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AMIA Board White Paper ■

## Program Requirements for Fellowship Education in the Subspecialty of Clinical Informatics

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**Abstract** The Program Requirements for Fellowship Education identify the knowledge and skills that physicians must master through the course of a training program to be certified in the subspecialty of clinical informatics. They also specify accreditation requirements for clinical informatics training programs. The AMIA Board of Directors approved this document in November 2008.

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### Introduction

The Program Requirements for Fellowship Education for the Subspecialty of Clinical Informatics identify the knowledge and skills that must be mastered through the course of fellowship training and specify accreditation requirements for training programs. The document is based on the Core Content for Clinical Informatics and follows the format that all subspecialties use to specify the requirements for training programs accreditation.<sup>1</sup> The American Board of Medical Specialties considers these two documents along with other requirements and factors when deciding whether to establish a new medical subspecialty. This document is the result of a two-year national development process initiated by the

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The American Medical Informatics Association (AMIA) Board of Directors thanks the members of the Clinical Informatics Training Program Requirements Team for their thoughtful, thorough, and balanced analysis that resulted in this document. Team members included: Christopher Cimino, MD; Reed M. Gardner, PhD, Carole A. Gassert, PhD, RN; John H. Holmes, PhD; Gretchen Purcell Jackson, MD, PhD; Stasia Kahn, MD; Christoph U. Lehmann, MD; Charles Safran, MS, MD (Chair); M. Michael Shabot, MD (Vice Chair). AMIA acknowledges the contributions of the individuals who provided comments on a draft of the Program Requirements. AMIA also thanks the Robert Wood Johnson Foundation for generously supporting this project.

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American Medical Informatics Association and supported by the Robert Wood Johnson Foundation.<sup>2</sup> In November 2008, the AMIA Board of Directors approved both the Core Content and Program Requirements for clinical informatics.

### Definition and Description of the Subspecialty

Clinical informaticians transform health care by analyzing, designing, implementing, and evaluating information and communication systems that enhance individual and population health outcomes, improve patient care, and strengthen the clinician–patient relationship.

Clinical informaticians use their knowledge of patient care combined with their understanding of informatics concepts, methods, and tools to:

- assess information and knowledge needs of health care professionals and patients;
- characterize, evaluate, and refine clinical processes;
- develop, implement, and refine clinical decision support systems;
- lead or participate in the procurement, customization, development, implementation, management, evaluation, and continuous improvement of clinical information systems.

Physicians who are board-certified in clinical informatics collaborate with other health care and information technology professionals to promote patient care that is safe, efficient, effective, timely, patient-centered, and equitable.

### Program Requirements

**(common program requirements are in BOLD)**

#### I. Institutions

##### A. Sponsoring Institution

**One sponsoring institution must assume the ultimate responsibility for the program, as described in the Institutional Requirements, and this responsibility extends to fellow assignments at all participating sites.**

The sponsoring institution and program must ensure that the program director has sufficient protected time and financial support for his or her educational and administrative responsibilities to the program.

The sponsoring institution must:

1. demonstrate a written commitment to education and research sufficient to support the fellowship program;
2. establish the clinical informatics subspecialty fellowship within a department or an administrative unit that has a demonstrable commitment to clinical informatics and whose primary mission is the advancement of education and patient care;
3. provide compensation and benefits for fellows as well as faculty, and other resources needed to fulfill accreditation requirements in education, clinical informatics, and research;
4. provide at least 20% of the program director's salary for the administrative activities of the clinical informatics subspecialty program. The program director must not be required to generate clinical or other income to provide this administrative support;
5. notify the Review Committee within 60 days of changes in institutional governance, affiliation, or resources that affect the educational program;
6. demonstrate financial capacity to support two fellowship positions at all times.

#### B. Primary Training Site

The primary training site is defined as the health care facility that provides the required training resources. It should be the location of the program director's major activity and the location where the fellows spend the majority of clinical informatics training time.

#### C. Participating Sites

Programs using participating sites must ensure the provision of a unified educational experience for the fellows. Each participating site must offer significant educational opportunities that complement the resources available at the primary training site. The reasons for including each site as part of the training program must be stated in writing.

1. **There must be a program letter of agreement (PLA) between the program and each participating site providing a required assignment. The PLA must be renewed at least every five years.**

The PLA should:

- a) identify the faculty who will assume both educational and supervisory responsibilities for fellows;
- b) specify their responsibilities for teaching, supervision, and formal evaluation of fellows, as specified later in this document;
- c) specify the duration and content of the educational experience;

- d) state the policies and procedures that will govern fellow education during the assignment.

2. The program director must submit any additions or deletions of participating sites routinely providing an educational experience, required for all fellows, of one month full time equivalent (FTE) or more through the Accreditation Council for Graduate Medical Education (ACGME) Accreditation Data System (ADS).
3. The Review Committee must give prior approval for any site providing three months or more of training.
4. Assignments at participating sites must be of sufficient length to ensure a quality educational experience. All participating sites must demonstrate the ability to promote the program goals and educational and peer activities.

## II. Program Personnel and Resources

### A. Program Director

1. **There must be a single program director with authority and accountability for the operation of the program. The sponsoring institution's Graduate Medical Education Committee must approve a change in program director. After approval, the program director must submit this change to the ACGME via the ADS.**
2. **The program director should continue in his or her position for a length of time adequate to maintain continuity of leadership and program stability.**
3. **Qualifications of the program director must include:**
  - a) **requisite specialty expertise and documented educational and administrative experience acceptable to the Review Committee;**
  - b) **current certification in clinical informatics by a member board of the American Board of Medical Specialties, or specialty qualifications acceptable to the Review Committee;**
  - c) **current medical licensure and appropriate medical staff appointment or professional qualifications acceptable to the Review Committee;**
  - d) **at least five years of experience in clinical informatics education, research, and practice.**
4. **The program director must administer and maintain an educational environment conducive to educating the fellows in each of the ACGME competency areas. The program director must:**
  - a) **oversee and ensure the quality of didactic and clinical education in all sites that participate in the program;**
  - b) **approve a local director at each participating site who is accountable for fellow education;**
  - c) **approve the selection of program faculty as appropriate;**

- d) evaluate program faculty and approve the continued participation of program faculty based on evaluation;
  - e) monitor fellow supervision at all participating sites;
  - f) prepare and submit all information requested by the ACGME, including but not limited to the program information forms and annual program fellow updates to the ADS, and ensure that the information submitted is accurate and complete;
  - g) provide each fellow with documented semi-annual evaluation of performance with feedback;
  - h) ensure compliance with grievance and due process procedures, as set forth in the Institutional Requirements and implemented by the sponsoring institution;
  - i) provide verification of fellowship education for all fellows, including those who leave the program prior to completion;
  - j) implement policies and procedures consistent with the institutional and program requirements for fellow duty hours and the working environment, including moonlighting, and, to that end, must:
    - (1) distribute these policies and procedures to the fellows and faculty;
    - (2) monitor fellow duty hours, according to sponsoring institutional policies, with a frequency sufficient to ensure compliance with ACGME requirements;
    - (3) adjust schedules as necessary to mitigate excessive service demands and/or fatigue;
    - (4) if applicable, monitor the demands of at-home call and adjust schedules as necessary to mitigate excessive service demands and/or fatigue.
  - k) monitor the need for and ensure the provision of back-up support systems when patient care responsibilities are unusually difficult or prolonged;
  - l) comply with the sponsoring institution's written policies and procedures, including those specified in compliance with the Institutional Requirements, for selection, evaluation, and promotion of fellows, disciplinary action, and supervision of fellows;
  - m) be familiar with and comply with ACGME and Review Committee policies and procedures as outlined in the ACGME Manual of Policies and Procedures;
  - n) obtain review and approval of the sponsoring institution's GMEC Designated Institutional Officer (DIO) before submitting to the ACGME information or requests for the following:
    - (1) all applications for ACGME accreditation of new programs;
    - (2) changes in fellow complement;
    - (3) major changes in program structure or length of training;
    - (4) progress reports requested by the Review Committee;
    - (5) responses to all proposed adverse actions;
    - (6) requests for increases or any change to fellow duty hours;
    - (7) voluntary withdrawals of ACGME-accredited programs;
    - (8) requests for appeal of an adverse action;
    - (9) appeal presentations to a Board of Appeal or the ACGME;
    - (10) proposals to ACGME for approval of innovative educational approaches.
  - o) obtain DIO review and co-signature on all program information forms, as well as any correspondence or document submitted to the ACGME that addresses:
    - (1) program citations, and/or
    - (2) request for changes in the program that would have significant impact, including financial, on the program or institution.
  - p) possess a current appointment with the sponsoring institution;
  - q) dedicate sufficient time for administration of the program and receive institutional support for that administrative time;
  - r) participate in academic societies and in educational programs designed to enhance his or her educational and administrative skills;
  - s) be located at the primary training site;
  - t) must be evaluated annually by the GME office.
- B. Faculty**
1. At each participating site, there must be a sufficient number of faculty with documented qualifications to instruct and supervise all fellows at that location. At the primary training site, there must be a minimum of three faculty members to instruct and supervise fellows. Total faculty effort must be equal to at least one full-time equivalent.
 

**The faculty must:**

    - a) devote sufficient time to the educational program to fulfill their supervisory and teaching responsibilities, and to demonstrate a strong interest in the education of fellows;
    - b) administer and maintain an educational environment conducive to educating fellows in each of the ACGME competency areas;
    - c) administer and maintain an educational environment conducive to educating fellows in the core competencies of clinical informatics.
  2. The physician faculty must have current certification in the subspecialty of clinical informatics,

or possess qualifications judged to be acceptable by the Review Committee.

3. The physician faculty must possess current and appropriate institutional appointments.
4. The nonphysician faculty must have appropriate qualifications in their field and hold appropriate institutional appointments.
5. The faculty must establish and maintain an environment of inquiry and scholarship with an active research component.
  - a) The faculty must regularly participate in organized clinical discussions, rounds, journal clubs, and conferences.
  - b) Some members of the faculty should also demonstrate scholarship by one or more of the following:
    - (1) peer-reviewed funding;
    - (2) publication of original research or review articles in peer-reviewed journals or chapters in textbooks;
    - (3) publication or presentation of case reports or clinical series at local, regional, or national professional and scientific society meetings;
    - (4) participation in national committees or educational organizations.
  - c) Faculty should encourage and support fellows in scholarly activities.

#### C. Other Program Personnel

The institution and the program must jointly ensure the availability of all necessary professional, technical, and clerical personnel for the effective administration the program.

#### D. Resources

1. The institution and the program must jointly ensure the availability of adequate resources for fellow education, as defined in the specialty program requirements.
2. There must be space and equipment for the educational program, including meeting rooms, classrooms, examination rooms, computers, Internet access, visual and other educational aids, and work/study space.
3. The primary training site must operate a robust clinical information system that:
  - a) collects, stores, retrieves, and manages health and wellness data and information;
  - b) offers clinical decision support;
  - c) supports ambulatory, inpatient, and remote care settings.
4. Administrative support must include adequate secretarial and administrative staff and technology to support the program director.

#### E. Medical Information Access

Fellows must have ready access to specialty-specific and other appropriate reference material in print or electronic format. Electronic medical literature databases with search capabilities should be available.

### III. Fellow Appointment

#### A. Eligibility Criteria

The program director must comply with the criteria for fellow eligibility as specified in the Institutional Requirements. Fellows must have completed a core training program accredited by ACGME.

#### B. Number of Fellows

The program director may not appoint more fellows than approved by the Review Committee, unless otherwise stated in the specialty-specific requirements. The program's educational resources must be adequate to support the number of fellows appointed to the program.

#### C. Fellow Transfer

1. Before accepting a fellow who is transferring from another program, the program director must obtain written or electronic verification of previous educational experiences and a summative competency-based performance evaluation of the transferring fellow.
2. A program director must provide timely verification of fellowship education and summative performance evaluations for fellows who leave the program prior to completion.

#### D. Appointment of Fellows and Other Students

Given the interdisciplinary nature of clinical informatics, the presence of other learners (including, but not limited to, residents from other specialties, subspecialty fellows, PhD students, and nursing students) in the program will likely enhance fellows' educational experiences. The program director must assure that the presence of other learners does not interfere with the appointed fellows' education. The program director must report the presence of other learners to the DIO and GMCE in accordance with sponsoring institution guidelines.

### IV. Educational Program

#### A. Curriculum

The curriculum must contain the following educational components:

1. Overall educational goals for the program, which the program must distribute to fellows and faculty annually;
2. Competency-based goals and objectives for each assignment at each educational level, which the program must distribute to fellows and faculty annually, in either written or electronic form. These should be reviewed by the fellow at the start of each rotation. For purposes of this document, a rotation refers to any experiential learning opportunity that lasts for a minimum of two weeks.
3. Written goals and objectives for each rotation or major learning experience. These goals and objectives should:
  - a) include the educational purpose, teaching methods, types of clinical settings and information systems, other educational resources



- to be used, and the method for evaluation of fellows' competence;
- b) define the level of fellows' supervision by faculty members;
- c) be reviewed and revised at least every three years by faculty members and fellows to keep the goals and objectives current and relevant.

3. Regularly scheduled didactic sessions;
4. Delineation of fellow responsibilities, progressive responsibility, and supervision of fellows over the continuum of the program.
5. ACGME Competencies

The program must integrate the following ACGME competencies into the curriculum.

a) Patient Care

Fellows must be able to leverage information and communications technology to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Fellows:

- (1) are expected to learn the informatics dimensions of health promotion, disease prevention, diagnosis, care, and treatment of individuals and their families across the lifespan;
- (2) are expected to use informatics tools to improve assessment, interdisciplinary care planning, management, coordination, and follow-up of patients;
- (3) are expected to use informatics tools such as electronic health records or personal health records to facilitate the coordination and documentation of key events in patient care, such as family communication, consultation around goals of care, immunizations, advance directive completion, and involvement of multiple team members as appropriate;
- (4) are expected to use informatics tools to promote confidentiality and security of patient data.

b) Medical Knowledge

Fellows must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care. Fellows are expected to learn the scientific method of problem solving and evidence-based decision making.

c) Practice-based Learning and Improvement

Fellows must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning. Fellows are expected to develop skills to meet the following goals:

- (1) identify strengths, deficiencies, and limits in one's knowledge and expertise;
- (2) set learning and improvement goals;
- (3) identify and perform appropriate learning activities;
- (4) systematically analyze practice, using quality improvement methods, and implement changes with the goal of practice improvement;
- (5) demonstrate knowledge of clinical utilization and financial outcomes of clinical informatics.

d) Interpersonal and Communication Skills

Fellows must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and professional associates. Fellows are expected to:

- (1) communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds;
- (2) communicate effectively with physicians, other health professionals, information technology professionals, administrators, and health related agencies;
- (3) work effectively as a member or leader of a health care team or other professional group;
- (4) act in a consultative role to other physicians and health professionals;
- (5) promote use of comprehensive electronic health and medical records;
- (6) collaborate effectively with others as a member or leader of an interdisciplinary team;
- (7) collaborate effectively with all elements of the care continuum, including hospitals, nursing homes, home care, and other community resources.

e) Professionalism

Fellows must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Fellows are expected to demonstrate:

- (1) compassion, integrity, and respect for others;
- (2) responsiveness to patient needs that supersedes self-interest;
- (3) respect for patient privacy and autonomy;
- (4) accountability to patients, society, and the profession;
- (5) sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation;

- (6) the ability to recognize one's own role and the role of systems in disclosure and prevention of medical error;
- (7) knowledge of ethical issues.

**f) Systems-based Practice**

**Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care as well as the ability to call effectively on other resources in the system to provide optimal health care. Fellows are expected to:**

- (1) **work effectively in various health care delivery settings and systems relevant to their clinical specialty, if applicable;**
- (2) **coordinate patient care within the health care system relevant to their clinical specialty;**
- (3) **incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate;**
- (4) **advocate for quality patient care and optimal patient care and/or public health systems;**
- (5) **work in multidisciplinary teams to enhance patient safety and improve patient care quality;**
- (6) **participate in identifying system errors and in implementing potential systems solutions;**
- (7) evaluate and implement systems improvement based on clinical practice or patient and family satisfaction data, in personal practice, in team practice, and within institutional settings;
- (8) demonstrate knowledge of the various settings and related structures for organizing, regulating, and financing care for patients.

**B. Fellows' Scholarly Activities**

- 1. The curriculum must advance fellows' knowledge of the basic principles of research, including how such research is conducted, evaluated, explained to patients, and applied to patient care.**
- 2. Fellows should participate in scholarly activity.**
  - a) To promote the development of clinical informaticians who exhibit a reflective approach to their practice, participation in an active research program is an essential component for fellows enrolled in clinical informatics subspecialty fellowship training.
  - b) Fellows should demonstrate evidence of recent research productivity through:
    - (1) publication (e.g., manuscripts, abstracts, or case reports) in a peer-reviewed journal; or

- (2) abstracts, posters, or presentations at scientific meetings.

**3. The sponsoring institution and program should allocate adequate educational resources to facilitate fellow involvement in scholarly activities.**

**C. Didactics**

- 1. The program must have a plan for ensuring that fellows master the major topics of clinical informatics as outlined in the clinical informatics core content document within a 2-year period.
- 2. Classes, conferences, and seminars must be conducted regularly as scheduled and must be attended by faculty and fellows. These must include:
  - a) clinical informatics seminars,
  - b) literature review conferences,
  - c) research conferences,
  - d) core curriculum classes.
- 3) Fellows must participate in planning and in conducting conferences.

**D. Rotations, Continuity Experiences, and Major Projects**

- 1. Fellows must have clearly defined, written descriptions of responsibilities and a reporting structure for all clinical informatics rotations, continuity experiences, and major projects.
- 2. Rotations are experiential assignments, of finite duration, that:
  - a) must be designed to provide fellows with exposure to different types of clinical and health information systems, in a range of settings that includes inpatient, ambulatory, and remote applications;
  - b) must constitute a minimum of 15% of a fellow's time over 24 months of training.
  - c) Fellows must write learning objectives prior to each rotation with guidance of faculty and evaluate themselves in terms of those objectives at the conclusion of the rotation.
- 3. Continuity experience is a long-term assignment designed to provide an opportunity for fellows to integrate their knowledge and prior experience in a clinical setting that poses real-world clinical informatics challenges. Fellows observe, participate in, and contribute to a clinical informatics project. The continuity aspect will enable experiences in leadership, team management, and system life-cycles, and will provide better understanding of clinical information system projects in an organizational context. Continuity experiences will further encourage cross-specialty collaboration and provide fellows with the opportunity to strengthen their ability to lead and manage changes associated with the introduction and adoption of clinical information systems.
  - a) The fellow must be embedded (i.e., assigned to participate as a member) in an interdisciplinary team that is addressing a significant clinical informatics challenge. This includes

attending regular team meetings and participating in analysis of issues, planning, and implementation of recommendations from the team. The interdisciplinary teams must include physicians, nurses, other health care professionals, administrators, and information technology/system personnel.

- b) The fellow should be an active participant in this team for at least 12 months.

#### 4. Major Project

Fellows must conceive, develop, implement, and evaluate a substantive, applied clinical informatics project and present the results of the evaluation in a peer-reviewed setting.

#### 5. Clinical Opportunities

Fellows should have the opportunity to maintain their primary board skills during clinical informatics subspecialty training. The program may not, however, require that the fellows provide more than 12 hours per week of clinical practice outside the requirements of the clinical informatics program.

### E. Program Outcomes

The program must certify that graduates can proficiently:

1. search and appraise the literature relevant to clinical informatics;
2. demonstrate fundamental programming, database design, and user interface design skills;
3. develop and evaluate evidence-based clinical guidelines and represent them in an actionable way;
4. identify changes needed in organizational processes and clinician practices to optimize health system operational effectiveness;
5. analyze patient care workflow and processes to identify information system features that will support improved quality, efficiency, effectiveness, and safety of clinical services;
6. assess user needs for a clinical information or telecommunication system or application and produce a requirement specification document;
7. design or develop a clinical or telecommunication application or system;
8. evaluate vendor proposals from the perspectives of meeting clinical needs and the costs of the proposed information solutions;
9. develop an implementation plan that addresses the socio-technical components of system adoption for a clinical or telecommunication system or application;
10. evaluate the impact of information system implementation and use on patient care and users;
11. develop, analyze, and report effectively (verbally and in writing) about key informatics processes.

### F. Program Duration

The length of the educational program is 24 months. Fellows must complete the program within 48 months of matriculation.

## V. Evaluation

### A. Fellow

#### 1. Formative Evaluation

- a) **The faculty must evaluate fellow performance in a timely manner during each rotation or similar educational assignment, and document this evaluation at completion of the assignment.** The faculty must discuss this evaluation with the fellow at the completion of the assignment.

- b) **The program must:**

- (1) **provide objective assessments of competence in patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, systems-based practice, as relevant to clinical informatics;**
- (2) **use multiple evaluators (e.g., faculty, peers, patients, self, and other professional staff);**
- (3) **document progressive fellow performance improvement appropriate to educational level;**
- (4) **provide each fellow with documented semiannual evaluation of performance with feedback.** This includes formal evaluations of knowledge, skills, and professional growth of fellows and required counseling by the program director.

- c) **The evaluations of fellow performance must be accessible for review by the fellow, in accordance with institutional policy.**

- d) Permanent records of evaluations and significant counseling sessions must be maintained in the fellow's file and must be accessible to the fellow and other authorized personnel.

- (1) Evaluations should document the fellow's achievement of the competencies in clinical informatics using appropriate evaluation methods. Evaluation records must be of sufficient detail to permit use in credentialing.

- (2) Evaluation records should document that fellows were evaluated in writing and their performance reviewed with them verbally on at least a semiannual basis.

- e) At the conclusion of the training program, each fellow must produce a well-documented portfolio of the knowledge, experiences, and skills they acquired during their 24 months of training in clinical informatics. This portfolio should follow the general outline of the clinical informatics Program Requirements Document, and the final copy should be approved in writing by the Program Director. This portfolio will establish the



foundation for the maintenance of competence process in clinical informatics.

## 2. Summative Evaluation

The program director must provide a summative evaluation for each fellow upon completion of the program. This evaluation must become part of the fellow's permanent record maintained by the institution, and must be accessible for review by the fellow in accordance with institutional policy. This evaluation must:

- a) document the fellow's performance during the final period of education;
- b) verify that the fellow has demonstrated sufficient competence to enter the practice of clinical informatics without direct supervision.

## B. Faculty

1. At least annually, the program must evaluate faculty and rotation supervisors' performance as it relates to the educational program.
2. These evaluations should include a review of teaching abilities, commitment to the educational program, clinical informatics knowledge, professionalism, and scholarly activities.
3. This evaluation must include at least annual written confidential evaluations by fellows. Provision must be made for fellows to confidentially provide written evaluations of each teaching faculty member and rotation supervisor at the end of a rotation or educational experience, and for the evaluations to be reviewed annually with faculty.
4. The results of the evaluations must be used for faculty member counseling and for selecting faculty members for specific teaching assignments.

## C. Program Evaluation and Improvement

1. The program must document formal, systematic evaluation of the curriculum at least annually. The program must monitor and track each of the following areas:
  - a) fellow performance;
  - b) faculty development, including performance of program graduates on the certification examination;
  - c) program quality. Specifically:
    - (1) Fellows and faculty must have the opportunity to evaluate the program, including the effectiveness of individual rotations or assignments in achieving the goals and objectives identified in the curriculum for that rotation or assignment, confidentially and in writing at least annually.
    - (2) The program must use the results of fellows' assessments of the program together with other program evaluation results to improve the program.
2. If deficiencies are found, the program should prepare a written plan of action to document

initiatives to improve performance in the areas listed in section V.C.1 The action plan should be reviewed and approved by the teaching faculty and documented in meeting minutes.

## VI. Fellow Duty Hours in the Learning and Working Environment

### A. Principles

1. The program must be committed to and be responsible for promoting patient and system safety and fellow well-being and to providing a supportive educational environment.
2. The learning objectives of the program must not be compromised by excessive reliance on fellows to fulfill service obligations.
3. Didactic and clinical informatics education must have priority in the allotment of fellows' time and energy.
4. Duty hour assignments must recognize that faculty and fellows collectively have responsibility for the safety and welfare of patients.
5. The program must adhere to current legal standards for duty hours.

### B. Supervision of Fellows

The program must ensure that qualified faculty provide appropriate supervision of fellows in patient care activities.

### C. Fatigue

Faculty and fellows must be educated to recognize the signs of fatigue and sleep deprivation and must adopt and apply policies to prevent and counteract its potential negative effects on patient care and learning.

### D. Duty Hours (the terms in this section are defined in the ACGME Glossary and apply to all programs)

Duty hours are defined as all clinical and academic activities related to the program; i.e., patient care (both inpatient and outpatient), administrative duties relative to patient care, the provision for transfer of patient care, time spent in-house during call activities, and scheduled activities, such as conferences. Duty hours do not include reading and preparation time spent away from the duty site.

1. Duty hours must be limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities.
2. Fellows must be provided with one day in seven free from all educational and clinical responsibilities, averaged over a four-week period, inclusive of call.
3. Adequate time for rest and personal activities must be provided. This should consist of a 10-hour time period provided between all daily duty periods and after in-house call.

### E. On-call Activities

1. In-house call must occur no more frequently than every third night, averaged over a four-week period.

2. Continuous on-site duty, including in-house call, must not exceed 24 consecutive hours. Fellows may remain on duty for up to six additional hours to participate in didactic activities, transfer care of patients, conduct outpatient clinics, and maintain continuity of medical and surgical care.
3. No new patients may be accepted after 24 hours of continuous duty.
4. At-home call (or pager call)
  - a) The frequency of at-home call is not subject to the every-third-night, or 24+6 limitation. However at-home call must not be so frequent as to preclude rest and reasonable personal time for each fellow.
  - b) Fellows taking at-home call must be provided with one day in seven completely free from all educational and clinical responsibilities, averaged over a four-week period.
  - c) When fellows are called into the hospital from home, the hours fellows spend in-house are counted toward the 80-hour limit.

#### F. Moonlighting

1. Moonlighting must not interfere with the ability of the fellow to achieve the goals and objectives of the educational program.
2. Internal moonlighting must be considered part of the 80-hour weekly limit on duty hours.

#### G. Duty Hours Exceptions

A Review Committee may grant exceptions for up to 10% or a maximum of 88 hours to individ-

ual programs based on a sound educational rationale.

1. In preparing a request for an exception, the program director must follow the duty hour exception policy from the ACGME Manual on Policies and Procedures.
2. Prior to submitting the request to the Review Committee, the program director must obtain approval of the institution's GMCC and DIO.

#### VII. Experimentation and Innovation

Requests for experimentation or innovative projects that may deviate from the institutional, common, and specialty specific program requirements must be approved in advance by the Review Committee. In preparing requests, the program director must follow Procedures for Approving Proposals for Experimentation or Innovative Projects located in the ACGME Manual on Policies and Procedures. Once a Review Committee approves a project, the sponsoring institution and program are jointly responsible for the quality of education offered to fellows for the duration of such a project.

#### References ■

1. Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, et al. Core Content for the Subspecialty of Clinical Informatics. *J Am Med Informatics Association* 2009;16:153-157.
2. Detmer DE, Lumpkin JR, Williamson JJ. Defining the Medical Subspecialty of Clinical Informatics. *J Am Med Informatics Assoc* 2009;16:167-168.