University of Michigan Clinical Scholars Program
Core Competencies

Background

All University of Michigan Clinical Scholars should obtain certain skills and proficiencies regardless of their main area of research and policy interest. Of course, scholars will vary greatly in their research specialties and therefore will require different depths of research skills. When we refer to core competencies, we are therefore referring to a proficiency in reading, evaluating and discussing work using these methods, not the ability to actually perform the technique personally.

Therefore, proficiency in this context is best measured by 1) an ability to articulate (preferably in common English rather than techno-speak) the basis, nature, applications and assumptions, if relevant, of each method or skill, 2) an ability to evaluate and teach others to evaluate articles using these methods, and 3) to be free of phobia and anxiety when doing the above.

Scholars need to master these skills for their research and clinical careers. As researchers, being unfamiliar or intimidated by basic study design and methodologic issues can result in 1) being parochial in one's reading (and thus ignoring important literature using different methodologies), 2) being defenseless in defending ones work when researchers' using different methodologies challenge your results, 3) being viewed as less than a serious researcher by the proponents of the methodologies of which you are ignorant. As a clinician, being able to critically appraise the medical literature is essential to sound decision making. As an educator, many scholars will be expected to provide training to medical students and fellows regarding critical appraisal of the literature and rigorous medical decision making.

University of Michigan Clinical Scholars Program Core Competencies

On completing the program, clinical scholars at the University of Michigan will have the following competencies.

1. Expertise in critical appraisal of the medical literature relevant to general medical practice and medical practice in their clinical specialty. This expertise should allow them to effectively teach medical trainees the basics of critical appraisal.

2. An ability to critically appraise health policy information.

3. Have a detailed understanding of the classic and recent literature in their research specialty area.

4. Effectively present their research, both orally and in writing (including abstracts, research manuscripts, oral presentations, and poster presentations).

5. Know how to submit and revise a grant proposal and be aware of sources for grant funding in their primary research area.

6. Be adept at conceptualizing research questions, including .generating and articulating research hypotheses and specific aims, and developing theoretical concepts, constructs and models.

7. Be familiar with each of the research methods outlined below. That familiarity should include the ability to a) articulate strengths and weaknesses of the approach; and b) identify some research questions for which these approaches are appropriate.

8. Be able to use an appropriate subset of these methodologies. By the end of their first year, Scholars should be able to identify, with the aid of a program mentor, which methods are relevant for their work.

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List of methods/approaches/ways of conceptualizing research

1. Basic study designs

a. Experimental and quasi-experimental designs
b. Cohort and case-control designs
c. Cross-sectional observational designs
d. Ecological designs
e. Meta-analysis, and literature review and synthesis.
f. Simulation and Decision Analytic models.

2. Study populations and sampling

a. Random and systematic sampling
b. Convenience sampling
c. Basic issues in obtaining community samples.

3. Data collection

a. Basic ethical and practical issues regarding scientific conduct
b. Basic issues of measurement and metrics
c. Assorted data collection methods
    1) Survey research
    2) Direct Observation
    3) Interviewing
    5) Literature searching
    6) Obtaining, cleaning & merging medical information system (MIS) data
    7) Medical record review

4. Data analysis

a. Matching analytic method to theoretical construct
b. Assorted analytic methods
    1) Basic Statistics
        a) Populations and their distribution
        b) Hypothesis testing
        c) Statistical significance, p values and confidence intervals
        d) Statistical power
        e) Basics of parametric statistics
        f) Basics of non-parametric statistics
        g) Basics of multi-variable regression
        h) Measures of Effect-size and Association
    2) Psychometric analysis
        a) Principal component and factor analysis
        b) Measures of reliability
        c) Conceptualization of measurement validation
    3) Markov models and statistical simulation
    4) Research Approaches from the Humanities
        a) Literary analysis
        b) Narrative analysis
        c) Ethnographic and anthropologic analysis
        d) Historical analysis
        e) Bioethics
    5) Basic econometrics

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