Recommended Curriculum Guidelines for Family Medicine Residents

Medical Informatics

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. Topic competencies, attitudes, 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 curriculum must include structured experience in several specified areas. Most of the resident’s knowledge will be gained by caring for ambulatory patients who visit the family medicine center. Structured didactic lectures, conferences, journal clubs, and workshops must be included in the curriculum, with an emphasis on outcomes-oriented, evidence-based studies that delineate common and chronic diseases affecting patients of all ages. Targeted techniques of health promotion and disease prevention are hallmarks of family medicine. Appropriate referral patterns and 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

“Medical informatics is the rapidly developing scientific field that deals with resources, devices, and formalized methods for optimizing the storage, retrieval, and management of biomedical information for problem solving and decision making.” (Greenes RA, Shortliffe EH. Medical informatics. An emerging academic discipline and institutional priority. JAMA. 1990;263(8):1114-1120.)

The ultimate concern of the physician is patient welfare, yet the medical knowledge required of physicians is beyond the brain’s physical capability. Therefore, physicians must leverage information technology to help ensure safe, high quality care. The acquisition, input, retrieval, analysis, and sharing of clinical and administrative data are crucial components of physician proficiency in this expanding field. As leaders of their respective health care teams, physicians must also track tasks, and communicate with team members and patients. Electronic health record (EHR) systems provide the ability to efficiently fulfill these requirements, helping physicians effectively perform their myriad duties and contributing to improved patient outcomes. Physicians must also be able to filter and use patient education resources to equip patients to be active participants in their treatment plans. Lastly, physicians must be exposed to and be comfortable with new technologies (e.g., mobile technologies, tablets, simulation centers, teleconferencing) that may be used to improve efficiency, effectiveness, and productivity.

This Curriculum Guideline provides an outline of the competencies, attitudes, knowledge, and skills regarding medical informatics that should be among the objectives of training programs in family medicine. This knowledge will lead to optimal patient care through the appropriate evaluation and application of biomedical information and health information technologies at the point-of-care by future family physicians.

Competencies

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

- Demonstrate basic computer literacy, utilization, and safety, in addition to effective use of office productivity and communication software tools (Systems-based Practice)

- Efficiently use appropriate information resources and tools available to support clinical decision making at the point-of-care and to promote lifelong professional learning and enrichment (Patient Care, Medical Knowledge)

- Exhibit understanding of the ways in which medical informatics and information technology can be applied to the continuum of care delivery in order to improve efficiency, quality, and safety (Practice-based Learning and Improvement, Patient Care)
• Access specific, relevant clinical information by performing and appropriately refining database searches through use of necessarily focused medical terminology and concepts (Medical Knowledge)

• Access, enter, and retrieve data related to patient care, and efficiently and accurately document clinical encounters, plans of care, and medical decision making via available clinical information systems (Systems-based Practice, Practice-based Learning and Improvement)

**Attitudes**

The resident should demonstrate attitudes that encompass:

• The encouragement of other members of the care team to develop comfort with and competency in the use of clinically relevant technologies

• Recognition of the importance of health care professional involvement in the planning, selection, design, and implementation of information systems, and participation in systems change processes and utility analysis at the point-of-care

• Awareness of the impact of implementing technology to facilitate medical practice and participating in policy and procedural development related to medical informatics

• Recognition of the relevance of aggregation and analysis of clinical data for improving care quality and patient outcomes

• Recognition of computer hardware and software system limitations and the need for continual learning in informatics skills, applications, and knowledge as technology continues to advance rapidly

• Recognition of personal knowledge deficits in evidence-based medicine and commitment to perpetual curiosity and inquiry to resolve them

• Understanding of the impact of information systems on clinical workflow and communication within multidisciplinary teams

• An upholding of legal and ethical standards related to data security, confidentiality, and patients’ right to privacy

• Recognition of the importance of accuracy, integrity, and completeness of the medical record, and commitment to playing a critical role in maintaining patient information
Knowledge

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

1. Information resources and support tools available to aid in clinical decision making and to promote patient education and lifelong learning for clinicians

2. Basic components of computer systems and networks, and the nature of computer-human interfaces as they impact patient care

3. Fundamentals of data modeling and database systems (including the definition and application of controlled vocabularies and structured versus unstructured data types)

4. Policies and procedures to ensure the security and confidentiality of patient information and the integrity of computer systems and networks

5. Application of aggregation and analysis of clinical data for improving care quality and patient outcomes

6. Benefits and limitations of computer hardware and software systems

7. New technologies that may be used in clinical practice to improve clinician efficiency, effectiveness, and productivity

8. The importance of technology tools to actively engage and involve the patient before, during, and after the visit

9. Simulation technologies to aid in clinician training

Skills

In the appropriate setting, the resident should demonstrate the ability to independently perform or appropriately refer the following:

1. Demonstrate basic computer literacy, utilization, and safety (including keyboarding, navigation of operating systems; connection; and use of peripheral devices, data storage, and backup)

2. Retrieve information by performing and appropriately refining database searches using logical (Boolean) operators in a manner that reflects understanding of medical language and terminology, and the relationships among medical terms and concepts

3. Access, evaluate, grade, and synthesize data, information, and knowledge from multiple sources and apply to clinical practice and professional development
4. Evaluate Internet-based health materials for quality, accountability, reliability, and validity, and use multiple information sources to gather evidence for clinical decision making at the point-of-care and for professional learning and enrichment.

5. Direct patients to credible online medical information and services, and use information management systems for patient education.

6. Use all technology tools to augment the patient experience, and be skilled at managing the physician-patient-computer triangle.

7. Access, enter, and retrieve data related to patient care, and efficiently and accurately document clinical encounters, plans of care, and medical decision making via available clinical information systems.

8. Collaborate with other clinicians and support staff via networks across multiple sites and contexts using email, discussion lists, news groups, teleconferencing, and related communication technologies.

9. Effectively use office productivity and communication software, including:
   a. Word processing
   b. Presentation (including multimedia)
   c. Spreadsheet
   d. Database
   e. Web browsers
   f. Email, instant messaging, video conferencing, and other digital messaging tools
   g. Ancillary devices: monitors, diagnostic and imaging tools for multimedia inclusion in the record
   h. Social media: effective and secure use to effectively manage one’s online reputation, support practices, and help patients deal with their acute and chronic conditions
   i. Wide array of digital tools to continuously monitor personal and practice-wide quality metrics to enhance the quality of care.

10. Evaluate and incorporate new applicable technologies for clinical practice and training, including mobile technologies, tablets, simulation technologies, and online educational tools.

11. Participate in design of data collection tools for practice decision making, record keeping, and participation in quality management/improvement initiatives related to clinical data in practice.

12. Evaluate security effectiveness and parameters of systems for protecting patient information and ensuring confidentiality.
Implementation

Curriculum implementation should include both focused and longitudinal experiences throughout the residency program. Didactic lectures and journal clubs should be augmented with instruction regarding principles of the physician-patient-computer relationship in daily practice. The model of care should shift from a reactive, individual model to a proactive, population-based model through technology application. Communication should be emphasized as integral to the effective use of information. Ready access to computer and information resources in the clinical care, administrative, and teaching environments should be provided. An efficient and responsive technical support infrastructure should be in place, in addition to a faculty “champion” to direct medical informatics training within the program. A baseline needs assessment at matriculation should lead to appropriate practical training in computer skills literacy through tutorials, and group and/or one-on-one instruction. Avoid applying technology for its own sake and intimidating those who are anxious about technology. Departments should also measure and report educational outcomes to promote evidence-based approaches to high quality medical informatics training for family medicine residents across the nation.

Resources


Website Resources


American Medical Informatics Association (AMIA). www.amia.org/
International Medical Informatics Association (IMIA). [www.imia.org](http://www.imia.org)


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