

**CURRICULUM ON MEDICAL KNOWLEDGE  
MSU INTERNAL MEDICINE RESIDENCY PROGRAM**

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Revision date: December 2014

TEC approval date: 1/21/15

**I. Educational Purpose and Goals**

Physicians must demonstrate knowledge about both established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences. Physicians must also be able apply this knowledge to patient care. MSU Internal Medicine residents must therefore develop breadth and depth of medical knowledge, and they must develop analytic skills to continuously refine and appropriately apply their knowledge in varied clinical settings.

**II. Principal Teaching Methods**

a. Supervised Direct Patient Care:

- i. Residents encounter diverse inpatient and outpatient populations. When providing care to these patients under the supervision of an attending physician, residents must incorporate knowledge of both biomedical and social-behavioral sciences. Management rounds, morning report, consultation services, and outpatient clinic experiences all contribute to an expanding knowledge base.
- ii. Required inpatient clinical experiences include General Internal Medicine (Firm, Night Float), Critical Care, Cardiology, Neurology, and Emergency Medicine.
- iii. Required outpatient medicine learning experiences include continuity clinic, Women's Health, Emergency Medicine, Geriatrics, Hematology-Oncology, Ambulatory Medicine – 3, and a minimum number of ambulatory medicine electives.
- iv. Required social-behavioral training is performed during the Psychosocial Medicine block and the Complex Care Clinic. Senior residents attend up to 8 of these clinics per year.
- v. Small Group Discussions: All residents on Firm and Night Float rotations attend teaching morning reports (morning report, multidisciplinary report, and biopsychosocial report) as described in the residency manual.
- vi. Patient logs: Osteopathic residents maintain logs of patients seen during clinic care. The logs are reviewed by the osteopathic program director.

b. Didactic Sessions

- i. *Core Curriculum Conference*: This weekly lecture series covers fundamental clinical and scientific topics pertinent to hospital-based medicine, as well as special topics addressing the Core Competency curriculum and mandatory ACGME interdisciplinary topics. Topics are drawn largely from the major specialty disciplines and are repeated in an 18-month cycle to ensure adequate opportunity for all residents to attend core conferences.
- ii. *Medical Emergencies Conference*: These sessions repeat yearly during the initial 8-10 weeks of the academic year, reviewing knowledge of common urgent medical symptoms.
- iii. *Journal Club*: This monthly conference includes evidence-based medicine and basic science topics. Both types of sessions teach critical reading skills and analysis, with resident presentation of articles from current medical literature. Articles contributing to recent advances in knowledge are stressed.
- iv. *Morbidity and Mortality Conference*: While this monthly conference primarily focuses on practice-based learning and improvement, it also covers fundamental medical knowledge in basic and clinical sciences.
- v. *ECG conference*: Monthly ECG didactics are followed by interactive ECG readings in a group setting, stressing fundamental ECG principles, wave forms, ECG patterns for common clinical conditions, and ECG patterns in cardiovascular emergencies.
- vi. *Clinical Pharmacology Conference*: This monthly conference teaches principles of pharmacotherapy. Topics coincide with board review or are drawn from resident questions.
- vii. *Interesting Case Conference*: Residents give case presentations to their peers based on clinical encounters, with review of pathophysiology, diagnosis and treatment strategies.
- viii. *Ethics Conference*: This conference teaches residents to identify key ethical principles and potential ethical conflicts.
- ix. *Board Review*: The subject books of the MKSAP series are covered; residents are expected to read the selected MKSAP book including the self-assessment questions. Brief presentations focus on facilitation of the ability to answer the questions. A faculty facilitator discusses the questions and responds to resident questions.
- x. *Grand Rounds*: Traditional Grand Rounds are held weekly.
- xi. *Ambulatory Conference*: Periodic conferences focus on knowledge required for the practice of ambulatory medicine.
- xii. *Clinic Conference*: Each week, residents review a topic within the Yale Ambulatory Curriculum series as a small group.
- xiii. *Balint Groups*: Quarterly, residents meet with a facilitator to discuss challenging sociobehavioral aspects of their training and clinical care.

- xiv. *PEERS Day*: This annual conference for R1 residents emphasizes teaching techniques, including RIME assessment, one-minute preceptor skills, evaluation methods, and giving feedback.
  - xv. *Morning report*: On general medicine inpatient rotations, residents participate in interactive didactic sessions three days a week, as described in the residency manual. Discussions are case based.
  - xvi. *Osteopathic journal clubs*. PGY1 residents meeting AOA training requirements participate in weekly journal clubs.
  - xvii. *Statewide Campus System sessions*. Osteopathic residents attend required didactic sessions offered through the College of Osteopathic Medicine's SCS. Topics cover medical knowledge, practice management, ethics, performance of procedures, and more.
  - xviii. *OMM workshops*. PGY1 residents meeting AOA training requirements participate in required OMM/OPP workshops offered through Sparrow Hospital.
  - xix. *Statewide Campus System board review*. All PGY3 osteopathic residents participate in a mandatory, 1 week board review course in June.
- c. Procedure training
- i. *Procedures Consult*. Subscriptions for this web-based system are provided by Sparrow Hospital. Modules for commonly encountered internal and emergency medicine procedures are included. Residents must pass post-module quizzes for a specified set of procedures, in compliance with American Board of Internal Medicine and American Osteopathic Association requirements.
  - ii. *Anesthesiology*. Residents meeting the American Osteopathic Association training requirements are required to complete two weeks of anesthesiology, with an emphasis on perioperative physiology and complications as well as procedure performance. Knowledge is assessed using an end of rotation exam. Allopathic residents may complete this rotation as an elective.
  - iii. *Workshops*.
    1. Formal instruction regarding procedure indications, consent, performance technique, complications, and post procedure care are taught through workshops with hands-on learning using simulators. Specific procedures covered may vary from year to year based on need.
    2. BLS/ACLS training: Orientation and R2 recertification
    3. Pelvic exam training during orientation using videotaped instruction and professional models with faculty supervision.
  - iv. *OSCE*. R1 residents complete a required OSCE within the first month of training. Immediate directed feedback is provided at the informed consent and aseptic technique stations.

- d. Administrative Medicine
  - i. Residents may complete a 2-4 week rotation in hospital administration, focusing on quality, safety, or business of medicine.
  - ii. The American Medical Association Introduction to the Practice of Medicine modules will be available to residents as of 2015. The on-line modules include an array of administrative and career guidance topics.
- e. Scholarly Activities and Research
  - i. Residents must engage in scholarly activity, as demonstrated by at minimum presentation of a case report at the regional research day. Program support is available for scholarly presentations and publication fees on a first come, first serve basis.
  - ii. All residents must complete research ethics training through the Michigan State University Institutional Review Board.
  - iii. All residents complete a PICO literature search under the supervision of the Sparrow librarians as part of the senior-level night float rotations.
  - iv. Residents may request up to two 4-week blocks of clinical investigation electives during their three years of training. During these blocks, residents work with a mentor to explore biomedical, clinical, or cognate sciences in depth.
- f. Independent Study
  - i. All residents must complete an independent study module and quiz on mitigation of fatigue. Completion is tracked using New Innovations.
  - ii. Independent review of MKSAP books and other board preparation materials as needed is expected in preparation for Board Review conferences.
  - iii. Residents have 24-hour access to written and electronic medical reference materials, including access to MSU's and Sparrow Hospital's extensive web-based electronic library. Residents are expected to independently read primary literature.
  - iv. Residents may request up to 5 days/yr of leave to attend scientific meetings or other CME activities. In addition, residents receive a yearly stipend toward texts, journals, or attendance at approved scientific meetings.

### III. Educational Content

- a. Medical Knowledge Topics/Content: The following topics are addressed throughout didactic conferences. Supervised patient care rotations pertinent to each topic are noted:
  - i. General Ambulatory Internal Medicine - Included in the mandatory Women's Health, Ambulatory Medicine-3, Continuity Clinic, Emergency Medicine, Psychosocial and Geriatrics

experiences, elective ambulatory rotations, the ambulatory medicine conference didactic series, and clinic conferences:

1. Gender specific medicine, including office gynecology and women's medicine
  2. Urgent care/emergency medicine
  3. Ambulatory consultative medicine
  4. Geriatrics
- ii. General Inpatient Internal Medicine – Included in Firm and Night Float rotations:
1. Group-practice based secondary care medicine, including geriatrics
  2. Inpatient Consultative Medicine
  3. Hospitalist medicine
- iii. Medical Subspecialties – Addressed in core didactics and the required Critical Care, Cardiology, Hematology/Oncology, and general inpatient medicine rotations. Further subspecialty training is available in elective rotations for both inpatient and ambulatory subspecialties.
1. Allergy and Immunology
  2. Cardiology
  3. Cardiology-Ambulatory
  4. Electrophysiology
  5. Endocrinology and Metabolism
  6. Gastroenterology
  7. Hematology/Oncology
  8. Hospice
  9. Infectious Diseases
  10. Nephrology
  11. Phlebology
  12. Pulmonology
  13. Rheumatology
  14. HIV/Viral Hepatitis
- iv. Other clinical knowledge essential to the practice of internal medicine, taught in clinical rotations
1. Emergency Medicine – Required
  2. Neurology – Required
  3. Psychiatry - elective
  4. Psychosocial medicine – Required
  5. Dermatology –Ambulatory selective
  6. Ophthalmology – Ambulatory selective
  7. Sports Medicine/Outpatient orthopedics – Ambulatory selective
  8. Physical Medicine and Rehabilitation – Elective
  9. Anesthesiology – Required for AOA/Elective for ACGME
  10. Occupational and Environmental Medicine – Elective

11. Radiology – Elective
  12. Pathology - Elective
  13. Hand surgery – Elective
  14. Osteopathic Manipulative Medicine – Elective
  15. Inpatient ENT - Elective
- v. Interdisciplinary knowledge: These topics are addressed at least once every 18 months in the mandatory didactics.
1. Adolescent medicine
  2. Clinical ethics
  3. Medical genetics and genomics
  4. Quality assessment and quality improvement:
  5. Risk management
  6. Preventive medicine
  7. Medical informatics and decision-making skills
  8. Law and public policy
  9. Pain management
  10. End-of-life care
  11. Domestic violence
  12. Physician impairment
  13. Substance-use disorders
  14. Fatigue
- vi. Knowledge central to the performance and interpretation of procedures:
1. Technical knowledge for performance of procedures
    - a. Instructed during orientation
      - i. Basic and advanced cardiac life support
      - ii. Pap smear and endocervical culture
      - iii. Endotracheal intubation
    - b. Instructed through self-study on-line modules in Procedure Consult
      - i. Abdominal paracentesis
      - ii. Arterial puncture and arterial line
      - iii. Arthrocentesis
      - iv. Central venous line
      - v. Incision and drainage of abscesses
      - vi. Lumbar puncture
      - vii. Nasogastric intubation
      - viii. Pulmonary artery catheterization
      - ix. Skin biopsies
      - x. Soft tissue injections
      - xi. Thoracentesis
  2. Interpretation of laboratory and other technical data
    - a. Instructed as part of mandatory conferences
      - i. Electrocardiogram
    - b. Instructed in clinical rotations

- i. Peripheral blood smear
  - ii. Sputum gram stain
  - iii. Microscopic urine
  - iv. KOH and wet prep of vaginal discharge
  - v. Fecal occult blood
  - vi. Chest roentgenogram
  - vii. Spirometry
  - viii. Exercise stress tests
- 3. Optional procedural knowledge content available to interested residents during the course of subspecialty rotations. Rotations with the available experience are noted (not exhaustively).
  - a. Removal of skin lesions and skin biopsy (cryotherapy or excision) – ambulatory medicine and continuity clinic
  - b. Elective cardioversion – cardiology
  - c. Soft tissue and joint injections – ambulatory medicine, rheumatology, and sports medicine/outpatient orthopedics
  - d. Temporary pacemaker placement – cardiology
  - e. Treadmill exercise testing – cardiology
  - f. Spirometry - pulmonology, occupational and environmental medicine
  - g. Sleep study interpretation – pulmonology
  - h. Ambulatory electrocardiogram interpretation – cardiology
  - i. Ambulatory blood pressure monitor interpretation – cardiology
- b. Patient characteristics – Medical knowledge is acquired during supervised care of a diverse population of general medical patients, including patients with neurologic presenting complaints. Internal medicine residents also see patients in consultation on surgical, rehabilitation, ob/gyn, or subspecialty services. The patient population has extensive socioeconomic diversity.
- c. Learning venues:
  - i. Sparrow Hospital: A level-one trauma center and the largest mid-Michigan hospital, serving as the regional medical center for an eight-county area.
  - ii. Michigan State University HealthTeam Practices (Clinical Center, Sparrow Professional Building and Breslin Cancer Center): An ambulatory clinical site with conference/lecture room facilities
  - iii. Community Physician Offices (clinical faculty of Michigan State University)
- d. Ancillary services interacted with
  - i. Medical librarians are available at both Michigan State University

- and Sparrow Hospital.
- ii. Clinical pharmacists, respiratory therapists, physical and occupational therapists, case managers, and social workers interact with residents in critical care, the emergency department, and med/surg units in Sparrow Hospital.
- iii. Care managers and social workers interact with residents at Michigan State University.
- e. Structure of the curriculum
  - i. Experiential medical knowledge acquisition
  - ii. The block training structure, including required conferences and required rotations, is fully documented in the MSU Residency Manual and the residency website. Individual rotation structures are documented separately.

#### IV. **Principal Ancillary Educational Materials**

- a. Residents must purchase the Medical Knowledge Self Assessment Program (MKSAP) produced by the American College of Physicians, and are provided funds to do so. MKSAP prep-for-boards is available to residents through the residency office.
- b. Readings in primary literature are assigned by attending physicians throughout rotations.
- c. The Yale Ambulatory Curriculum is used as the basis for clinic conferences.
- d. Full service 24-hour libraries with electronic and web-based databases are present at Sparrow Hospital, with onsite medical librarians. Standard texts and medical journals are available in both print and electronic formats. All residents have 24-hour accessibility to the extensive online Michigan State University electronic library.
- f. In the residency office and hospital libraries, videotapes and audiotapes are available including procedures videotapes. Residents can access Procedures Consult remotely after registering as a user at Sparrow Hospital.
- g. Continuity clinics are stocked with resource texts.

#### V. **Methods of Evaluation**

- a. Resident Performance
  - i. Examinations and certifications
    1. *ACLS/BLS* certification is required.
    2. *In Training Exam*. Residents are required to take the In Training Exam (published by the American College of Physicians) at least twice during residency, and are expected to take it every year. Residents with DO degrees are expected to take the American Osteopathic Association in-training exam every spring. Individual performance reports are provided to each resident; residents with score

below the 20<sup>th</sup> percentile for rank must meet with the program director or his/her designee to discuss results and devise a plan to address medical knowledge and/or test taking skills. Results are used only for formative feedback, and are not used to decide promotion. However, percentile scores below 50% result in loss of moonlighting privileges.

3. *RI OSCE*. Residents complete a medical knowledge quiz as part of the orientation OSCE at the Learning and Assessment Center. This is a formative experience focusing on core medical knowledge across specialties.
  4. *Board Review Exam Series*. Residents must take and pass all internal examinations administered as part of the board review didactics; the percentage required to pass varies with stage of training. Residents failing to do so must meet with the program director or his/her designee to develop a medical knowledge remediation plan.
  5. *Procedures Consult post-tests*. Residents must take and pass Procedures Consult module post-tests for those procedures for which the program requires demonstration of knowledge only (e.g., pulmonary artery catheter placement). (NB: If a resident completes and documents the number required for certification for a particular procedure, then credit is given for demonstration of knowledge.)
  6. *USMLE or COMLEX Step 3*. All residents must pass the Step 3 exam prior to promotion to R3.
  7. *ECG exam*. All residents take an ECG exam at the beginning and end of each academic year. They must pass it by the conclusion of their R3 year.
  8. *Institutional Review Board certification*. Each resident must complete the Michigan State University on-line research ethics training at least once during his/her training.
- ii. Clinical evaluations
1. *Global Evaluations*. Faculty and nursing staff complete web-based electronic resident evaluation forms provided by the residency office for each rotation. The evaluations are competency-based and assess medical knowledge. The evaluations are shared with the resident, are available for on-line review by the resident at their convenience, and are available to the residency office for internal review. Evaluations are part of the resident file and are incorporated into the semiannual performance review for directed resident feedback.
  2. *Mini-CEX*. Faculty members may also assess resident knowledge using the standard ABIM mini-CEX forms.

Each resident must have ten mini-CEXes documented per year.

3. *Chart Stimulated Recall*. Residents complete a chart stimulated recall exercise with a faculty member or the R4 chief resident during assigned night float rotations.
4. *Social-behavioral knowledge* is assessed at the completion of the required Psychosocial Medicine rotation as well as during general medicine rotations.
5. *Patient satisfaction surveys*. Surveys are distributed to patients during assigned continuity clinics.
6. *Nurse/Case Manager evaluations*. Nursing staff and the nurse case manager assigned to the Firm complete competency-based evaluations of assigned residents twice annually (clinic) or based on rotation assignment (Firm and night float), respectively.

**b. Program and Faculty Performance**

- i. *Resident Global Evaluations*. Using the online evaluation system, residents complete service evaluations. The residency office reviews evaluations and attending physicians receive anonymous copies of aggregate completed evaluations. Collective evaluations serve as tools to assess faculty development needs. The Training and Evaluation Committee review evaluation results annually.
- ii. *Program-wide In Training Exam Results*. Residency core faculty and the Training and Evaluation Committee assess instructional outcomes using results of the annual In-Training Exam.
- iii. Graduate Outcomes.
  1. *ABIM Board Certification pass rates* are reviewed annually.
  2. *Graduate Survey*. We send graduates an electronic survey to ask their opinions about their preparation across the spectrum of subspecialty areas, including knowledge.
  3. *Employer Survey*. We send employers of recent graduates surveys that globally assess the physicians' core competencies.

**VI. Institutional Resources: Strengths and Limitations**

**a. Strengths**

- i. Faculty members have received high ratings for ability and dedication to teaching, and have won numerous awards for teaching excellence.
- ii. 24 hour medical library and online medical literature is available at all major training sites. Medical research librarians are available at each major teaching site.
- iii. Psychosocial Medicine training is performed by dedicated and experienced faculty.

- b. Limitations
  - i. Lack of a transplant unit, burn unit, or ECMO limit training in these areas.

**VII. Medical Knowledge Specific Competency Objectives.**

Residents must demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care. Residents are expected to:

- a. Know and apply the basic and clinically supportive sciences which are appropriate to their discipline
  - i. R1 residents will
    - 1. Demonstrate knowledge of common procedural indications, contraindications, equipment, specimen handling and patient after-care.
    - 2. Demonstrate knowledge of basic and clinical sciences.
    - 3. Demonstrate satisfactory knowledge of common medical conditions, sufficient to manage urgent complaints with supervision. Residents must exhibit sufficient content knowledge of common conditions to provide care with minimal supervision by completion of the R1 year.
    - 4. Pass all internal board review subject exams.
  - ii. R2 residents will additionally
    - 1. Demonstrate a progression in content knowledge and analytical thinking in order to develop well-formulated differential diagnoses for multi-problem patients.
    - 2. Demonstrate understanding and responsiveness to socio-behavioral issues.
    - 3. Develop knowledge of statistical principles. Understand and appropriately use sensitivity, specificity, predictive values, likelihood ratio, number needed to treat, and odds ratios.
    - 4. Pass the USMLE or COMLEX Step 3 exam, with documented passing grade required for promotion to R3.
  - iii. R3 residents will additionally
    - 1. Demonstrate growing knowledge in the area of their chosen career path.
    - 2. Demonstrate knowledge regarding performance of procedures while minimizing patient risk and discomfort.
    - 3. Exhibit knowledge of effective teaching and evaluation methods, including RIME, one-minute preceptor, and evaluation techniques.
    - 4. Pass the final ECG reading examination as part of the ECG conference series requirements.
- b. Demonstrate an investigatory and analytic approach to clinical situations

- i. R1 residents will
  - 1. Exhibit use of library resources.
  - 2. Exhibit self-motivation to learn.
  - 3. Demonstrate sufficient analytic skills necessary to develop appropriate assessments and plans for common medical diagnoses and complaints.
- ii. R2 residents will additionally
  - 1. Independently present up-to-date scientific evidence to support hypotheses.
- iii. R3 residents will additionally
  - 1. Regularly display self-initiative to stay current with new medical knowledge.
  - 2. Regularly demonstrate knowledge of the impact of study design on validity or applicability to practice.
- c. Demonstrate incorporation of osteopathic principles to clinical situations
  - i. Osteopathic R1 residents will demonstrate understanding of somatovisceral relationships and the role of the musculoskeletal system in disease