

# Recommended Curriculum Guidelines for Family Practice Residents

## Research and Scholarly Activity

This document has been endorsed by the American Academy of Family Physicians and was developed in cooperation with the Association of Departments of Family Medicine, the Association of Family Practice Residency Directors and the Society of Teachers of Family Medicine.

Research and scholarly activity are increasingly important components of family medicine education. Research and scholarly activity are broadly defined in the context of training family physicians. Research is a process or activity in which knowledge is tested or developed. Scholarly activity refers to an oral or written presentation that reflects a thorough and critical collection of knowledge. The audience for scholarly activity on the part of residents may be faculty, peers, medical students or the public.

Resident scholarship should be a requirement. Scholarship is broadly defined and may include such areas as qualitative/quantitative research projects, quality improvement projects, and community-oriented primary care projects. Residents may work individually or as a member of a team, but must show evidence of individual critical inquiry. This requirement for scholarship implies the need for residents' skill development in areas of (1) critical review of the literature, evidence-based medicine, and introduction to research methods; (2) faculty development; and (3) availability of resources, including information technology, resident time, and support. To support a culture of scholarship and inquiry, residents must approach their patient care as life-long learners (reflective practitioners) with a spirit of scholarship and inquiry.

### Attitudes

The resident should develop attitudes that encompass:

- A. A recognition of the importance of scholarly activity in family medicine.
- B. An appreciation and understanding of the role of research in clinical care.
- C. A desire to practice evidence-based medicine.

### Knowledge

The resident should develop a knowledge of:

- A. Basic research designs
  1. Interventional trials
    - a. Randomized controlled trials
    - b. Historical controlled trials
    - c. Cross over trials
    - d. Factorial design trials
  2. Observational studies
    - a. Cohort studies
    - b. Case controlled studies
    - c. Cross sectional studies
    - d. Ecological studies
  3. Meta-analyses
- B. The components of a research article
  1. Introduction
    - a. Validity of research question
    - b. Relevant literature review
  2. Methods
    - a. Appropriate sample
    - b. Familiarity with commonly used statistical tests (e.g., chi-square t test,).
    - c. Measurement of validity and reliability
  3. Results
    - a. Complete
    - b. Consistent
  4. Discussion/conclusions
    - a. Validity
    - b. Applicability to specific patients and populations
- C. Modes of written communication
  1. Review article
  2. Case report
  3. Patient/community education material
  4. Research article
  5. Book chapter
- D. Modes of presentation
  1. Grand rounds
  2. Case conference
  3. Community groups

### Skills

The resident should develop skills that encompass the ability to:

- A. Perform literature searches using MEDLINE and other resources.
- B. Critically evaluate research articles.
- C. Utilize evidence-based medical information resources.
- D. Interpret treatment and screening recommendations.
- E. Interpret and apply clinical decision rules.
- F. Appropriately apply evidence in clinical decision-making.

### Advanced Skills

- A. Formulate a research question
  1. Identify a problem or general question to investigate.
  2. Refine the problem so it can be investigated.
  3. Establish a clear purpose to the research.
  4. Translate the general question into specific hypotheses, recognizing the difference between research, null and alternative hypotheses.
  5. Define variables and terms operationally.
  6. Recognize the difference between independent and dependent variables, when applicable.
  7. Determine how each variable will be measured, recognizing different levels of measurement.
  8. Evaluate the reliability and validity of a given measurement.
  9. Evaluate variables and their measurement in the area of research.
- B. Design a descriptive and/or explanatory study
  1. Categorize research designs (e.g., observational versus interventional, prospective versus retrospective).



2. State the purpose, strengths and limitations of each design.
  3. Compare major types of studies, such as case reports and case control studies, etc.
  4. Explain important threats to internal and external validity as applicable to each study design.
  5. State the relationship between the chosen research design, the type of data collected and the necessary statistical techniques.
  6. Prepare for and use design specialist consultation.
  7. Thoroughly analyze the dominant research designs used in the area of study.
  8. Recognize sources of error in the study and methods of minimizing error.
- C. Collect and analyze data
1. Distinguish inferential from descriptive statistics.
  2. Determine the universe, population, appropriate sample, sample size and appropriate sampling technique for a given study.
  3. Understand the application of commonly used statistical functions, e.g., chi-square, test, analysis of variance, correlations and multiple regression.
  4. Construct a plan for managing data files and analyzing data according to level of measurement and research design.
  5. Be familiar with statistical packages (e.g., SPSS) to direct computer personnel in the proper analysis to use and related decisions (for example, how to handle missing data).
  6. Interpret printouts on common analyses from statistical packages for the research area.
  7. Understand how to graphically summarize data (e.g., histogram, bar graph, pie chart, frequency curve).
  8. Report results correctly and be able to cite both strengths and limitations of the study based on the data.
  9. Prepare for and use consultation with computer analysts and statisticians.
  10. Understand the more advanced statistical tests that may be used in the research area, e.g., discriminate analysis, principal components analysis, multiple logistic analysis.
- D. Evaluate and discuss study findings
1. Explain the outcome of given analyses in terms of the originally stated hypothesis.
  2. Conduct additional literature review as needed to elaborate on findings and their implications for a given body of research.
  3. Integrate the research findings with the existing literature by discussing what is known and unknown and what requires further study.
  4. Express appropriate cautions in interpreting results and base these cautions on methodologic and theoretic conditions.
  5. Place the study in the context of existing research and justify its contribution to important questions in the area.
- E. Understand how to write a research paper
1. State the primary purpose of the project.
  2. Explain what is new, different or important about the findings.
  3. List or diagram the primary points of the message and their connections.
  4. Determine the background information (e.g. facts, definitions, references).
  5. Determine boundaries for the subject: which points or topics are included, which are excluded.
  6. Implement a system for abstracting/documenting literature and other sources of information on a topic.
  7. Use frameworks for structuring material, e.g., diagrams, notes, content outlines, mini-drafts in a publication format.
  8. Schedule a timetable for writing that encourages systematic and frequent writing sessions.
  9. Build in a mechanism for evaluation and revision.
- F. Apply rules of English usage, style and composition for publication
1. Write in the active voice at the appropriate reading level.
  2. Avoid sex-biased or culture-biased language.
  3. Decode jargon
  4. Eliminate redundancy.
  5. Avoid both pompous and overly tentative statements.
  6. Use variety in adjectives, verbs and nouns, and the pattern of sentence structure.
7. Allow humor, warmth or other expressions of feeling to surface when appropriate to the audience/publication format.
8. Edit for economy of expression.
  9. Sequence arguments, concepts and facts in a logical manner.
  10. Construct graphs, charts, tables and figures according to reference guidelines.
- G. Make presentation effectively utilizing the following:
1. Speaking
  2. Audio-visual aids
  3. Computer-assisted learning

## Implementation

Assessment of medical research literature can be integrated into residency training through didactic sessions and a journal club. Production of scholarly work can be accomplished by expecting all residents to deliver at least one scholarly presentation, including a written handout, during their residency. All faculty in the program should have basic research knowledge so they can assist the residents as mentors. Residents should have access to other faculty or staff in the program who are researchers. Practice of the skills involved in actually conducting research requires the use of an elective or additional time.

## Resources

- Users' guides to the medical literature: I – XXV. Evidence-Based Working Group. JAMA 1993;2000.
- Ewigman BG. Fire in the belly: doing what it takes to produce excellent research. Fam Med 1996;42:199-203.
- Henry R. Developing research skills for medical school faculty. Fam Med 1997;29:258-61.
- Nutting PA. Practice-based research networks: building the infrastructure of primary care research. J Fam Pract 1996;42:199-203.
- Starfield B. A framework for primary care research. J Fam Pract 1996;42:181-5.
- Stange KC. Primary care research: barriers and opportunities. J Fam Pract 1996;42:192-8.
- Riegelman RK. Studying a study and testing a test: how to read the health science literature. Boston: Little, Brown, 1996.