eHealth Competencies for Undergraduate Medical Education

Created by The Association of Faculties of Medicine of Canada in Partnership with Canada Health Infoway, May 2014
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Background

To better prepare medical students to practice in modern, technology-enabled, clinical environments, the Association of Faculties of Medicine of Canada (AFMC) in partnership with Canada Health Infoway (Infoway) has initiated a project on ehealth curriculum and eLearning. A key goal of the initiative is to develop ehealth competencies for undergraduate medical education.

ehealth is defined as the appropriate and innovative use of information and communication technologies (ICTs) to enable and improve health and health care services. This document outlines the recommended ehealth competencies and skills for undergraduate medical students and aligns them to the CanMEDS 2015 roles. The skills are further subdivided into preclinical and clerkship milestones and listed below their relevant competencies.

Each section begins with a note to readers that explains the thinking behind the competency and highlights any overlap of roles.

Competencies

1. Communicator

These competencies focus on documentation, use and exchange of data, and communication with patients, families, caregivers and colleagues beginning with the individual patient-physician encounter and moving to the systems perspective. The emphasis is on communication for clarity and enhancement of the doctor–patient relationship.

1.1 Document patient outcomes and safety considerations in electronic health records (EHR) and electronic medical records (EMR) in an accurate, complete, timely and retrievable manner.

Milestones:

- Pre-clerkship: Summarize the principles behind documentation, access to and retrieval of health information from electronic records.
- Clerkship: Document in and retrieve information from EHRs and EMRs in an accurate, complete and timely manner.

1.2 Recognize how the capture, organization, tabulation and display of health information can impact patient care and outcomes, facilitate or impede information exchange and influence the efficiency of the health system.

Milestones:
• Pre-clerkship: Describe the difference between structured and unstructured data entry.

• Pre-clerkship: Appreciate that the care and safety of the patient can be affected by the way their health data is handled.

• Clerkship: Enter data in EHRs and EMRs in a way that supports clinical decision-making, facilitates ongoing care (e.g., includes reminders and alerts) and tracks outcomes.

• Clerkship: Select from pick-lists and use standardized terminology for data entry

1.3 Examine the components of eHealth literacy and appreciate how these components impact patients.

1.3.1 Use context- and content-appropriate language and media resources to communicate health information to patients, their families and caregivers and to help patients support their care and manage their health where appropriate.

1.3.2 Direct patients to current, credible and relevant resources that are appropriate to their level of health information literacy.

Milestones:

• Pre-clerkship: Examine the components of ehealth literacy.

• Clerkship: Communicate health information to patients using context- and content-appropriate language and media resources in accordance with their ehealth literacy level

2. Collaborator

These competencies focus on the importance of communicating and sharing electronic information with other health professionals for the purpose of promoting patient wellbeing, furthering patient care and improving patient outcomes. We believe it is important to jointly develop, advance and use electronic information and management tools, processes and resources to shape health information systems and improve our current ehealth environment through interprofessional, interdisciplinary and stakeholder collaboration.

2.1 Employ recognized pan-Canadian standards for recording, communicating, sharing and classifying health information in an electronic context.
2.1.1 Recognize the limits of and barriers to electronic information-sharing among health professionals when using information technologies and systems in local, regional, provincial and national contexts.

*Milestones:*

- Pre-clerkship: Review pan-Canadian standards for recording, communicating, sharing and classifying health information in an electronic context, particularly as they pertain to working as part of a medical team.

- Clerkship: Apply pan-Canadian standards effectively and efficiently when recording, communicating, sharing and classifying health information in an electronic context.

2.2 Identify, use and share medical information contained in EHRs, EMRs with individual health professionals and interprofessional teams for the purposes of integrating and optimizing care and improving outcomes for individuals and populations.

*Milestones:*

- Pre-clerkship: Describe EHR and EMR systems and their components.

- Pre-clerkship: Identify the role of the physician in the design and use of EHR and EMR systems.

- Clerkship: Collaboratively use and share electronic medical information with other health care providers in a variety of clinical settings.

2.3 Complete the electronic handover of professional responsibility and accountability to another health professional in a manner that ensures quality, continuity and patient safety.

*Milestones:*

- Pre-clerkship: Itemize the components of an effective electronic handover of clinical care.

- Clerkship: Complete clinical care handover and electronic sign over in a manner that ensures quality, continuity and patient safety.
3. Scholar

*These competencies focus on the obligation of the individual to sustain and continually improve information and communication technologies best practices to enhance patient care, participate in lifelong learning and teaching, and engage in continual quality improvement and excellence in their own practices. There could be some overlap with medical expert and professionalism.*

3.1 Use information and communication technologies to enhance knowledge, skills and judgment in providing evidence-informed patient care. (KEY)

3.1.1 Articulate an information need and gather relevant data from a variety of sources, including literature, web-based resources, electronic health records and databases, and discussions with colleagues.

3.1.2 Critically assess the reliability, quality and comprehensiveness of all data used to inform health care decisions.

3.1.3 Appraise, consolidate, apply and evaluate electronic and print information acquired to care for and manage patients, bearing in mind their unique biological, personal and cultural circumstances.

*Milestones:*

- Pre-clerkship: Find credible data from a variety of sources using accepted literature search techniques.

- Pre-clerkship: Develop skills in critical analysis and evaluation of the information retrieved.

- Clerkship: Sharpen and enhance research, critical appraisal and dissemination skills, applying this knowledge and these techniques to support communication with colleagues and patients.

- Clerkship: Synthesize information from a variety of sources and apply this synthesis to guide clinical decision-making processes.

3.2 Demonstrate that professional judgment prevails over technologies designed to support clinical assessment, interventions and evaluation.

*Milestones:*
• Pre-clerkship: Appreciate that there are benefits and limitations to the technologies used for clinical assessment and evaluation.

• Pre-clerkship: Assess the quality, reliability and applicability of technological applications used for clinical assessment

• Clerkship: Exercise judgment and convey an opinion to others regarding the benefits and limitations of technology when these tools are employed for assessment and evaluation.

• Clerkship: Make informed decisions based on critical appraisal of health systems and other technologies, particularly for complex issues and articulate this decision-making process to others.

3.3 Maintain, appraise and continually improve information and communication technology skills for scholarly research and health information management.

**Milestones:**

• Pre-clerkship: Explore new and emerging information and communication technologies as they apply to health care and make personal choices as to which ones to adopt for their own practice

• Clerkship: Use new information and communication technologies to store, exchange and share medical resources.

• Clerkship: Make use of personal audits and reporting functions to track individual continuing professional development activities.

4. Professional

*These competencies focus on defining professional boundaries, obligations and responsibilities as they translate into ehealth practices: Knowing that electronic information and communication strategies have the potential to alter the quality of doctor-patient relationship and obscure the limits governing breach of information.*
4.1 Ensure the use of technology preserves and strengthens the doctor–patient relationship, is of benefit to patients individually and collectively, and is used in a way that maintains public trust in the profession. (KEY)

*Milestones:*

- Pre-clerkship: Explore ways in which information can be made widely available to physicians, other medical teams, and patients.
- Pre-clerkship: Recognize and convey in examples how information and communication technologies can strengthen and undermine the doctor–patient relationship.
- Pre-clerkship: Demonstrate optimal use of electronic media. Minimize the negative influences of technology that carry the potential to undermine doctor–patient relationship building and ongoing interactions.
- Clerkship: Use technology appropriately to help patients understand and manage (to the degree possible) their health.

4.2 Record and share electronic information with colleagues in a timely and professional manner.

*Milestones:*

- Pre-clerkship: Cite responsibly and give credit to the originators of data and ideas
- Pre-clerkship: Give appropriate attribution for data obtained electronically, particularly data copied from colleagues and other medical reports.
- Clerkship: Demonstrate how one’s place in a shared documentation system can affect the work of others by signing off and completing charts within a reasonable time frame.

4.3 Uphold professional obligations, maintaining appropriate personal, organizational and policy boundaries when using social media platforms and ICTs to record, convey, promote and respond to information.

*Milestones:*

- Pre-clerkship: Follow pertinent provincial and federal privacy legislation and provincial college regulatory statements relating to ehealth, telehealth and social media use.
• Clerkship: Mentor peers in the pertinent provincial and federal privacy legislation and provincial college regulatory statements relating to ehealth, telehealth and social media use.

4.4 Adhere to organizational, professional, regulatory and legal tenets pertaining to the privacy, confidentiality and security of data in health information systems.

*Milestones:*

- Pre-clerkship: Follow and share knowledge about all laws and regulations pertaining to the privacy, confidentiality and security of health information.
- Clerkship: Follow changes to professional, regulatory and legal rulings pertaining to the privacy, confidentiality and security of health and medical data. Apply this knowledge in clinical settings.

4.5 Recognize and report system errors or misuse that create a security risk for patients and health care systems.

*Milestones:*

- Pre-clerkship: Identify examples of how system errors may threaten patient privacy and security and generate inaccurate data for research purposes.
- Pre-clerkship: Report deficiencies, misuse, errors or security breaches to appropriate personnel (e.g., misplacing an electronic device that contains confidential information).
- Clerkship: Report deficiencies, misuse, errors and security breaches in EHRs, EMRs and personal electronic devices that may affect the integrity and security of health information, EHRs and EMRs.

5. Health Advocate

These competencies focus on promoting physician advocacy with respect to humanism in the virtual health care workplace, while at the same time maintaining awareness of the competing priorities between the patient’s and health systems’ needs. This section addresses the need to balance the use of health information for global initiatives while respecting the privacy of individual patient information. It speaks to meaningful use of electronic resources to inform population health strategies.
5.1 Employ health informatics to enhance quality of care and service delivery in the context of acute and chronic disease management in community settings. (KEY)

5.1.1 Respect an individual’s right to privacy by sustaining anonymity and appropriate use of aggregated data.

5.1.2 Recognize health information and demographic data collected by physicians that is subsequently pooled informs health policy decision-making at local, regional, national and international levels.

5.1.3 Provide for the balance between an individual’s right to privacy and community rights to health information and data when using EHRs and EMRs.

Milestones:

- Pre-clerkship: Articulate the key components, purpose and use of health informatics in health information systems.
- Pre-clerkship: Explain the principles of, and uses for, aggregated health information.
- Pre-clerkship: Illustrate how data entry can affect everything from patient care to health care policy.
- Pre-clerkship: Learn how to enter data effectively.
- Pre-clerkship: Recognize that tensions can exist between advocating for individual rights and those of the larger society.
- Clerkship: Develop a working knowledge of health informatics.
- Clerkship: Build an awareness of health informatics through chart audits and research projects.
- Clerkship: Use refined data entry skills when using decision support tools in the clinical setting.
- Clerkship: Develop skills in balancing the competing priorities between individual rights for privacy and societal rights for information. Cite specific examples.

5.2 Describe how health and population information can be used for disease surveillance, adverse event tracking, population health monitoring, and risk management.
Milestones:

- Pre-clerkship: Articulate the principles of managing and using health and population information.

5.3 Educate patients about medical misinformation portrayed in all types of media.

Milestones:

- Pre-clerkship: Illustrate examples of how medical misinformation portrayed in print, electronic and social media can affect patient care and physician–patient relationships.

- Clerkship: Educate patients about, and respond to misinformation in print, electronic and social media where appropriate. Point to or provide alternative, credible sources for review.
6. Medical Expert

These competencies focus on how information technologies can enhance an individual’s medical expertise, recognizing that data and telehealth tools are adjuncts to support decision making while medical expertise is vital to management choices. There can be overlap here with the scholar role.

6.1 Describe the role and potential impact of information and communication technologies to deliver patient-centred care to diverse populations in a variety of settings. (KEY)

**Milestones:**

- Pre-clerkship: Perceive and describe how information and communication technologies impact on patient-centred care
- Clerkship: Assess and adopt a variety of information and communication technologies for patient-centred care.

6.2 Employ decision-support tools as an adjunct to clinical judgment in providing timely, evidence-based, safe interventions.

**Milestones:**

- Pre-clerkship: Learn about and use the decision support tools that are available in the local EHR and EMR
- Clerkship: Judiciously employ decision-support tools to accompany clinical judgments and demonstrate their use in clinical care.

6.3 Monitor and audit individual practice through the capture and analysis of health, quality and patient safety data.

**Milestones:**

Pre-clerkship: Demonstrate the role that monitoring and audit practices assume throughout a physician’s career and how electronic data entry can facilitate this process.
Clerkship: Monitor and audit practice through the use of procedural and patient logs
Clerkship: Recognize the essential contribution of personal practice audits to continuing professional development and quality improvement.

7. Leader

_The competencies in this section focus on the clinician’s leadership abilities in clinical service delivery, including the responsibility for ensuring factual and accurate output from electronic health records._

7.1 Contrast the benefits and limitations of health information systems and apply this knowledge to patient management, patient safety and continuous quality improvement in all clinical environments where one works.

_Milestones:_

- Pre-clerkship: Evaluate, at a theoretical level, the benefits and limitations of health information systems.
- Clerkship: Assess benefits and limitation of health information systems in clinical environments.

7.2 Recognize that the structure of EHRs and EMRs and the manner in which data is recorded can distort the data and negatively affect patient safety. Advocate for and implement harm-reduction strategies to address this.

_Milestones:_

- Pre-clerkship: Assess the benefits, limitations and possible problems with EHRs and EMRs.
- Pre-clerkship: Identify circumstances where the organization and/or display of data may lead to a distorted interpretation. For example, information presented in bold font jumps out at the reader and may be selected more often, skewing results.
• Clerkship: Advocate for and implement harm-reduction strategies to mitigate the human, technological and infrastructure limitations that have the potential to lead to distortion of data interpretation.

7.3 Ascribe meaning and relevance to the terms *Health System Use of Data* (in the Canadian context) and *interoperability* as they apply to use of electronic health data in medical practice.

*Milestones:*

• Pre-clerkship: Define the terms *Health System Use of Data* and *interoperability*.

• Clerkship: Provide examples of how health system use of data and interoperability are relevant in medical practice and can strengthen the health system.

7.4 Recognize that output from EMRs can be customized for purpose-driven use to improve patient care.

*Milestones:*

• Pre-clerkship: Demonstrate how EMRs can be customized.

• Clerkship: Use outputs from an EMR to develop individualized resources for patient care. For example, creation of information handouts for patients and their families, preparation of a list of online support resources.

7.5 Understand that data inter-relationships and interoperability influence data output, its quality and usability in patient care.

*Milestones:*

• Pre-clerkship: Provide examples to show that the way data is entered can affect the quality and future use of health information.

• Clerkship: Collaborate on case scenarios that depict the influence of data inter-relationships.

• Clerkship: Demonstrate appropriate use of structured data.
## Glossary

<table>
<thead>
<tr>
<th>Competency</th>
<th>A complex set of behaviours based on combining and mobilizing knowledge, skills, attitudes and external resources to apply knowledge and judgment appropriately in specific types of situations</th>
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<tbody>
<tr>
<td>Digital</td>
<td>Electronic technology that generates, stores and processes data in binary forms. Although the word digital is often used interchangeably with the word electronic, digital technology comprises one area of electronics. The other is analog.</td>
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<tr>
<td>eHealth</td>
<td>The appropriate use of information and communication technologies (ICT) and innovation to improve or enable health and health care services</td>
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<tr>
<td>eHealth literacy</td>
<td>An individual’s ability to search for, successfully access, comprehend and appraise desired health information from electronic sources and to then use such information to attempt to address a particular health problem. Ehealth literacy comprises six components: traditional literacy, information literacy, media literacy, health literacy, computer literacy and scientific literacy.</td>
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<tr>
<td>Electronic handover</td>
<td>The handover of EHRs to another professional</td>
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<tr>
<td>Electronic health records (EHR)</td>
<td>An electronic health record provides each individual in Canada with a secure and private lifetime record of his or her key health history and care within the health system. The record is available electronically to authorized health care providers and the individual anywhere, any time in support of high quality care.</td>
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<tr>
<td>Electronic medical records (EMR)</td>
<td>An electronic medical record is specific to a clinician’s practice or an organization. It is the record clinicians maintain on their own patients and which details demographics, medical and drug history, and diagnostic information such as laboratory results and findings from diagnostic imaging. It is often integrated with other software that manages activities such as billing and scheduling.</td>
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