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Recommended Curriculum Guidelines for Family Medicine Residents

Scholarly Activity and Information Mastery

This document was endorsed by the American Academy of Family Physicians (AAFP).

Introduction

This Curriculum Guideline defines a recommended training strategy for family medicine residents. Attitudes, behaviors, knowledge, and skills that are critical to family medicine should be attained through longitudinal experience that promotes educational competencies defined by the Accreditation Council for Graduate Medical Education (ACGME), www.acgme.org. The family medicine curriculum must include structured experience in several specified areas. Much of the resident's knowledge will be gained by caring for ambulatory patients who visit the family medicine center, although additional experience gained in various other settings (e.g., an inpatient setting, a patient's home, a long-term care facility, the emergency department, the community) is critical for well-rounded residency training. The residents should be able to develop a skillset and apply their skills appropriately to all patient care settings.

Structured didactic lectures, conferences, journal clubs, and workshops must be included in the curriculum to supplement experiential learning, with an emphasis on outcomes-oriented, evidence-based studies that delineate common diseases affecting patients of all ages. Patient-centered care, and targeted techniques of health promotion and disease prevention are hallmarks of family medicine and should be integrated in all settings. Appropriate referral patterns, transitions of care, and the provision of cost-effective care should also be part of the curriculum.

Program requirements specific to family medicine residencies may be found on the ACGME website. Current AAFP Curriculum Guidelines may be found online at www.aafp.org/cg. These guidelines are periodically updated and endorsed by the AAFP and, in many instances, other specialty societies, as indicated on each guideline.

Each residency program is responsible for its own curriculum. **This guideline provides a useful strategy to help residency programs form their curricula for educating family physicians.**

Preamble

Research and scholarly activity are integral parts of family medicine education. Through the Core Competencies, the Accreditation Council for Graduate Medical Education (ACGME) has emphasized incorporating scholarly activity into the patient care experience, and the Family Medicine Review Committee has made resident scholarly activity a requirement.

In the context of training family physicians, scholarship is broadly defined and may include the discovery, synthesis, or integration of knowledge. Well-designed and well-conducted process improvement projects should be considered scholarship. Considering the broad landscape of family medicine, and the unique role of family physicians in the community, family physicians are uniquely positioned to contribute knowledge about common medical problems, the natural history of disease, the patient-centered medical home (PCMH), and health care delivery. Qualitative/quantitative research, critical reviews of the literature, and quality improvement projects are examples of scholarly work. Direct involvement in research gives residents the greatest understanding of the process. The more aspects of the research process in which they are involved, the greater their educational experience. Residents may complete scholarly projects individually or as a member of a team, and their work may be disseminated in oral or written fashion to an appropriate forum. A successful curriculum will also address the availability of resources, including information technology, resident time, and support.

Information management is a skillset that encompasses the acquisition, appraisal, and application of knowledge. Family physicians must integrate large amounts of information into the care of individual patients and populations, frequently within the time constraints of an appointment. This task presents an ever-increasing challenge as new research that may impact practice is constantly generated and needs to be readily accessible to physicians. Training programs have a responsibility to prepare residents for the task of lifelong learning, with the goal of continued provision of evidence-based care. As media such as the Internet and television expose patients to information about various health topics, the responsibility of family physicians to interpret and explain this information to patients within the context of evidence-based medicine has grown.

This Curriculum Guideline provides an outline of the competencies, attitudes, knowledge, and skills that should be among the objectives of training programs in family medicine in order to lay a foundation for the provision of evidence-based care and advancement of the field by future family physicians. Special attention to the section on implementation will help guide residency programs to success in this challenging arena.

Competencies

At the completion of residency training, a family medicine resident should:

- Have completed two scholarly activities, at least one of which should be a quality improvement project (Practice-based Learning and Improvement)
- Formulate a searchable question from a clinical question (Practice-based Learning and Improvement)
- Demonstrate the ability to ask answerable questions applicable to the direct clinical care of their patients (Medical Knowledge)
- Demonstrate the ability to apply a set of critical appraisal criteria to different types of research that includes evaluation of study design, associated types of biases, and measured outcomes (Practice-based Learning and Improvement)
- Demonstrate the ability to use point-of-care evidence-based information and guidelines to make clinical decisions (Practice-based Learning and Improvement and Medical Knowledge)
- Use evidence-based sources to identify the risks and benefits of different preventative and treatment/management options (Systems-based Practice, Patient Care)
- Demonstrate knowledge of the principles of ethics as it applies to medical research and the process of evaluating the potential ethical implications of proposed research projects (Professionalism)

Attitudes

The resident should demonstrate attitudes that encompass:

- A posture of perpetual curiosity and inquiry in approaching knowledge deficits
- A desire to practice evidence-based medicine
- An appreciation of the importance of scholarly activity in family medicine
- A desire to identify areas for improvement within one's clinical practice

Knowledge

In the appropriate setting, the resident should demonstrate the ability to apply knowledge of:

1. Relevant, answerable clinical questions
 - a. Population
 - b. Intervention
 - c. Comparison
 - d. Outcome

2. Information sources
 - a. Journals/textbooks
 - b. Internet-based search tools
 - c. Practice guidelines
 - d. Point-of-care tools
3. Statistical principles
 - a. Risk reduction
 - i. Absolute
 - ii. Relative
 - b. Odds/risk ratios
 - c. Confidence intervals and p-values
 - d. Number needed to treat/harm
 - e. Likelihood ratios/pre-test probability/post-test probability
 - f. Power
4. Grading evidence
 - a. Levels of evidence
 - b. Strength of Recommendation Taxonomy (SORT)
5. Study designs
 - a. Case report
 - b. Case series
 - c. Cross-sectional study
 - d. Cohort study
 - e. Case-control study
 - f. Randomized controlled trial
 - g. Systematic review
 - h. Meta-analysis
 - i. Qualitative designs and mixed methods
 - i. Focus groups
 - ii. Interviews
6. Principles of research ethics
 - a. Autonomy
 - b. Nonmaleficence
 - c. Beneficence
 - d. Justice
7. Bias in research

- a. Selection bias
 - b. Measurement bias
 - c. Intervention/exposure bias
 - d. Reporting bias
8. Research format
- a. Abstract
 - b. Introduction
 - i. Purpose and relevance of research question
 - ii. Literature review
 - c. Methods
 - i. Sample
 - ii. Study design
 - iii. Outcome measures
 - d. Results
 - e. Discussion/conclusions
 - i. Meaning and implications
 - ii. Generalizability of findings
 - iii. Strengths and limitations
 - iv. Further research
9. Modes of dissemination
- a. Presentation formats
 - i. Oral presentation
 - a) Lectures
 - b) Seminars
 - c) Workshops
 - ii. Poster presentation
 - b. Publication types
 - i. Case report or series
 - ii. Review article
 - iii. Original research
 - iv. Book chapter
 - v. Online and other electronic resources
 - vi. Blogging and social media
10. Health policy and health services resources and research
11. Practice-based research networks

Skills

Context: It is assumed that the residency program will have an electronic health record (EHR) system and be working to implement the full model of the patient-centered medical home (PCMH). Family physicians function in multiple

professional domains, often simultaneously. The essential scholarship and information management skills of a family physician will vary based on the domain of activity in which the family physician is functioning.

In the appropriate setting, the resident should demonstrate the ability to independently perform or appropriately solicit assistance in serving the following roles and performing the following functions:

1. Family physician domains of activity
 - a. Care provider
 - i. Evidence-based disease management and health maintenance
 - ii. Discussion of relevant clinical research studies and assistance in enrollment, if desired
 - b. Health care team leader
 - i. Monitoring and management of a health care delivery system (e.g., medical office)
 - ii. Identification of areas for improvement
 - iii. Implementation of measures to improve the function of a health care delivery system and measure the impact
 - iv. Informing members of the health care team of new and clinically relevant research findings and their effect upon the delivery of patient care
 - c. Learner
 - i. Acquisition, evaluation, and integration of clinically relevant findings from scholarly investigation
 - d. Investigator
 - i. Participation in scholarly investigation as a clinical investigator

Specific skills

1. Working with individual patients and families
 - a. Continually and actively question one's own knowledge base and practice methods with specific patients and patient problems
 - b. Formulate clear and focused clinical questions that are important to the patient and/or to clinical management, and that are:
 - ii. Answerable by a well-performed literature search
 - iii. Meaningful to the patient
 - c. Identify the most relevant published studies through literature searches
 - d. Evaluate the relevance of published recommendations based on strength of evidence criteria. For original studies, evaluate the relevance of the findings based on:
 - i. Strength of study design
 - ii. Comparability of the study population and of the clinical circumstances
 - iii. Sources of bias, confounding, and other challenges to study validity
 - e. Share findings with patient, and develop a plan of implementation and a plan of outcome assessment

- f. Assess processes and outcomes of health maintenance and disease management through ongoing EHR monitoring, and compare with the patient's unique care goals and with accepted standards
 - g. Understand the steps and process involved in the enrollment of patients and families in studies and clinical trials, including contact and informed consent
2. Working with the health care team and community
- a. Develop a profile of the demographics of the local community and its major health problems, based on data from the EHR and from local community epidemiological data
 - b. Develop a profile of the demographics of the local community and its major health problems, based on data from the EHR and from local community epidemiological data
 - c. Formulate important and answerable questions about the performance of individual clinicians and the practice as a whole in key areas of health maintenance and disease management
 - d. Based on (2.c.), access the EHR to generate reports of one's own clinical performance, identify areas of concern, and implement process improvement based on the strongest available clinical recommendations
 - e. Develop a profile of the demographics of the practice as a whole and its major health problems, based on data from the EHR and from local community epidemiological data, and work with colleagues to identify and address areas of concern
 - f. Design and conduct assessments of practice performance using key data sources other than the EHR, such as care team informants and patient groups (e.g., group sessions, surveys, interviews)
 - g. Collaborate with practice colleagues to evaluate, modify, and implement clinical guidelines into the practice
3. Being a student, teacher, resource to colleagues, and lifelong learner
- a. Lead a journal club session that reviews an original clinical study, selecting a study that has potentially practice-changing impact. Prepare for the session by accomplishing these steps:
 - i. Identify the importance and quality of the question(s), and the logic and strength of the hypothesis or hypotheses
 - ii. Evaluate the introductory justification for the study and the quality of the literature review on which the current study is based
 - iii. Identify the study design, its suitability for the question, and whether it is the right "next step" in this line of research. Identify potentially useful alternative designs.
 - iv. Critique the merits of the study population in terms of applicability to the present practice, how well it supports generalizability of findings, rationale of exclusions and inclusions, sampling techniques, potential biases, contaminations, subject loss, etc.
 - v. Evaluate the power of the study and adequacy of the sample size, based on the study design, the stated hypotheses, and expected effect size

- vi. Assess the strength of the measurement tools and methods
 - vii. Identify the type of data (qualitative; quantitative; categorical, ordinal, or continuous ratio)
 - viii. Identify the potential distribution of data and its effect on analytic methods (i.e., parametric vs. nonparametric)
 - ix. Critique the suitability and strength of the data analysis methods, considering the study design and nature of the data
 - x. Evaluate the presentation of the results in terms of completeness, clarity, statements of significance and uncertainty, and validity
 - xi. Assess the validity of conclusions and whether they are justified by the results or are biased. Evaluate generalizability and clinical significance of the conclusions.
 - xii. Propose the basic elements of a useful subsequent study in this line of research
- b. Compose and deliver a lecture/seminar on a relevant clinical topic, based on a review of high-quality and up-to-date primary research literature
 - i. Work with a mentor who provides critique and resources as the talk is developed
 - c. Guide more junior clinical learners in information management while supervising their patient care
 - i. Guide them in looking for unresolved issues that can be translated into important clinical questions
 - ii. Help them formulate such questions in an answerable form
 - iii. Guide them in accessing a medical literature database and identifying useful published studies to answer the question
 - iv. Discuss the implications of findings for current clinical management problems
 - d. Develop a personal program of continuing medical education (CME)
 - i. Devise a multifaceted program of self-assessment that includes (1.a.) and (2.d.) above and American Board of Family Medicine (ABFM) certification/recertification
 - ii. Assess the quality of the CME and clinical information options based on “strength of evidence”
4. Working with a team of clinical investigators
- a. Complete training and certification in “ethical principles of research with human subjects”
 - b. Formulate clear and focused research questions that are important to patient care, public health, or practice management
 - c. Translate research questions into clear, specific, and well-grounded hypotheses
 - d. Develop annotated reference lists of the most important relevant previous research on the topics of interest. The annotations will be parallel to items (3.a.i.) through (3.a.xi.) under “Being a student, teacher, resource to colleagues, and lifelong learner”
 - e. Contribute a “family physician perspective” and clinical content expertise to a research team composed of:
 - i. Research design methodologist

- ii. Clinical content expert
 - iii. Statistical methodologist
 - iv. Clinical database manager
- f. Identify an available study population appropriate for the study question
 - g. Make a credible assessment of subject availability and probable sample size
 - h. Review and critique the study power analysis done by the methodologist and/or statistician, and critique their underlying assumptions, such as hypothesized clinical “effect size”
 - i. Co-author an informed consent document that is appropriate for the study population, with sensitivity to the language and culture, general literacy, and health literacy of the study population
 - j. Co-write the Institutional Review Board application
 - k. Co-develop measurement tools, such as surveys, with attention to simplicity, understandability, and relevance to the hypotheses, reliability, and validity
 - l. Provide sensitive and open liaison between the research team, the office staff, and the patient subject groups
 - m. Participate in ensuring integrity of data collection, storage, transfer, and analysis
 - n. Ensure that the data analysis remains guided by the stated hypotheses, avoiding “data mining” if it is not an explicitly exploratory study
 - o. Critique the study results in terms of credibility, potential sources of biases and confounding, statistical and clinical significance, generalizability, and comparisons to results of other studies
 - p. Prepare and present a poster or oral report of the study, working closely with your research team members/mentors on issues of verbal, graphic, and tabular presentation
 - q. Promote and facilitate association with a practice-based research network

Implementation

Scholarly activity and information management should be integrated into residency training in a longitudinal fashion. Evidence-based, point-of-care resources should be utilized in the context of patient care in both the inpatient and outpatient settings. The process of searching for high-quality, evidence-based answers to clinical questions should be modeled by faculty at every opportunity and in all settings. Didactic sessions and hands-on experiences (such as a library resource workshop and a recurring, interactive journal club) should also be utilized. Didactic sessions on research methodology should be incorporated into the curriculum. Collaboration should be encouraged during the production of scholarly work.

Residents should be given protected time free from clinical and administrative duties to work on scholarly projects. Residencies should provide venues for residents to present completed projects. Residents also should be afforded ample opportunity to publish or

present work at regional and national conferences. Active participation in all steps of the production of scholarship is the best way to introduce learners to the topic.

Faculty with experience in critical appraisal and scholarly work should be available to model and lead these efforts. Faculty should be given protected time in order to pursue their own scholarly work and mentor residents. Program directors should also be actively engaged in scholarly activity. Resident and faculty scholarship achievements should be prominently displayed in the facility. Residencies who do not have adequate faculty expertise can explore other ways to enhance their scholarship (e.g., partnering with local colleges and universities, joining practice-based research networks). A library with access to full-text journal articles should also be provided.

Funding is a significant constraint on residents' scholarly activity. Funding difficulties can be overcome through the careful selection of inexpensive projects, through the utilization of technical assistance in grant writing, through collaborative involvement in already funded projects, and by active participation in practice-based research networks.

Residency programs that are successful at resident scholarship typically feature the following characteristics:

- Program director support of research
- Protected time for residents to perform research
- Faculty involvement in research
- Presence of a research curriculum
- Regular journal club
- Easily accessible research professionals
- Opportunities for residents to present research
- Recognition for resident scholarly work
- Initiation of scholarly activity by residents early in training

Resources

Accreditation Council for Graduate Medical Education. ACGME program requirements for graduate medical education in family medicine. July 1, 2014. https://www.acgme.org/acgmeweb/Portals/0/PFAssets/ProgramRequirements/120_family_medicine_07012014.pdf. Accessed June 2015.

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Website Resources

Society of Teachers of Family Medicine (STFM) Resource Library.
www.fmdrl.org/index.cfm?event=c.showLoginForm (requires login to STFM account)

University of Alberta. Evidence-Based Medicine Toolkit. www.ebm.med.ualberta.ca

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