

Research Curriculum Educational Goals & Objectives

The Research curriculum at CMHS is designed to introduce first year residents to thoughtful investigation of medical and psychosocial questions that affect individual and/or population health. Emphasis is on familiarity with basic biostatistics and their application in the practice of evidence-based medicine. Focus will be on helping residents to identify a mentor and structuring a project. Residents will be strongly encouraged to present their work in a public forum through poster, presentation, and/or publication. This curriculum is a longitudinal experience and includes formal research and quality improvement didactics, journal clubs, work with a librarian, participation on hospital committees, and evidence-based bedside clinical work. Residents in PGY2-5 of training continue to participate in regularly scheduled journal clubs, ongoing scholarly work, and continuous quality improvement.

Patient Care

- I. Residents will learn to identify questions that impact daily patient care and become familiar with the use of information management tools to seek a timely response.

Medical Knowledge

- I. Residents will
 - learn general guidelines for conducting biomedical research and become familiar with concepts such as study design, measurement, and analysis
 - learn how the Institutional Review Board works and become certified through the NIH course for the protection of human subjects
 - gain basic skills in understanding statistical concepts behind evidence-based medicines, which may include
 - absolute and relative risk reduction
 - confidence intervals
 - hazard ratio
 - intention to treat
 - likelihood ratios
 - number needed to treat
 - odds ratio
 - power
 - pretest probability
 - p-value
 - sensitivity and specificity
 - type I and II errors
 - be able to identify opportunities for scholarly inquiry, define a clinical question, and understand how to develop and execute a research plan
 - develop skills to facilitate critical appraisal of published medical research

Practice-Based Learning and Improvement

- I. Residents should

- be able to access current clinical practice guidelines, electronic data bases, published studies, and computer-based diagnostic reasoning programs to answer clinical questions
- learn to analyze the strengths and weaknesses of published trials and apply the results of relevant clinical trials to their practice
- foster intellectual inquiry through self-directed learning

Interpersonal and Communication Skills

- I. Residents will
 - develop their presentation skills and be able to answer questions in a public forum
 - learn to distill salient information from published studies and be able to counsel patients regarding impact on their care
 - hone writing skills by providing a narrative description of their scholarly activity and where appropriate, writing a scientific paper suitable for publication
 - obtain informed consent for research when appropriate

Professionalism

- I. Residents must demonstrate a commitment to using evidence-based data to care for patients and shape research and quality improvement efforts.

System-Based Practice

- I. Residents should look for opportunities to perform quality improvement projects to improve care within our health care system.

Resident Responsibilities

- I. Residents must review available publications from their specialty colleges for research requirements.
- II. Residents must meet CMHS scholarly work requirements to graduate.
 - All projects must be approved by the Program Director.
 - Residents conducting research involving human subjects must receive Resident Research Review Committee and CMHS IRB approval.
 - Residents will complete the NIH course on Protection of Human Subjects and obtain a certificate of completion.
<https://phrp.nihtraining.com/>
- III. Required conference attendance
 - Research Symposium and 3-Minute Scholarly Summary – residents are required to present their work to date
 - Journal club – residents are required to present an organized critical review of an approved article
 - Introduction to the IRB – for new residents
 - Research didactic sessions

Resources

- Journals and Texts
 - Guyatt G, Rennie D, Meade M, Cook D. Users' Guides to the Medical Literature. McGraw-Hill Professional; 3rd ed. 2014.
 - JAMA *Guide to Statistics and Methods*. JAMA. 2014;312(1):35.
 - Frakt, A, and Carroll, A. "Can This Treatment Help me? There's a Statistic for That." *New York Times* 26 Jan. 2015.
- Online educational resources
 - American College of Physicians (ACP) High Value Care Curriculum: Utilizing Biostatistics in Diagnosis, Screening, and Prevention. <https://www.acponline.org/clinical-information/high-value-care>
 - ACP Writing a Research Abstract http://www.acponline.org/education_recertification/education/program_directors/abstracts/prepare/res_abs.htm
 - American Osteopathic Association (AOA) Research and Grants <http://www.osteopathic.org/inside-aoa/development/research-and-development/Pages/grant-opportunities.aspx>
 - Agency for Healthcare Research and Quality (AHRQ): What Is Comparative Effectiveness Research <https://www.effectivehealthcare.ahrq.gov/topics/ceer-methods-4th-symposium/executive>
 - CONSORT Transparent Reporting of Trials <http://www.consort-statement.org/>
 - International Committee of Medical Journal Editors (ICMJE) Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals. <http://www.icmje.org/recommendations/>
 - Shulman HM. *Journal of the American Osteopathic Association* Osteopathic Graduate Medical Education: New Research Standards Needed <http://www.jaoa.osteopathic.org/content/114/5/336.full>
 - OPTI-West Research Information Page <http://opti-west.org/research.html>
 - PRISMA Transparent Reporting of Systematic Reviews and Meta-Analyses <http://www.prisma-statement.org/>
 - The NNT: Quick summaries of evidence-based medicine. www.thennt.com
 - STROBE Statement Strengthening the Reporting of Observational Studies in Epidemiology <http://www.strobe-statement.org/>
 - Vandembroucke JP, von Elm E, Altman DG, et al. STROBE Explanation and Elaboration. *Ann Intern Med*. 2007;147:W-163-W-194.
 - Western States Medical Monographs <https://sites.google.com/site/cahead5/>
- Specialty college resources
 - American College of Physicians guideline for poster presentations http://www.acponline.org/education_recertification/education/program_directors/abstracts/prepare/pos_pres.htm

- AOA Guidelines for the Resident Literature Review, Case Report, Scientific Paper, or Poster Presentation
<http://www2.aoao.org/pdfs/residents/ResidentPaperPosterGuidelines.pdf>

Evaluation

- I. Residents must present their ideas for scholarly work to their Program Director for approval prior to starting a project. Residents must also present projects requiring IRB review to the Resident Research Review Committee.
- II. Mentors will provide formative verbal feedback to the resident intermittently throughout the project as well as to the Program Director regarding resident performance.
- III. Residents will provide Program Directors with a narrative description outlining their proposed project. Residents will work with their Program Coordinator to log their project in New Innovations.
- IV. Program Directors meet at minimum semi-annually with residents to discuss research progress.
- V. Journal club presentation evaluations
- VI. GME Committee reviews overall resident progress as well as the research curriculum periodically as part of internal evaluation and planning. Proposed changes are reviewed and incorporated as appropriate as part of our annual improvement process.

Curriculum Structure

- I. Residents should attend regularly scheduled research didactic sessions, Journal Clubs, and Patient Safety/Quality Improvement learning sessions. Topics are added or modified based on the needs and skill sets of different resident classes.
- II. Residents will identify a mentor in the first half of their intern year. Subsequently, they will meet with their mentor regularly to discuss development and execution of a project. For residents involved in subsequent or ongoing projects, they may have different mentors for different projects. Residents are encouraged to work with faculty who are currently engaged in active research projects.
 - Residents will do a focused literature search as part of their project and may be asked to do presentations during the course of the project in addition to their final presentation.
 - Specialty Colleges may have specific requirements for research and quality improvement projects by year. Residents must adhere to those requirements. Residents from all specialties may find these guidelines helpful.
- III. All educational sessions will occur within the bounds of resident work hours as per ACGME requirements.