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Recommended Curriculum Guidelines for Family Medicine Residents

Medical Informatics

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

Introduction

Each family medicine residency program is responsible for its own curriculum. The AAFP Commission on Education's Subcommittee on Graduate Curriculum has created this guide as an outline for curriculum development, and it should be tailored to the needs of the program.

Through a series of structured and/or longitudinal experiences, the curricula below will support the overall achievement of the core educational competencies defined by the Accreditation Council for Graduate Medical Education (ACGME) and provide guideposts to program requirements specific to family medicine. For updates and details, please refer to the ACGME website at www.acgme.org. 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.

Preamble

Medical informatics is the interdisciplinary study of the design, development, adoption, and application of information technology-based innovations in health care services delivery, management, and planning and patient care. It is also referred to as applied clinical informatics and operation informatics. Clinical informatics encompasses a wide

range of topics, including clinical decision support, visual imagery (e.g., radiological, pathological, dermatological, ophthalmological), clinical documentation, computerized physician order entry (CPOE) systems, system design, and system implementation and adoption.[1]

A physician's ultimate concern is patient welfare; however, time constraints exist in primary care. When properly applied, technology can provide the tools for trained physicians to save time, energy, and resources. Physicians can use technology to benefit themselves and their patients. The physician must learn to be proficient in collecting and analyzing data and applying these data directly to care decisions in order to improve patient outcomes. As leaders of their respective health care teams, physicians must also track task completion and communicate frequently with team members and patients. Electronic health record (EHR) systems are one tool that can assist physicians in performing their myriad of tasks.

Physicians must be able to effectively utilize patient education resources to prompt patients to be active participants in their care plans. During training, family medicine residents should be exposed to and become familiar with new technologies (e.g., mobile devices, tablets, simulation centers, teleconferencing, telemedicine) that may be utilized in patient care and directed to improve efficiency, effectiveness, and productivity.

Technology can provide a valuable means of delivering care in specific circumstances. The implementation of telehealth visits during the COVID-19 pandemic accelerated a process in which nontraditional (virtual) visits were utilized to provide necessary medical care. While limiting traditional face-to-face visits, physicians and residency programs had to quickly adapt to and learn newer ways of connecting with patients. Furthermore, advanced integration of telehealth platforms in the EHR systems was developed. Competencies in utilizing telehealth for patient care must be developed to ensure that physicians master the utilization of such technology. Learning and development of these competencies should be adapted by training programs.

This curriculum guideline provides an outline of the competencies, attitudes, knowledge, and skills regarding medical informatics that should be among the objectives of family medicine training programs. 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.

Patient Care

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

- Promote the use of patient-driven health tools and technology with patients to encourage them to be more involved with health care and have access to their medical information and self-driven health literacy education (e.g., patient portals, digital patient education materials)
- Recognize the increase in personalized medicine and genomics in delivering tailored care (e.g., diabetes monitoring tools, tailored medication dosage)
- Incorporate informatics principles (e.g., data interpretation) across the dimensions of health care, including population health promotion; disease prevention; and diagnosis and treatment of individuals, their families, and populations across the life span
- Provide patients with credible, research-informed educational information from electronic sources
- Direct patients to utilize patient portals to access their personal health information and maintain appropriate communication with their health care team
- Effectively complete a history and physical examination through a virtual visit
- Develop, document, and communicate a detailed assessment and plan
- Utilize advancing technologies (e.g., voice assistance technology, mobile app integration, patient portals) as clinician aids to help them manage and follow up with patient care
- List and describe emerging and upcoming informatics developments (e.g., patient-centered devices [diabetes chip], humanoid robots to interact with human patients, mobile health, virtual personal assistants [scribes], digital health, drones for medication delivery)
- Recognize and promote the use of patient panel registries to manage and improve patient care

Medical Knowledge

In the appropriate setting, a family medicine resident should demonstrate the ability to apply knowledge of the following:

1. How to access specific, relevant clinical information by performing and refining database searches using focused medical terminology and concepts
2. Information resources and support tools available to aid in clinical decision-making, promote patient education, and facilitate lifelong learning for clinicians
3. Limitations of a telemedicine visit that can affect patient care

4. How to evaluate various clinical information sources for quality, accountability, reliability, and validity
5. Utilization of appropriate evidence for clinical decision-making at the point of care and for professional learning and enrichment
6. Current health care technology devices, software, and data processing utilized throughout the health care continuum (e.g., inpatient disinfection robots, 3D printers, middleware clinical alarms)
7. Appropriate use of informatics tools to improve medical knowledge and improve patient care (e.g., clinical decision support systems, preventive medicine resources)

Interpersonal and Communication Skills

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

- Use secure forms of communication (e.g., email, discussion lists, videoconferencing, teleconferencing, text messaging, e-consults, and related technologies) to collaborate with other clinicians and support staff via networks across multiple sites within health care information systems
- Access, enter, and retrieve data related to patient care via available clinical information systems, remote monitoring, and wearable technology, and efficiently and accurately document clinical encounters, plans of care, and medical decision-making
- Effectively use patient-physician communication mediums to build strong relationships with patients, support continuity of care, empower patients to be more involved in their care, and open the line of communication with patients
- Implement policies and procedures for how to safely and appropriately conduct a telemedicine visit, including how to involve family members/health proxies in providing care while maintaining information privacy and security

Systems-Based Practice

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

- Understand the process of selecting, developing, and implementing a clinical information system and evaluate its effectiveness
- Identify the key types of health information systems and describe how to achieve system interoperability
- Identify the non-technical factors that influence the adoption of clinical information systems by clinicians and describe strategies for promoting effective use of clinical information systems

- Understand the role of medical informatics in enhancing the accuracy and efficiency of reimbursement mechanisms while also improving quality of care
- Understand the role of medical informatics in enhancing patient population decisions in terms of patient safety, prevention, and improved quality
- Understand the role of advancing technologies in increasing primary care efficiency and optimizing patient outcomes
- Recognize the importance of health care professionals' involvement in selection, design, planning, and implementation of information systems, as well as their participation in system improvement and evaluation processes
- Be aware of the impact of implementing technology to facilitate medical practice, including the development of policies and procedures
- Recognize the relevance of aggregation and analysis of clinical data for improving care quality, patient outcomes, and population health
- Apply aggregation and analysis of clinical data to improve care quality, population management, and individual and public health outcomes
- Understand and participate in the continuous system development process, including planning, analysis, design, implementation, support, and security of medical informatics
- Understand the basic components of computer systems and networks and the nature of computer-human interfaces as they impact patient care and population health
- Retrieve information by performing and appropriately refining database searches
- 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
- Identify various clinical decision support tools, how they are developed, and their appropriate application to specific situations
- Understand the importance of technology tools for actively engaging and involving the patient before, during, and after the visit (e.g., pre-visit planning, patient portals, health education websites)
- Effectively use health care informatics related to patient care and communication: telemedicine, diagnostic and imaging tools, social media, digital quality metric tools, point-of-care devices, and portals, as well as various interfaces (e.g., laboratory, radiology, pharmacy, e-prescribing)
- Describe the role of data and images across the health care system, the laws governing their use, and technical approaches to ensure privacy and security (e.g., Health Insurance Portability and Accountability Act [HIPAA])
- Understand simulation technologies and use them to aid in clinician training and enhance patient safety to improve health outcomes (e.g., extended reality)

- Understand the role and impact of information systems on clinical workflow and interdisciplinary team communication
- Recognize the role of the family physician as a leader of change management during the implementation and sustainment of informatics system within a clinical environment
- Apply new technologies as they become relevant to clinical practice and patient safety (e.g., changes in informatics system memory, storage and connectivity, user interfaces, metadata, telemedicine, virtual monitoring, personalized health care, wearable systems, cloud computing)
- Understand the impact information system changes have on practice patterns, physician-patient relations, and physician work-life balance
- Recognize that expanding the role of the EHR to monitor clinician practice and patient responsiveness can capture the quantity, complexity, and quality of care, as well as enhancing the accuracy and efficiency of reimbursement mechanisms while improving quality of care
- Use health care informatics tools effectively without compromising the physician-patient relationship
- Use health care informatics effectively to support business operations while providing security for registration, scheduling, billing, and EHR management
- Demonstrate ability to locate state laws regarding telehealth and prescribing

Practice-Based Learning and Improvement

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

- Demonstrate 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, cost-effectiveness, quality, and safety
- Promote a culture of competency in the utilization of clinically relevant technology within the team
- Participate in projects designed to use technology to promote patient care that is safe, efficient, effective, timely, patient centered, and equitable (e.g., quality improvement projects evaluating the use of voice recognition technologies)
- Efficiently utilize appropriate information resources and tools available to support clinical decision-making and promote an attitude of lifelong learning and enrichment
- Recognize the limitations of computer hardware and software systems and the need to stay abreast of informatics skills, applications, and knowledge as technology continues to evolve

Professionalism

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

- Understand and apply legal and ethical standards for the use of social media as it relates to professionalism, data security, confidentiality, and patients' right to privacy
- Apply policies and procedures to ensure the appropriate utilization of social media as it relates to patient information and professionalism
- Recognize the importance of accuracy, integrity, and completeness of the medical record and the health care professional's critical role in maintaining patient information
- Apply policies and procedures to ensure the security and confidentiality of patient information and the integrity of computer systems and networks (e.g., ensuring telehealth visits are carried out privately and securely)
- Evaluate effectiveness of the security and parameters of systems for protecting patient information and ensuring confidentiality (e.g., authentication, firewalls, encryption)
- Use social media effectively and securely to manage and maintain their online reputation, support their practice, and help patients deal with acute and chronic conditions
- Use a team-based practice approach to the data gathering and entry process throughout the health care continuum, recognizing the physician as a crucial player to ensure accuracy and protection of data
- Evaluate and incorporate new applicable technologies for clinical practice and training, with an understanding of "implementation fatigue" and burnout

Implementation

Curriculum implementation should include both focused and longitudinal experiences throughout the residency program. Didactic lectures and journal clubs should include instruction regarding principles of the physician-patient-computer relationship in daily practice, including telemedicine visits. Communication should be emphasized as integral to the effective use of information. Ready access to computers, information resources, and telemedicine platforms 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 (and possibly resident) "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. 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

Accreditation Council for Graduate Medical Education (ACGME). ACGME program requirements for graduate medical education in clinical informatics. July 1, 2022. Accessed April 22, 2023. https://www.acgme.org/globalassets/pfassets/programrequirements/381_clinicalinformatics_2022.pdf

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Website Resources

Agency for Healthcare Research and Quality (AHRQ). Topic: Health Information Technology. www.ahrq.gov/topics/health-information-technology-hit.html

American Medical Informatics Association (AMIA). www.amia.org/

International Medical Informatics Association (IMIA). https://imia-medinfo.org/wp/

Nursing Informatics Competencies: Self-Assessment. www.nursing-informatics.com/niassess/index.html

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Revised 08/2018 by Adventist Health Hanford Family Medicine Program, Hanford, CA
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