Core Informatics Competencies for Clinical and Translational Science Trainees

Goal and Scope: These competencies are focused at the master's degree level for clinician scientists enrolled in translational research training programs. They are intended to enable clinician scientists to utilize existing informatics tools and to collaborate effectively with informatics specialists in order to make use of best practices for the generation, storage, management, retrieval, use, sharing, presentation, protection and analysis of biomedical and health information in clinical and translational research.

1. Utilize informatics-based tools in translational research including:
    a. Locate relevant informatics tools;
    b. Select appropriate informatics tools; and
    c. Use those tools in research for managing and analyzing biomedical and health information.

2. Describe the essential functions of the major clinical systems (e.g., the electronic health record (EHR) and its feeder systems, such as radiology and lab) that are relevant to clinical and translational science (CTS) and the challenges to using these data for research.

3. Describe the essential functions of major research computer systems (e.g., clinical trials management systems (CTMS), biospecimen management systems, research grant and finance management systems, and research services tracking systems) that are relevant to CTS.

4. Compare and contrast the organizational roles and principal responsibilities essential for access, management, and governance of data related to CTS.

5. Explain the role of health information technology standards in the interoperability of research, clinical, and administrative information systems and on secondary use of data for CTS.

6. Identify, retrieve, and manage biomedical and health science knowledge through literature searches using advanced search techniques (such as MeSH, PubMed, Google Scholar, etc.)

7. Describe the essential information generation, management, analysis, transformation, summarization, and visualization methods that apply to CTS data, such as:
    a. Genomic, proteomic and other "-omics" data;
    b. Clinical data;
    c. Imaging data;
    d. Consumer and patient-reported data; and
    e. Population-level and environmental exposure data.

8. Illustrate the nature of the contributions in both consulting and/or collaborating with biomedical and health informaticians throughout the life cycle of individual clinical and translational research projects:
    a. Use the terminology and principles of biomedical informatics to interact effectively with informaticians;
    b. Discriminate among the different sub-domains of biomedical informatics in order to identify the appropriate informatics consultant or collaborator; and
    c. Enumerate the roles of biomedical informatics specialists in the design, development, and implementation of translational research projects.

9. Discuss the fundamental principles and practices that address the ethical, legal, social, privacy, and security implications of biomedical and health informatics.

10. Identify how structure and organization of information in a domain can impact researchers' translational research foci through:
    a. Fundamental data categories and elements;
    b. Terminologies and taxonomies; and
    c. Ontologies.

11. Describe and make use of best practices for developing research instruments and protocols and for communicating results of research that are appropriate to specific audiences and special populations, addressing:
    a. Literacy and numeracy;
    b. Cultural attitudes; and
    c. Special terminologies.

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