



Investigating the importance of clinical topics for developing a curriculum on gastroenterology for pediatric residents

Étude de l'importance de sujets cliniques dans un cursus de gastro-entérologie à l'intention des résidents en pédiatrie

Kathleen McNeil and Mohsin Rashid

Volume 12, Number 1, 2021

URI: <https://id.erudit.org/iderudit/1076152ar>

DOI: <https://doi.org/10.36834/cmej.43242>

[See table of contents](#)

Publisher(s)

Canadian Medical Education Journal

ISSN

1923-1202 (digital)

[Explore this journal](#)

Cite this article

McNeil, K. & Rashid, M. (2021). Investigating the importance of clinical topics for developing a curriculum on gastroenterology for pediatric residents. *Canadian Medical Education Journal / Revue canadienne de l'éducation médicale*, 12(1), e60–e69. <https://doi.org/10.36834/cmej.43242>

Article abstract

Background: Focused objectives provide effective learning. Pediatric residents in Canada follow objectives set by the Royal College of Physicians and Surgeons of Canada (RCPSC) with the goal of becoming competent general pediatricians. During the gastroenterology rotation, it remains unclear as to what clinical problems listed in the aforementioned objectives are crucial to understand as part of general pediatric practice. The purpose of this study was to identify the gastroenterological conditions of most importance to incorporate into a focused curriculum for pediatric residents.

Methods: All pediatricians across four Canadian Atlantic provinces were surveyed by a mailed questionnaire. Questions included demographics and ranking of the 14 clinical problems currently listed in the RCPSC objectives along with six more generated after input was gained from pediatric gastroenterologists.

Results: Of the 234 pediatricians surveyed, 132 (56%) responded, 48% of whom were general pediatricians. Celiac disease, gastroesophageal reflux, and obesity (currently not on the RCPSC list) were identified as important/very important conditions to understand by 94.4%, 96.1%, and 96.0% of respondents, respectively. There were no significant differences in rankings between general pediatricians and subspecialists. Most (75.6%) recommended that a rotation in gastroenterology be mandatory during pediatric residency.

Conclusions: Pediatricians from four Canadian Atlantic provinces recommended a list of gastrointestinal conditions to be included in pediatric residency training. It would be important to consider these recommendations to keep the training curriculum in sync with real world needs.

© Kathleen McNeil, Mohsin Rashid, 2021



This document is protected by copyright law. Use of the services of Érudit (including reproduction) is subject to its terms and conditions, which can be viewed online.

<https://apropos.erudit.org/en/users/policy-on-use/>

Érudit

This article is disseminated and preserved by Érudit.

Érudit is a non-profit inter-university consortium of the Université de Montréal, Université Laval, and the Université du Québec à Montréal. Its mission is to promote and disseminate research.

<https://www.erudit.org/en/>

Investigating the importance of clinical topics for developing a curriculum on gastroenterology for pediatric residents

Étude de l'importance de sujets cliniques dans un cursus de gastro-entérologie à l'intention des résidents en pédiatrie

Kathleen McNeil,¹ Mohsin Rashid¹

¹Division of Gastroenterology and Nutrition, Department of Pediatrics, Faculty of Medicine, Dalhousie University, Nova Scotia, Canada
Correspondence to: Dr. Mohsin Rashid MD, MEd, FRCP(C), Division of Gastroenterology & Nutrition, Department of Pediatrics, Division of Medical Education, Faculty of Medicine, Dalhousie University, IWK Health Centre, 5850 University Avenue, Halifax, Nova Scotia, Canada B3K 6R8; phone: (902) 470-8746; fax: (902) 470-7249; email: mohsin.rashid@iwk.nshealth.ca

Published ahead of issue: January 18, 2021; published: February 26, 2021. CMEJ 2021, 12(1). Available at <http://www.cmej.ca>

© 2021 McNeil, Rashid; licensee Synergies Partners

<https://doi.org/10.36834/cmej.43242>. This is an Open Journal Systems article distributed under the terms of the Creative Commons Attribution License. (<https://creativecommons.org/licenses/by-nc-nd/4.0>) which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is cited.

Abstract

Background: Focused objectives provide effective learning. Pediatric residents in Canada follow objectives set by the Royal College of Physicians and Surgeons of Canada (RCPSC) with the goal of becoming competent general pediatricians. During the gastroenterology rotation, it remains unclear as to what clinical problems listed in the aforementioned objectives are crucial to understand as part of general pediatric practice. The purpose of this study was to identify the gastroenterological conditions of most importance to incorporate into a focused curriculum for pediatric residents.

Methods: All pediatricians across four Canadian Atlantic provinces were surveyed by a mailed questionnaire. Questions included demographics and ranking of the 14 clinical problems currently listed in the RCPSC objectives along with six more generated after input was gained from pediatric gastroenterologists.

Results: Of the 234 pediatricians surveyed, 132 (56%) responded, 48% of whom were general pediatricians. Celiac disease, gastroesophageal reflux, and obesity (currently not on the RCPSC list) were identified as important/very important conditions to understand by 94.4%, 96.1%, and 96.0% of respondents, respectively. There were no significant differences in rankings between general pediatricians and subspecialists. A large majority recommended that a rotation in gastroenterology be mandatory during pediatric residency.

Conclusions: Pediatricians from four Canadian Atlantic provinces recommended a list of gastrointestinal conditions to be included in pediatric residency training. It would be important to consider these recommendations to keep the training curriculum in sync with real world needs.

Résumé

Contexte : L'établissement d'objectifs ciblés favorise un apprentissage efficace. Au Canada, les résidents en pédiatrie poursuivent les objectifs fixés par le Collège royal des médecins et des chirurgiens du Canada (CRMCC) pour devenir de bons pédiatres généralistes. Durant le stage en gastro-entérologie, les problèmes cliniques à prioriser dans cette liste d'objectifs, en vue d'une pratique pédiatrique générale, demeurent imprécis pour les résidents. Cette étude visait à identifier les troubles de l'appareil digestif les plus importants à inclure à un cursus ciblé à l'intention des résidents en pédiatrie.

Méthodologie : On a mené un sondage auprès de pédiatres des quatre provinces de l'Atlantique en leur envoyant un questionnaire par la poste. Les questions visaient à obtenir des données démographiques et leur demander de classer 14 troubles faisant actuellement partie de la liste du CRMCC, puis six autres après avoir recueilli des avis auprès de gastro-entérologues pédiatriques.

Résultats : 132 (56 %) des 234 pédiatres sondés, dont 48 % étaient des pédiatres généralistes, ont répondu au questionnaire. La maladie cœliaque, le reflux gastro-œsophagien et l'obésité (maladie qui ne figure pas actuellement sur la liste du CRMCC) ont été jugés comme des troubles importants ou très importants à connaître par 94,4 %, 96,1 % et 96,0 % des répondants, respectivement. On n'a observé aucune différence significative entre le classement des pédiatres généralistes et celui des surs-spécialistes. Une grande majorité de répondants ont recommandé qu'un stage en gastro-entérologie devienne obligatoire durant la résidence en pédiatrie.

Conclusions : Les pédiatres des quatre provinces de l'Atlantique ont recommandé une liste de troubles de l'appareil digestif à inclure au programme de résidence en pédiatrie. Il serait important de tenir compte de ces recommandations pour que le programme de formation reste adapté aux besoins de la réalité.

Introduction

Defined and well-constructed objectives are important for effective learning. A curriculum needs to be developed systematically. Kern et al. described a six-step approach in the development of curricula for medical education.¹ Problem identification and general needs assessment and needs assessment of targeted learners are the first two steps, followed by goals/objectives, educational strategies, implementation, and evaluation and feedback. In the Kern model, complete problem identification requires the analysis of current approaches shown by patients, practitioners, and medical education systems in addressing the identified need. This is followed by the selection of an ideal approach that describes how patients, practitioners, and education systems should address the need. The difference between the two represents the scope of a general needs assessment. The second step involves assessing the needs of one's targeted group of learners (and the institution), which may differ from the needs of learners in general. Kern's six-step approach has been used previously for curriculum development in the medical education domain.^{2,3,4}

Pediatric residents in Canada are required to meet educational objectives as set by the Royal College of Physicians and Surgeons of Canada (RCPSC). Even though residents may rotate through a variety of subspecialty disciplines during the core three years of their training, the focus remains on preparing them to function as general pediatricians. As the pediatric (and similar) residency training programs prepare trainees to become generalists, it is important that input is solicited from general pediatricians as they are in the best position to list which conditions are important in clinical practice.

The RCPSC has proposed a list of objectives and key clinical conditions in gastroenterology, last updated in 2008.⁵ The list is primarily symptom-based, with only one specific disorder inflammatory bowel disease listed. Some common disorders such as celiac disease and gastroesophageal reflux are not included. To our knowledge, there is no information available on the methodology of the development of this list of clinical problems and, hence, it remains undetermined as to which of these problems are more important relative to others in general pediatric practice. The list was likely developed by consensus among subject matter experts, which could be problematic as there may be differences in how specialists and academic physicians perceive the importance of a condition in

comparison with generalists who are practicing in the community. Gastrointestinal disorders are common in children and it is important to identify the most important clinical problems so that more emphasis could be placed on learning methods for diagnosis and treatment of those issues during training. By engaging practicing pediatricians, we applied Kern's approach for curriculum development by identifying the problem and general needs assessment/needs assessment of targeted learners. This study was designed to provide information on these first two steps of curriculum development.¹

Medical knowledge base is expanding rapidly. This poses challenges both at undergraduate and postgraduate levels in terms of what to include in the limited time available to deliver curriculum.⁶ With time constraints on resident work hours, difficulties in adequately covering subspecialty topics during a three- to four-week rotation is increasingly becoming recognized.⁷⁻¹⁰ Given such constraints, it may not be possible to learn in detail all the listed problems/key conditions in a certain medical field during a rotation. Different educational strategies in other pediatric subspecialties have been investigated.^{8,11-14} Although the most effective pedagogical method of training should be utilized, it is essential to first determine how important various topics are in clinical practice. Since general pediatricians are at the forefront of primary care, the clinical problems they feel are more important in practice are likely to be the ones that should be emphasized during residency training.

The purpose of this study was to investigate the relative importance of various gastroenterological problems /disorders listed in the RCPSC objectives in clinical practice, especially in general pediatrics. This information is expected to be helpful in developing a concise and focused curriculum for pediatric residents completing rotations in gastroenterology.

Methods

All pediatricians in the four Canadian Atlantic provinces were surveyed with a mailed questionnaire. The list of clinical problems presented in the survey was taken from the current RCPSC objectives⁵ with additions from six academic gastroenterologists from Dalhousie University and the Memorial University of Newfoundland. The names and contact information details of prospective respondents were obtained from the websites of the medical regulatory authorities of the four provinces.

The survey questionnaire asked about demographic information on the participants including gender, type of practice (academic, private, combination), scope of practice (general, subspecialty, mixed), location of paediatric pediatric postgraduate training (Canada, United States, other), years in practice, number of patients with gastrointestinal problems in their practice, completion of a gastroenterology rotation during paediatric training, and frequency of interactions with medical trainees. The ranking of the topics was done on a four-point Likert scale (1 = Not Important, 2 = Somewhat Important, 3 = Important, and 4 = Very Important). The survey instrument is included in Appendix A.

A pilot survey was administered to four pediatricians for clarity and reliability. To maintain anonymity, there was no coding of the survey forms. The participants were asked to complete the survey within two weeks. A self-addressed postage-paid return envelope was included. Only the initial mailing of the questionnaire was completed, with no reminders subsequently provided.

As part of this study, we wanted to investigate if there were differences between participants' ranking of the importance of various clinical disorders based on their years in practice, scope of practice, and the reception of Canadian or non-Canadian post-graduate training amongst other variables as listed in Table 1. Variables were recoded for ease of cross-tabulation analysis. The location of pediatric residency combined all non-Canadian residency trainees into one subset, which was compared to the group of Canadian graduates. The number of years of practice was recoded into dichotomous variables of zero to 10 years or more than 10 years, respectively. The number of patients seen with gastrointestinal complaints in practice currently was grouped into zero to 10 patients, 11 to 100 patients, or more than 100 patients. The answers "no" and "not sure" were combined into one category and compared to "yes" for as responses to whether gastroenterology rotation was completed during residency and whether a gastroenterology rotation should be mandatory during pediatric residency training. Finally, the frequency of interaction with learners was dichotomized into daily and less than daily. The p-values were derived from the Fisher's exact test.

The study was approved by the research ethics board of IWK Health Center, Halifax, Nova Scotia.

Table 1. Demographic characteristics of participants n (%)

Gender	Male	54 (42.5%)
	Female	73 (57.5%)
Practice type	Academic	62 (48.8%)
	Private	34 (26.8%)
	Combination	31 (24.4%)
Practice scope	General pediatrics	61 (48.0%)
	Subspecialty	54 (42.5%)
Institution of residency*	Mixed	12 (9.5%)
	Canadian	99 (79.2%)
	Non-Canadian	26 (20.8%)
Years in practice	0–10	34 (26.8%)
	>10	93 (73.2%)
Number of patients in practice with GI disorders	0–10	29 (22.8%)
	11–100	58 (45.7%)
	>100	40 (31.5%)
Did a GI rotation/elective during pediatric residency training	Yes	79 (62.2%)
	No or unsure	48 (37.8%)
Recommend GI rotation as mandatory during pediatric residency training	Yes	96 (75.6%)
	No or unsure	31 (24.4%)
Have trainees in practice	Daily	80 (63.0%)
	Less than daily	47 (37.0%)

* indicates missing values

Results

Of the 234 participants contacted, 132 (56%) completed the survey. Of these, five were excluded due to a significant number of missing responses to the questions on the survey form. Data were analyzed for the remaining 127 respondents.

The demographic characteristics of the respondents are shown in Table 1. Most (73.2%) were experienced pediatricians, having been practicing for more than 10 years. The majority also saw a significant number of patients with gastrointestinal disorders in their practice. Further, almost two two-thirds were involved in some form of teaching by having daily interaction with learners.

Table 2 shows the ranked importance of various clinical problems currently listed in the RCPSC objectives for gastroenterology and those not currently listed but which were added to the survey with input from regional pediatric gastroenterologists. (Regrettably, malabsorption and inflammatory bowel disease which are on the RCPSC list, unexpectedly were deleted during the printing of the final version of the survey questionnaire, an error that was recognized only after the surveys had already been distributed).

Conditions found to be "important" or "very important" by more than 90% of respondents included: vomiting and regurgitation ($n = 122$; 96.1%), chronic abdominal pain ($n = 122$;

96.1%), constipation ($n = 122$; 96.1%), gastroesophageal reflux disease ($n = 122$; 96.1%), obesity ($n = 119$; 96.0%), chronic diarrhea ($n = 121$; 95.3%), acute abdominal pain ($n = 121$; 95.3%), jaundice ($n = 120$; 94.5%), celiac disease ($n = 119$; 94.4%), and acute diarrhea ($n = 118$; 93.6%).

Conditions felt to be “not important” or “somewhat important” by the majority of respondents included: clinical situations encountered in during the long term follow-up of survivors of liver transplantation ($n = 76$; 61.3%), chronic pancreatitis ($n = 74$; 58.3%), and short bowel syndrome ($n = 67$; 53.2%). Only a few participants rated some clinical problems as “not Important,” including enlargement of the liver ($n = 2$; 1.6%), liver dysfunction or failure ($n = 1$; 0.8%), dysphagia ($n = 4$; 3.2%), hepatitis ($n = 2$; 1.6%) and acute pancreatitis ($n = 2$; 1.6%).

Cross-tabulation of all dichotomous composite variables revealed a statistically significant difference between academic and non-academic pediatricians in rating the importance of abdominal pain ($p = 0.029$), with academic pediatricians suggesting higher importance. Pediatricians in practice for less than 10 years thought long long-term

issues in liver transplantation ($p = 0.039$) and celiac disease ($p = 0.015$) were significantly more important as compared with how those in practice longer than 10 years felt. Those who completed a gastroenterology rotation during their pediatric residency training felt that enlargement of liver was significantly more important than did those who did not complete such a rotation ($p = 0.030$). Finally, respondents who had completed a Canadian residency program felt that liver dysfunction/failure was a more important topic when compared to with the responses of non-Canadian residency trainees ($p = 0.05$).

Overall, there were no significant differences between general pediatricians and specialists in the cross-tabulation of surveyed clinical problems.

The survey ended with an invitation posed to the participants to add conditions that they felt should be included in the objectives. The most common ones were failure to thrive ($n = 8$), cow’s milk protein allergy ($n = 6$), irritable bowel syndrome ($n = 6$), nutrition ($n = 5$), eosinophilic esophagitis ($n = 4$), lactose intolerance ($n = 4$), and cyclic vomiting ($n = 3$).

Table 2. Ranking of the importance of various clinical conditions currently listed in the RCPSC learning objectives for Gastroenterology (A) and Conditions not listed in the RCPSC objectives and but which were added with input from gastroenterologists (B)

(A). Conditions currently listed in the RCPSC objectives for gastroenterology				
	Not Important	Somewhat Important	Important	Very Important
Constipation	0	5 (3.9%)	32 (25.2%)	90 (70.9%)
Vomiting	0	5 (3.9%)	35 (27.6%)	87 (68.5%)
Chronic abdominal pain	0	5 (3.9%)	43 (33.9%)	79 (62.2%)
Acute abdominal pain	0	6 (4.7%)	43 (33.9%)	78 (61.4%)
Chronic diarrhea	0	6 (4.7%)	51 (40.2%)	70 (55.1%)
Acute diarrhea*	0	8 (6.4%)	51 (40.5%)	67 (53.1%)
Jaundice	0	7 (5.5%)	56 (44.1%)	64 (50.4%)
Intestinal bleeding*	0	13 (10.3%)	56 (44.5%)	57 (45.2%)
Abdominal mass*	0	14 (11.2%)	57 (45.6%)	54 (43.2%)
Enlargement of the liver	2 (1.6%)	20 (15.7%)	59 (46.5%)	46 (36.2%)
Liver dysfunction/failure*	1 (0.8%)	32 (25.6%)	53 (42.4%)	39 (31.2%)
Hepatitis*	2 (1.6%)	25 (19.8%)	69 (54.8%)	30 (23.8%)
Dysphagia*	4 (3.2%)	34 (27.0%)	65 (51.6%)	23 (18.2%)
Liver transplantation follow-up*	8 (6.5%)	68 (54.8%)	36 (29.0%)	12 (9.7%)
(B). Conditions not listed in the RCPSC objectives but which were added after input from gastroenterologists				
	Not Important	Somewhat Important	Important	Very Important
Gastroesophageal reflux	0	5 (3.9%)	35 (27.6%)	87 (68.5%)
Obesity*	0	5 (4.0%)	41 (33.1%)	78 (62.9%)
Celiac disease	0	7 (5.6%)	66 (52.4%)	53 (42.0%)
Acute pancreatitis	2 (1.6%)	39 (31.0%)	58 (46.0%)	27 (21.4%)
Short bowel syndrome*	8 (6.4%)	59 (46.8%)	47 (37.3%)	12 (9.5%)
Chronic pancreatitis	10 (7.9%)	64 (50.4%)	43 (33.8%)	10 (7.9%)

Discussion

We investigated the relative importance of clinical topics by surveying practicing pediatricians as part of a needs assessment initiative for developing a curriculum in gastroenterology for pediatric residents by surveying the practicing paediatricians. In this study, we used principles described by Kern et al. for the needs assessment of targeted learners.¹ Even though pediatric residents rotate through sub-specialty disciplines, the primary focus of their schooling is to prepare them as general pediatricians. The respective postgraduate institutions in Canada, the United States, and the United Kingdom have varying objectives in the curricula for of pediatric residents. However, there is no description of the methodologies used in the development of these objectives for their curricula. In addition, there is variability between the objectives of each individual institution and between countries.

While there are several well-defined curricula for pediatric gastroenterology fellowship training, there is little information on the pediatric residency curriculum in gastroenterology.^{14,15,16} Researchers at the Department of Pediatrics, University of Cincinnati College of Medicine performed a needs assessment of graduates from at their institution in order to develop a curriculum in gastroenterology.⁷ General pediatricians who had completed pediatric residency training at their university were surveyed. The participants were asked to rate report their opinion of their preparedness to for manage managing patients with issues relating to various gastroenterological disorders. This survey primarily consisted of considered responses for regarding self-perceived knowledge of topics in gastroenterology and it was a small survey with only 31 respondents. Our study includes, in contrast, surveyed and collected data from a large number of pediatricians spread over a vast geographical area with a variety of clinical practice environments. This makes the data from our study more generalizable and useful.

Another study assessing gastroenterology curricula conducted by Lin et al. focused specifically on pediatric nutrition and obesity.¹² The researchers performed a survey involving members of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition. However, while nutrition and obesity are important topics, this study did not address the many other important aspects of pediatric gastroenterology.

The results from our study demonstrate that the majority of clinical problems listed in the current RCPSC objectives are felt to be “important” or “very important” by more than 90% of pediatricians in the Atlantic Canada area. This is a reassuring finding as it indicates that the expert consensus likely used by RCPSC in developing the list, for the most part, reflects current practice. However, key problems including liver dysfunction, dysphagia, and hepatitis were considered “important” or “very important” by only 65% to 75% of respondents. Meanwhile, Long-term follow-up of liver transplant recipients was not felt to be important by 61.3%. It should be pointed out that the survey specifically asked about importance, not frequency. All disorders encountered frequently in clinical practice would be considered important by the mere fact that they are so common. However, some disorders may be rarer but still important. The determination regarding level of importance was left up to the discretion of the participants completing the survey.

More than 94% of respondents thought celiac disease (94.4%), gastroesophageal reflux (96.1%), and obesity (96.0%) were important clinical problems. These are currently not listed on the RCPSC list of clinical problems. Obesity may be taught in other disciplines including General pediatrics and endocrinology. Since the current RCPSC list is primarily symptom symptom-based, celiac disease may be partly covered as a differential diagnosis of abdominal pain or diarrhea or malabsorption. Similarly, gastroesophageal reflux may be covered under vomiting or dysphagia. However, these two disorders are very common in the pediatric population and in-depth learning is essential in terms of not only being able to recognize their clinical features and make a diagnosis but also conduct appropriate management and follow-up. For this, these conditions are best taught as specific disorders. Medical curricula are structured in a variety of ways including by disciplines, body systems, and clinical problems or clinical presentation (i.e., symptom). Often, the medical school curriculum includes a mix of various components. A symptom-based approach may be more suitable for teaching differential diagnosis, while illness-based approach addresses issues around management, follow-up, and prognosis of disorders. For some clinical problems such as vomiting and acute abdominal pain listed in the current RCPSC objectives (Table 2), residents may be exposed to them while doing rotations in other disciplines. This may lead them to ultimately still learn the necessary knowledge, even if not during the gastroenterology rotation, although this cannot be guaranteed.

The cross-tabulation analysis found that newer graduates placed greater importance on the long-term follow-up of liver transplantation transplant recipients and patients with celiac disease compared with those who graduated more than 10 years ago. This may be the result of increasing numbers of patients now surviving after a liver transplantation and seen in general pediatric practices. These patients are followed by their general pediatricians, in addition to the gastroenterologists. Similarly, the prevalence of celiac disease has increased significantly in the last few decades.

Interestingly, there was no significant difference seen in the ranking of various clinical problems between general and subspecialist pediatricians. This suggests that a revised curriculum would be applicable to all postgraduate trainees, irrespective of the final scope of practice.

While all clinical problems currently listed in the RCPSC objectives and those added by input from pediatric gastroenterologists recruited for the study (Table 2) have clinical relevance, residents may not have the time to learn about all of them in the required detail. Residency rotations are generally four weeks in duration. As the subspecialty rotations are considered non-core, residents often take vacation time during this period. In addition, several days of clinical activity may be lost after repeatedly being post-call or involved with administrative activities. Therefore, the relative priority level needs to be adjusted toward supporting more in-depth learning on the most important clinical problems. All disorders in medicine are, in fact, "important". The challenge lies in deciding which ones to teach and assess in more depth than relative to the others. To assign priority, one may consider putting placing more emphasis on those listed as important by more than two-thirds of the pediatricians. As mentioned in the Results section of this report, two clinical problems namely malabsorption and inflammatory bowel disease were, unfortunately, missed in the printing of the final questionnaire. This error was recognized only after the mailing of the surveys. One cannot comment on the importance of these two conditions and this needs to be investigated.

It is important to recognize that patterns of diseases change independently of one another over time. Therefore, the relative importance of diseases should be assessed on a periodic basis when including in the curriculum.

Interestingly, the current RCPSC pediatric residency curriculum does not mandate a rotation in gastroenterology. This is also the case for several other subspecialty disciplines such as cardiology, endocrinology, and neurology, etc. where these rotations are optional. Some or all of the clinical problems related to these disciplines may be covered in general pediatric rotations but whether this is true and to what extent remains undetermined. In our study, 75.6% of the respondents recommended that a rotation in gastroenterology should be made mandatory in the pediatric residency training program. Based on this strong support, we suggest that the Royal College consider making this rotation mandatory.

This study has some limitations. The participants were asked only about the relative importance of various gastrointestinal clinical problems and not their comfort level or competence in dealing with them in practice. Furthermore, the participants were all from one though large geographical region (Atlantic Canada) and disease patterns may be somewhat different in other parts of the country.

A similar approach to curriculum development can be applied to other disciplines in medicine. Medical practitioners perceive most clinical conditions as important. Using a comparison group by asking clinicians to rank the importance of a particular condition relative to the highest level seen in practice might provide more variability in the data and a greater range of scores between conditions. This would help educators to prioritize focusing on conditions of most the highest importance. The survey should also be conducted at a national level to procure wider representation. Further, it would also be ideal to specifically include recent graduates from the residency programs, as they are in the best position to report what they were taught during training and what they actually encounter in clinical practice. With the advent of the Competence by Design initiative (CBD) by RCPSC, we anticipate that there will be an even greater need to develop a reliable and focused curriculum.

The information regarding the importance of certain clinical topics in gastroenterology gleaned from this study will enable us to develop a focused curriculum in gastroenterology for pediatric residents. This curriculum will have specific goals, educational materials/resources, and a plan of to assess the trainees to evaluate the usefulness of the curriculum. The various assessment tools such as multiple choice questions and objective structured clinical examinations will focus on the relatively more

important clinical problems. It would also be necessary to verify our findings by investigating the real-world prevalence of the gastrointestinal conditions considered important in this research by utilizing provincial health care databases and International Statistical Classification of Diseases and Related Health Problems ICD codes.

Conclusion

The present survey of pediatricians has provided an overview of relevant importance of topics for developing a gastroenterology curriculum for core pediatric residency training. This information has also helped identify some gaps in the current RCPSC objectives. As the prevalence and relative importance of clinical disorders can change over time, input from practicing general pediatricians should be sought systematically and on a regular basis in order to keep the curriculum current and focused.

Conflicts of Interest: There are no conflicts of interest to declare by any of the authors.

Funding: There is no source of funding to declare by any of the authors.

Acknowledgements: The authors wish to thank Drs. Anthony Otle, Angela Noble, Johan van Limbergen, Pushpa Sathya, and Jeff Critch for their suggestions and the supplementation of additional clinical conditions in the survey questionnaire.

References

1. Kern D, Thomas P, Howard D et al. *Curriculum development for medical education - a six step approach*. Johns Hopkins University Press.1998.
2. Lucas R, Choudhri T, Roche C et al. Developing a curriculum for emergency medicine residency orientation programs. *J Emerg Med*. 2014 May;46(5):701-5. <https://doi.org/10.1016/j.jemermed.2013.08.132>
3. Barsuk JH, Cohen ER, Wayne DB et al. Developing a simulation-based mastery learning curriculum: lessons from 11 years of advanced cardiac life support. *Simul Healthc*. 2016 Feb;11(1):52-9. <https://doi.org/10.1097/SIH.000000000000120>
4. Gisondi M A, Chou A, Joshi N, et al. Curriculum design and implementation of the emergency medicine chief resident incubator. *Cureus*. Feb 2018. 10(2): e2223. <https://doi.org/10.7759/cureus.2223>
5. Royal College of Physicians and Surgeons of Canada, *Objectives of training in pediatrics* <http://www.royalcollege.ca/cs/groups/public/documents/document/y2vk/mdaw/~edisp/tztest3rcpsced000931.pdf> [Accessed September 2016].
6. D'Eon M, Crawford R. The elusive content of the medical-school curriculum: a method to the madness. *Med Teach*. 2005;27(8):699-7003 <https://doi.org/10.1080/01421590500237598>
7. Pentiuik S, Baker R. Development of a gastroenterology educational curriculum for pediatric residents using fellows as teachers. *J Pediatr Gastroenterol Nutr*. 2012;54:281-84. <https://doi.org/10.1097/MPG.0b013e31822cd2b7>
8. D'Sa VA, High PC. Resident education in developmental behavioral pediatrics: the impact of the 80-hour work week. *J Dev Behav Pediatr*. 2010 Apr;31(3):230-2. <https://doi.org/10.1097/DBP.0b013e3181d60dc1>
9. Feist M, Ciccarelli M, McFerron BA et al. Methods and effects of a case-based pediatric gastroenterology online curriculum. *J Pediatr Gastroenterol Nutr*. 2013 Feb;56(2):161-5 <https://doi.org/10.1097/MPG.0b013e31825677d7>
10. Robson J. Considerations for physician training in a new era of medical education. *J Pediatr Gastroenterol Nutr*. 2013 Feb;56(2):111-12. <https://doi.org/10.1097/MPG.0b013e31827fc770>
11. O'Dell JR, Klassen LW, Moore GF. The use of outcome measures to evaluate clinical rheumatology curriculum changes. *J Rheumatol*. 1993 Jun;20(6):1033-6.
12. Lin HC, Kahana D, Vos MB et al. Assessment of nutrition education among pediatric gastroenterologists: a survey of NASPGHAN members. *J Pediatr Gastroenterol Nutr*. 2013 Feb;56(2):137-44. <https://doi.org/10.1097/MPG.0b013e3182638ce8>
13. Cullen EJ, Lawless ST, Nadkarni VM et al. Evaluation of a pediatric intensive care residency curriculum. *Crit Care Med*. 1997 Nov;25(11):1898-903. <https://doi.org/10.1097/00003246-199711000-00031>
14. Martinez JA, Koyama T, Acra S et al. Nutrition education for pediatric gastroenterology, hepatology and nutrition fellows: survey of NASPGHAN fellowship training programs. *J Pediatr Gastroenterol Nutr*. 2012 Aug;55(2):131-5. <https://doi.org/10.1097/MPG.0b013e31824ee535>
15. Raman M, Shaffer E, Lockyear J. Gastroenterology fellowship training: Approaches to curriculum assessment and evaluation. *Can J Gastroenterol* 2008 June;22(6):559-64. <https://doi.org/10.1155/2008/583190>
16. The gastroenterology core curriculum. American College of Gastroenterology. 3rd Edition, May 2007. <http://gi.org/wp-content/uploads/2011/07/fellows-GICoreCurriculum.pdf> [Accessed October 10, 2018]

Appendix A: Instructions and Questionnaire sent to study participants

Study title: **Needs Assessment for the Development of a Curriculum in Gastroenterology for Paediatric Residents**

Dear colleague,

Paediatric Residents are expected to meet the educational objectives as set out by the Royal College of Physicians and Surgeons of Canada. Like several other sub-specialties, a rotation in gastroenterology is not mandatory for Residents during their training. The Royal College has a list of objectives with clinical problems in gastroenterology but it is not clear how this list was developed and whether it includes the problems about which knowledge is essential for general practice.

Focused objectives are essential for effective learning. With increasing educational commitments, Residents have limited time in acquiring all the essential skills for clinical practice. Needs assessment of the target population is an important part of the development of any curriculum. We ask that you complete the attached survey that will help generate a list of key clinical problems in gastroenterology. This list can then be used as the basis for developing a more focused curriculum.

The survey will take ~10 minutes to complete. **Your participation in the study is completely voluntary.** Submission of a completed survey constitutes your consent to participate in the research. To maintain full confidentiality, your responses will remain completely anonymous and you will not be asked to identify yourself by name.

This study has been approved by the Research Ethics Board at the IWK Health Centre, Dalhousie University.

We would appreciate it if you return the completed questionnaire in the addressed envelope within **two weeks**. A summary of the survey results will be disseminated by posting it on a web site through a link on the Dalhousie University, Division of Paediatric Gastroenterology.

If you have any questions or concerns please contact us at the address listed above.

Sincerely yours,

STUDY: Needs assessment for the development of a curriculum in gastroenterology for paediatric residents

Practice Demographic Profile

(1). Sex:

- Male
- Female

(2). Which best describes your practice?

- Academic/university based
- Private practice
- Combination of both
- Retired from practice

(3). What is your primary scope of practice?

- General paediatrics
- Subspecialty (please specify: _____)
- Mixed (please specify which subspecialty/area of interest: _____)

(4). Where did you do your Paediatric residency training?

- Canada
- United States
- Other

(5). For how long have you been practicing paediatrics?

- Less than 5 years
- 5 to 9.9 years
- 10 to 19.9 years
- 20 or more years
- Not currently practicing

(6). How many patients with gastrointestinal problems do you have in your practice?

- None
- 1 to 10
- 11 to 100
- 101 to 200
- > 200
- Not sure

(7). Did you do a rotation in Gastroenterology during your paediatric residency training?

- Yes
- No
- Do not recall

(8). Do you feel that a rotation in Gastroenterology should be mandatory in paediatric residency training?

- Yes
- No
- Not sure

(9). Which best describes the frequency of your interactions with trainees (medical students, residents, fellows)?

- Daily
- Occasional (2 to 4 times per month)
- Rarely (less than once per month)
- None

Gastrointestinal Problems

(10). The following is a list of paediatric gastroenterology problems/disorders. Many of these are in the Royal College objectives in gastroenterology, but not all. There may be overlap in some of the items listed (e.g.; Diarrhoea and Malabsorption). The wording of these has been kept as listed in the Royal College objectives.

Please rate each of the following gastrointestinal problems/disorders according to how important you feel they are in paediatric clinical practice:

Clinical Presentation/Disorder	Not important	Somewhat Important	Important	Very Important
Vomiting and regurgitation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Acute diarrhea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic diarrhea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intestinal bleeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enlargement of liver	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abdominal masses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Acute abdominal pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic abdominal pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Constipation / encopresis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jaundice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liver dysfunction / failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dysphagia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hepatitis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clinical situations encountered in long-term follow-up of survivors of liver transplantation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Celiac disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gastroesophageal reflux disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Acute pancreatitis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic pancreatitis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Short bowel syndrome	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Obesity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(11). Other problem(s) commonly encountered not on the above list:

Thank you for participating in the survey.

Please use this space if you would like to make any additional comments.
