community GIM	3.8	12.7	46.8	36.7
Journal clubs	1.3	7.6	57.0	34.2
Exposure to procedural skills	**1.3**	**43.0**	**34.2**	**21.5**
Number and variety of patients	0.0	6.3	41.8	51.9
Clear goals and objectives	0.0	13.9	63.3	22.8
Organized scholarly activities	5.1	13.9	64.6	16.5
Quality assurance / improvement	**5.1**	**39.2**	**46.8**	**8.9**
Increasing professional responsibility	0.0	13.9	58.2	27.9
Consistent evaluation	0.0	19.0	63.3	17.7

Discussion

GIM has matured a great deal since becoming a distinct subspecialty of IM in 2010. When developing the first Objectives of Training Requirements (OTR) of the discipline,[5] the GIM community conducted an in-depth needs assessment of GIM graduates.[4,8] It was important to identify gaps in training, resolve conflicts between standardization of the educational process and protect the diversity and breadth of training emphasized for generalists. We designed this study for quality assurance and monitoring of training needs as we enter the next major step in educational reform: competency by design.[6]

Our data indicate that most GIM graduates practice in larger urban communities, are typically hospital-based practices and focus on clinical work. This aligns with the most recent data from the Canadian Medical Association physician workforce survey[9] which suggests our respondents are representative of the practicing GIM physician population. The increase in response rate per year of training is likely reflective of increased admissions to programs over the years. Most graduates continue to report importance and preparedness for disciplines related to the most common reasons for inpatient admissions in adults.[10]

An ongoing training need in neurology was identified which may reflect the breath and complexity of the discipline or lack of mandatory exposure to it within GIM training. We identified an ongoing training need in substance use disorders which is not surprising given the rising prevalence of these conditions. According to the Canadian Institute for Health Information, substance use disorders were the fourth most common reason for hospital stays in 2020-2021.[11] The need for further training in pain syndromes may be indirectly related given the intricate link between chronic pain and substance use.[12]

Specific to procedures deemed highly important by over 50% of respondents, we demonstrated a persistent gap of > 20% between preparedness and importance for endotracheal intubations (21% 2006; 26% 2021). The responses for endotracheal intubation may be biased. Most respondents were practicing in urban areas, where endotracheal intubation is often under the purview of critical care specialists. It is possible that these respondents did not seek out rigorous training in this skill due to local practice patterns of their future location of work. However,

the respondents may still have rated and perceived this skill to be highly important as it is a mandatory training experience within current curricula, which aim to prepare trainees for diverse practice types. Given the mandatory nature of this procedure as part of GIM training, we recommend that programs deliberately create opportunities for trainees to feel prepared performing this task. The practice of point-of-care ultrasound (POCUS) is new and evolving quickly in GIM. It is anticipated that POCUS will become an integral component of training with consensus recommendations for curricula in IM and GIM having been recently proposed.[13] Our study highlights this as an opportunity for growth in CBD.

Our study demonstrates that many of the previously identified gaps in specific skills for the practice of GIM have been closed since the development of a standardized RCPSC GIM certification route in Canada. Within the medical expert role, the deliberate inclusion of obstetrical and perioperative medicine in the curriculum has been successful in improving preparedness. Ongoing issues in pain management and substance use counseling exist as detailed above. Intrinsic roles are notoriously more difficult to teach and assess than medical expertise. Our study shows fewer training gaps within intrinsic CanMEDS[14] roles than the prior survey (6 vs 11) but these areas require ongoing attention within our curricula particularly within the leader/manager competency. This finding is similar to those of a prior study where training gaps were most frequent in manager/leader roles.[8] These skills (administrative skills and set-up office) may be best addressed during the 'transition to practice' phase of CBD.[6]

Graduates report that GIM programs met most of their needs including flexibility which was very important to the subspecialty committee as this is a truly valued feature of GIM. Clinically, the only area where less than 2/3 of respondents felt their needs were not met/surpassed was in exposure to procedural skills. This may be because of the broader availability of interventional radiology for procedural assistance. Programs should focus ongoing attention to scholarly activities (research skills, quality assurance/improvement) and preparing trainees for the transition to practice as detailed above through mentorship and career counseling activities.

There are limitations to this study. The overall response rate is low particularly in respondents from Quebec, perhaps because of pre-existing difference in their training structure with two guaranteed years of training rather than one as was the norm in Canada. Further, response rate may have been affected by the COVID19 pandemic given that many general internists were providing direct patient care to a higher volume of patients. The 2021 survey removed the neutral option from the Likert scale meaning that data are presented categorically rather than continuously. Although this did not permit direct statistical comparisons, it did not align with the intended goals of this study to serve as a quality assurance process. As is inherent with this type of data, responses are subjective.

Conclusions

Our study indicates that since the introduction of standardized GIM training in Canada, many previously identified gaps between preparedness and knowledge have been closed. Work is still needed in some areas that reflect the increasing complexity of the patient population and diversity of practice. New skills, such as point-of-care ultrasound, require deliberate implementation within GIM curricula. As we transition to a new educational framework with CBD, we will continue to seek the perspectives of both our trainees and recent graduates as key stakeholders in ensuring that we are meeting the mark in preparing them for long and rewarding careers in GIM.

Conflicts of Interest: The authors do not have any conflicts of interest to declare.

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References

1. Daniels VJ, Kassam N. Determinants of internal medicine residents' choice in the Canadian R4 fellowship match: a qualitative study. *BMC Med Educ. 2011.* 11, 44. https://doi.org/10.1186/1472-6920-11-44
2. Card SE, Clark HD, Elizov M, Kassam N. The evolution of General Internal Medicine (GIM)in Canada: international implications. *J Gen Intern Med.* 2017 May;32(5):576-581. https://doi.org/10.1007/s11606-016-3891-z
3. CARMS. *CARMS medical subspecialty match reports*. Available at https://www.carms.ca/data-reports/msm-data-reports/ [Accessed Feb 22, 2022].
4. Card SE, Snell L, O'Brien B. Are Canadian general internal medicine training program graduates well prepared for their future careers. *BMC Med Educ*. 2006; 6(1); 1-9. https://doi.org/10.1186/1472-6920-6-56
5. Royal College of Physicians and Surgeons of Canada. *General internal medicine objectives of training in the subspecialty of general internal medicine.* Royal College of Physicians and Surgeons of Canada. National Standards for training PRIOR to July 1, 2019. 2012. Available at

https://www.royalcollege.ca/rcsite/documents/ibd/general_internal_medicine_otr_e.pdf [Accessed Feb 22, 2022].

6. Royal College of Physicians and Surgeons of Canada. *Competence by Design: Canada's model of competency-based medical education*. Available at https://www.royalcollege.ca/rcsite/cbd/competence-by-design-cbd-e [Accessed Feb 22, 2022].
7. Cavalcanti RB, Hendricks AC, Card SE. Procedural skills of a General Internist – informed by the front lines. *Can J Gen Int Med*. 2017. 12(3)8-12. https://doi.org/10.22374/cjgim.v12i3.163
8. Card SE, PausJenssen AM, Ottenbreit RC. Determining specific competencies for General Internal Medicine residents (PGY4 and 5). What are they and are programs currently teaching them? A survey of practicing Canadian General Internists. *BMC Res Notes*. 2011; 4(1): 1–6. https://doi.org/10.1186/1756-0500-4-480
9. Canadian Medical Association. *Physician workforce survey*: *internal medicine*. Available at https://www.cma.ca/sites/default/files/2019-01/internal-medicine-e.pdf [Accessed Feb 22, 2022].
10. Salah HM, Minhas AMK, Khan MS, et al. Causes of hospitalization in the USA between 2005 and 2018. *Eur Heart J Open* 2021 Jun 15;1(1). https://doi.org/10.1093/ehjopen/oeab001
11. Canadian Institute for Health Information. Hospital Stays in Canada. 2022. Available at https://www.cihi.ca/en/hospital-stays-in-canada. [Accessed Jan 19, 2023].
12. Garland EL, Froeliger B, Zeidan F, Partin K, Howard MO. The downward spiral of chronic pain, prescription opioid misuse, and addiction: cognitive, affective, and neuropsychopharmacologic pathways. *Neurosci Biobehav Rev.* 2013;37(10 0 2):2597-2607. https://doi.org/10.1016/j.neubiorev.2013.08.006
13. Ma, I.W.Y., Arishenkoff, S., Wiseman, J. et al. Internal Medicine point-of-care ultrasound curriculum: consensus recommendations from the Canadian Internal Medicine Ultrasound (CIMUS) group. 2017. *J Gen Intern Med* 32, 1052–1057 https://doi.org/10.1007/s11606-017-4071-5
14. Frank JR, Snell L, Sherbino J, editors. *CanMEDS 2015 Physician Competency Framework.* Ottawa: Royal College of Physicians and Surgeons of Canada; 2015. URL: https://www.royalcollege.ca/rcsite/documents/canmeds/canmeds-full-framework-e.pdf [Accessed Mar 8, 2022].