Content analysis of Dalhousie University family medicine residents' scholarly projects: What do they write about?

DALHOUSIE UNIVERSITY
DEPARTMENT OF FAMILY MEDICINE

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Jim Thompson MD CCFP(EM) FCFP
Laura Sadler MD CCFP FCFP
Julie Easley PhD
M. Ruth Lavergne PhD
Mathew Grandy MD CCFP
Robin Parker PhD
Stephanie Welton MSc

Department of Family Medicine, Dalhousie University

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Authors

Jim Thompson MD CCFP(EM) FCFP is Assistant Professor in the Dalhousie University Department of Family Medicine and Research Coordinator at the Prince Edward Island site of the Dalhousie University Family Medicine Residency Program Charlottetown, Prince Edward Island. jim.thompson@dal.ca https://orcid.org/0000-0001-7443-8732

Laura Sadler MD CCFP FCFP is Assistant Professor in the Dalhousie University Department of Family Medicine and Chair of the Resident Project Sub-Committee of the Dalhousie University Family Medicine Residency Program in Halifax, Nova Scotia. LSadler@dal.ca

Julie Easley PhD is Adjunct Professor in the Dalhousie University Department of Family Medicine and Research Director in the Horizon Health Network of the New Brunswick Department of Medical Education in Fredericton, New Brunswick. https://orcid.org/0000-0002-1711-1343

M. Ruth Lavergne PhD is Associate Professor in the Primary Care Research Unit of the Dalhousie University Department of Family Medicine in Halifax, Nova Scotia. ID https://orcid.org/0000-0002-4205-4600

Mathew Grandy MD CCFP is Associate Professor in the Dalhousie University Department of Family Medicine and Network Director of the Maritime Research Network of Family Practice (MaRNet-FP) in Halifax Nova Scotia. https://orcid.org/0009-0007-8862-7084

Robin Parker PhD is Evidence Synthesis & Information Services Librarian at the WK Kellogg Health Sciences Library and Research Associate at the Department of Community Health and Epidemiology, Faculty of Medicine, Dalhousie University in Halifax, Nova Scotia. https://orcid.org/0000-0002-8966-2785

Stephanie Welton MSc is Adjunct Professor in the Dalhousie University Department of Family Medicine, and Research Coordinator at the South West Nova site of the Dalhousie University Family Medicine Residency Program in Yarmouth, Nova Scotia. https://orcid.org/0009-0007-4697-3165

Potential Conflicts of Interest

All authors were members of the Dalhousie University Department of Family Medicine Sub-committee that oversees the scholarly projects curriculum.

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Abstract

Background. Scholarly projects have long been required in physician training programs in Canada and the United States. While there is literature on challenges and solutions in delivering scholarly curricula, we found no publications describing residents' topic choices. Our objectives were to systematically describe the nature of scholarly projects completed by Dalhousie University family medicine residents and reflect on how the findings relate to training and practice.

Methods. We reviewed all 363 scholarly projects completed by 407 Dalhousie University Family Medicine residents during 2019-2024. We used two forms of manifest content analysis: (1) categorization in four domains reflecting the nature and complexity of family medicine (practice activities, practice settings, life course phase and determinants of health), and (2) assignment of keywords based on residents' wording.

Results. Literature appraisals were the most common project type (32%), followed by clinical education tools (29%), research (19%), position papers (9%), medical education tools (7%), practice quality improvement (2%), and humanities (2%). The number of research and literature appraisal projects declined in the COVID pandemic years. Residents chose a wide range of topics across the life course, most frequently care of acute and chronic physical and mental health conditions and preventive care in usual practice settings, and health system determinants of health. Half addressed nonclinical along with clinical topics, and many addressed highly topical issues of current interest to Canadian communities. Few residents addressed socioeconomic determinants of health such as finances and employment.

Conclusions. The residents addressed a wide variety of clinical and nonclinical topics in their scholarly projects, including topics beyond the core subjects identified for competency assessment, and novel topics of evolving current interest. The findings demonstrate topics rarely addressed by the residents. The findings indicate that the goals of the scholarly project curriculum were being met. We discuss implications for family physicians' training and roles.

Keywords

Family practice/education, scholarly projects, residency, research/education

Introduction

Scholarly activity is mandatory in family medicine training programs in Canada and the United States.[1,2,3,4] Scholarship is recognized by the College of Family Physicians of Canada (CFPC) as a key family physician role, is a core CanMEDS-FM competency, and promotes lifelong learning.[5,6] Citing Boyer, the CFPC accreditation standards for family medicine residency programs define "scholarly activity" this way: "*Scholarship includes the scholarship of discovery (including original research), … integration (synthesis of information), … application (results that can be shared with or reviewed by peers), and … teaching*.[1,7]

As in other medical specialties and health care professional training programs, a majority of family medicine residency programs in Canada and the United States require residents to complete scholarly projects in addition to other scholarly activity.[8,9,10] The Dalhousie family medicine residency program has required residents to complete scholarly projects since 1984.[9] While early curricula emphasized original research, Dalhousie, like many programs, soon permitted additional project types reflecting the full range of Boyer's scholarly activities beyond research to include integration, application and teaching. [9,11,12,13] Prior studies have described the need for scholarly activity training of family medicine residents, challenges and facilitators in curriculum delivery, and characteristics of successful scholary curricula.[8,14,15,16,17,18]

In the scholarly project curriculum at Dalhousie University, residents are free to choose any topic of interest to themselves that is broadly relevant to family medicine. During our study period (2019-2024), they were free to choose one seven project types: research, literature appraisal, position paper/essay, clinical education tool, medical education tool, practice quality improvement or medical/health humanities.[12,19] The residents are supervised by experts and faculty and required to submit a paper for independent evaluation, then present their projects to colleagues. Criteria for CFPC certification includes successful completion of a project. In addition to the project curriculum, family medicine residents at Dalhousie also must participate in quality improvement projects.[19]

The CFPC's outcomes of training project was established to ensure that family physician training keeps pace with dynamic social and health system changes.[11] Rural, indigenous, immigrant and other populations are still underserved, there is a maldistribution of family physicians, scopes of practice are narrowing, and team primary care is developing.[20,21,22,23] Early career Canadian family physicians tend to feel less prepared for virtual care, business management, provision of culturally safe care, some patient care activities, and conducting research.[24] Climate change has become an important focus in health care.[25] Many early, middle and late career family physicians are narrowing their practices from traditional comprehensive care or shifting to nonclinical professional activities.[10] Given this background of rapid change and growing curriculum demands on the two-year residency, it is appropriate to understand how the scholarly curriculum is working in family medicine.[11]

Studies in family medicine, emergency medicine, psychiatry, and pediatric residency programs have examined scholarly project outcomes in terms of participation and publications, but we

found no papers describing topics about which physician residents write.[26,27,28] Our objective therefore was to employ content analysis to describe the primary foci of projects completed by family medicine residents training at Dalhousie University during 2019-2024 and to reflect on the findings with respect to Canadian family physician training. Content analysis has a long history of being used to identify and interpret meaning in writings.[29,30] Our goal was to support the scholarly development and contributions of family physicians.

Methods

Design

We chose manifest content analysis to systematically explore what topics residents wrote about in their projects, enabling us to organize the information in a descriptive manner. [29,31,30] Manifest content analysis reflects text to show what is literally present. We used two forms. First, prior to the reviews, we identified as a group four domains representing the complexity of family medicine to describe the main foci of projects: practice activity, practice setting, life course phase, and determinants of health. We agreed on categories for each domain based on lists found in the literature and modified by the authors' collective experience. We made minor changes to the categories by consensus during categorization. We documented our process for developing the categories in Appendix 1. Second, we identified keywords to provide more specific topic information than the domain categories, for example "point of care ultrasound" (keyword) versus "medical technology" (practice activity category).

Sample, Data Collection and Analysis

We reviewed all 363 scholarly projects successfully completed by Dalhousie University's 407 family medicine residents across the nine distributed residency program sites in the three Maritime provinces during 2019-2024. The highly diverse residents came from medical schools across Canada as well as international medical graduates. Co-authored scholarly projects were counted once. Family Medicine residents at Dalhousie also participate in separate quality improvement projects and those were not included in this study.

For the categorization by domain process, the reviewers used a de-identified spreadsheet containing project title, abstract, and type. JT used project main text excerpts to create abstracts for 36 projects that did not have one. Each pair of reviewers were assigned one domain. Using the spreadsheet, each reviewer independently categorized project titles and abstracts to reflect the projects' primary foci. Reviewers could select "other" and write comments to recommend alternative categories or make observations. Then the pair met to finalize categories and resolve differences.

In addition to the domain categorization process, JT added up to three keywords to each project based on words used in the titles and abstracts while considering National Library of Medicine medical subject headings (MeSH) to partially standardize wording. Keywords were not limited to MeSH so as not to constrain descriptions of residents' topics.

The topic descriptions were summarized as aggregate counts in tables to identify topics with higher and lower frequencies. We reflected on the findings as a group to identify themes in the context of medical education, preparation for practice, and knowledge production and dissemination.

Ethics and manuscript preparation

The Dalhousie University Research Ethics Board determined that this project was program evaluation/quality improvement and so exempt from review. We prepared this manuscript using the STROBE guideline for cross-sectional studies.[32]

Results

The most common project type was literature appraisal (32%), followed in order by clinical education tool (29%), research (19%), position paper (9%), medical education tool (7%), practice quality improvement (2%), and humanities (2%) (Table 1). The medical/health humanities project type was introduced in 2021. The number of research and literature appraisal topics declined over the study period while the number of clinical and medical education tools increased.

Figure 1 shows that while 98.3% of the 363 projects addressed clinical topics, half of those (50.7%) also addressed non-clinical topics. Six projects (1.7%) addressed only non-clinical topics.

Reviewers selected 758 practice activity categories (Table 2) and 428 practice setting categories (Table 3) to describe the 363 projects (up to three categories of each per project). Clinical (direct patient care) categories were most common, primarily traditional activities and settings such direct patient care for chronic and acute physical conditions, preventive care, and mental health care in usual clinical settings. However, many residents addressed currently topical subjects such as equity/diversity/inclusivity/accessibility, health literacy, chronic pain, physician well-being, and virtual care. There were no projects addressing sports medicine or occupational/industrial/military medicine. Many projects (187, 52%) had nonclinical categories but only 7 were entirely nonclinical.

Their projects addressed issues across the life course, from fetus to old age. The reviewers were unable to infer phases for 25 projects owing to insufficient information in the abstracts. They classified 98 projects as “not directly applicable” to life course categorization where project foci were system matters such as academics or administration rather than direct patient care (Table 4).

There were 574 determinants of health categories selected by reviewers to describe the 363 projects (up to three per project). Health services was the most common type. Very few focussed on social supports/factors, economy, personal finances or physical environment. None addressed employment (Table 5).

Table 6 lists keywords identified in five or more projects. The top keyword was "pharmacotherapy" in one of eight abstracts, followed by "public education", "non-pharmacologic management", "pain management", "screening", "medical education" and "program evaluation". The full list of 927 instances of 489 keywords demonstrates the wide range of residents' interests (Appendix 2).

Discussion

To our knowledge, no prior study has systematically described scholarly project topics chosen by family medicine or other medical residents. The residents addressed a wide range of subjects across the life course using a variety of project types, consistent with the complexity of the specialty. Traditional practice activities and settings for physical or mental health and preventive care were most common, consistent with basic training requirements.[19,33] However, a number also addressed less traditional areas of highly topical interest in our evolving world. Notably, half the projects also addressed nonclinical topics. Some topics were rarely or not addressed, such as occupational/military medicine and some socioeconomic and physical environment determinants of health. One in five completed original research projects and one in three completed literature appraisals. The findings informed five broad themes: medical education, residents' interests in nonclinical and topical issues, participation in original research, and knowledge mobilization.

Medical Education

The CFPC's accreditation requirements for scholarly activity include an educational environment promoting learning in an atmosphere of scholarly enquiry and access to opportunities such as research, quality improvement and teaching.[1] Our findings indicate that project curriculum goals generally were being met: residents answered questions relevant to family medicine; demonstrated original thinking about practice-relevant questions; conducted evidence assessment; communicated findings to colleagues; were able to develop their research interests; and systematically addressed a wide range of topics relevant to family medicine generalist care and their communities.[12] The findings also demonstrate that the project curriculum supports development in CanMEDS roles beyond scholar to include communicator, collaborator, advocate, professional and family medicine expert.[6] The project curriculum allows residents to systematically explore a wide range of topics relevant to family medicine generalist care and their communities, supplementing other aspects of the residency program.[11,12] Our study also identified topics rarely addressed, some of which were areas where early career family physicians felt less prepared for Canadian practice.[24]

Our study found that many projects addressed topics beyond the list of 105 competency topics used for the final examination and Dalhousie's list of mandatory academic curriculum topics, and that fully half of the projects also addressed non-clinical topics.[19,33] Successful completion of a scholarly project is required for CCFP certification at Dalhousie, complementing the examination to indicate the full range of CanMEDS competencies.

Our study did not directly explore how residents choose their project topics, but the findings suggest that residents might select topics in areas where they feel they need to learn more. In a recent qualitative study, Canadian early-career family medicine residency graduates felt less prepared for a variety of clinical and non-clinical activities including virtual care, providing culturally safe care, delivering specific services in emergency care hospitals, obstetrics, self-care, engaging with the local communities, and conducting research activities. Those are all topics chosen by several residents in our study.[24] While prior studies found that a significant proportion of family medicine residents surveyed during training felt neutral or negative about doing scholarly projects, little is known about their perceptions of the project experience after graduating.[34] Further research could assess whether the project curriculum enables scholarly activity after entering practice, the degree to which doing a project prepares residents for practice, and the relationship of the project curriculum to the expanding training curriculum.

The scholarly project curriculum continues to evolve. At Dalhousie for example, the position paper option was upgraded in 2025 to an advocacy project consistent with the CFPC's outcomes of training project recommendations.[11] Also that year, residents were given the option of composing questions for the CFPC's self-learning continuing education program.[35]

Residents' Interest in Nonclinical Topics

Half the 363 projects addressed nonclinical topics in administration, academics, medical technology, public health and advocacy, but nearly all of those were in addition to clinical topics. This finding demonstrates that residents' professional interests extend beyond direct patient care, consistent with a study of Canadian family medicine residents that noted their interest in leadership training.[36] Family physicians doing comprehensive family practice have roles to play in teaching, research and advocating for patients, providers and communities.[6,11] The finding of mixed clinical and nonclinical interests suggests their capacity to provide more rounded generalist practice in team patient care settings such as the CFPC's patient's medical home model.[21,22]

Residents' Interest in Topical Issues

The keyword analysis showed that many residents chose highly topical issues like the COVID pandemic, diversity/equity/accessibility, medical assistance in dying, point of care ultrasound, virtual care, indigenous care and artificial intelligence (Appendix 2). Many topics were beyond the CFPC's list of priority assessment objectives for certification in family medicine, again suggesting that residents explore novel topics that they feel will be of value to themselves or their communities in practice.[33]

Competency in social determinants of health has been viewed as a CanMEDS health advocate role.[37] Given that the primary role of family physicians is direct patient care, it is not surprising that a majority of the residents addressed health services determinants while considerably fewer addressed socioeconomic or physical environment determinants. Residents might be less

aware of those determinants owing to their clinical focus or not have direct access to people working on them. While team care in medical homes offers potential solutions, more work is needed to effectively implement determinants of health in medical education and practice.[38]

Original Research Projects

An encouraging 19% of the residents completed an original research project, most of them unfunded. Promoting research capacity in family medicine was an original objective for scholarly curricula.[9] However, we found an unexplained decline in the number of research projects and literature appraisals relative to other project types over the five-year study period. In the two-year program, residents typically only have about 12 months to decide on a topic and complete a project. We know anecdotally that some residents started research projects but pivoted to other types owing to a variety of barriers including ethics or data access approval delays, or challenges in recruitment or data collection. In addition, there were point declines in research project numbers during the peak COVID pandemic years (2020-22) and again in 2024 when those residents would have been medical students during 2020-22, likely owing to immediate and latent effects of the public health limitations.[39,40] Mentorship, protected time and faculty/administrative support are key facilitators for research by residents.[41,42]

Knowledge Mobilization Challenges

The 363 projects are a significant body of knowledge of potential value to providers, educators, administrators, government and the public. Anecdotally, we know that very few projects were published, although a number of residents' projects found practical application by various audiences. A survey of former University of British Columbia family medicine residents found that 7% published while 55% would have liked to publish.[43] In contrast, a study of Canadian pharmacy residents' projects found that 32% were published in professional journals.[44] Peer-support writing groups have been used in several Canadian universities to help family medicine residents with writing skills, and several family medicine programs have employed other strategies to support publication.[15,17,18] Finally, public access to projects is limited because the primary intent of the curriculum is residents' education and because the curriculum is distributed over 9 sites in 3 provinces. However, work is under way to make selected projects publicly available.[45]

Strengths and Limitations

Strengths of our study include review of all completed projects in the five-year study period; systematic use of domains reflecting family medicine training and practice; use of a reproducible coding practice; and reviewer pairs working independently then together to resolve differences.

One limitation is that we reviewed only titles and abstracts to characterize projects; however the objective was to describe the primary foci of projects, which is what titles and abstracts are intended to reflect. Topics discussed secondarily in the main texts were not identified and latent

content analysis of entire project reports using computer-assisted qualitative methods could reveal deeper insights into residents' evolving interests and awareness.[30] Our findings are from one program at a single institution but given general similarities to scholarly project curricula in other programs these findings will also be of wider interest.

Conclusions

Our study found that the CFPC's accreditation scholarly requirements and goals of the Dalhousie scholarly project curriculum were being met both directly, through completion of projects, and indirectly, by providing opportunities to explore in depth topics relevant to various aspects of family medicine practice. When free to choose any topic relevant to family medicine and of interest to the residents, their scholarly projects addressed a wide variety of clinical and nonclinical topics, including topics beyond the core set identified for competency assessment, and novel topics of evolving societal interest. The findings demonstrate that the project curriculum gives residents opportunities to develop skills and knowledge across the whole range of Boyle's scholarly activities beyond original research. Prior research has identified barriers and facilitators to delivering scholarly curricula, but more work is required to understand how residents choose their topics and to more fully understand the role of scholarly project curricula in preparing residents for practice and professional service to their communities. Work is required also to learn how to support the significant minority of residents interested in doing original research projects in distributed residency programs, and to mobilize the knowledge produced by residents.

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Tables

Table 1. Number of completed projects by year and type.

Project Type	2019	2020*	2021	2022	2023	2024	Total
Literature appraisal	20	25	22	21	14	14	116
Clinical education tool	11	14	19	15	21	26	106
Research	15	10	8	14	13	9	69
Position paper/Essay	3	5	10	5	5	5	33
Medical education tool	2	3	3	3	5	8	24
Practice quality improvement	3	1		3	1	1	9
Medical/health humanities			1	3		2	6
Grand Total	54	58	63	64	60	65	363

*COVID pandemic restrictions began in March 2020.

Table 2. Practice activities.
Reviewers could select up to three categories per project.

Activity	Number of Projects (363)
Clinical (Number of projects):	
Chronic physical conditions care	89
Acute physical conditions care	50
Preventive care	49
Mental health care	46
Pregnancy/Obstetric/Newborn care	45
Emergency care	44
Lifestyle medicine	35
Health literacy	34
Palliative care/End of life	26
Addiction/Substance use/abuse	20
Equity/Diversity/Inclusivity/Accessibility	20
Chronic pain care	18
Physician well-being/wellness	18
Office procedures/Surgery	16
Acute pain management/Anesthesia	15
Geriatrics	7
Hospitalist	7
Alternative/Complementary medicine	5
Environmental/Wilderness medicine	4
Sports medicine	0
Occupational/Industrial/Military medicine	0
Subtotal (Category selections not projects)	548
Nonclinical (Number of projects):	
Administration*	71
Academics†	52
Medical technology	36
Population/Community/Public health‡	27
Advisory/ Advocacy/Political§	24
Subtotal (Category selections not projects)	210
TOTAL (Category selections not projects)	758

*Health services system management; hospital administration; practice business management; leadership/governance.

†Medical education, research or writing.
‡Activities, including research in population health.
§Policy/program advisory; advice for community groups, industry, regulators, legal system or government; political advocacy/advisory activity.

Table 3. Practice settings.
Reviewers could select up to three categories per project.

Setting	Number of Projects (363)
Clinical (Number of projects):	
Office/clinic/community health centre	160
Multiple/not specified clinical settings	40
Emergency department	33
Hospital	21
Obstetrics	13
Home/long term care	10
Virtual care	6
Other clinical*	5
Indigenous community	4
Subtotal (Category selections not projects)	291
Nonclinical (Number of projects):	
Academic†	53
Administrative‡	47
Public/community health	27
Industrial§	9
Subtotal (Category selections not projects)	135
TOTAL (Category selections not projects)	428

*Health care at e.g. prehospital EMS workplaces, incarceration facilities, sporting events, shelters, military in the field, pre-hospital, disaster scenes, etc.
†Health care provider medical education or research settings.
‡e.g., for a regulatory agency, clinic, hospital, public health, business like insurance company, or government.
§e.g., pharmaceutical or informatics company.

Table 4. Life course phases.

Life course phase	Number of Projects (363)
Prenatal/Newborn/Birth parent	23
Prenatal/Newborn	1
Prenatal/Newborn/Child	2
Child (0-10)	2
Child/Adolescent	18
Adult (18-64)	6
Adolescent/Adult	26
Adolescent/Adult/Geriatric	4
Geriatric (65+)	7
Adult/Geriatric	69
Child/Adolescent/Adult/Geriatric	73
All	9
Not specified	25
Not directly applicable*	98
TOTAL	363

*Project addressed system issues rather than direct patient care.

Table 5. Determinants of health.

Reviewers could select up to three categories per project.

Determinants of health	Number of Projects (363)
Health services - patient care*	218
Health services - administration†	130
Health services - provider education‡	67
Health behaviours/coping skills	52
Public/patient education/health literacy	50
Equity/diversity/inclusivity/accessibility§	19
Governance/legislation/other services¶	14
Social supports/factors#	8
Physical environment**	5
Biology/genetic endowment	4
Economy††	4
Personal finances	3
Employment	0
TOTAL (Category selections not projects)	574

*Direct care, not system issues: see provider education or administration.
†e.g., access to care, system management, chart reviews, regulation, research management.
‡Specific focus of the project, not merely the project being a “clinical-” or “medical education tool”, and new information for providers rather than summarizing existing knowledge.
§Factors affecting subpopulations with special needs or risk of marginalization including genders, cultural groups, immigrants, low socioeconomic status, etc.
¶Services other than health care.
#Includes caregiving, violence.
**e.g. climate, housing, transportation infrastructure.
††Economic environment including employment opportunities.

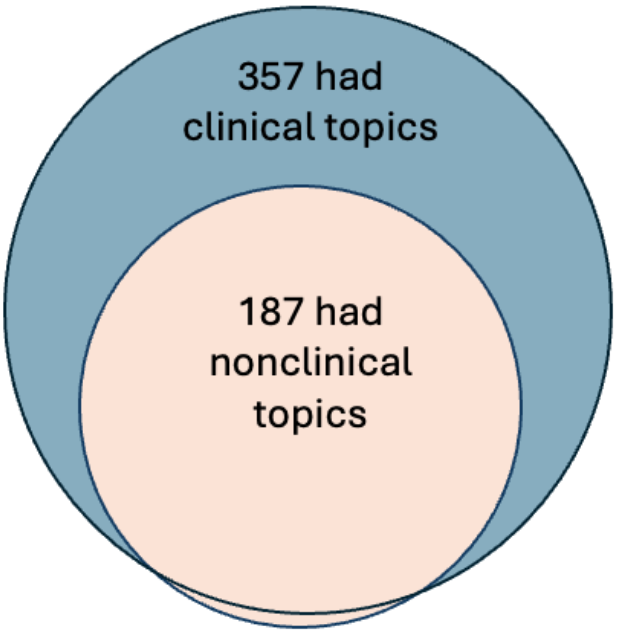
Table 6. Keywords assigned to five or more projects.

Keyword	Number of Projects*
Pharmacotherapy	63
Public education	21
Non-pharmacological management	20
Pain management	20
Screening	20
Medical education	16
Program evaluation	14
COVID-19 pandemic	12
Diabetes	12
Health literacy	12
Advance directives	10
Public health measures	10
Lifestyle management	9
Palliative care	9
Physician awareness	8
Burnout	7
Simulation	7
Access to care	6
Access to primary care	6
Demography	6
Depression	6
MAiD (medical assistance in dying)	6
Opioid use disorder	6
Physician wellness	6
Point of care ultrasound	6
Pregnancy complications	6
Preventive medicine	6
Exercise	5
Harm reduction	5
Indigenous people	5
Obesity	5
Transitional care	5

* There were 457 additional keywords each assigned to four or fewer projects.

Figures

Figure 1. Of the 363 projects, 176 addressed clinical topics only, 181 both clinical and non-clinical, and six nonclinical only.



Appendix 1. Development of the domain categories.

Prior to reviewing the residents' scholarly projects, the reviewers (author team) agreed on the four domains and category lists. During and after the review process, they settled on a few final revisions. This appendix compares the initial and final categories and provides citations to literature used to inform the lists.

Step 1. Categories prior to the start of the review process

References indicate literature used to suggest categories for the authors' consideration during development of the categories.

Practice Activity[1-9]

Clinical (Direct individual patient health care)
- Acute physical conditions care
- Chronic physical conditions care
- Emergency medicine
- Mental health care
- Hospitalist (care)
- Acute pain management/Anesthesia
- Chronic pain care
- Addiction/Substance use/abuse (care)
- Preventive care/Health literacy (screening, vaccination, counselling, health literacy)
- Pregnancy/Obstetric/Newborn care
- Geriatrics
- Palliative care/End of life (care)
- Office procedures
- Surgery (minor, major, assisting, performing)
- Occupational/Industrial/Military medicine
- Sports medicine
- Peer support/Physician well-being (physician health/wellness/well-being, mentoring, coaching)
- Lifestyle medicine (diet, exercise, etc.)
- Environmental/Wilderness medicine (e.g. climate change-related care)
- Alternative/Complementary medicine
- Inclusivity/Diversity/Equity/Accessibility (Care of potentially vulnerable or disadvantaged persons including indigenous/First Nation, immigrant, genders, etc.)

Non-clinical (Activities other than direct care of individual patients)
- Population/Community/Public health (activities)
- Academics (Medical education, research in any setting, writing)
- Informatics (Software or website development, database management)
- Medical technology (development, use)

• Administration (Health services system management; hospital administration; practice business management; leadership/governance)
• Advisory/ Advocacy/Political (e.g. Policy/program advisory; advice for community groups, industry, regulators, legal system or government; political advocacy/advisory activity)
Other
• Other (clinical or non-clinical category not listed above)

Practice Setting[2-16]

Clinical (physical or virtual settings for individual patient care, includes teaching health care providers in direct patient care)
• Office/clinic/community health centre
• Home/long term care
• Emergency department
• Hospital (other than emergency department)
• Virtual care (care delivered via telephone, video link or computer)
• Other clinical (Health care at e.g. prehospital EMS workplaces, incarceration facilities, sporting events, shelters, military in the field, pre-hospital, disaster scenes, etc.)
• Multiple/not specified clinical settings
Non-clinical (physical or virtual settings for activities other than care of individual patients, even if conducted in physical facilities where patient care also takes place, such as a family physician who administers a medical education program or participates in research in their clinic's office; or a physician working in a home office for a regulatory agency)
• Administrative (e.g. for a regulatory agency, clinic, hospital, public health, corporation e.g. insurance company, or government).
• Public/community health
• Academic (medical education or research settings)
• Industrial (e.g. pharmaceutical company, informatics agency)
Other
• Other (a setting not listed above)

Life Course[17]
• Prenatal/newborn
• Pediatric (0-17 years)
• Adult (18-64 years)
• Geriatric (65+)
• Multiple
• All
• Not specified

Determinants of Health.[3,18-20]

• Health services - patient care (direct care, not system issues: see provider education or administration)

• Health services - provider education (specific focus of the project, not merely the project being a “clinical-” or “medical education tool”)
• Health services - administration (e.g. access to care, system management, chart reviews, regulation, research)
• Public education/Health literacy (of patients or public not providers)
• Personal/household finances
• Economy (economic environment including employment opportunities)
• Employment
• Social supports/factors (includes caregiving, violence)
• Health behaviours/coping skills
• Governance/legislation/services other than health care
• Gender/Race/Marginalized (subpopulations with special needs including genders, races, cultural groups, immigrants, low socioeconomic status, etc.)
• Physical environment (e.g. climate, housing, transportation infrastructure)
• Biology/genetic endowment
• Other

Step 2. Domain categories after the review process.

These are the revised, final domain categories after the review process was completed. Differences are shown in bold font and strikeout.

Practice Activity

Clinical (Direct individual patient health care)
• Acute physical conditions care
• Chronic physical conditions care
• Emergency care medicine (irrespective of acuity and setting)
• Mental health care
• Hospitalist (care)
• Acute pain management/Anesthesia
• Chronic pain care
• Addiction/Substance use/abuse (care)
• Preventive care/Health literacy (screening, vaccination)
• Health literacy (e.g. counselling, patient handouts)
• Pregnancy/Obstetric/Newborn care
• Geriatrics
• Palliative care/End of life (care)
• Office procedures/Surgery [Several “office procedures” included minor surgery like suturing, and we found no “surgery” projects.]
• Surgery (minor, major, assisting, performing)
• Occupational/Industrial/Military medicine
• Sports medicine

• Peer support/Physician well-being (physician health/wellness/well-being, mentoring, coaching, peer support)
• Lifestyle medicine (diet, exercise, etc.)
• Environmental/Wilderness medicine (e.g. climate change-related care, wilderness activity)
• Alternative/Complementary medicine
• Inclusivity/Diversity/Equity/Accessibility (Care of potentially vulnerable or disadvantaged persons including indigenous/First Nation, immigrant, genders, etc.)
• Non-clinical (Activities other than direct care of individual patients)
• Population/Community/Public health (activities, including research in population health)
• Academics (Medical education, research in any setting doing research or writing)
• Informatics (Software or website development, database management)
• Medical technology (development or use of technologies including devices, software and informatics)
• Administration (Health services system management; hospital administration; practice business management; leadership/governance)
• Advisory/ Advocacy/Political (Policy/program advisory; advice for community groups, industry, regulators, legal system or government; political advocacy/advisory activity)
Other
• Other (clinical or non-clinical category not listed above)

Practice Setting

New reference: Goodman et al. 2018.[16]

Clinical (physical or virtual settings for individual patient care, includes teaching health care providers in direct patient care)
• Office/clinic/community health centre
• Home/long term care
• Emergency department
• Hospital (other than emergency department)
• Virtual care (care delivered via telephone, video link or computer)
• Obstetrics
• Indigenous community (services located in indigenous communities)
• Other clinical (Health care at e.g. prehospital EMS workplaces, incarceration facilities, sporting events, shelters, military in the field, pre-hospital, disaster scenes, etc.)
• Multiple/not specified clinical settings
Non-clinical (physical or virtual settings for activities other than care of individual patients, even if conducted in physical facilities where patient care also takes place, such as a family physician who administers a medical education program or participates in research in their clinic's office; or a physician working in a home office for a regulatory agency)
• Administrative (e.g. for a regulatory agency, clinic, hospital, public health, corporation like insurance company, or government).
• Public/community health
• Academic (health care provider medical education or research settings)

• Industrial (e.g. pharmaceutical company, informatics agency)
• Non-clinical community (services in non-clinical, community services other than the other settings)
Other
• Other (a setting not listed above)

Life Course

New reference: Adolescent Health Committee Canadian Pediatric Society 2003, Ontario provincial government, and World Health Organization.[21-23]

"The Canadian Paediatric Society believes that a definition of adolescence based solely on chronological age is unjustified and impractical. The Society favours a more functional definition based on the biopsychosocial readiness of young people to enter adulthood… Adolescence begins with the onset of physiologically normal puberty and ends when an adult identity and behaviour are accepted. This period of development corresponds roughly to the period between the ages of 10 and 19 years, which is consistent with the World Health Organization's definition of adolescence."[21]

• Prenatal/newborn
• Pediatric (0-17 years)
• Prenatal/Newborn/Birth parent
• Prenatal/Newborn/Child (Child instead of Pediatric)
• Prenatal/Newborn/Adult
• Child (0-10 years) was Pediatric (0-17 years)
• Adolescent (11-19 years) was Pediatric (0-17 years)
• Child/Adolescent was Pediatric (0-17 years)
• Adult (20-64 years)
• Geriatric (65+)
• Adolescent/Adult
• Adolescent/Adult/Geriatric
• Child/Adolescent/Adult
• Child/Adolescent/Adult/Geriatric
• Adult/Geriatric
• All
• Not specified and unable to infer was Unclear
• Not applicable (addressed system issues, not direct patient care)
• Unclear
• Other (specify in the Comments cell)

Determinants of Health

New references: Barber et al. (2024), Wright et al. (2024) and Pinto and Bloch (2019).[24-26]

• Health services - patient care (direct care, not system issues: see provider education or administration)
• Health services - provider education (specific focus of the project, not merely the project being a “clinical-” or “medical education tool”, and new information for providers rather than summarizing existing knowledge.)
• Health services - administration (e.g. access to care, system management, chart reviews, regulation, research management)
• Public & patient education/Health literacy (of patients or public not providers)
• Personal/household finances
• Economy (economic environment including employment opportunities)
• Employment
• Social supports/factors (includes caregiving, violence)
• Health behaviours/coping skills
• Governance/legislation/services other than health care
• Equity/Diversity/Inclusivity/Accessibility (Factors affecting subpopulations with special needs or risk of marginalization including genders, cultural groups, immigrants, low socioeconomic status, etc.)
• Physical environment (e.g. climate, housing, transportation infrastructure)
• Biology/genetic endowment
• Other

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Appendix 2. Complete keywords list.

Up to 3 keywords were assigned to each project. There were 927 instances of 489 keywords across the 363 projects.

Keyword	Projects
Pharmacotherapy	63
Public education	21
Non-pharmacological management	20
Pain management	20
Screening	20
Medical education	16
Program evaluation	14
COVID-19 pandemic	12
Diabetes	12
Health literacy	12
Advance directives	10
Public health measures	10
Lifestyle management	9
Palliative care	9
Physician awareness	8
Burnout	7
Simulation	7
Access to care	6
Access to primary care	6
Demography	6
Depression	6
MAiD	6
Opioid use disorder	6
Physician wellness	6
Point of care ultrasound	6
Pregnancy complications	6
Preventive medicine	6
Exercise	5
Harm reduction	5
Indigenous people	5
Obesity	5
Transitional care	5
Abortion	4
Ankyloglossia	4
Anxiety	4
Barriers and facilitators	4

Diabetes management	4
Diet	4
Emergency department utilization	4
Frenotomy	4
Hypertension	4
Non-pharmacological therapy	4
Office emergencies	4
Patient care team	4
Patient experiences	4
Pregnancy	4
Primary care	4
Cancer	3
Cardiac arrest	3
Contraception	3
Dementia	3
Diagnosis and management	3
E-learning	3
Electronic medical record	3
Patient values	3
Physician recruitment	3
Physician wellness	3
Physician work performance	3
Rural medicine	3
Access to health care	2
Alcohol use	2
Alcohol use disorder	2
Ambulatory procedures training	2
Anaphylaxis	2
Artificial intelligence	2
Asthma	2
Attention deficit hyperactivity disorder	2
Borderline personality disorder management	2
Breastfeeding	2
Cannabidiol	2
Cannabis	2
Cervical cancer	2
Chronic disease management	2
Chronic non-cancer pain	2
Clinical skills	2
Cognitive behavioural therapy for insomnia	2
Croup	2
Cystitis	2
Dermoscopy	2

Diagnosis	2
Epidemiology	2
Family Physician role	2
Gestational diabetes	2
Heart failure	2
Interprofessional communication	2
Low back pain	2
Medical abortion in Family practice	2
Mental health	2
Midwifery	2
Nurse-led resuscitation	2
Opioid use disorder	2
Opioid constipation	2
Osteoarthritis	2
Out of hospital cardiac arrest	2
Patient handoff	2
Patient outcome assessment	2
Physician-patient relations	2
Point of care testing	2
Preparedness	2
Primary care obstetrics	2
Prognosis	2
Psychotherapy	2
Role of reflective writing	2
Self-management	2
Smoking	2
Socioeconomic status	2
Ultrasound	2
Abdominal aortic aneurysm	1
Adherence to guidelines	1
Advanced care paramedics	1
Adverse reactions to medication	1
After hours care	1
After-hours primary care	1
Anatomy	1
Anesthesia	1
Antibiotic stewardship	1
Anxiety and depression	1
Anxiety disorders	1
Appointments and schedules	1
Art-based distraction	1
Arthritis	1
Assistive technology	1

Attention deficit and hyperactivity disorder in pregnancy	1
Barriers	1
Barriers and facilitators to early discussion	1
Benzodiazepines	1
Bowel bladder dysfunction	1
Brain health	1
Breastfeeding care	1
Buprenorphrine-Naloxe	1
Burnout prevention and management	1
Cancer care	1
Cancer causality	1
Cancer screening	1
Cancer skin	1
Cancer treatment to primary care	1
Cannabis	1
Cannabis efficacy and safety	1
Cannabis use	1
Cannabis use and cannabis use disorder	1
Cardiac rehabilitation	1
Cardiopulmonary resuscitation	1
Career choice	1
Caregiving	1
Case studies	1
Centenarians	1
Cerebrospinal fluid sampling indications	1
Cervical ripening	1
Charting	1
Chest compression effectiveness software	1
Chromosomal aneuploidy	1
Chronic obstructive pulmonary disease	1
Clerkship curriculum	1
Climate change	1
Clinic décor	1
Clinic design	1
Clinical competence training	1
Clinical photography in primary care	1
Coaches' knowledge	1
Code status documentation for inpatients	1
Cognitive behavioural therapy software	1
Cognitive impairment	1
Comparison to pharmacotherapy	1
Competency	1

Computerized cognitive behavioural therapy	1
Conflict of interest	1
Continuity of patient care	1
Continuous glucose monitoring efficacy	1
Continuous vs interrupted sutures	1
Coronary artery disease	1
Cost and radiation exposure	1
Cost effectiveness	1
Couple counselling	1
Critical care procedures training	1
Cross-cultural communication	1
D-mannose	1
De-prescribing	1
Death at home	1
Death at home facilitators	1
Death rattle	1
Delerium	1
Dementia	1
Deployment of advanced care paramedics	1
Deprescribing	1
Determinants of mental health	1
Development of online access to formulary	1
Dexamethasone	1
Diagnosis and prognosis	1
Diagnostics imaging	1
Difficult clinical experiences in training	1
Disaster medicine curriculum	1
Discussion groups	1
Disordered eating recognition and management	1
Early pregnancy complications clinic impact	1
Early pregnancy loss	1
Early warning score	1
Eating disorders	1
Eczema	1
Effect of vegetarian and vegan diets on children	1
Efficacy and safety of SSRI and SNRI medications	1
Electronic appointment reminders	1
Emergency physician shift scheduling	1
Emergency Department handover	1
Emergency department triage	1
Emergency Medicine 3rd year	1
Emergency physician to Hospitalist	1

Emergency physicians' experiences related to MAiD or dying conversations	1
Endotracheal intubation	1
Environmental health	1
Episiotomy	1
Erector spinae block	1
Ethical behaviour	1
Ethnicity	1
Ethnicity/Racialization	1
Etonogestrel contraceptive implant	1
Exercise	1
Extension of Family Medicine residency to three years	1
Extra corporeal cardiopulmonary resuscitation	1
Fall prevention	1
Family medicine complexity	1
Family medicine portrayal in medical education	1
Family Physician contributions	1
Family physician obstetric care	1
Family Physician recruitment factors	1
Family physician vs Hospitalist vs Internist	1
Family physician workload	1
Family physicians' offices and Emergency Departments	1
Family Physician retention from residency	1
Farmers	1
Fascia iliac compartment block	1
Fasting in Ramadan	1
Fibromyalgia	1
Fluid status in resuscitation	1
Fluoridation	1
Followup care and surveillance	1
Food allergy	1
Fracture prevention	1
Frailty	1
Frailty management	1
Frostbite	1
Gender dysphoria	1
Gender-affirming care	1
Gender-affirming hormone therapy	1
Geographic distance	1
Gestational weight gain	1

Gestational weight gain documentation and practice	1
Glucose sensors	1
Grief	1
Group A Streptococcal puerperal infection	1
Group dynamics	1
Growth and nutrient status	1
Guideline adherence	1
Gynecologic disorders	1
Hallux valgus	1
Head injuries	1
Health care utilization	1
Heel pain	1
Herpes simplex virus	1
Hormonal Intrauterine Devices	1
Hospital rapid response team	1
Hospital to primary care	1
Hospitalists	1
Human immunodeficiency virus	1
Humour	1
Hypertension diagnosis and management	1
Hypothyroidism in pregnancy	1
ICU admission prediction	1
Immigrants	1
Impact of primary care access	1
Imposter syndrome	1
Indigenous health curriculum	1
Induction of labour	1
Infection risk	1
Influenza	1
Inpatient outcomes	1
Insomnia	1
Insomnia management	1
Insomnia management children and adolescents	1
Integrated clinical experience	1
Intensive care admission	1
Interaction with physicians	1
Intermittent versus continuous fasting	1
International medical graduates	1
Intimate partner violence	1
Intrauterine device insertion	1
Iron deficiency	1
Irritable bowel syndrome	1

Ischemic heart disease	1
IUD insertion pain management	1
Ketamine	1
Learning strategies	1
Lesbian, gay, bisexual	1
Lidocaine paracervical block	1
Limited English proficiency	1
Longevity factors	1
Low birth weight	1
Lyme disease	1
Malignant bowel obstruction	1
Medical clearance	1
Medical humanities-informed approaches to addressing burnout	1
Medical students	1
Medically unexplained symptoms	1
Medication costs	1
Menopausal hormone therapy	1
Menopause	1
Mental health consequences	1
Mentoring	1
Mentorship in Family Medicine residency training	1
Migraine	1
Mild traumatic brain injury	1
Milk	1
Mindfulness	1
Mindfulness software	1
Mindfulness training	1
Miscarriage management	1
Mood disorders	1
Mortality	1
N-terminal pro b-type natriuretic peptide	1
Naltrexone	1
Narrative medicine	1
Nexplanon	1
Nitrofurantoin	1
No-show patients	1
Non-binary health care	1
Non-powder gun injuries	1
Non-alcoholic fatty liver disease	1
NSAIDs	1
Number of issues per visit	1
Nutrition	1

Obesity management	1
Obesity management in children	1
Office procedures	1
Online education	1
Opiate agonist therapy	1
Opioid use disorder in pregnancy	1
Opioid replacement therapy	1
Oral cancer detection	1
Oral health	1
Organ and tissue donation	1
Orientation to residency	1
Outcome and process assessment	1
Outcomes	1
Oxygen therapy	1
Pain catastrophizing	1
Paternal peripartum depression	1
Patient education	1
Patient experiences	1
Patient experiences in primary care	1
Peanut allergy	1
Pediatric emergencies	1
Peer support	1
Pelvic floor exercises	1
Perception of Family Medicine	1
Personal protective equipment	1
Pharmaceutical industry	1
Physical activity	1
Physical trauma	1
Physician adherence to guidelines	1
Physician compensation to reduce health care inequity	1
Physician engagement	1
Physician leadership engagement	1
Physician leadership training	1
Physician led exercise	1
Physician peer review	1
Physician recognition and management	1
Physician recruitment and retention	1
Physician training effect on intention to provide care	1
Physician vaccination status impact on recommending vaccination	1
Physician well-being	1

Physician-patient communication	1
Physician-patient interactions	1
Physicians	1
Physiotherapy	1
Pigmented skin lesions	1
Polypharmacy	1
Post-partum pelvic floor disorders	1
Postpartum depression	1
Poverty	1
Practice effectiveness	1
Practice gaps	1
Prehospital scene time	1
Prenatal	1
Prenatal testing for aneuploidies	1
Preparation for professional examinations	1
Prescription costs	1
Prescription medication compliance	1
Prescription writing	1
Preventive medicine guidelines	1
Primary care management	1
Primary care providers	1
Problematic internet use	1
Procedure checklist	1
Procedure utility in Family Medicine	1
Professional competencies curriculum	1
Program establishment	1
Proton pump inhibitor complications	1
Proton pump inhibitors	1
Proton pump inhibitors and Clostridium difficile infection	1
Provider adherence to guidelines	1
Provider education	1
Provider wellness	1
Provider-patient relations	1
Psychological trauma	1
Psychological trauma in learners	1
Psychophysiologic disorders	1
Pulmonary emboli	1
Quality of life	1
Rapid sequence intubation	1
Rapid sequence intubation complications	1
Recognition and diagnosis	1
Recognition and management	1

Recognition of Caesarean section complications	1
Redirection of low acuity patients to primary care	1
Referral and consultation	1
Referral letter quality	1
Referral to surgery	1
Reflective writing	1
Refugees	1
Reproductive health	1
Resident physician wellness	1
Residents' experiences in training	1
Resistance training	1
Respiratory failure	1
Resuscitation	1
Risk assessment	1
Risk of community-acquired pneumonia	1
Risk scores	1
Role of hospital volunteers	1
Role of kinesiologists	1
Role of primary care	1
Role of sport and exercise physicians	1
Role of visual art	1
Rural Family Practice	1
Safe drinking water access	1
Safety and adherence	1
Safety in pregnancy	1
Safety of electronic cigarettes	1
Screen time	1
Sedation for procedures	1
Sedative-induced hypotension	1
Sepsis recognition	1
Sexual assault management	1
Shared decision making	1
Shock therapy	1
Shoulder pain	1
Singing effect on stress reduction	1
Skin	1
Sleep apnea	1
Sleep dysfunction in fibromyalgia	1
Social media use	1
Social stigma	1
Software	1
Software	1
Spinal cord stimulation vs opioid therapy	1

Suicide prevention	1
Suicide survivor care	1
Survivor expectations	1
Taxation	1
Terminal care	1
Terminal illness prognosis	1
Thalassemia	1
Thoracic aortic dissection	1
Thyroid cancer	1
Tool comparison	1
Topical medication	1
Transaortic valve implantation	1
Transition to Dalhousie Family Medicine residency	1
Trauma-informed care	1
Unattached patients	1
Urinary tract infection	1
Utility in Family Medicine	1
Utility in Family Practice	1
Utility of rs-fMRI	1
Vaccination	1
Vaccination mandates	1
Vegetarian diet	1
Virtual care	1
Vitamin D	1
Vitamin E	1
Vortioxetine	1
Water quality	1
Waterbirth	1
Weight gain	1
Weight loss	1
Weight management	1
Wilderness medicine	1
Written action plan	1