

A Journey Toward Excellence:  
Training Future Gastroenterologists



# THE GASTROENTEROLOGY CORE CURRICULUM

**Third Edition – May 2007**

Presented by the  
American Association for the Study of Liver Diseases (AASLD)  
American College of Gastroenterology (ACG)  
AGA Institute  
American Society for Gastrointestinal Endoscopy (ASGE)

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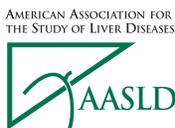
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# Preface

The Gastroenterology Core Curriculum was first published in 1996; this document contains the third edition of the Gastroenterology Core Curriculum for gastroenterology fellowship training. The Core Curriculum constitutes a living document that represents the four societies' vision of best practices in gastroenterology training. It provides a framework for developing an individual plan of study and growth that should be tailored to meet the needs of each individual trainee based on the strengths and special qualities of each individual training program. The curriculum will continue to evolve with time as new knowledge, methods of learning, novel techniques and technologies, and challenges arise.

This edition has been divided into an overview of training and 17 chapters encompassing the breadth of knowledge and skills required for the practice of gastroenterology. These areas include not only the traditional curricular content of gastroenterology and hepatology but also associated disciplines such as pathology, radiology, and surgery. New areas that have been incorporated into the third edition of the Gastroenterology Core Curriculum include new antireflux techniques, advanced training (certificate of added qualification [CAQ]) in hepatology, moderate sedation, novel techniques and technologies, and CT colonography. Additionally, all areas have been linked to the Accreditation Council on Graduate Medical Education (ACGME) Outcome Project's General Competencies.

This edition of the curriculum represents a joint collaborative effort among the national gastroenterology societies—the American Gastroenterological Association (AGA) Institute, the American College of Gastroenterology (ACG), the American Association for the Study of Liver Diseases (AASLD), and the American Society for Gastrointestinal Endoscopy (ASGE). The training committees of each of the four sponsoring societies, as well as several subject matter experts, made specific recommendations for revising the core curriculum. Each society then named two representatives who were charged with overall responsibility for developing, communicating, and distributing the curriculum (see page 3). Additionally, the Gastroenterology Steering Committee received input on the draft curriculum from several training directors and faculty members and extends its sincere gratitude for their support. Those who provided substantive editorial contributions to this edition are featured in Appendix I, along with the names of contributing editors for the previous edition that was published in 2003.

Throughout this document, the paramount importance of practice and research based on the highest principles of ethics, humanism, and professionalism is reinforced. This document links trainee

assessment to the ACGME Outcome Project's General Competencies and as such recommends a number of tools that can be used to assess the competence of trainees, including direct observation by qualified faculty, log books, periodic patient care record reviews, portfolios, patient surveys, 360° global rating evaluations, and formal examinations. Numerical guidelines provide only a minimum standard for competency and instead should be viewed as a threshold level after which competency-based assessment should be instituted. Regardless of the duration of training, the number of patients seen, or the number of procedures performed, the ultimate goal must always remain excellence in all aspects of patient care, scholarship, and a commitment to lifelong learning.

## The Quality Initiative in Medicine

The Quality Initiative in American medicine is an effort to improve outcomes, maximize safety, and simultaneously increase the value of care for health-care consumers. Severe cost pressures in the U.S. healthcare delivery system over the past several decades have forged alliances among corporate payers to maximize the cost-effectiveness of care (e.g., the Leapfrog Group, 2000). Reports related to medical errors and patient safety (To Err Is Human, 1999) raised concerns and drew the attention of many public and private entities. The Institute of Medicine's recommendations for an improved health care system (Crossing the Chasm a New Health System for the 21st Century, 2001) urged the alignment of payment with quality improvement.

The Center for Medicare and Medicaid Services' (CMS) took up that challenge and continues efforts to contain expenditures for its beneficiaries. Clinical quality data around the variability of care (e.g., CABG rates in different regions of the country) and outcomes (e.g., CAD mortality rates unchanged, despite uneven intensity of care), have also spurred public demand for a more transparent and predictable standard of care. In recent years, the growth of evidence-based medicine has contributed to healthcare quality and its measurement. Training programs must assure that fellows understand the importance of quality measurement in their future practice of gastroenterology and that fellows are familiar with the techniques used to measure quality and with methods used to enhance performance. For more information on quality in gastroenterology, please visit [www.gastro.org](http://www.gastro.org), Clinical Practice section.

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# Overview of Training in Gastroenterology

## Importance

Gastroenterology consultants must possess a range of attributes, including a broad knowledge base, the ability to generate a relevant differential diagnosis based on an accurate history and physical examination, an understanding of the indications and contraindications for diagnostic and therapeutic procedures, skill at performing these procedures, the ability to think critically, and an appreciation of the humanistic and ethical aspects of medicine. Such attributes can emanate only from a clinical training program that provides a firm foundation in pathophysiology as well as abundant exposure to patients under the supervision of experienced, thoughtful educators. This exposure must be long enough for trainees to understand the natural history of disease and the impact of treatment both on the disease and on the patient. Instructors in procedures must impart a thoughtful, cost-conscious approach to the use of technology as an extension of the subspecialist's craft rather than as an end in itself. Facilities must be available for trainees to participate actively in research as a means of fostering the inquisitive thought processes demanded of skilled consultants, to create new knowledge, and to improve patient care. Surrounding all of these activities must be a dedication to the patient as a person; technical expertise in the absence of humanism represents the antithesis of the skilled practitioner, whether generalist or subspecialist.

## General Aspects of Training

### Prerequisites for Training

Trainees in gastroenterology must have completed a 3-year residency in internal medicine, or be in the American Board of Internal Medicine (ABIM) Research Pathway, at an institution accredited by the ACGME or a foreign equivalent. The training requirements referenced herein reflect the ACGME's *Program Requirements for Fellowship Education in the Subspecialties of Internal Medicine* and the *Program Requirements for Fellowship Education in Gastroenterology*, effective July 2005 (see [www.acgme.org](http://www.acgme.org)).

### Training Institutions

Gastroenterology training must take place only in medical institutions that are accredited for internal medicine and gastroenterology training by the ACGME and are affiliated with established medical schools. As outlined in the July 2005 ACGME Program Requirements for Fellowship Education in the Subspecialties of Internal Medicine and the Program Requirements for Fellowship Education in Gastroenterology, evidence of institutional commitment to education must include financial resources adequate to support appropriate compensation for sufficient faculty and trainees, adequate and modern facilities, sufficient space and current equipment to

accomplish the overall educational program.

Specifically, as directed by the ACGME, section II.A.4:

“The sponsoring institution must assure that adequate salary support is provided to the program director for the administrative activities of the internal medicine subspecialty program. The program director must not be required to generate clinical or other income to provide this administrative support. It is suggested that this support be 25-50% of the program director's salary, depending on the size of the program. (See Section III.A.4f).”

In addition, training institutions must provide adequate clinical support services on a 24-hour basis, foster peer interaction among specialty and subspecialty trainees, and sponsor meaningful biomedical research.

### Educational Program

Gastroenterology training programs must provide an intellectual environment for acquiring the knowledge, skills, clinical judgment, attitudes, and values of professionalism that are essential to the practice of gastroenterology. As defined by the ABIM in the 2001 Project Professionalism:

“Professionalism in medicine requires the physician to serve the interests of the patient above his or her self-interest. Professionalism aspires to altruism, accountability, excellence, duty, service, honor, integrity, and respect for others. The elements of professionalism encompass a commitment to the highest standards of excellence in the practice of medicine and in the generation of knowledge, a commitment to sustain the interests and welfare of patients, and a commitment to be responsive to the health needs of society.”

The program also must stress the role of gastroenterologists as consultants and the need to establish the skills necessary to communicate effectively with referring physicians. The objectives of training can be achieved only when the program leadership, supporting staff, faculty, and administration are fully committed to the educational program and when appropriate resources and facilities are available. While it is recognized that trainees provide substantial service to their teaching hospital, service commitments should never compromise the achievement of educational goals and objectives.

Every aspect of training should include the cultivation of an attitude of skepticism and inquiry and a dedication to continuing education that will remain with the trainees throughout their professional careers. A major contributor to the enhancement of a scholarly attitude is active participation in one or more research projects, ideally followed by presentation of the work at a national meeting and publication of a paper in a peer-reviewed journal.

### Duration of Training

Training programs must be at least 3 years in duration and must include a minimum of 18 months of clinical training experience. A premium is placed on experience. The more experience gained under supervision during training, the more skilled the specialist will become. Such experience should include the long-term management of patients with a variety of diseases and exposure of trainees to the natural history of gastrointestinal and hepatic diseases as well as the effectiveness and limitations of therapy. As training progresses, it is important for the trainees to develop independence. A 3-year training program allows sufficient time for a gradual reduction in the level and degree of supervision so that, by the end of the training period, trainees feel confident in their own abilities to independently manage complicated disorders.

### Duty Hours

Trainee duty hours should be monitored to ensure that they meet guidelines established by the ACGME (see Section VI).

### Levels of Training

The curriculum continues to require a minimum of 3 years of training in gastroenterology. The core clinical curriculum requires a minimum of 18 months of patient care experience and consists of traditional inpatient and outpatient consultative and specialized care experience. A longitudinal outpatient ambulatory experience is mandated for the full 3 years of training. Explicit programmatic recommendations are indicated in the areas of acid-peptic disease, biliary tract diseases and pancreatic disorders, cellular and molecular physiology, endoscopy, ethics, medical economics and system-based practice, geriatric gastroenterology, hepatic pathology, hepatology, inflammation and enteric infectious disease, malignancy, motility and functional illnesses, nutrition, pediatric gastroenterology, radiology, research, surgery, and women's health issues. A central feature of training in gastroenterology remains the requirement for dedicated training in hepatology. Included in the guidelines for training in hepatology is the requirement that at least one faculty member is recognized as having expertise in liver disease.

ASGE guidelines for training in basic endoscopic skills are affirmed with the explicit requirement that certification of competency in basic endoscopy cannot be considered before minimum threshold levels are met; competency-based assessment demands attainment of substantial skill and experience before program directors can attest to the competence of the trainees in endoscopy. Achievement of expertise in endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasonography (EUS) is not included as an objective for all trainees, but is reserved for selected trainees desiring enhanced skills in interventional endoscopy. See Appendix II for the *Diagnostic Colonoscopy Procedural Competency Form* and the *Diagnostic Upper Endoscopy Procedural Competency Form*.

A substantive research experience of 3–6 months as a stimulus for developing an inquiring and critical mind is required. As important as direct patient care, and woven throughout the 3-year fellowship, is the requirement for an array of conferences and didactic sessions. Trainees are expected to have specific instruction throughout the fellowship in the clinical, translational, and basic sciences that underlie the scientific basis of practice today and to have the opportunity to participate in meaningful scholarly activity.

Beyond the 18-month core clinical curriculum and the 3–6 month research requirement, 12 additional months are required to complete fellowship training. This time will permit flexibility for activities outside of the prerequisites of the core clinical curriculum that meets the trainee's needs, interests, and career goals. This may translate into 12 months of additional clinical training or research training, specialized training in specific skills, or elective experiences.

Level 2 training, or enhanced clinical training, is specifically for any gastroenterologist who wishes to provide specialized services as a consultant to other physicians and is detailed for geriatrics, nutrition, advanced endoscopic procedures, motility studies, biliary tract diseases and pancreatic disorders, and hepatology. Detailed criteria that mirror the requirements set by the ABIM before sitting for the examination for added qualifications in transplant hepatology are included, but would necessarily be accomplished during a fourth year of training.

In most cases, up to 12 additional months of clinical or research training beyond the core clinical curriculum may be required to attain level 2 expertise in a given area. It is anticipated that under most circumstances, level 2 training can be accomplished for some within the context of the 3-year training period. However, in some circumstances, such as expertise in advanced therapeutic procedures, an additional year, that is, a fourth year may be necessary to satisfactorily complete all requirements for level 2 training.

For trainees preparing for careers in laboratory or clinical investigation, an intensive research experience during fellowship training is recommended, with the recognition that such training may need to be continued well beyond the standard 3-year period of training to prepare the trainee for a career as an independent investigator. This training may include university course work appropriate for careers in clinical or basic research, for example, epidemiology, statistics, research methodology, outcomes and effectiveness research, decision analysis, cell biology, molecular genetics, and/or ethics as well as supervised research activity under the guidance of qualified mentors.

Throughout this document, the paramount importance of practice and research based on the highest principles of ethics, humanism, and professionalism is reinforced. The importance of the scientific method and of preparation for lifelong learning based on

independent and critical thinking, a desire for self-improvement, and a love of learning is emphasized.

## Program Faculty

### Program Director

A single training director must be responsible for the program. She or he must be board certified in gastroenterology or possess equivalent qualifications and must have 5 years of participation as an active faculty member in the subspecialty. The training director is expected to ensure adequate time to coordinate and direct training-related activities. In accordance with ACGME guidelines, the director must be based at the primary training site of the program (see Section III.4.c) and must dedicate an average of 20 hours per week to the training program (see Section III.4.f).

### Faculty

In addition to the program director, the program must provide a minimum of four institutionally-based key clinical faculty members who all must be certified in gastroenterology or possess equivalent qualifications. For programs with an approved compliment of more than six, a ratio of key clinical faculty to fellows of at least 1:1.5 must be maintained (see Section XII).

At least one full-time faculty member must be a fully trained hepatologist, as defined within the Training in Hepatology chapter. At least one full-time faculty member must be skilled and demonstrate expertise in advanced endoscopic procedures, as defined within the Training in Gastrointestinal Endoscopy chapter. Above and beyond a minimum number of faculty, there must be enough additional full-time or part-time faculty to ensure adequate supervision of trainees and coverage of all programmatic components. At all times, fellows will be adequately supervised by staff physicians.

Each full-time faculty member must devote at least 10 hours per week, averaged over 1 year, to teaching, research, administration, and/or the critical evaluation of the performance, progress, and competence of trainees. In addition, faculty members must serve as appropriate role models by active participation in the clinical practice of gastroenterology, their own continuing education, regional and national scientific societies, research activities, and the presentation and publication of scientific studies and scholarly reviews.

Faculty should be evaluated at intervals by trainees to assure that the trainees' needs are being met. Please visit [www.acgme.org](http://www.acgme.org) for more information on program faculty requirements for gastroenterology.

## Environment for Training in Gastroenterology

### Relationship to Training in Internal Medicine

Gastroenterology fellows must maintain their skills in general internal medicine and develop appropriate lines of communication and responsibility with internal medicine residents and faculty.

### Relationship to Other Disciplines

Care of patients with digestive diseases often involves a multidisciplinary approach. Therefore, trainees must learn to work effectively and efficiently with members of other specialties and subspecialties. This is especially true for the internal medicine subspecialties of cardiology, critical care medicine, and oncology as well as the specialties of surgery, pathology, and radiology. Increasingly, trainees will need to develop skills in management to enable them to lead multidisciplinary teams. Particular instruction and experience in collaborating with primary caregivers in a managed care setting is essential.

### Facilities and Resources

The following facilities and resources are essential for the training program:

1. There must be a sufficient number of new and follow-up patients, with a broad variety of gastrointestinal and hepatic diseases, to ensure adequate inpatient and outpatient experiences. Both men and women and—to the extent possible pregnant women and adolescents—and geriatric patients of both sexes must be included in the fellow's panel of patients. Patient backgrounds should be diverse and represent a range of ethnic, cultural, and socioeconomic groups. Qualified faculty must supervise trainees in all aspects of patient care, including care delivered in both inpatient and outpatient settings and during procedures.
2. Up-to-date inpatient and ambulatory care facilities are essential to accomplish the overall mission of the training program.
3. There must be a fully equipped and staffed procedure laboratory that includes state-of-the-art diagnostic and therapeutic endoscopic instruments and motility equipment. The laboratory must be capable of performing, or have access to, specialized serological, parasitological, immunologic, metabolic, and toxicological studies applicable to gastrointestinal and hepatobiliary disorders. Computers should be available with appropriate software to permit trainees to access medical literature online, perform Internet searches, record results of procedures, and establish a database. The capability to perform basic gastrointestinal function tests is essential.
4. Supporting services, such as a full-service emergency department, diagnostic and interventional radiology department, medical imaging and nuclear medicine facility, pathology laboratory, general and hepatobiliary surgical unit, and oncology unit must be available.
5. There must be a modern, fully-staffed unit for the intensive care of critically ill patients with gastrointestinal and hepatic disorders.
6. A library with online capabilities for providing adequate access to the literature and including computer-assisted literature searches is required.
7. Adequate administrative support for the fellowship program, including financial support for a fellowship coordinator or assistant,

access to computers for personnel management and scheduling, and a budget to provide office supplies and other administrative expenses to run a program.

## Specific Program Content

### Patient Care Experience

The patient care experience for trainees is comprised of three major elements.

1. While training should be tailored to reflect the ultimate career goals of the individual fellow, every gastroenterology training program must include a core clinical training experience of 18 months to be completed by all trainees. This period will consist of clinical training in the inpatient and outpatient diagnosis and management of digestive diseases as outlined by each of the relevant chapters on training, with approximately 5 months of this experience devoted to training in liver disorders (see Section XI.C). During the core clinical training, adequate numbers of routine endoscopic procedures must be performed to exceed the minimum standards as described within the chapter, Training in Endoscopy. Trainees must have appropriate supervised experience to develop skills in providing consultative services and communicating with physicians and other members of the health care team.
2. For those individuals whose career goals consist primarily of patient care, a further 18 months of training will include a total of at least 6 months of scholarly activity consisting of basic or clinical research, course work, or other structured activity not primarily involving direct patient care (see Training in Research). The remaining months will include additional experience in general consultative gastroenterology and experience in specialized areas, depending on the interests and career goals of the trainees and the opportunities available in the programs. Such areas of study might include enhanced competence in hepatic diseases, motility disorders, inflammatory bowel disease, nutrition, or interventional endoscopy (see appropriate chapters).

Where formal guidelines for attaining enhanced competence in an area are provided, the designation of level 2 training is applied. Level 2 training will designate that the trainee can act as a consultant to other gastroenterologists and other clinicians in that area of expertise. Upon satisfactory completion of level 2 training, the trainee will receive a letter or other document that indicates that this level of expertise has been reached.

3. In recognition of the importance of outpatient medicine to the practice of gastroenterology, all trainees must spend at least one half-day per week for the entire 3-year period in an ambulatory care clinic in which both new and continuing care patients with gastroenterological and hepatic

diseases are evaluated and managed. The arrangements must be such that patients recognize the fellow as the physician who is involved in providing their continuous care. To understand the natural history and long-term outcome of digestive diseases, trainees must attend the same clinic for a minimum of 6 months.

### Training Through Conferences and Other Nonpatient Care Activities

In addition to the patient care experience, trainees should have extensive involvement in other types of experiences.

1. Trainees should, through independent study, develop a scholarly approach to education by reading current textbooks and monographs, relevant scientific literature, and distributed syllabus materials. Trainees should be encouraged to attend seminars, postgraduate courses, and annual scientific meetings of the major digestive diseases societies.
2. Clinical conferences should be held on a weekly basis. Trainees must be actively involved in the planning and content of these conferences.
3. Basic science, journal club, and research conferences should be held regularly, at least monthly. The journal club should be used as a tool to teach the skills of critical reading, detection of biases, assessment of validity of controls, application of statistics, generalizability of results, and related attributes of scientific studies.
4. Interdisciplinary conferences with radiology, pathology, and surgery services should be held at least monthly.
5. A series of lectures/discussions should be held throughout the period of training to cover a core curriculum of physiology, pathophysiology, and clinical pharmacology.
6. Visiting scholars, professors, and investigators should be brought in to stimulate new thoughts and ideas among trainees as well as faculty.
7. Participation in quality assurance and continuous quality improvement programs should be required. Discussion of systems-based practice should be an integral part of this effort.
8. The opportunity to formally study the elements of study design, decision analysis, outcomes and effectiveness research, statistics, epidemiology, and other skills necessary to conduct and evaluate clinical investigation should be available to all trainees yearly.

### Teaching Experience

Trainees should actively participate in the teaching of medical students, medical residents, and less advanced trainees in gastroenterology. In addition, ample opportunity must be provided for trainees to participate in seminars and conferences. The ability to interweave basic and clinical material in a cohesive manner and to present and defend concepts in an open forum is invaluable for a career as a subspecialty consultant.

## I. Evaluation of Trainees

Formal evaluations of each trainee's progress and final competence are required by the ACGME and for objective documentation for purposes of credentialing. Training programs must have established methods to evaluate trainee competence, regular written records detailing the progress of all trainees, and a defined program of verbal and written feedback to the trainees. The trainee must receive appropriate and timely feedback throughout the training experience, including formative and summative evaluations in all areas being evaluated.

### Elements of Competence to be Assessed

As outlined in the ACGME General Competencies, trainees should be evaluated in the following areas (Table 1):

1. **Patient care** – Trainees must be able to provide patient care that is appropriate, effective and compassionate. This would include, but not be limited to, the following: history-taking,

including family, genetic, psychosocial, and environmental histories, and the ability to perform a comprehensive and accurate physical examination. The ability to arrive at an appropriate differential diagnosis, outline a logical plan for specific and targeted investigations pertaining to the patient's complaints, and formulate a plan for management and follow-up treatment of the patient is critical. The ability to effectively present the results of a consultation orally and in writing and to defend the clinical assessment, differential diagnosis, and diagnostic and management plans is essential. In addition, trainees must demonstrate procedural skills essential for the practice of gastroenterology and hepatology.

2. **Medical knowledge** – Trainees must demonstrate a core fund of knowledge in gastroenterological and hepatic physiology, pathophysiology, clinical pharmacology, radiology, and surgery as outlined in the goals of each chapter

**Table 1 – Methods for Assessing ACGME General Competencies**

### 1. PATIENT CARE

- a. Direct observation by qualified faculty during a) work and teaching rounds, b) patient history-taking and physical examination, c) procedures, and d) conferences
- b. Formal evaluation forms from faculty members, nurses, allied health personnel, and patients who come into contact with the trainees (360° evaluation)
- c. Patient care record review
- d. Patient and staff surveys (360° evaluation)
- e. Formal examinations to test the clinical skills and medical knowledge of the trainee, including mastery of the interpretation of endoscopic, radiologic, and pathologic findings, such as an in-service training examination.
- f. Portfolios
- g. Procedural skills (as defined by each training chapter)
- h. Log books (preferably computerized) and objective competency determinations of all endoscopic procedures and liver biopsies and all level 2 skills

### 2. MEDICAL KNOWLEDGE

- a. Formal examinations
- b. Direct observation by qualified faculty during a) work and teaching rounds, b) patient history-taking and physical examination, c) procedures, and d) conferences
- c. Formal evaluation forms from faculty members, nurses, allied health personnel, and patients who come into contact with the trainees (360° evaluation)
- d. Patient care record review
- e. Formal examinations to test the clinical skills and medical knowledge of the trainee, including mastery of the interpretation of endoscopic, radiologic, and pathologic findings, such as an in-service training examination.

### 3. PRACTICE-BASED LEARNING AND IMPROVEMENT

- a. Direct observation by qualified faculty during a) work and teaching rounds, b) patient history-taking and physical examination, c) procedures, and d) conferences
- b. Patient care record review

- c. Portfolios

- d. Formal evaluation forms from faculty members, nurses, allied health personnel, and patients who come into contact with the trainees (360° evaluation)
- e. Formal examinations to test the practice-based learning and improvement in clinical skills and medical knowledge of the trainee

### 4. INTERPERSONAL AND COMMUNICATION SKILLS

- a. Direct observation by qualified faculty during a) work and teaching rounds, b) patient history-taking and physical examination, c) procedures, and d) conferences
- b. Formal evaluation forms from faculty members, nurses, allied health personnel, and patients who come into contact with the trainees (360° evaluation)
- c. Patient and staff surveys (360° evaluation)

### 5. PROFESSIONALISM

- a. Direct observation by qualified faculty during a) work and teaching rounds, b) patient history-taking and physical examination, c) procedures, and d) conferences
- b. Formal evaluation forms from faculty members, nurses, allied health personnel, and patients who come into contact with the trainees (360° evaluation)
- c. Patient and staff surveys (360° evaluation)

### 6. SYSTEMS-BASED PRACTICE

- a. Direct observation by qualified faculty during a) work and teaching rounds, b) patient history-taking and physical examination, c) procedures, and d) conferences
- b. Formal evaluation forms from faculty members, nurses, allied health personnel, and patients who come into contact with the trainees (360° evaluation)
- c. Observation during involvement in continuous quality improvement activities
- d. Formal examinations to test the system-based practice clinical skills and medical knowledge of the trainee, such as an in-service training examination

on training. Trainees must be able to demonstrate an analytic approach and use appropriate investigations, including the practice of evidence-based medicine.

3. **Practice-based learning and improvement** – Trainees must be able to investigate, evaluate, and improve their patient care practice by analyzing and assimilating both scientific evidence as well as their own prior experience into their practices. They should be able to apply knowledge of statistical methods to critically appraise clinical studies and be able to use information technology to support their own education. They must be involved in teaching and be able to facilitate the learning of other students and health care professionals.
4. **Interpersonal and communication skills** – Trainees must be able to demonstrate interpersonal and communication skills that result in effective information exchange with their patients, families, and other health care professionals. This would include, but not be limited to, verbal and written communication as a consultant and to generation of endoscopic reports that are accurate and timely. Trainees must be able to work effectively as members and leaders of the health care team.
5. **Professionalism** – Trainees must demonstrate an understanding of and commitment to all elements of professionalism, including respect, compassion and integrity toward their patients, patient families, and other health care professionals. They must demonstrate ethical behavior, responsiveness, and sensitivity to a diverse gender, ethnic, socioeconomic, and aging patient population.
6. **Systems-based practice** – Trainees must demonstrate an understanding of, awareness of, and responsiveness to the larger context and system of health care delivery. The trainees should understand how their patient care practice impacts other health care professionals, the larger health care system, and society in general. They should be able to practice cost-effective health care without compromising quality of care for their patients. The trainee should be able to advocate for timely, quality patient care and know how to partner with other health care providers to provide the optimal health care for their patients.

#### Methods for Assessing Trainee Competence

Depending upon the specific area that the trainee is being evaluated in, the following methods may be used to evaluate the trainee's performance:

- Direct observation by qualified faculty during a) work and teaching rounds, b) patient history-taking and physical examination, c) procedures, and d) conferences
- Log books (preferably computerized) and objective competency determinations for all endoscopic procedures and all level 2 skills
- Periodic patient care record reviews

- Portfolios (a collection of products prepared by the trainee that provides evidence of learning and achievement related to the learning plan. It might include a log of clinical procedures performed; a summary of the research literature reviewed when selecting a treatment option; a quality improvement project plan and report of results; ethical dilemmas faced and how they were handled; a computer program that tracks patient care outcomes; or a recording or transcript of counseling provided to patients, etc.)
- Patient surveys
- 360° evaluations (an evaluation method that incorporates feedback by all members of the health care team, colleagues, and patients). This "full circle" evaluation provides multiple perspectives on one's performance.
- Formal in-service examinations to test the clinical skills and medical knowledge of the trainee, including mastery of interpretation of endoscopic, radiologic, and pathologic findings

## II. Evaluation of Graduates

The training director should attempt to evaluate the performance of graduates from the program on a routine basis. Suggested components of this evaluation include the following:

- a. Scores on Certification and Recertification examinations administered by the ABIM
- b. Licensure and practice status of graduates
- c. Involvement in postgraduate educational courses and other Continuing Medical Education (CME) programs
- d. Involvement in teaching and research activities
- e. Publications

## III. Evaluation of Training Program and Faculty

Training programs, including curricular and faculty performance, must be evaluated in a rigorous and meaningful fashion on a regular basis.

- a. Graduates should be surveyed at intervals about the relevance of what they were taught to their current activities and areas in which additional educational efforts by the training programs are needed.
- b. Trainees must be given the opportunity to anonymously evaluate the faculty and training program at regular intervals, but minimally at the end of each rotation.
- c. The program director must regularly meet with the faculty and trainees to evaluate the curriculum and whether the training objectives are being met.
- d. Standardized testing should be used to assess the individual performance of trainees, as well as the program's success in achieving its specified educational milestones.

# Training in Acid-Peptic Disease

## Importance

Acid-peptic disorders (gastroduodenal ulcer, gastroesophageal reflux disease, gastritides/gastropathies, duodenitis, Zollinger-Ellison syndrome and other hypersecretory states) are common afflictions. It has been estimated that 7% of the U.S. population experiences heartburn symptoms daily and almost half on a monthly basis. Dyspepsia accounts for upwards of 10% of all physician encounters. Peptic ulcer disease affects more than 5% of the U.S. population. *Helicobacter pylori* (*H. pylori*) gastritis is a major risk factor for peptic ulcer as well as gastric carcinoma and lymphoma. The use of nonsteroidal anti-inflammatory drugs (NSAIDs) and/or aspirin also is a major risk factor for peptic ulcers. These conditions cause morbidity and may result in serious complications leading to hospitalization, surgery, or even death. Because of their prevalence, potential for complications, and economic consequences, acid-peptic disorders encompass an important group of diseases.

Technology in diagnostic and therapeutic imaging techniques and in surgical, radiologic, and endoscopic management of these disorders has changed dramatically. Great strides have been made in understanding the pathophysiology of, and therapy for, disorders of the upper gastrointestinal tract. The ability to reliably diagnose such disorders has been greatly enhanced by endoscopy, and definitive therapy may be performed during endoscopy for disorders such as esophageal stricture and bleeding ulcers. Endoscopic techniques for the management of gastroesophageal reflux disease have also recently been described.

The practice of gastroenterology now involves more than just the time-honored physician skills of history-taking and physical examination. Both the cognitive and technical skills of endoscopy must be acquired and continuously maintained. The acquisition of skills in these multiple disciplines as they relate to the evaluation and management of acid-peptic disorders will best ensure well-trained gastroenterologists.

## Goals of Training

During fellowship, trainees should gain an understanding of the following:

1. Anatomy, physiology, and pathophysiology of the esophagus, stomach, and duodenum.
2. Gastric secretion and indications for gastric analysis (i.e., measuring gastric acid output).
3. The indications for serum gastrin measurement and secretin testing for the diagnosis of gastrinoma and consequences of hypergastrinemia in both hypersecretory and achlorhydric states; trainees should also gain an understanding of the mechanisms involved in the development of secondary hypergastrinemia due to low acid states.
4. The natural history, epidemiology, and complications of acid-peptic disorders, including recognition of premalignant conditions (e.g., Barrett's metaplasia).
5. The role of *H. pylori* infection in acid-peptic diseases; trainees should gain an understanding of the properties of *H. pylori* infection, including its epidemiology and pathophysiology, such as factors specific to the organism (e.g., the CagA protein), factors specific to the host (e.g., interleukin polymorphisms), and factors specific to the environment (e.g., diet and antisecretory therapy).
6. The role of NSAIDs in the pathogenesis of gastroduodenal ulcers and their complications, including an understanding of risk factors for developing NSAID-related ulcers and the relative risks posed by different individual NSAID preparations based on various different properties.
7. The pharmacology, adverse reactions, efficacy, and appropriate use and routes of administration of drugs for acid-peptic disorders; these include antacids and histamine-2 receptor antagonists, proton pump inhibitors, mucosal protective agents, prostaglandin analogues, prokinetic agents, and antibiotics.
8. Endoscopic and surgical treatments of acid-peptic disorders. It is suggested that trainees gain an understanding of clinical indications and relative cost effectiveness, complications, and side effects, both in the short-term and long-term (see chapters on Training in Endoscopy and Training in Surgery).

Unless otherwise noted, trainees must also develop competence in the following:

1. Performing a thorough gastrointestinal-directed history and physical examination.
2. Performing diagnostic and therapeutic upper gastrointestinal endoscopy. It is suggested that trainees gain familiarity with endoscopic modalities for the treatment of gastroesophageal reflux disease, such as application of radiofrequency, energy injection therapy, and mechanical devices (see Training in Endoscopy).
3. Familiarity with capsule endoscopy and its applicability to the evaluation of upper gastrointestinal disease.
4. Trainees should learn to perform, read, and interpret esophageal pH probe tests, including wireless technology, esophageal impedance testing, and esophageal motility studies (see Training in Motility and Functional Illnesses).
5. Trainees should gain experience in interpreting plain films of the abdomen, barium examinations of the upper gastrointestinal tract, ultrasonography, abdominal computed tomographic scans, magnetic resonance imaging, angiogra-

phy, and somatostatin receptor scintigraphy (see Training in Radiology).

6. Understanding invasive and noninvasive techniques for diagnosing *H. pylori* infection.
7. Understanding the role of prostaglandins in mucosal protection, the importance of prostaglandin inhibitors (NSAIDs, aspirin) in causing ulcers, and the effects of selective cyclooxygenase-2 (COX-2) inhibitors on mucosal integrity in the upper gastrointestinal tract, on platelet function, and on the pathogenesis of thrombotic events. Other potential effects of COX inhibition, such as possible beneficial benefits in the treatment of dysplasia in Barrett's esophagus and prophylaxis of colorectal polyps, should be discussed.

## Training Process

Trainees must acquire a thorough knowledge of appropriate history-taking, which should consist of family, genetic, psychosocial, and environmental histories, including a detailed history of prescription and over-the-counter (nonprescription) drug use, particularly NSAIDs and aspirin, and the ability to perform a comprehensive and accurate physical examination in patients with acid-peptic disease. This should include an examination of the whole patient. Trainees should be able to arrive at an appropriate differential diagnosis, be able to outline a logical plan for specific and targeted investigations pertaining to the patient's complaints, and be able to design an appropriate scheme of management and follow-up.

Trainees must develop expertise under direct supervision in performing and interpreting all of the procedures and diagnostic tests that are routinely used in the evaluation and treatment of patients with acid-peptic disorders (see Training in Endoscopy). This experience should include the indications, limitations, technical aspects, and complications of the following procedures as well as an understanding of the benefits and dangers of moderate sedation:

1. Upper intestinal endoscopy, both elective and emergent, including proficiency in the use of

the endoscopic treatment modalities for hemorrhage (including injection therapy, cautery, banding, and clipping), biopsy, and polypectomy. It is suggested that trainees become familiar with the placement of radiotelemetry devices and have experience with endoscopy in patients with surgically altered anatomy (fundoplication, ulcer surgeries, gastric bypass)

2. Dilatation of benign and malignant esophageal strictures
3. The performance and interpretation of esophageal motility studies, 24-hour pH monitoring including wireless technology, and the interpretation of gastric secretory studies. It is suggested that trainees gain familiarity with impedance testing (see Training in Motility and Functional Illnesses).
4. Trainees should gain experience in the interpretation of radiological studies of the upper gastrointestinal tract, including contrast gastrointestinal examinations, ultrasonography, computed tomographic scans, magnetic resonance imaging, somatostatin receptor scintigraphy, and angiography
5. Indications and interpretation of studies for specific entities, such as hypersecretory states, *H. pylori*, and other infections of the upper gastrointestinal tract, particularly acquired immunodeficiency syndrome (AIDS)-related disorders
6. It is suggested that trainees gain a working knowledge of upper gastrointestinal tract pathology, such as mucosal biopsies for gastritis, Barrett's esophagus, and malignant conditions (see Training in Pathology).

## Assessment of Competence

Knowledge of acid-peptic disease should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to acid-peptic disease should be included on the board examination and should reflect a general knowledge of this content.

# Training in Biliary Tract Diseases and Pancreatic Disorders

## Importance

### Biliary Tract Diseases

Biliary tract diseases occupy a significant portion of the practice of gastroenterology. The diagnosis of and therapy for these diseases represent major challenges to practicing gastroenterologists because rapid advances in technology require skills not previously taught (e.g., invasive endoscopic and radiological procedures, endoscopic ultrasound, scintigraphy). To achieve maximal effectiveness, minimize risk, reduce costs, and provide the best possible care for patients, specialized training is required that emphasizes knowledge of anatomy, physiology, pathophysiology, and clinical presentation of biliary tract diseases. Gastroenterologists must be familiar with new technology and be in a position to apply it for the benefit of their patients.

### Pancreatic Disorders

Pancreatic disorders are common diseases that present multifaceted challenges to gastroenterologists. For example, acute pancreatitis may lead to the rapid development of a variety of potentially life-threatening complications; chronic pancreatitis is a long-standing, frequently debilitating disease. In caring for patients with pancreatic cancer, gastroenterologists must make an expeditious and cost-effective diagnosis and weigh possible curative or palliative treatment options. Because of the complexity of these diseases, the wide assortment of potential diagnostic modalities, and the lack of consensus in many aspects of diagnosis and management, gastroenterologists are commonly the primary consultants or direct caregivers for patients with pancreatic disease.

## Goals of Training

During fellowship, trainees should gain an understanding of the following:

### Biliary

1. Basic embryology and anatomy of the biliary tree and congenital structural anomalies, including duplications and cysts.
2. Hormonal and neural regulation of bile flow and gallbladder function.
3. Physiology of bile secretion and its derangement in cholestatic disorders.
4. Bile composition in health and disease.
5. Cholelithiasis—epidemiology, etiology, clinical manifestations and complications, treatment modalities.
6. Other disorders of the bile ducts, including

recurrent pyogenic cholangitis, parasitic and opportunistic infections.

7. Other inflammatory disorders of the gallbladder such as acalculous cholecystitis.
8. Neoplastic diseases of the gallbladder and bile ducts.
9. Motility disorders including gallbladder dyskinesia, sphincter of Oddi dysfunction.
10. Principles of evaluation and treatment of common clinical syndromes:
  - a. Cholestasis
  - b. RUQ and “biliary-type” pain
  - c. Incidental findings on radiographic testing
11. Radiographic evaluation of the biliary tree: basic principles, utility and lesion recognition:
  - a. Ultrasonography
  - b. CT
  - c. MRI
  - d. Scintigraphic techniques
  - e. MRCP
12. Principles, utility, and complications of biliary surgery.
13. Procedural competence—see below.

### Pancreatic

1. The embryological development and anatomy of the pancreas and the pancreatic duct system and congenital disorders such as pancreas divisum, annular pancreas.
2. The physiological processes involved in pancreatic exocrine secretion of digestive enzymes, water, and electrolytes.
3. The types of digestive enzymes secreted by the pancreas, their mechanisms of activation and their roles in the digestive process.
4. The factors that protect the pancreas from autodigestion.
5. The epidemiology, etiology, pathophysiology, natural history, and management of acute pancreatitis in all spectra of severity and its complications.
6. The epidemiology, etiology, pathophysiology, natural history, and management of chronic pancreatitis with particular emphasis on management of exocrine insufficiency and chronic pain.
7. The epidemiology, etiology, natural history, and management of pancreatic cancer and its complications.
8. The molecular genetics of pancreatic disease with particular reference to hereditary pancreatitis and cystic fibrosis, their diagnosis and management.
9. Radiographic evaluation of the pancreas: basic

principles, utility, and lesion recognition:

- a. Ultrasonography
  - b. EUS
  - c. CT
  - d. MRI
  - e. MRCP
10. Principles, utility, and complications of pancreatic surgery.
  11. The basis and indications for and the interpretation of diagnostic test results in the diagnosis and management of diseases of the pancreas, in particular, serum amylase and lipase determination, markers for chronic pancreatitis (fecal elastase, serum trypsinogen-like immunoreactivity, etc.) serum tumor markers (e.g., CA 19-9), radiological and endoscopic imaging studies (see *Training in Endoscopy* and *Training in Radiology*), indirect tests of pancreatic secretory function, direct tests of secretory function (e.g., secretin and secretin/cholecystokinin stimulation tests, test meals), duodenal drainage with analysis for biliary crystals, fine-needle aspiration of pancreatic masses, and analysis of cytology in endoscopic aspirates of pancreatic juice.
  12. Principles and practice of nutritional support for patients with both acute and chronic pancreatitis.
  13. Procedural competence—see below.

## Training Process

As with most specialties a combination of cognitive/clinical skills and knowledge, along with procedural proficiency is necessary for training in the care of patients with these disorders. Two levels of training should be offered. Level 1 training is for those trainees who will be a part of the general gastroenterology program and have exposure to diseases of the biliary tract and pancreas. Level 2 training is intended for those who will be selected to spend the entire third year of training and/or an additional fourth year of training in biliary tract diseases and/or pancreatic diseases.

### Clinical/Cognitive Training

#### *Level 1*

At this level, all trainees should acquire the fundamental core of information outlined above in the first 18 months (core clinical) of training through individual reading, presentation of core curriculum at gastroenterological/radiological/surgical clinical conferences, lectures by invited speakers, journal clubs, and daily contact with the attending physicians.

#### *Level 2*

The major goal for trainees at level 2 (see also *Training in Endoscopy*) is to acquire an in-depth knowledge of pathophysiology, clinical presentation, diagnosis, epidemiology, and therapy of biliary and pancreatic diseases. In general, trainees in biliary and pancreatic diseases at this level should have completed at least 18 months of training in general gastroenterology and should spend up to an additional year specializing in biliary and pan-

creatic diseases. Trainees will be provided the opportunity to perform an adequate number of procedures, receive supervised teaching, and to be involved in clinical research. While the endoscopic training is important, level 2 training should aim to produce an expert in managing all aspects of biliary tract diseases. In terms of cognitive and diagnostic acumen, level 2 trainees should be expected to know physiology, pathophysiology, diagnosis, and therapy of biliary and pancreatic diseases in greater detail than those at level 1 of training.

All trainees at level 2 should also be given the opportunity to be involved in clinical or basic research. Trainees in the biliary and pancreatic sections will be expected to acquire an understanding of clinical research, including study design, methodology, statistical analysis, writing the protocols, submitting protocols to institutional review boards, writing informed consent, enrolling patients into studies, analyzing and interpreting data, presenting at national meetings, and writing papers. Individual preceptors should teach basic or clinical research on a one-on-one basis and at research conferences. It is anticipated that most physicians participating in level 2 training will enter an academic environment, which will allow them to continue in the multidisciplinary area of treating patients with biliary and pancreatic diseases as well as teaching and conducting clinical research.

### Procedural Training

All trainees should have a thorough knowledge of the endoscopic techniques used in the diagnosis and treatment of biliary tract diseases and pancreatic diseases, including their potential risks, limitations, and costs. Trainees also must understand the role of alternative diagnostic and therapeutic modalities (medical, surgical, and radiological) in the evaluation and management of biliary tract and pancreatic diseases. They should understand the advantages and disadvantages of the different diagnostic and therapeutic procedures available.

Endoscopic retrograde cholangiopancreatography and endoscopic ultrasound are the primary tools for accessing the biliary tree and the pancreatic ductal system and a major route for therapeutic intervention. Trainees should attain an understanding of percutaneous transhepatic cholangiography and the performance and interpretation of endoscopic retrograde cholangiopancreatography and endoscopic ultrasound (indications, contraindications, limitations, complications, and interpretation) through participation in and observance of those procedures under supervision of the attending physician and with the assistance of a radiologist. These complex procedures require extensive training, which is difficult to give to all trainees. The level of experience required for performing endoscopic retrograde cholangiopancreatography may vary with the career expectations of the trainees. As above, training can be stratified into two levels (see also *Training in Endoscopy*).

*Level 1*

This level involves minimal exposure to biliary and pancreatic endoscopy for those trainees who do not plan to perform them. “Minimal exposure” is defined as an understanding of the indications and contraindications of ERCP and EUS, the advantages and disadvantages, complications, alternative diagnostic and therapeutic options, and interpretation of findings. This knowledge could be acquired through conferences, teaching rounds, courses, and 1- to 2-month rotations through the biliary tract service. Hands-on experience in biliary procedures is encouraged but not required in this group of trainees.

In addition to a knowledge and understanding of endoscopic procedures, all level 1 trainees should have a general understanding of the indications, advantages, and disadvantages of imaging procedures, such as plain film of the abdomen, cholecystogram, ultrasound, computed tomography, magnetic resonance imaging, and scintigraphy. As part of this process, they should have a basic understanding of how to interpret these studies. This knowledge will be acquired through regular and frequent contacts with radiologists and nuclear medicine specialists and/or a 1- to 2-month rotation through radiology. Lastly, trainees should be exposed to the performance and the interpretation of endoscopic ultrasound and endoscopic retrograde cholangiopancreatography and should observe several surgical biliary and pancreatic procedures during the course of training (see Training in Radiology and Training in Surgery).

*Level 2*

This level involves at least 12 months of advanced training in pancreaticobiliary endoscopy (see Training in Endoscopy) and is aimed at individuals who seek to be true experts in endoscopic management of biliary tract diseases (level 2). The experience necessary to become proficient in the diagnosis and therapy of biliary tract diseases should be offered only in institutions that have a large patient referral base, a wide range of patients with biliary tract diseases, and experienced faculty in gastroenterology, radiology, surgery, and clinical pathology.

Trainees in gastroenterology must understand the role the following disciplines play in the diagnosis and management of pancreatic disorders and must have direct experience working with these disciplines in the care of individual patients: therapeutic endoscopy, surgery, interventional radiology, anatomic pathology and cytopathology, nutritional support service, pain management service, medical oncology, and radiation oncology (see Training in Endoscopy, Training in Surgery, Training in Radiology, Training in Hepatic Pathology, and Training in Nutrition).

**Assessment of Competence**

Knowledge of biliary tract diseases and pancreatic disorders should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to biliary tract diseases and pancreatic disorders should be included on the board examination and should reflect a general knowledge of this content.

# Training in Cellular and Molecular Physiology

## Importance

Instruction in the fundamentals of cellular and molecular physiology provides an essential foundation for the overall educational program in modern gastroenterology. A complete understanding of normal and abnormal gastrointestinal processes cannot be achieved without a working knowledge of life at its most fundamental level. The following goals must be acquired by those trainees planning a career in basic biomedical research, while all trainees must gain exposure to gastrointestinal cellular and molecular physiology.

## Goals of Training

During fellowship, trainees should gain an understanding of a variety of disciplines, including immunology, genetics, physiology, neurogastroenterology, pharmacology, biochemistry, and pathology. Such exposure should result in an operational understanding of technology as well as information on cellular and subcellular structure and function pertinent to each discipline. Trainees should develop the capacity to understand and interpret the relevant literature as well as to comprehend and study future developments in the field. Furthermore, trainees should be able to search and critically analyze fundamental scientific and related pertinent information from appropriate national and international published literature. Finally, it is suggested that they learn how to search for suitable funding organizations and regulatory agencies, such as the National Institutes of Health, National Science Foundation, and the U.S. Food and Drug Administration, to apply for research funds, including the national gastroenterology societies, and from which to obtain updated information on newly developed therapeutic approaches and drugs. These skills will provide the trainees with the means to access information to answer specific questions regarding molecular mechanisms and molecular disorders that may occur in patients with gastrointestinal diseases and how to approach their management.

## Concepts

Although a precise curriculum cannot be specified because of the rapidly advancing scientific environment, it is suggested that the following be covered.

### Molecular Biology

The trainees should understand the following:

1. The function of genes and chromosomes and their location, composition, and the mechanisms regulating their replication.

2. Genomic organization, including the function of the promoter region, introns, exons, and untranslated regions, and mechanisms regulating the expression of this information, including transcription, messenger RNA synthesis, translation, and protein synthesis.
3. The importance of genetic variability, including single nucleotide polymorphisms and other chromosomal aberrations, particularly as they apply to diagnostics and therapeutics.
4. The molecular processes responsible for maintaining genetic fidelity, such as proofreading and repair enzymes, and the consequences of their failure, including malignant cellular transformation.
5. The basic cellular mechanisms regulating cell proliferation and differentiation and cellular demise, including those of apoptosis, anoikis, and necrosis.
6. The role of epigenetic factors and chromatin remodeling in regulating gene expression, including DNA methylation and histone acetylation.

### Genetics

Trainees should acquire a basic understanding of the following:

1. Genetic polymorphisms, genetic defects, the genetic basis of gastrointestinal diseases such as hemochromatosis, Wilson's disease, familial pancreatitis, cystic fibrosis, MEN-1, intestinal polyposis syndromes, colorectal cancer, Crohn's disease, and inborn errors of metabolism; the gene mutations involved; and the nature of human gene mutations involved in disease pathogenesis.
2. Oncogenes, tumor suppressor genes, microsatellite and genetic instability, genomic imprinting, chromosomal rearrangements, gene amplification, and epigenetics, and their roles in altered cell growth.
3. Trainees must gain an understanding of the genetics of colorectal cancer and other disorders listed above to enable the identification of individual patients at risk, guide diagnostic and therapeutic interventions in specific patients and their families, and provide guidance, counseling, and answers to questions from patients and their families.

### Cell Biology

It is suggested that trainees gain knowledge in the following:

1. The basic subcellular constituents of the cell such as the nucleus, mitochondria, Golgi, endoplasmic reticulum, and lysosomes, along with their

- normal functions and alterations in disease.
- The normal control of the cell cycle and processes leading to its disruption.
  - The fundamental properties of cell types specific to and crucial to the operation of the gastrointestinal tract. This includes an understanding of the turnover of the gastrointestinal epithelium and the need for continuous differentiation from stem cells located within each specific tissue and/or organ comprising the gastrointestinal tract as well as the processes regulating normal tissue differentiation and organogenesis.
  - The epithelial layer as a modulator of vectorial solute transport, as a sensory organ, and as a critical barrier against toxins and pathogens. Mechanisms that lead to the establishment of cell polarity and the appropriate development of intercellular junctions that are central to epithelial barrier function both under normal conditions and in disease states such as inflammatory bowel disease.
  - The functional and structural organization of the enteric nervous system, the network of neurons embedded within the gastrointestinal wall controlling gastrointestinal function, and the extrinsic neurons (afferent and efferent) that contribute to the modulation of digestive functions. Segmental differences along the cephalocaudal axis critical to function as well as specialized regulatory cells such as the interstitial cells of Cajal and immune cells also must be understood.
- knowledge of the complexity of the innervation and transmitter/modulator system governing the various digestive functions must be acquired.
- The existence and importance of the endocrine system that is scattered throughout the digestive tract and that often expresses the same regulatory peptides and other chemical messengers as neurons.
  - The existence of immune cells that activate local and systemic defense systems by interacting with endocrine cells and neurons. Immune messages are converted by local lymphocytes and amplified by circulating lymphocytes in response to luminal antigen activation.
  - The disparate mechanisms by which different chemical messengers are released and reach their sites of action, including endocrine, neuroendocrine, paracrine, and autocrine mechanisms of action. Trainees should have a basic understanding of regulatory peptides and of neurotransmitters and their specific receptors as they relate to the gastrointestinal tract. Appreciating the molecular basis of this initial signaling step is essential for interpreting potential genetic alterations as well as the basis of pharmacological interventions.
  - The roles of nitric oxide and NO synthase in cellular physiological events and their implications related to gastrointestinal physiology and pathophysiology as well as the NO pathway in inflammation and splanchnic circulation and its likely interaction with the glutamate system.

#### Pharmacology and Cellular Signaling

It is strongly suggested that trainees be able to recognize the following:

- Basic receptor pharmacology, including regulation, trafficking, and signaling as well as receptor transport mechanisms, cellular signal transduction, and cell-to-cell signaling.
- The existence of different superfamilies of receptors, including ion-channel gated, G protein coupled, nuclear, and tyrosine kinase-activating receptors, along with the different pathways through which second messengers are activated to induce a functional response. The existence and complexity of cross-talk among these various signaling pathways at both the intracellular and extracellular level.
- The rapidly growing field of cellular signal transduction as a mechanism underpinning critical regulatory processes in health and disease. These include cell-matrix communication, important in host defense; cell-cell communication, important in tissue responses; and intracellular pathways critical for cell homeostasis that, when disturbed, can cause unregulated growth or premature cell death.
- The existence of numerous transmitters and modulators synthesized and released by neurons innervating the digestive system, including classical transmitters such as acetylcholine and noradrenaline as well as slow transmitters/modulators (e.g., regulatory peptides). A clear

#### Host-environment Interactions

Trainees should have an understanding of the following:

- The factors permitting the existence of commensal organisms and their contribution to maintaining host health as well as the processes whereby pathogenic organisms are recognized and by which they induce a host response
- The principles that underlie the efficacy of probiotic organisms in gastrointestinal diseases.
- The cellular and molecular biology underlying important infections, including *H. pylori*, *Salmonella* species, *E. coli*, and other enteric pathogens
- Basic virology so that current infections, including the many causes of hepatitis, HIV, and gastroenteric infections as well as future disorders can be appreciated; an understanding of viral life cycle, genome organization, regulation of replication, and pathophysiologic mechanisms of disease

#### Immunology

Unless otherwise noted, it is strongly suggested that trainees have a fundamental knowledge of the following:

- Gut-associated immune system. Trainees should gain familiarity with gut-associated immune system and distinct differences from systemic immunology and the implications of

this particular system in understanding gastrointestinal physiology and pathophysiology. This knowledge should include a clear understanding of the roles of a variety of mediators and modifiers of the inflammatory process, including cytokines and chemokines and other related molecular species.

2. Autoimmune diseases. Trainees should gain familiarity with autoimmune diseases and the markers for immune-mediated gastrointestinal diseases.
3. Basic transplantation biology. Trainees should gain familiarity with basic transplantation biology, including the processes leading to and permitting the development of critical disorders such as graft-versus-host disease.
4. Innate and adaptive immunity. Trainees should gain familiarity with innate and adaptive immunity, such as Th1 and Th2 responses.

### Technologies

Technical advances have played a critical role in allowing bench-to-bedside transfer of technology. Therefore, a basic understanding of many critical technologies must be included in the education of gastroenterology trainees.

1. Genetic screening techniques. A fundamental understanding of genetics required to apply genetic screening techniques effectively.
2. Principles of polymerase chain reaction. Understanding the technology as well as its utility, limitations, applications, and diagnostic and information acquisition potential.
3. Microarray technology. Understanding the methodology, present and projected applications, and limitations.
4. Recombinant DNA technology. Understanding the techniques and applications of development of recombinant human proteins and peptides for their therapeutic and diagnostic applications; basic knowledge of strategies in gene therapy, including familiarity with the use of oligonucleotides, anti-sense DNA, small interfering RNA, and micro RNA.
5. Basic understanding of genetic animal models of disease, such as transgenic and gene knock out or knock in technologies as well as their limitations with respect to pathophysiology of human disease.
6. Proteomic methodology. Understanding of methods applied to the assessment of the amount and activation status of specific proteins within cells, including Western blotting, electrophoretic separation, and mass spectrometric approaches.
7. Antibody methodology. Understanding techniques involved in creation of hybridomas and the potential application of monoclonal antibodies obtained using this technique, an understanding of the theory and practical use of humanized chimeric monoclonal antibodies because of their present and future applications for diagnosis and management of patients, familiarity with polyclonal antibodies

and their use in radioimmunoassay and immunohistochemistry as well as an understanding of antibody specificity and sensitivity.

8. Cell sorting technology/flow cytometry. Understanding the basis of these techniques and their potential applications to distinguish among specific cell types. For example, their use in the elucidation of cell populations involved in inflammatory responses and/or neoplastic processes.
9. Detection of cell markers. Understanding methodologies ranging from microscopic, nucleic acid hybridization, immunodetection methods to enzymatic assays, used to identify cell markers. Application of such technologies to distinguish the various populations of cells involved in inflammatory and neoplastic processes. The limitations of these immunological and biochemical detection methods in sorting out information regarding specific disease processes.
10. Imaging techniques. Understanding how fluorescent and other markers can be used to assess cell signaling events in real time
11. New technologies. An understanding of rapidly developing technologies, including phage display technology, filamentous phage biology, and applications from the nascent fields of genomics and proteomics.
12. Information acquisition. Understanding the acquisition of information in molecular biology or as it pertains to gastroenterology, both now and in the future, via the Internet. For example, DNA and RNA relationships and DNA sequences, DNA databases, SNPs, and permutations in DNA sequences, such as gene mutations and deletions, applicable to gastrointestinal diseases.

In summary, the nature of gastroenterology requires an understanding of the cellular, molecular, and genetic mechanisms underlying normal physiology, including proliferation, differentiation, and programmed cell death (apoptosis). The importance of the multiple specialized tissues that encompass gastrointestinal function, ranging from the musculature to the gut brain, the splanchnic circulation, the endocrine system, the gut immune system, and the epithelia, cannot be minimized. Equally crucial is an appreciation of what goes awry in altered physiological states seen in inflammation, infection, and neoplasia.

### Training Process

Ideally, any training program should seek to combine the acquisition of fundamental information pertaining to gastrointestinal morphology, physiology, and biology, with presentation of information on altered cellular events in gastrointestinal disorders. Training in gastroenterology provides unique opportunities to do this because there are numerous examples in the field where the information

can be presented in tandem. Equally relevant, the trainees should be educated in methods to acquire and critically interpret information from the literature now and in the future. Most important is the recognition by faculty and trainees that a thorough understanding of the fundamental physiological, cellular, and molecular mechanisms is imperative for the well-trained gastroenterologist.

The experience, training, and acquisition of information for trainees in these areas may be provided in a variety of ways, which are not mutually exclusive.

1. Specific lectures dedicated to conveying information regarding the topics indicated above as well as inclusion of relevant basic science in clinical lectures.
2. Appropriate readings including primary literature and instructional materials with critical discussions in an appropriate forum such as journal clubs.
3. Conferences and lectures at local, national, or international meetings.
4. Seminar-type courses that focus on the cellular and molecular basis of gastrointestinal physiology for credit in academic institutions. Instruction can be based on a combination of prior reading assignments, didactic discourse with question-

- and-answer sessions, and trainee presentations.
5. An emphasis on basic mechanisms in direct one-on-one instruction and questioning of trainees during the diagnosis and management of patients. Instruction in basic cellular and molecular physiology must be incorporated into all aspects of clinical training and cannot be divorced from that training so as to appear separate from, and possibly irrelevant to, clinical practice.
6. Direct involvement in research activities from basic science to translational research that utilize the tools and techniques of cell and molecular physiology to ask questions pertinent to the pathophysiology of gastrointestinal and hepatobiliary diseases.

### **Assessment of Competence**

Knowledge of cellular and molecular physiology should be assessed as part of the overall evaluation of the trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. No specific examination or other instrument of assessment needs to be developed for this portion of the training. It is recommended that the program director or a faculty committee oversee the accomplishment of these goals.

# Training in Endoscopy

## Importance

Gastrointestinal endoscopy is an essential part of modern clinical gastroenterology. Therefore, all gastroenterologists must be knowledgeable about endoscopic procedures. Gastroenterologists performing routine diagnostic and therapeutic endoscopy (e.g., control of gastrointestinal bleeding) require training to achieve basic and clinical knowledge, judgment skills, and the technical competence requisite for performing these studies. Furthermore, gastroenterologists who perform advanced endoscopic procedures, such as endoscopic retrograde cholangiopancreatography (ERCP), endoscopic ultrasound (EUS), endoscopic mucosal resection (EMR), placement of enteral stents and endoscopic GERD therapy require additional training in therapeutic endoscopy as well as advanced training in hepatobiliary diseases, pancreatic diseases, and oncology. Not all trainees can or should be offered comprehensive training in advanced endoscopy. Furthermore, not all programs are capable of providing training in all advanced endoscopic procedures to all trainees.

The ABIM defines procedural skills as the learned manual skills (including supervision of technical aspects) necessary to perform certain diagnostic and therapeutic procedures in gastroenterology. Successful mastery of these skills includes technical proficiency; an understanding of their indications, contraindications, and complications; and the ability to interpret their results.

## Goals of Training

The objective of endoscopic training programs is to provide trainees with critical, supervised instruction in gastrointestinal endoscopy to ensure quality care for patients with digestive diseases. Endoscopic procedures are not isolated technical activities but must be regarded by the instructors and trainees as integral aspects of clinical problem solving. Endoscopic decision making, technical proficiency, and patient management are equally important, and the interdependence of these skills must be emphasized repeatedly during the training period.

During fellowship, trainees should gain an understanding of the following:

1. Appropriate recommendation of endoscopic procedures based on findings from personal consultations and in consideration of specific indications, contraindications, and diagnostic/therapeutic alternatives.
2. Performance of specific procedures safely, completely, and expeditiously.
3. Correct interpretation of most endoscopic and capsule endoscopic findings.
4. Integration of endoscopic findings or therapy into the patient management plan.
5. Recognition of risk factors attendant to endoscopic procedures and to be able to recognize and manage complications.
6. Personal and procedural limits and to know when to request help.
7. Indications, complications, and risks of capsule endoscopy and how to integrate this technology into the overall clinical evaluation of the patient.
8. Safe and appropriate use of moderate sedation.

In addition, gastroenterologists should be skilled in the approach to the diagnosis and the endoscopic and/or medical management of patients with gastrointestinal hemorrhage, including acute upper gastrointestinal hemorrhage of both variceal and nonvariceal origin and lower gastrointestinal bleeding of either acute or chronic presentation.

Two levels of endoscopic training for two distinct types of gastroenterologists should be recognized.

- Level 1 includes gastroenterologists performing routine gastrointestinal endoscopic and non-endoscopic procedures as part of the practice of gastroenterology and gastroenterologists specializing in non-endoscopic aspects of gastroenterology, including, but not limited to, the study of liver diseases, motility, nutrition, and basic science research.
- Level 2 includes gastroenterologists who, in addition to all or part of the above, perform some or all advanced (both diagnostic and therapeutic) gastrointestinal endoscopy procedures, including endoscopic retrograde cholangiopancreatography (with sphincterotomy, lithotripsy, stent placement, etc.), endoscopic ultrasound, endoscopic mucosal resection, endoscopic GERD therapy, and laparoscopy. Gastroenterologists who perform advanced endoscopic procedures should assume responsibility for teaching these advanced endoscopic procedures to designated trainees if appropriate, conduct endoscopic research, and critically assess and evaluate new and emerging endoscopic technology/procedures for safety and efficacy.

## Faculty

Endoscopy training instructors should be sound clinicians and teachers who are well trained, experienced, and skilled in endoscopy. Endoscopy instructors should have a demonstrated aptitude for teaching because it is recognized that not all expert endoscopists are expert teachers. The optimal endoscopic instructor should be sensitive to the level of training and will demonstrate sufficient patience according to the trainee's appropriate level of training. Instructors should be responsible for appropriate didactic instruction and supervision (or

delegation of supervision to other instructors) of all elective and emergency procedures. Supervision consists of observing and directing the trainees as they manipulate the endoscope.

The actual process is comprised of verbal directions for a series of complex physical maneuvers with the instructors at the sides of the trainees. In addition, the endoscopy instructors should be responsible for continuing instruction in endoscopic decision making, technique, and interpretation of findings and the ongoing evaluation of procedures, reports, and photographic records. Timely and accurate evaluation of the trainee's skills is essential to ensure the proper development of skills and the identification of deficiencies that can be quickly corrected.

#### Facilities

Modern inpatient, ambulatory care, clinical laboratory, radiology, and pathology facilities to accomplish the overall educational program must be available and be functioning at the primary training sites. The clinical environment must include emergency as well as intensive care facilities to ensure adequate exposure to patients with acute upper and lower gastrointestinal hemorrhage. In addition, safe and efficient performance of gastrointestinal endoscopy relies on the availability of the following:

1. Properly trained gastrointestinal endoscopists
2. Properly trained nurses and endoscopy technicians
3. Well-maintained and functioning equipment
4. Adequately furnished preparation, endoscopy, and recovery areas
5. Equipment and trained personnel to perform cardiopulmonary resuscitation, if needed
6. A functioning quality-improvement program

#### Endoscopic Experience

Trainees must be exposed to a sufficient number of new and follow-up inpatients and outpatients of varied ages (adult and geriatric) and of both sexes and with a variety of common and uncommon digestive disorders to permit a broad endoscopic experience. It is essential that endoscopic experience be attained in patients presenting with both acute and chronic upper and lower gastrointestinal hemorrhage, including acute variceal hemorrhage. Trainees should achieve competence in a variety of methods of endoscopic therapy (e.g., endoscopic hemostasis for both variceal and nonvariceal gastrointestinal hemorrhage). Table 2 provides guidelines for endoscopic training in routine procedures.

Each required number of procedures noted in Table 2 represents the threshold number of procedures that must be performed before competency can be assessed. The number represents a mini-

**Table 2 – Guidelines for Endoscopic Training in Routine Procedures: Threshold for Assessing Competence**

Procedure	Required number <sup>a</sup>
Esophagogastroduodenoscopy	130
Including treatment of nonvariceal hemorrhage (10 actively bleeding)	25
Including treatment of variceal hemorrhage (5 actively bleeding)	20
Esophageal dilation (guidewire and through the scope)	20
Colonoscopy	140
Including snare polypectomy and hemostasis	30
Percutaneous endoscopic gastrostomy placement <sup>b</sup>	15
Capsule endoscopy (small bowel)	25

NOTE. The information in this table represents the current recommendations of the ASGE. Because ASGE guidelines are living documents, they undergo frequent revision. Please check the ASGE web site ([www.asge.org](http://www.asge.org)) to obtain the most current information.

<sup>a</sup> Required number represents the threshold number of procedures that must be performed before competency can be assessed. The number represents a minimum, and it is understood that most trainees will require more (never less) than the stated number to meet the competency standards based on existing data.

<sup>b</sup> Refers to the gastric component of the PEG tube placement.

mum, and it is understood that most trainees will require more (never less) than the stated number. Trainees must learn that, when performing a diagnostic procedure, they must be prepared to conduct needed therapeutic interventions as well, should that become necessary. Trainees must assume continuing responsibility for both acute and chronically ill patients, before and after endoscopy, to learn the natural history of gastroenterological disorders as well as the effectiveness of therapeutic endoscopic procedures. The use of teaching aids such as endoscopy simulators, videotaped recordings of previously performed endoscopic procedures, use of endoscopy atlases, attendance at endoscopy courses, including short hands-on animal courses, and ongoing review of the endoscopic literature is encouraged but should not be viewed as substitutes for hands-on experience in performing procedures.

## Training Process

Endoscopic training should take place within the framework of clinical care and problem solving. Successful programs require skilled, experienced endoscopic supervisors who continually maintain and improve their abilities and possess the talents required to teach endoscopy; trainees with sound general medical or surgical training who have the motivation and aptitude for endoscopy; a structured training experience with ongoing evaluation of all trainees' progress in relation to interests, aptitudes, and career goals; and the opportunity for adequate clinical and endoscopic experience. Endoscopic procedures should be preceded by a careful clinical evaluation, including indications and individual risk factors.

### Level 1

All trainees should have a clear understanding of the indications, limitations, complications, and medical and surgical implications of the findings of gastrointestinal endoscopy. This includes an understanding of the underlying pathophysiology of gastrointestinal diseases and the ability to interpret the endoscopic findings for each. All trainees should complete at least 18 months of clinical training in gastroenterology and hepatology, including inpatient consultation, outpatient care, and extensive training in endoscopic procedures. Trainees should participate in the performance of endoscopic procedures with gastroenterologists knowledgeable in the indications for and the technique of performing the procedures as well as the method of recording the results of the procedures and the clinical significance of the findings. Trainees should also be trained in the indications, techniques, and interpretation of emerging technologies, including capsule endoscopy (esophageal and small bowel). Specifically, trainees should be able to understand the indications, contraindications, and risk of capsule endoscopy. While the minimal training needed to competently perform capsule endoscopy of the

esophagus and small intestine has not been evaluated, most experienced endoscopists who have completed a formal gastroenterology fellowship readily master this technique.

Essential components of patient safety during endoscopic procedures must be mastered, including the intravenous administration of medications that produce moderate sedation and analgesia and the application and interpretation of noninvasive patient monitoring devices. Familiarity in the administration of deep sedation, with such agents as propofol, during endoscopic procedures should also be included. Trainees should be familiar with the care, cleaning, and proper maintenance of endoscopy equipment. Technical skills for endoscopic procedures must be acquired in a sequential fashion. Proficiency develops as an incremental process through performance of sufficient numbers of procedures under direct supervision in a methodical sequence of increasing complexity. After suitable supervision, the trainees should be capable of independently performing routine endoscopic procedures, including specific therapeutic maneuvers (e.g., polypectomy, hemostasis techniques) when indicated (Table 2).

### Level 2

Trainees who elect to pursue additional training in gastrointestinal endoscopy should have completed at least 18 months of a standard gastroenterology training program (core clinical curriculum) or equivalent training and should have documented competence in "standard" (i.e., not advanced) endoscopic procedures (Table 2). The minimum duration of training required to achieve advanced technical and cognitive skills is 12 months. Programs offering advanced endoscopic training should have a minimum of two endoscopists capable of performing and providing instruction in advanced endoscopy. The instructors should be acknowledged as experts by their peers for the advanced procedures being studied and should have proven records of endoscopic research and teaching experience as documented by substantial published reports, reviews, editorials, and/or participation in local, regional, or national symposia and/or postgraduate courses.

Trainees should participate in the performance of advanced endoscopic procedures with an experienced endoscopist knowledgeable in the indications for the procedure, the techniques of performing and the method of recording the results of the procedure, and the clinical significance of the findings. Trainees who wish to perform endoscopic retrograde cholangiopancreatography must have a basic understanding of radiation safety, fluoroscopy, normal radiological anatomy, and radiographic interpretation. Those intending to perform endoscopic ultrasound must have a clear understanding of cross-sectional human anatomy (both gross and microscopic), the principles of ultrasonography, and the principles of oncology as

they pertain to the staging of gastrointestinal malignancies. It is essential for trainees planning to perform endoscopic ablation therapy to have a clear understanding of cross-sectional human gross anatomy and the principles of oncology as they pertain to tumor growth and staging.

Technical skills for advanced endoscopic procedures must be acquired in a sequential fashion. Proficiency develops incrementally through performance of sufficient numbers of procedures under direct supervision in a methodical sequence of increasing complexity. After suitable supervision and completion of training, the trainees should be capable of performing advanced diagnostic and therapeutic endoscopic procedures independently (Table 3). The required number of procedures noted in Table 3 represents the threshold number of procedures that must be performed before competency can be assessed. The number represents a minimum, and it is understood that most trainees will require more (never less) than the stated number.

*Endoscopic Ultrasound (EUS).* For comprehensive competence in EUS, at least 150 supervised cases should be performed, with 50 EUS-guided fine-needle aspirations (25 for nonpancreatic and 25 for pancreatic lesions) and at least 75 pancreaticobiliary cases. For trainees interested in mucosal and submucosal lesions only and not pancreaticobiliary imaging, a minimum of 100 supervised cases should be completed. At least 50% of these cases should be for tumor staging. For pancreaticobiliary competency, a minimum of 75 cases dedicated to pancreaticobiliary pathology should be performed, with most for tumor staging. These numbers exclude therapeutics, such as fine-needle aspiration and celiac plexus neurolysis. (ASGE guidelines for credentialing and granting privileges for EUS. ASGE publication no. 1056, May 2001).

*Endoscopic Retrograde Cholangiopancreatography (ERCP).* Although no specific numerical recommendation has been clearly established for training in advanced procedures, it has been determined that substantially more procedures are required before competence can be assessed in

technically demanding therapeutic procedures. Competence of graduates of advanced training programs in ERCP may be assessed by the demonstrated ability (at least an 80% success rate) to obtain access to (selectively and freely cannulate) the desired duct reliably without assistance in normal anatomy cases. Cases that are used to assess competency for ERCP should exclude those procedures in which the native anatomy of the patient has been surgically or otherwise altered (e.g., gastric outlet obstruction, Billroth II anastomosis), where prior sphincterotomy has been performed, or where a routine stent exchange is being performed (ASGE ERCP Core Curriculum. *Gastrointestinal Endoscopy* 2006; 63:361-76).

Endoscopic competence is difficult to define and quantify. Evaluation remains largely subjective; however, the objective Assessment of Competence is more desirable. Examples of objective parameters used to assess competency for endoscopy are shown in Table 4.

The ABIM has determined that specific methods for observation, evaluation, and documentation of procedural skills should be left to the discretion of the program directors. When performing endoscopic procedures early in training, all trainees should be observed regularly by supervisors. Faculty members should substantiate the trainees' competence by documenting the performance of the designated procedures. Simpler procedures may require fewer observations, whereas those that are technically complex may require more. The competency of all gastroenterology trainees should be documented by the program directors and by the endoscopy directors. The program directors have the responsibility of confirming or denying the technical competency and endoscopic exposure of trainees.

The ABIM has recommended that documentation be provided by a procedure card, computer record, or log book that identifies and evaluates the procedure(s) performed and any complications and includes the faculty supervisors' signatures. This evaluation should become part of the trainees' files. The ABIM provides documentation

**Table 3 – Guidelines for Endoscopic Training in Advanced Procedures: Minimum Threshold for Assessing Competence**

Procedure	Required number <sup>a</sup>
Endoscopic retrograde cholangiopancreatography	200
Endoscopic ultrasound	150

<sup>a</sup>The required number of procedures represents the threshold number of procedures that must be performed before competency can be assessed. The number represents a minimum, and it is understood that most trainees will require more (never less) than the stated number.

log books for training programs to distribute to trainees for documenting training and achievement of technical proficiency.

### Assessment of Competence

Knowledge of endoscopy should be assessed as

part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to endoscopy should be included on the board examination and should reflect a general knowledge of this content.

**Table 4 – Suggested Objective Performance Criteria for the Evaluation of Gastrointestinal Endoscopy (Also see Appendix II)**

Procedure	Performance criteria
Esophagogastroduodenoscopy	Esophageal intubation
	Pyloric intubation
Colonoscopy	Intubation of splenic flexure
	Intubation of terminal ileum (desirable skill)
	Retroflexion
Endoscopic retrograd cholangiopancreatography	Cannulation of the desired duct
	Opacification of the desired duct
	Sphincterotomy
	Stent placement
	Stone extraction
Endoscopic ultrasonography	Intubation of esophagus
	Intubation of pylorus
	Imaging of desired organ and/or lesion
	Successful lesion fine-needle aspiration
	Tumor staging in agreement with the surgical findings and similar to that reported in the literature
All procedures	Recognizes normal and abnormal findings
	Develops appropriate endoscopic/medical treatment in response to these findings
	Obtains appropriate informed consent
	Inserts the endoscope using proper technique and detects and identifies all significant pathology
	Conducts thorough examination of the entire organ and correctly identify landmarks
	Completes examination within a reasonable time and prepares accurate report
	Recognizes and manages any complications expeditiously
	Plans correct management and disposition and discusses findings with patient and other physicians
	Conducts proper follow-up, review of pathology, case outcome

Adapted from ASGE Publication: Principles of Training in Gastrointestinal Endoscopy, GIE volume 49, number 6, 1999. Visit [www.asge.org](http://www.asge.org).

# Training in Ethics, Medical Economics, and System-Based Practice

## Importance

Trainees eventually complete training and must find their way in the medical marketplace whether in academics or practice. This marketplace has become increasingly complex as physicians change from solo practice or small group practices to more complicated arrangements both inside and outside of institutions. Many graduates have expressed concern that training programs did not prepare them well for the business aspects of medical practice. This has become an important issue for medical practice as contracting, reimbursement, and economic matters impact more and more on the ability of physicians to provide medical services. In addition, increased enforcement efforts have resulted in more prosecution for fraud and abuse in relation to medical billing and in more licensing boards taking disciplinary action against physicians for moral lapses. Finally, at every level of medical care attention has been focused on providing quality care and improving quality by analyzing practice patterns with an eye toward reducing medical errors and improving outcomes. Trainees must understand how this can be done effectively. Although the main emphasis of training programs must continue to be the practice and science of medicine, one can not ignore these ethical, economic, and systemic issues. Trainees are encouraged to attend national meetings, seminars, and workshops on these topics offered regularly by the professional societies.

## Goals of Training

During fellowship, trainees should gain an understanding of the following:

1. Providing unbiased information about different systems of providing medical care, such as solo practice, private group practice, academic group practice, health maintenance organizations, independent practice organizations, public health clinics and hospitals, and military medicine. This information should include discussion of the governance of these organizations and the roles of physicians in providing care and in managing these systems. When possible, physicians participating in these

schemes should be available for trainees to question about their experiences in working in these different settings.

2. Offering sufficient training about medical economics, including contract negotiations, so that trainees can evaluate different employment opportunities and make plans for a career that is satisfactory for them.
3. Teaching the mechanics of insurance schemes, coding, and billing so that reimbursement for professional services can be sought without violating the law.
4. Imbuing trainees with the moral values necessary to engage in satisfying and ethical professional interactions with colleagues and patients.
5. Involving fellows with quality assessment programs and quality improvement initiatives during their training so that they can understand the methods employed to assess quality of care and initiate improvement schemes.

## Training Process

Didactic lectures, experience on quality assessment committees, involvement with continuous quality improvement activities in the clinic and gastrointestinal laboratory, “career days” in which trainees can interact with graduates practicing in a variety of settings, and mentoring by physicians from a variety of settings are some of the means that can be used to provide training to fellows.

In addition, each of the professional societies involved in producing this curriculum has seminars and other activities that address these issues.

## Assessment of Competence

Knowledge of ethics, medical economics, and system-based practice should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to ethics, medical economics, and system-based practice should be included on the board examination and should reflect a general knowledge of this content.

# Training in Geriatric Gastroenterology

## Importance

As individuals age, there are important changes that occur in gastrointestinal pathophysiology and function that predispose older adults to a variety of clinical problems. These include impaired swallowing and aspiration, increased risk of acid- and NSAID-mediated mucosal injury, increased colon cancer risk, slowing of colonic motility with subsequent constipation and fecal incontinence, and diminished functional reserve to cope with superimposed gastrointestinal disease. In addition, older patients also have other comorbidities, such as cardiovascular disease, hypertension, and impairments in cognition and mobility that impact the ability of gastroenterologists to provide clinical care. The issue is becoming increasingly important as the population ages. It has been estimated that by the year 2020, approximately 22% of the population will be 65 years of age and the percentage of individuals older than 85 years will have increased several-fold. Improved delivery of specialty care in gastroenterology to this population requires updated knowledge of both the pathophysiology of aging in the gastrointestinal tract and the special issues and concerns of geriatric patients who have gastrointestinal disease.

The aging of the population has significant implications for clinical practice. Certain diseases, such as gastrointestinal tract cancer and neurodegenerative motility disorders, are far more common in older persons. Impairments in appetite control, absorption, and food intake are important causes of malnutrition in older individuals. Aging-associated changes in drug metabolism and increased usage of multiple drugs in older patients have resulted in an increased number of reports of serious interactions and side effects of drugs used to treat gastrointestinal disease. Depression and dementia are common disorders in the aged population that have a profound effect on patient nutrition, symptom presentation, and response to therapy. Gastrointestinal disease may present with atypical features in older individuals compared with those in younger patients, often due to age-associated decline in sensory and autonomic neuronal reflexes. The ability of gastroenterologists to recognize the impact of common geriatric disorders on gastrointestinal tract function is essential for adequate delivery of specialty care to the aged.

Gastroenterologists participate in important health maintenance screening for conditions such as colon cancer and Barrett's esophagus. In the past few years there have been significant changes in the recommendations for colon cancer screening, based on new data obtained in geriatric patients indicating a higher risk of right-sided colonic neoplasia than was previously appreciated. Cost effectiveness of screening is evolving from age-based cutoffs

towards use of functional status and comorbidities to define populations benefiting from screening. More data are available on the gastrointestinal problems of the very old, as the numbers of nonagenarians and centenarians increase rapidly. As the demographics of hospitalized patients shifts to include ever-increasing numbers of patients over age 80, gastroenterologists need to be aware of the social issues and problems of treatment in frail older patients at high risk for iatrogenic complications of treatment.

## Goals of Training

During fellowship, trainees must be provided with formal instruction and clinical experience in the evaluation and management of gastrointestinal, hepatobiliary, pancreatic, and nutritional disorders of the elderly. Fellows must demonstrate competence in the evaluation and management of older patients.

Geriatric training in gastroenterology is divided into two levels. Level 1 represents the basic training in geriatrics required for all trainees. Level 2 represents advanced training in geriatric gastroenterology and is limited to individuals who complete the fellowship requirements for board certification in both gastroenterology and geriatric medicine. Therefore, level 2 training could not be accomplished within the 3 years of gastroenterology fellowship without formal and separate training in geriatric medicine.

### Level 1

1. Level 1 training includes general geriatric issues that addresses the impact of age on patient communication, family and social support, and presentation of disease.
2. Level 1 training also includes geriatric gastroenterology dealing with the impact of age on presentation, diagnosis, and treatment of common and important gastrointestinal conditions in the elderly. An important feature of this training is the ability to recognize the effect of age on pathophysiology and response to treatment.

The fellowship program should provide training required to achieve the above stated goals, including the following topics:

1. Pathophysiology of aging. An overview of the current concepts and models of aging, with particular emphasis on the gastrointestinal tract and liver, should be presented. Examples of current cellular models include acquisition of genetic errors in rapidly replicating tissue, damage from oxidants or other injurious substances, limitation of growth by replicative "clocks," and changes in metabolic signal pathways with aging that impair cellular responses.
2. Demographics and epidemiology of aging.

Trainees should be aware of the impact of aging on the epidemiology of gastrointestinal disease, health care delivery, and the issues of costs and resources.

3. Impact of common geriatric disorders on gastroenterology. Trainees should appreciate the impact of common diseases, such as depression and dementia, on the presentation and evaluation of gastrointestinal and liver disease. They should be aware of the importance of functional assessment of activities of daily living in the geriatric population and be able to implement screening maneuvers in the office setting to diagnose functional and/or cognitive impairment. Trainees should be able to assess the patient's ability to follow a treatment plan, with emphasis on the effect of cognitive impairment on management of gastrointestinal problems.
4. Social and ethical issues in aging. Trainees should be able to assess the patient's level of dependence on external psychosocial support from family, friends, and organizations as part of the treatment plan and should be aware of the importance of appropriate communication with the patient's family (or equivalent). Abused and neglected geriatric patients can present with various gastrointestinal complaints or malnutrition. Trainees should be aware of common signs and symptoms of abuse and have basic knowledge of community resources available for intervention in cases of abuse, neglect, and caregiver stress. Training should enable trainees to develop empathy for and understanding of the special needs of frail older individuals. This includes ethical issues concerning the risk-to-benefit ratio of the investigation and treatment of disease as well as end-of-life issues.
4. Cultivation of an attitude of inquiry and assimilation of scientific evidence to improve patient care practices in aging. Trainees should note that aged individuals may differ from younger patients in the presentation and response to treatment of conditions such as peptic ulcer disease, gastritis, and colitis. The demographics and special management of IBD, irritable bowel syndrome, and biliary disorders in older patients should be understood. Trainees should be encouraged to participate in geriatric research, including analysis of practice experience and perform practice-based improvement activities using systematic methodology.
5. Effective listening skills and creation of a therapeutic and ethically sound relationship with elderly patient and their families. This issue becomes more crucial in the dying patient. For many older persons, dying is characterized by physical stress, fragmented care systems, poor to absent communication among doctors, patients, and families, and enormous strain on caregivers.
6. Communicating bad news to the elderly. Trainees should learn a systematic approach to delivering bad news (e.g. pancreatic cancer) to the patient or next of kin (if needed). Effective discussions will improve the patient's and the family's ability to plan for setting realistic goals and for emotional support. Communication with such patients involves preparation to ensure medical facts, exploring the patient knowledge of illness, and the patient's desire to know the diagnosis. Trainees should be instructed to deliver information in a sensitive, straightforward manner, avoiding technical language.
7. Geriatric patients are a very heterogeneous population. Trainees should learn how to approach the elderly patients who could be very healthy or may present with gastroenterology-associated illnesses associated with several comorbid conditions, such as cognitively impaired, demented and agitated, depressed and delusional or dying patient. Elderly patients should be treated similarly to other patients, with dignity, honor, integrity, accountability, excellence, and respect to other. The trainees should be familiar with the patient's advanced directives. These directives will guide the physician's commitment to ethical principles pertaining to provision or withholding of clinical care.
8. Effective strategies for inpatient and outpatient management. Trainees should be able to assess the severity and emergent nature of gastrointestinal complaints in the elderly in inpatient and outpatient settings. The increase in comorbid illnesses in the elderly may require a multidisciplinary approach. Trainees must learn to work effectively and efficiently with members of other specialties. The pitfalls of routine assessment maneuvers used in younger patients, such as skin turgor, should be stressed and appropriate strategies for fluid/volume assessment and management in aged individuals developed. Trainees should be aware of adverse cardiovascular and central nervous system effects of rapid volume replacement in older individuals. They should have an appreciation for the subtle and misleadingly benign presentation of acute abdominal conditions in frail older patients and an understanding of the need for early surgical referral. Trainees should learn to practice cost-effective health care and resource allocation that does not compromise quality of care. Finally, trainees should be aware that there are considerable deficits in our understanding of gastrointestinal disease in older patients and that there is a need for research in this area. The importance of evidence-based medicine and an ability to assess outcome measures of treatment should be stressed in level 1 training.
9. Changes in gastrointestinal function with aging. Trainees should be aware of the "normal" or expected changes in physiology of the gut, pancreas, and liver that occur with

aging. Particular emphasis should be placed on functions shown to be affected by aging. These include swallowing disorders due to a variety of aging-associated changes in oropharyngeal and esophageal motility, impaired gastric motility and acid secretion, changes in hepatic metabolism, slowing of colonic motility, and rectal dysfunction. Familiarity with the normal range of laboratory data in the elderly is required. An appreciation of the range of normal gastrointestinal function in the aged patient will assist trainees in distinguishing between normal aging and abnormal findings due to disease.

10. Changes in drug metabolism with aging. Trainees must have an appreciation of the changes in drug metabolism, particularly in the liver that occurs with aging. Evolving areas of research, such as absorption and metabolism of drugs in the gastrointestinal mucosa, also should be covered. Trainees should be able to identify and anticipate side effects and interactions of medications used for the management of gastrointestinal disorders in the geriatric population.
11. Gastrointestinal effects of drugs. Trainees should have an appreciation for the presentation and differential diagnosis of gastrointestinal side effects of commonly prescribed drugs in older individuals. These include drugs with significant symptoms or effects on gastrointestinal motility, such as neuroleptics, antihistamines, antidepressants, antiarrhythmic agents, and antihypertensive agents such as calcium channel antagonists.
12. Effect of aging on nutrition. Using a nutritional assessment tool, trainees should be able to discover malnutrition in the geriatric age group. They should be aware of the common disorders predisposing to inadequate intake of nutrients (including vitamin deficiencies) in aged patients. In addition, they should recognize that adaptation of food intake to illness or abrupt changes in physiology is impaired or delayed in older individuals. Trainees should be taught age-appropriate strategies for fluid and nutritional replacement in inpatient and outpatient settings. Presentation of anorexia, obesity, and eating disorders in older individuals should be covered. The ethical and treatment issues of feeding tube placement should be covered, with particular emphasis on risks and benefits in frail or demented patients.
13. Common gastrointestinal conditions in the elderly. Trainees should be familiar with the presentation and pathophysiology of common gastrointestinal diseases in the geriatric population. These include dysmotility syndromes affecting the oropharynx, stomach, and colon as well as anemia due to a variety of conditions. Malabsorption, gastrointestinal bleeding, and oncological diseases are important causes of gastrointestinal morbidity in older patients, and trainees should be aware of

the effects of aging on prevalence, diagnosis, and treatment of these conditions. Management of common syndromes, such as reflux disease, is changing rapidly as new information concerning oncogenic risk and treatment becomes available. Trainees should be informed about the prevalence of substance abuse, particularly alcohol, in the elderly. The effects of alcohol on gastrointestinal function and common presenting signs and symptoms of alcohol abuse should be covered. Finally, trainees should have an appreciation for the diagnosis and management of common gastrointestinal problems in institutionalized and bedridden geriatric individuals. As an example, trainees should be able to recognize the importance of fecal impaction as a risk factor for urinary incontinence and should be taught appropriate strategies for management.

### Level 2

At this time, it is anticipated that level 2 training will be limited to individuals who complete the fellowship requirements for board certification in both gastroenterology and geriatric medicine. Level 2 trainees should have an in-depth understanding and documented clinical experience in all aspects of level 1 training. In addition they will have extensive knowledge of geriatric medicine and the psychosocial issues involved in geriatric care, based on providing care to geriatric patients in clinical settings specifically designed to maximize the percentage of older patients. These can include geriatric gastroenterology outpatient clinics, inpatient geriatric units, and long-term care facilities. They should have considerable information about the community resources available for management of complicated geriatric issues and a full understanding of the range of gastrointestinal disease in the older population. Level 2 trainees should have experience in teaching geriatric gastroenterology to medical students, house staff, and level 1 gastroenterology fellows. Trainees completing level 2 training should be able to serve as specialty consultants to specific geriatric populations, including specialized geriatric outpatient tertiary referral centers and nursing home residents. They should be qualified to organize and direct a teaching program in geriatric gastroenterology.

## Training Process

### Level 1

To obtain the knowledge required for level 1 training, trainees should be exposed to a variety of teaching experiences that include topics and issues pertinent to geriatric gastroenterology. These should include didactic lectures (including CD-ROM and Internet-based programs), case presentations, group discussions and seminars, clinical bedside teaching, and individualized teaching. The clinical experience should jointly cover all areas listed as goals of training and be provided primarily by interaction with consultants in both gastroenterology and geriatric medicine as part of the clinical

rotation in gastroenterology. Trainees should be involved in assessment and management of gastrointestinal problems in geriatric-aged patients in both the inpatient and outpatient setting. If specific geriatric venues are not used, then other methods of tracking and documenting treatment of older patients, such as a log, should be maintained. Faculty who are knowledgeable in geriatric gastroenterology should be available at the base institution of training or be made available in a block rotation through an appropriate academic affiliation. Involvement of faculty in geriatric medicine is suggested, particularly for teaching general geriatric issues if such knowledge is not available from gastroenterology faculty. In institutions without a formal geriatric medicine program, training by affiliated family practice groups with a substantial geriatric population is an alternative strategy.

#### Level 2

Level 2 training should be obtained only at institutions that have faculty with expertise in geriatric gastroenterology and a fellowship program in geriatric medicine that can provide the trainee with the components of training required for the CAQ in geriatric medicine over a 12-month period. In addition to specific training in geriatric gastroenterology clinics and inpatient settings, the program

should provide trainees with experience in diagnosis and management of other common geriatric problems, such as dementia, depression, delirium, urinary incontinence, falls, mobility impairment, osteoporosis, and chronic pain. The trainees should serve as consultants for other physicians in both general geriatric medicine and geriatric gastroenterology. At least 25% of training should be allocated to assessment and management of geriatric patients in skilled nursing facilities, long-term care settings, and specialized dementia units. Trainees should perform research in clinical or pathophysiologic aspects of geriatric gastroenterology and should be mentored by faculty with expertise in this area. Trainees should be involved in the training of level 1 gastroenterology fellows and should be given guidance concerning effective teaching methods and presentation skills.

### Assessment of Competence

Knowledge of geriatric gastroenterology should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to geriatric gastroenterology should be included on the board examination and should reflect a general knowledge of this content.

# Training in Hepatology

## Importance

Liver disease is one of the 10 leading causes of death in the United States; it additionally leads to substantial morbidity in many patients. As a result, the social and financial burdens of liver disease are significant and the management of patients with liver disease is associated with a significant cost. Thus, liver disease has become an increasingly important component of the practice of internal medicine and gastroenterology. This increase reflects both an improvement in the recognition of patients with liver disease and significant advances in therapy. One of the major advances has been in the area of orthotopic liver transplantation, which has become a widely accepted form of therapy for the treatment of end-stage liver disease. A second major advance has been the evolution of specific treatment for patients with viral hepatitis. These recent advances have necessitated appreciable changes in subspecialty training in the area of liver disease.

The success of liver transplantation has had a major impact on gastroenterology and hepatology practice. Each year, approximately 5000 patients undergo orthotopic liver transplantation. Survival rates at 1 year and 3 years generally exceed 85% and 65%, respectively. Given the limited supply of donor organs and the resulting long waiting times for transplantation, the expert management of these complications is crucial to the survival of the patient. It is critical that patients be referred in a timely fashion, and that practitioners are familiar with the care of disorders common in patients with end-stage liver disease (which often occur prior to transplant), including gastrointestinal bleeding; bacterial infections; hemodynamic, hematological, pulmonary, renal, and neurological complications; and nutritional deficiencies. Moreover, the postoperative care of the transplant patient with complex immunosuppressive regimens has increased the need for training of individuals with this expertise. It is essential that gastroenterology training programs provide the necessary experience in the evaluation and management of these patients.

The development of novel and more effective therapies for viral hepatitis in particular has had a major impact on the practicing gastroenterologist. The identification of the hepatitis C virus has increased the number of patients with liver disease who seek medical evaluation and treatment, and the concurrent development of treatments for hepatitis B and C has increased the importance of identifying infected patients. The treatment of these patients, however, is not straightforward. Variations in treatment regimens in patient subgroups, the use of combination therapies, the application of varied therapeutic endpoints, and the spectrum of side effects of current therapies present

challenges to the practicing gastroenterologist. A thorough understanding of the disease process is required to manage these patients in an appropriate manner, particularly as treatment options continue to evolve rapidly.

There is increasing evidence that nonalcoholic fatty liver disease (NAFLD), associated with the epidemics of obesity and diabetes, is a major emerging health problem in the United States and other developed countries. A significant number of patients with NAFLD appear to progress to cirrhosis; their long-term prognosis is similar to patients with HCV-related disease. As the pathogenesis of this disease becomes clearer, novel treatment strategies are evolving for patients with NAFLD. Finally, it is imperative that all gastroenterologists are familiar with other liver diseases (acute liver failure, drug-induced liver disease, alcohol-induced liver disease, hemochromatosis, Wilson's disease, etc.) and their management.

## Goals of Training

The overall goal of training in liver disease is to train gastroenterologists who are competent to manage the broad spectrum of liver problems encountered in a typical gastroenterology practice. Training programs must provide trainees with a broad knowledge of the physiology of the liver and a thorough knowledge of the management of patients with hepatobiliary diseases.

### Levels of Training

- Level 1 training encompasses a basic understanding of liver disease in general, with an ability to recognize, diagnose, and treat all types of routinely seen liver diseases. This level of training can be completed in a 3-year gastroenterology fellowship program.
- Level 2 entails advanced formal training in transplant hepatology and requires an additional fourth year of training with specific elements that fulfill the requirements for additional training (i.e., CAQ) in hepatology. See [www.aasld.org](http://www.aasld.org) for more information.

Level 1 training is designed to prepare an individual to develop clinical and/or research expertise in hepatology. While this usually occurs in the context of an academic setting, some subspecialists in community-based practices may devote the majority of their professional efforts toward patients with liver disease. To obtain the core knowledge required for level 1 training, trainees should be exposed to didactic lectures, case conferences, selected readings (which can include CD-ROMs and Internet-based programs), and clinical experience that jointly cover all areas listed above. The clinical experience can be obtained by rota-

tion on an inpatient hepatology service, exposure to liver transplant physicians and team members, and/or participation in an outpatient clinic focused on hepatology.

Level 2 training is the advanced formal training in advanced hepatology and transplant hepatology and is not currently feasible within the scope of the 3-year curriculum in gastroenterology and requires an additional year of training. Guidelines for this training experience have been developed by the American Society for Transplantation (AST) and the AASLD (*Liver Transplantation*, Vol 8 No 1, 2002: pp 85–87).

Training programs should ensure that the trainee acquires the following specific basic knowledge/skill(s):

1. Significant knowledge about genetic markers of liver disease, immunology, virology, and other pathophysiological mechanisms of liver injury; the basic biology and pathobiology of the liver and biliary systems as well as a thorough understanding of the diagnostic and treatment of a broad range of hepatobiliary disorders.
2. Skill in the performance of a limited number of diagnostic and therapeutic procedures.
3. An appreciation of the indications and use of a number of diagnostic and therapeutic procedures that are needed to manage hepatobiliary disorders.

During the training period, comprehensive teaching of the following subjects is essential:

1. The biology and pathophysiology of liver diseases
2. Diagnosis and management of patients with the wide variety of diseases of the liver and biliary tract systems, including the following:
  - a. Acute hepatitis: viral, drug, toxic, drug-induced.
  - b. Fulminant hepatic failure, including the timing to transplant, management of cerebral edema, coagulopathy, and other complications associated with acute hepatic failure.
  - c. Chronic hepatitis (and cirrhosis); chemical, biochemical, serological, and histopathologic diagnosis of chronic viral hepatitis.
  - d. Complications of chronic liver disease, including complications of portal hypertension (ascites, spontaneous bacterial peritonitis, prevention and treatment of bleeding esophageal varices and gastropathy), hepatic encephalopathy, hepatorenal syndrome.
  - e. Hepatocellular carcinoma (screening and diagnostic options, treatment options).
  - f. Nonviral causes of chronic liver disease, such as alcohol, nonalcoholic fatty liver disease (including nonalcoholic steatohepatitis), Wilson's disease, primary biliary cirrhosis, autoimmune hepatitis hemochromatosis, and  $\alpha_1$ -antitrypsin deficiency.
  - g. Gallstone disease, including the appropriate use of medical and surgical therapies (see Training in Biliary Tract Diseases and Pancreatic Disorders).
  - h. Hepatobiliary disorders associated with pregnancy, including care of patients with abnor-

mal liver tests as well as those with severe liver disease associated with pregnancy.

- i. Perioperative care of patients with defined disease of the liver or evidence of hepatobiliary dysfunction.
  - j. Selection and care of patients awaiting liver transplantation, including the assessment of the candidacy of patients for transplantation.
  - k. Care of patients following liver transplantation, including an understanding of the use of immunosuppressive agents; diagnosis and management of rejection; and recognition of other complications of transplantation, such as certain infections and biliary tract and vascular problems.
  - l. Use of antiviral agents in the treatment of liver disease.
3. Management of the nutritional problems associated with chronic liver disease (see Training in Nutrition).
  4. Liver pathology, including histological interpretation and specific pathological techniques (see Training in Pathology).
  5. Pediatric and congenital hepatobiliary disorders (see Training in Pediatric Gastroenterology).
  6. Liver imaging modalities, including interpretation of computed tomography, magnetic resonance-based techniques (magnetic resonance imaging, magnetic resonance angiography, magnetic resonance cholangiography), hepatic angiography, and ultrasound (including Doppler evaluation of hepatic vasculature). The limitations of each modality should be understood. Some programs may choose to provide selected fellows with hands-on training in hepatic ultrasound for liver biopsy guidance; formal training in liver biopsy requires an understanding of the use of ultrasound in the setting of liver biopsy.
  7. An understanding of the principles of experimental design, clinical biostatistics, and epidemiology sufficient to critically interpret the medical literature (see Training in Research).

## Training Process

### Program Faculty

The faculty should include at least one individual recognized to possess advanced expertise in liver diseases, including continued productivity in clinical or basic research related to hepatology. Programs offering training in hepatology should include at least two individuals whose primary focus within gastroenterology is liver disease, including at least one with significant experience with liver transplantation.

### Prerequisites for Training

Level 1 training (and level 2 training) in hepatology will take place as an integral part of subspecialty fellowship training in gastroenterology, after trainees have successfully completed at least 3 years of postdoctoral education in internal medicine.

Level 2 training requires specific exposure to transplant hepatology. Training in advanced hepatology will typically occur following successful completion of a 3-year gastroenterology fellowship.

#### **Duration of Training**

In level 1 training, at least 5 months devoted to clinical training in gastroenterology should be dedicated to training in hepatology (see Section XI.C). This training should include experience equally divided between the management of inpatients with a variety of hepatic disorders and the treatment of outpatients with liver disease. To provide an adequate experience, at least 30% of the inpatients seen by the trainees in their capacity as primary physicians or consultants should have hepatobiliary disease. An opportunity for trainees to become familiar with the referral and management of liver transplant patients should also be provided. This may require that the trainees rotate through another institution for this training.

#### **Procedural Skills**

The trainees must demonstrate understanding of the indications, contraindications, limitations, complications, and interpretation of the following:

1. Percutaneous liver biopsy
2. Diagnostic and therapeutic paracentesis

Training in the performance of liver biopsy is not a requirement for level 1 competency in hepatology training, although all other aspects of gaining familiarity with liver biopsy are required, including specific reading and interpretation of liver biopsy. It is recognized that some training programs will offer percutaneous liver biopsy as part of training

in hepatology apart from the formal additional year of training (i.e., the CAQ year). Training in liver biopsy is a mandatory part of the formal advanced training process.

#### **Training in Hepatology Research**

Opportunities should be available for clinical and/or laboratory-based research activity in liver diseases. Trainees should be encouraged to participate in research activities related to liver disease, under the guidance of mentors with research training and experience and a focus on liver physiology and/or disease processes. For trainees interested in developing careers in academic medicine, training beyond the 3-year gastroenterology fellowship may be necessary.

#### **Training Through Conferences, Seminars, Literature Review, and Lectures**

There must be regularly scheduled conferences that include didactic lectures, literature reviews, and research seminars focused on liver disease topics. Trainees should be responsible for liver disease-related teaching and supervising residents in internal medicine as well as medical and other medical personnel (see Overview of Training in Gastroenterology).

#### **Assessment of Competence**

Knowledge of hepatology should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to hepatology should be included on the board examination and should reflect a general knowledge of this content.

# Training in Inflammation and Enteric Infectious Diseases

Gastrointestinal inflammation, whether infectious, noninfectious, or idiopathic, is a primary mechanism of disease for many patients referred to specialists in digestive diseases. Therefore, it is imperative that trainees be exposed to diagnostic and therapeutic aspects of gastrointestinal inflammatory disorders as components of their fellowship experience. The unique aspects of gastrointestinal infections (related or not related to human immunodeficiency virus [HIV]) and idiopathic inflammatory bowel diseases (IBD) will be discussed separately. The differential diagnoses overlap due to the non-specific presentation of acute or chronic small or large bowel inflammatory disorders.

## I. GASTROINTESTINAL INFECTIONS IN NONIMMUNOSUPPRESSED PATIENTS

### Importance

The gastrointestinal tract is host to a large and complex microbial flora. In addition, all levels of the gastrointestinal tract (including the liver and biliary tree) are subject to acute and chronic infection by a variety of pathogenic microbial agents (viruses, bacteria, fungi, and protozoa). These infections present, acutely or chronically, as disordered organ function manifested by diarrhea, malabsorption, bleeding, or ulceration, symptoms that are commonly seen by primary care physicians and frequently are the indications for gastroenterological referral. The understanding of gastritis and duodenal ulcer disease has been revolutionized by the recognition of the role of *H. pylori*, whereas the agents responsible for some gastrointestinal diseases known to be infectious (e.g., *Tropheryma whipplei* for Whipple's disease) have only recently been identified. Many gastrointestinal diseases currently regarded as idiopathic are likely to be the result of infection by currently unrecognized pathogens or idiosyncratic reactions of the host to normal flora. New forms of common pathogens are continually appearing, such as the toxin-producing *Escherichia coli* responsible for hemorrhagic colitis. A gastroenterological specialist, therefore, should be knowledgeable regarding the epidemiology, differential diagnoses, confirmatory diagnostic studies, therapy, and outcomes of treated and untreated gastrointestinal infections in the adult and pediatric populations.

### Goals of Training (GI Infections in Nonimmunosuppressed Patients)

During fellowship, trainees should gain an understanding of gastrointestinal infections, including the following:

1. The mechanisms of inflammation
2. Elements of the mucosal defense system (including the mucosal immune system and the components of intestinal barrier function)
3. The composition and function of normal enteric flora (including protection against pathogens, colonization resistance, role in metabolism [nitrogen, carbohydrate, fat, vitamins, bile salts], and the effects of antibiotics on the flora)
4. The prevalence, clinical presentation, and virulence factors (including mechanism of toxin action, colonization, translocation, and invasion) of gastrointestinal pathogens (viruses, bacteria, fungi, and protozoa)
5. The pathophysiology of diarrhea due to infection
6. The indications and contraindications for antimicrobial therapy, mechanisms of microbial drug resistance, and risk of infections from altering normal flora (e.g., *Clostridium difficile*)

Clinical skills should include a familiarity with the following diagnostic and histopathologic studies (see Training in Pathology):

1. Microscopic examination of stool: fecal leukocytes and ova and parasites
2. Culture of stool, intestinal fluid, and mucosal biopsy specimens (specimen collection, handling, special stains, and media)
3. Mucosal biopsy interpretation
4. Antigen detection in stool and fluid (enzyme immunoassay, fluorescent antibody) and stool toxin testing
5. Rapid diagnostic tests (DNA probes or polymerase chain reaction)
6. Liver biopsy and interpretation (see Training in Hepatology)

Clinical skills should also encompass the selection and use of antibiotic therapy and methods for preventing infection during endoscopy (disinfection and antibiotic prophylaxis). Clinical exposure to gastrointestinal infections should include the diagnosis and management of patients with common infectious presentations, such as esophagitis (fungal, viral, bacterial); ulcer disease and gastritis (emphasizing the role of *H. pylori* and appropriate antibiotic therapies); acute, chronic, hemorrhagic, and traveler's diarrhea; bacterial overgrowth; infections in immunocompromised hosts (e.g., transplantation patients); and hepatic inflammation (e.g., liver abscess, hepatitis, cholangitis), including the role of liver biopsy. In addition, concepts of preventive medicine, such as indications for vaccination, routes of infection, dietary and hygienic

practice for travelers, and appropriate recommendations for prophylactic antibiotic therapy, should be included in training.

## Training Process

The training and experience for the diagnosis and treatment of gastrointestinal infection should include participation in the evaluation and management of outpatients and inpatients with the presentations and diagnoses listed above and should include the appropriate use of diagnostic tests, indications, complications, and application of therapy in these disorders. Additional exposure to related sciences (immunology, microbiology, and molecular biology) and related fields of medicine (infectious diseases and laboratory, anatomic, and surgical pathology) can be obtained through conferences, seminars, and literature reviews as well as practical demonstration of techniques.

## II. GASTROINTESTINAL DISORDERS IN IMMUNOSUPPRESSED PATIENTS

### Importance

According to a 2004 report of the World Health Organization, 40 million people worldwide are infected with HIV. AIDS is the leading cause of death of persons aged 15–59. In 2005, the National Institutes of Health reported that 40,000 new HIV infections occur annually in the United States and the infection rate in African American males has doubled over the past 10 years. Most, if not all, patients with AIDS will manifest at least one AIDS-related disorder of the gastrointestinal tract, hepatobiliary system, or pancreas. Many other patients are immunosuppressed due to congenital or acquired conditions or due to the effects of immunosuppressive drugs given to treat other ailments or to prevent rejection of transplanted organs. Many of these patients also suffer from opportunistic infections. Therefore, it is important for gastroenterological specialists to recognize and know how to evaluate and treat infections in immunosuppressed patients.

### Goals of Training (GI Disorders in Immunosuppressed Patients)

During fellowship, trainees should be able to assess the broad range of gastrointestinal symptoms and signs of illness in immunosuppressed patients and be able to differentiate AIDS-related from AIDS-unrelated conditions. Esophageal disorders include infectious esophagitis (fungal, viral, HIV, and neoplasms). Trainees should be able to assess AIDS gastropathy and other infectious and neoplastic gastric disorders. They should be able to assess disorders of the small intestine, including causes of diarrhea in immunosuppressed patients; interpret endoscopic, barium, and computed tomographic and ultrasound examinations; and treat bacterial, fungal, viral, and protozoal infections of the small

bowel in patients with AIDS. Trainees should also recognize causes of colorectal disorders, including proctitis, proctocolitis, and AIDS-related malignancies (e.g., Kaposi's sarcoma) and should be familiar with the indications for and interpretation of flexible sigmoidoscopic, colonoscopic, and radiographic studies of the colon.

Within the biliary system, trainees should be capable of evaluating causes of hepatomegaly, abnormal liver test results (infections, neoplasia, drugs), and the interaction of hepatitis viruses and HIV; distinguish AIDS cholangiopathy and cholecystitis; and assess indications for liver biopsy. AIDS-associated pancreatic disorders, including causes of pancreatitis (infectious, neoplastic, toxic), the implications of hyperamylasemia, and the nutritional evaluation of pancreatic disorders in patients with AIDS (assessment of nutritional status and development and implementation of nutritional therapies, including enteral and parenteral) should be incorporated (see Training in Nutrition). Trainees should be able to determine the cause of and prescribe a rational treatment plan for common opportunistic and neoplastic conditions in a cost-effective and humanitarian fashion.

### Training Process

Training and experience within the 18-month core clinical experience should include inpatient and outpatient consultative evaluations of patients with AIDS who have dysphagia/odynophagia, diarrhea, rectal bleeding, abnormal liver enzymes/hepatomegaly, abdominal pain, and hyperamylasemia. In addition, extensive interactions between trainees and specialists in laboratory medicine, diagnostic and interventional radiology, and infectious disease and immunology should be available through formal conferences and in the evaluation and management of individual patients.

## III. IDIOPATHIC INFLAMMATORY BOWEL DISEASE

### Importance

IBD is a unique disorder for which gastroenterologists provide both primary care and consultative services. Because these diseases are uncommon in the general community, general internists and family physicians typically have little experience in the spectrum of clinical presentation and therapeutic options. Expertise in diagnosis, including the interpretation of diagnostic studies and ability to implement a therapeutic plan and assume longitudinal follow-up for patients with these chronic disorders, differentiates gastroenterological specialists from primary care physicians.

### Goals of Training (Idiopathic Inflammatory Bowel Disease)

During fellowship, trainees should become proficient in the following:

1. Recognition of clinical and laboratory features (including serum antibody testing) of intestinal inflammation that may aid in differentiating between Crohn's disease and ulcerative colitis.
2. Distinction between the signs of intestinal inflammation from those of secretory and osmotic diarrhea and from symptoms of irritable bowel syndrome.
3. Differentiation of chronic idiopathic IBD from other specific entities, such as acute self-limited (infectious) ileitis and colitis, drug- or radiation-induced colitis, ischemic bowel disease and diverticulitis.
4. Understanding the indications for and interpretation of serologic, endoscopic, radiological, histological, and microbiological studies used in the diagnosis and evaluation of patients with IBD.
5. Understanding the cost-benefit and risk-benefit ratios for endoscopic and radiological procedures used to diagnose, define disease extent and severity, and to assess complications of ulcerative colitis and Crohn's disease.
6. Recognition of different presentations of IBD, including the pediatric manifestations, anorectal complications, and inflammatory versus fistulizing versus fibrostenotic patterns of Crohn's disease, and be able to recognize these various presentations on history-taking and physical examination.
7. Recognition and management of the intestinal (hemorrhage, obstruction), extraintestinal (ocular, dermatologic, musculoskeletal, hepatobiliary, urinary tract), and nutritional complications of ulcerative colitis and Crohn's disease.
8. Understanding the influence of IBD on pregnancy and of pregnancy on IBD and acquire knowledge on the safe use of IBD medications during pregnancy.
9. Recognition and management of the adverse effects of medicines used in the treatment of IBD, including the role of measuring serum enzyme (thiopurine methyltransferase) and 6-mercaptopurine metabolite levels in conjunction with the use of immunomodulators.
10. Addressing issues pertaining to family history and genetic counseling, including knowledge about the implications of gene mutations relevant to IBD.
11. Awareness of the long-term cancer risks in ulcerative colitis and Crohn's disease and be able to implement appropriate cost-effective surveillance programs.
12. Understanding the histopathologic criteria for diagnosis of dysplasia in ulcerative colitis.
13. Understanding the indications for surgery in ulcerative colitis and Crohn's disease.
14. Diagnosing postoperative complications of surgery in ulcerative colitis (including pouchitis after ileo-anal anastomoses) and Crohn's disease (including the differentiation and management of postoperative diarrhea).
15. Sensitivity to psychosocial influences as well as the consequences of IBD on patients and on family dynamics.
16. Capability of developing a therapeutic plan commensurate with disease extent severity for both ulcerative colitis and Crohn's disease.
17. Understanding the indications, contraindications, and pharmacology of nonspecific therapies, including new biologic therapies such as infliximab, anticholinergic agents, antidiarrheals, and bile salt sequestrants; oral and topical aminosalicylates; parenteral, enteral, and rectal corticosteroids; and immunosuppressants (purine analogues and methotrexate) antibiotics and probiotics used in relevant clinical situations.
18. Understanding the impact of antibodies to biologic agents and how to prevent, diagnose, and manage immunogenicity to biologic agents.
19. Understanding the indications for enteral and parenteral alimentation and be able to implement nutritional therapies (see Training in Nutrition).

In addition, trainees should be capable of diagnosing and differentiating other inflammatory disorders, including collagenous and microscopic colitis, NSAID enterocolopathies, diverticulitis (including medical and surgical complications), radiation enteritis and colitis, Whipple's disease, celiac sprue, diversion colitis, graft-versus-host disease involving the gastrointestinal tract, and the solitary rectal ulcer.

## Training Process

Unlike many other purely consultative aspects of gastroenterology, trainees should be able to assume responsibility for the care of both inpatients and outpatients with IBD, encompassing diagnosis, acute and chronic treatment, long-term follow-up, and counseling of the families and/or significant others. Adequate experience should include exposure to hospitalized as well as ambulatory patients, including the initial assessment and longitudinal management of patients with IBD, particularly in the ambulatory setting, under the supervision of skilled attending physicians.

## Assessment of Competence

Knowledge of inflammation and enteric infectious diseases should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to inflammation and enteric infectious diseases should be included on the board examination and should reflect a general knowledge of this content.

# Training in Malignancy

## Importance

The digestive tract has the highest incidence of cancer of any organ system of the body. Approximately 24% of cancer deaths in the United States are due to gastrointestinal cancers; 230,000 gastrointestinal cancers occur each year in the United States, with 110,000 deaths (American Cancer Society statistics, 2005). Importantly, appropriate intervention can dramatically alter the natural history and mortality of certain malignant and premalignant diseases. Patients who are treated in a timely manner can usually return to normal lives and will not be burdened by crippling chronic disease. For example, in theory, colon cancer is almost entirely preventable.

Gastroenterologists are responsible for the management of several patient groups who are at particularly high risk for gastrointestinal and associated extraintestinal cancers. These include groups of patients with FAP, HNPCC, Peutz-Jeghers syndrome, and the juvenile polyposis syndromes; patients with nonsyndromic family histories of cancer (particularly colorectal cancer); patients with a prior history of gastrointestinal neoplasia, IBD, gastroesophageal reflux disease, Barrett's esophagus, chronic atrophic gastritis, chronic pancreatitis, and celiac disease; patients who previously have had a gastrectomy; and patients infected with *H. pylori*. In addition, gastroenterologists manage patients with chronic viral hepatitis B and C, which predisposes them to the development of hepatocellular carcinoma (HCC), as do the iron storage diseases, for which diagnostic testing is now available. Furthermore, patients with primary sclerosing cholangitis and certain other related conditions are at risk for developing biliary tract cancers. Each of these high-risk conditions has a unique natural history and lends itself to diagnostic surveillance or therapeutic intervention.

Gastrointestinal cancer has been an area in which there has been a rapid emergence of new concepts. There has been an explosion of information in the area of tumor genetics. A model of multistep carcinogenesis for colorectal cancer has been developed, which represents the first coherent formulation of cancer pathogenesis. Two important concepts are the role of nutrition in the genesis of gastrointestinal cancers and the emerging role of cancer chemoprevention for high-risk groups. It has recently been appreciated that aspirin and related compounds may play an important role in preventing cancer. New classes of pharmacological agents (including aspirin and certain nonsteroidal anti-inflammatory agents) may be indicated in the primary prevention of colon and other gastrointestinal cancers. The application of these modalities is likely to become commonplace, making it essential for

the gastroenterologist to understand the indications for and uses of chemopreventive agents. In view of the major advances in the prevention, diagnosis, staging, and treatment of gastrointestinal malignancy and the impact these advances will have on the practice of gastroenterology, this field deserves particular emphasis in the education of gastroenterology trainees.

## Goals of Training

During fellowship, trainees should:

1. Develop a sound knowledge of tumor biology to a level similar to that traditionally achieved for acid-base or smooth muscle physiology. Balanced training now should reflect the state-of-the-art and the relative importance of cancer to this field.
2. Develop a thorough familiarity with the literature on cancer epidemiology, primary prevention, and screening for colorectal cancer with fecal occult blood tests as well as endoscopic and radiological approaches.
3. Become knowledgeable about the recommended guidelines for screening for gastrointestinal neoplasia and the literature supporting these recommendations.
4. Be able to read and interpret literature about the emerging technologies and know how to evaluate novel technologies and approaches.
5. Have a working knowledge of clinical genetics and understand the approaches to the genetic diagnosis of FAP, HNPCC, and other rarer polyposis syndromes. They should recognize the clinical characteristics of these diseases, the distinctions among the familial forms of cancer, the specific diagnostic and screening tests for each, and the rational approaches to their treatment.
6. Learn the principles of neoplastic growth as they relate to therapy, including endoscopic treatment as well as traditional surgical approaches. A complete understanding of the management of premalignant conditions is necessary.
7. Become familiar with the pathological interpretation of tissue biopsies (endoscopic and percutaneous) and have a thorough working knowledge of the management of dysplastic lesions. They must understand the distinctions among the varieties of colorectal polyps and their management.
8. Learn the principles of chemotherapy for gastrointestinal cancer and radiation treatment for early and advanced tumors. They must understand the initial management of those patients in whom the diagnosis of gastrointestinal cancer has just been made.
9. Understand how to counsel patients who have had gastrointestinal neoplasia and how to manage patients who inquire about the man-

agement of positive family histories of gastrointestinal cancer. Trainees should understand the principles and importance of genetic counseling as it pertains to genetic testing and the management of the inherited gastrointestinal diseases. They should be familiar with the prognoses associated with different types of gastrointestinal cancer.

10. Become familiar with the technical considerations in the therapy of colorectal adenomas and carcinomas. They should be thoroughly experienced in colonoscopic polypectomy of pedunculated and sessile polyps and ablative therapies for sessile lesions. Trainees must understand the capabilities and limitations of endoscopic mucosectomy for early gastrointestinal cancers.
11. Understand the appropriate surveillance and surveillance intervals for patients at high risk for developing cancer and those in whom premalignant epithelium has already been detected.
12. Gain additional experience, for those who desire advance training, in the placement of endoscopic stents, laser ablation, photodynamic therapy, endoscopic ultrasound, fine-needle aspiration of tumors, endoscopic mucosectomy, and endoscopic celiac ganglion block for patients with pancreatic cancer (level 2 training).

## Training Process

### Cognitive

Throughout the entire fellowship period, trainees should participate in the screening, diagnosis, and management of all types of gastrointestinal malignancies. Lectures in molecular and cellular biology as well as clinical oncology and screening, treatment, and palliation of gastrointestinal cancer should be included in the core curriculum. Lectures should be provided by experts in interventional endoscopy, oncology (medical and surgical aspects), radiation oncology, and medical genetics. It is critical that trainees understand the emerging role of the gastroenterologist in multiple aspects of gastrointestinal cancer. To achieve these goals, many programs will be required to invite outside consultants.

Coverage of the following topics should also be provided:

1. Changes in screening and surveillance recommendations.
2. The evolution of genetic testing and counseling for FAP, HNPCC, and other familial forms of gastrointestinal cancer.
3. Novel approaches to the diagnosis of gastrointestinal cancer, including endoscopic approaches, radiological approaches, nuclear medicine, ultrasound/endoscopic ultrasound, and new genetic techniques.
4. Staging of gastrointestinal cancer, management options, and prognostication.
5. Techniques used in the basic science investigation of gastrointestinal cancer, including flow cytometry, polymerase chain reaction assays,

mutation analysis, methylation assays, DNA sequencing, and linkage analysis.

### Endoscopic

Endoscopic training in the diagnosis and management of gastrointestinal cancer is required. Recommendations for the duration, frequency of procedures, and other details are covered in Training in Endoscopy. However, areas relevant to gastrointestinal malignancy that require specific attention include the following:

1. Endoscopic management of Barrett's esophagus.
2. Familiarity and at least limited experience with the indications, techniques, and management implications of laser therapy, photodynamic therapy, and stents for palliating esophageal cancers.
3. Management of upper gastrointestinal neoplasia in FAP, including the management of gastric, duodenal, and periampullary lesions.
4. Endoscopic management of the gastric remnant following Billroth I and II surgery
5. Recognition of neoplasia in the pancreaticobiliary tree.
6. Familiarity and at least limited experience with the indications, techniques, and management implications of therapeutic endoscopic retrograde cholangiopancreatography for pancreatic and biliary cancers.
7. Proper technique for polypectomy for pedunculated and sessile polyps, including saline injection.
8. Familiarity with the indications, techniques, and management implications of the emerging endoscopic imaging techniques for surveillance of gastrointestinal malignancies such as confocal laser endoscopy, chromoendoscopy, and optical coherence endoscopy.
9. Familiarity with recommendations for endoscopic screening for colon cancer in average-risk individuals.
10. Surveillance of the colon in IBD, including considerations for normal-appearing mucosa and abnormal-appearing mucosa.
11. Recognition of anal cancer lesions.

Gastroenterology trainees should become familiar with the appearance of cancer by using the following radiological and pathological techniques:

1. Radiological: gastrointestinal cancer on barium upper gastrointestinal series, barium enema, CT colography, CT scans, and MRI/MRCP
2. Pathological:
  - a. Recognition of Barrett's epithelium and dysplastic change in Barrett's mucosa
  - b. Recognition of intestinal metaplasia and atrophy in the stomach
  - c. Recognition of neuroendocrine and stromal cell tumors of the gastrointestinal tract
  - d. Identification of neoplastic and non-neoplastic polyps and malignancies
  - e. Recognition of the depth of invasion of cancer in the polyp or into the wall of the colon and its significance

- f. Recognition of dysplasia versus reactive changes in IBD

The roles of radiology and pathology are specifically addressed by Training in Radiology and Training in Pathology.

Certain trainees may elect to receive additional training in advanced endoscopic procedures, level 2 training (see Training in Endoscopy). These procedures should not be attempted by all trainees; rather, they should be reserved for those who wish to spend the time to master these techniques and may be reserved for selected centers.

These procedures include the following:

1. Endoscopic ultrasound of the esophagus, stomach, duodenum, and rectum
2. Dilating, stenting, and tissue sampling of the esophagus and biliary and pancreatic tree
3. Ablative therapy of neoplasms using laser
4. Photodynamic treatment of epithelial neoplasia in Barrett's esophagus
5. Fine-needle aspiration of masses in the liver and pancreas.

### Assessment of Competence

Knowledge of malignancy should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to malignancy should be included on the board examination and should reflect a general knowledge of this content.

# Training in Motility and Functional Illnesses

## Importance

Functional bowel and motility disorders account for visits by nearly 40% of patients being seen by practicing gastroenterologists and are among the most challenging disorders to manage. An effective approach to the evaluation and management of patients with motility and functional bowel disorders involves several key elements:

1. An understanding of the physiology of the enteric nervous system, gastrointestinal muscle function, and familiarity with concepts of the brain–gut axis, visceral sensation, and the regulation of gut function during feeding and fasting conditions.
2. Exposure to state-of-the-art patient management by physicians with experience and expertise in the field is an integral part of the training of effective and compassionate gastroenterologists.
3. Appreciation of the importance of the psychosocial aspects of functional bowel disorders and familiarity with effective treatments for chronic pain, depression, and anxiety.
4. An understanding of the utility, indications, and limitations of diagnostic motility studies. Recommendations about the use of these studies should acknowledge consensus documents commissioned by the various gastrointestinal professional societies.

A major goal of the training in motility and functional bowel disorders is to develop highly trained specialists that are familiar with the clinical nuances of these complicated problems. Patients with motility disorders and functional illnesses offer unique opportunities to develop this competency due to the combination of chronicity, disability, and psychological distress characteristic of many of these disorders. For example, chronic nausea and chronic pain produce great suffering in these patients and require great compassion by the treating physician in addition to detailed knowledge of effective management strategies. These conditions also require a great deal of judgment on the part of the treating physician. For example, the management of chronic idiopathic intestinal pseudo-obstruction demands difficult and appropriate decision making for medications and surgical procedures that might be required to promote motility and vent static portions of the gastrointestinal tract.

To diagnose and treat motility and functional disorders effectively, trainees in gastroenterology must attain knowledge and understanding of the following specific topics:

1. Organization of the contractile apparatus of the gastrointestinal tract including smooth muscle and interstitial cells of Cajal.
2. Anatomy and physiology of the enteric nervous

system: fasting and postprandial programs of motility and secretion.

3. Anatomical and physiological basis of visceral afferent signaling, including vagal and spinal pathways, neurobiology of pain signaling, and visceral sensitization.
4. Brain–gut interactions and the biopsychosocial continuum.
5. Pharmacology of agents modulating motility and sensation, including prokinetic drugs, antidiarrheals, and laxatives
6. Development of the enteric nervous system and congenital disorders of motility such as Hirschsprung's Disease and hypertrophic pyloric stenosis.
7. Physiology of deglutition and neural control mechanisms and disorders of swallowing, including secondary and primary etiologies.
8. Esophageal motor physiology, esophageal dysmotility, including achalasia, diffuse esophageal spasm and other spastic disorders, noncardiac chest pain.
9. Physiology and pathophysiology of gastroesophageal reflux, singultus, and belching.
10. Organization and control of gastric motor activity and physiology of gastric emptying, gastroparesis and postsurgical gastric syndromes, nonulcer dyspepsia.
11. Small bowel physiology, congenital and acquired disorders of small bowel motility, including diabetes, scleroderma, and pseudo-obstruction.
12. Colonic and defecatory physiology and pathophysiology, colonic inertia, anorectal and pelvic outlet/floor disorders, irritable bowel syndrome, and diverticular disease.
13. Motility of the biliary tract, Sphincter of Oddi dysfunction, and gallbladder dyskinesia
14. Systemic disorders affecting gastrointestinal motility (diabetes mellitus, scleroderma, thyroid disease, paraneoplastic syndromes, and neurologic disorders including dysautonomia).
15. Principles of clinical psychology as it relates to the management of patients with chronic disorders including an understanding of cognitive-behavioral therapy, hypnosis, and other forms of alternative medicine indications and appropriate use of psychopharmaceuticals.

The chronic nature and social impact of many disorders of dysmotility necessitates the cooperation and support of family members in the care of these patients. Fellows should develop effective techniques for interacting with family members to accomplish these goals. Management of these patients also requires a multidisciplinary approach requiring coordination with several other specialties, including general surgery, nutrition, clinical psychology, and pain management. Motility disorders require an intense commitment and professionalism on the part of the

physician because of the chronic and often intractable nature of the symptoms. Pain management and understanding of the psychosocial factors driving illness behavior can be particularly challenging.

The numerous systemic diseases that adversely affect gastrointestinal motility require cooperation among many specialties in medicine, such as neurology, endocrinology, surgery, anesthesiology, clinical psychology, and gynecology. The high expense and technical expertise of resources for these diseases also demand judicious use of health care resources such as total parenteral nutrition and small bowel transplantation.

## Goals of Training

As with most specialties, a combination of cognitive/clinical skills and knowledge along with procedural proficiency is necessary for training in the care of patients with these disorders. Two levels of training should be offered. Level 1 is for all trainees who will be a part of the general gastroenterology program and who need to develop a familiarity with motility and functional disorders. Level 2 is intended for those who will specialize in motility and functional disorders and require more intensive training.

### Level 1

At this level all trainees should acquire the fundamental core of information outlined above through supervised patient care experiences, mentored interpretation of diagnostic tests, individual reading, presentation of core curriculum at gastroenterological/radiological/surgical clinical conferences, lectures by invited speakers, journal clubs, and contact with attending physicians.

### Level 2

The major goal for trainees at level 2 is to acquire an in-depth knowledge of pathophysiology, clinical presentation, diagnosis, epidemiology, and therapy of gastrointestinal motility and functional disorders. In general, trainees at this level should have completed at least 18 months of training in general gastroenterology and should spend up to an additional 18 months concentrating on motility and functional disorders. Trainees seeking advanced training in motility and functional disorders should be selected on the basis of demonstrated interest and a record of excellent clinical performance in the general gastroenterology track. Selected trainees must be provided with the opportunity to perform an adequate number of motility studies and motility-directed therapeutic procedures (e.g., pneumatic dilation), to receive supervised teaching, and to be involved in clinical research. Ideally, level 2 training should produce an expert capable of managing all aspects of motility and functional disorders. In terms of cognitive and diagnostic acumen, level 2 trainees are expected to know physiology, pathophysiology, diagnosis, and therapy of dysmotility, functional, and diverticular diseases in greater detail than those at level 1 of training.

It is anticipated that most physicians participating in level 2 training will practice in an academic environment; therefore, all level 2 trainees should gain expertise in clinical or basic research. This includes mastery of study design, methodology, statistical analysis, protocol writing, drafting informed consent documents, submission of protocols to institutional review boards, enrollment of patients into studies, analyzing and interpreting data, presenting at national meetings, and writing papers. Having effective mentorship is essential for success at clinical or basic research.

## Procedural Training

### Level 1

With respect to motility studies, all trainees should have a clear understanding of the indications and potential pitfalls in the performance of motility studies and the limitations of interpretation of esophageal manometry, esophageal pH studies, esophageal motility with provocative agents, radionuclide gastric emptying studies, small bowel motility, colonic transit measurements, anal sphincter manometry, and anal sphincter and pelvic floor biofeedback training. Trainees gain experience with these tests in the course of the clinical care of their patients, however, this level of training is done primarily on an intellectual level to produce an understanding of the value and limitations in interpreting the findings of the tests and to know when they would be valuable in the management of a patient. It is expected that this level of training will be incorporated in the first 18 months of clinical training.

All trainees should have an understanding of the specifics of how tests are performed to know when they might be contraindicated in any individual patient. In addition, trainees should be able to recognize the manometric features of major motor disorders of the esophagus and anal sphincter. These disorders include esophageal achalasia, diffuse esophageal spasm, ineffective esophageal motility and scleroderma, internal anal sphincter weakness, external anal sphincter weakness, and absence of the rectoanal inhibitory reflex. Trainees should understand the features of esophageal pH testing and the limitations of this study as a measure of gastroesophageal reflux. Trainees also should learn to recognize the factors that may introduce artifact into a study so that reports can be interpreted by the referring physicians without the need to rely completely on the physician performing the test.

### Level 2

This level involves additional training in the interpretation of diagnostic tests and is aimed at individuals who seek to be true experts in management of motility and functional disorders. The experience necessary to become proficient in the diagnosis and therapy of these types of diseases should be offered only in institutions that have a large patient referral base, a wide range of patients with motility and functional disorders,

adequate facilities, and faculty expert in the management of these conditions.

Specifically, the goal of this higher level of training is to provide appropriate instruction for subspecialty trainees who will conduct and interpret motility studies after training and act as consultants to other gastroenterologists and other clinicians. Major therapeutic decisions rest on the results of these studies, including decisions regarding surgical procedures and use of drugs for long-term therapy. Trainees who wish to be able to provide this consultative service are required to be involved in a sufficient number of studies and to be completely familiar with the logistics of performing studies, potential technical problems with the techniques that might affect the interpretation of the studies, and the nuances of interpreting these studies. It is important that level 2 trainees are able to interpret these studies without relying on computer analyses alone. Level 2 trainees also are expected to be familiar with emerging technologies, such as intraluminal impedance measurements, advanced scintigraphic transit measurements and assessments of accommodation, and gastrointestinal wall movements, even though these are not in widespread use yet.

## Training Process

### Functional Bowel Disorders

The process of developing the expertise to manage patients with functional bowel disorders is difficult to codify. However, an understanding of the physiology of the brain-gut axis and the physiology of motility and sensation of the gut as well as an understanding of the psychosocial forces that modify symptom presentation and behavior are critical to the care of these patients. It is likely that this will be even more important as newer drugs and other treatments are introduced. A goal of training should be to develop experienced clinicians who can apply both the “art” and “science” of medicine to the management of patients with functional

bowel disorders. Subspecialty trainees should acquire skills in interview techniques, physical examination, particularly for pelvic floor disorders, and the integration of psychological information into clinical reasoning and decision making. Although many of these skills can be learned by caring for patients with these disorders under the preceptorship of experienced clinicians, formal discussion of these skills may be valuable, particularly during multidisciplinary conferences.

### Level 1

Trainees should be provided with appropriate clinical experiences during which patients with possible motility disorders can be evaluated and managed under the guidance of the faculty. This experience should include discussion about appropriate testing, interpretation of test results, and treatment of patients under the guidance of appropriate staff. In addition to learning about motility tests, trainees should have the opportunity for hands-on experience doing motility studies, including ambulatory pH studies, to understand what the test experience will involve so that they can more accurately explain the tests to patients. This also will allow appreciation of potential limitations and artifacts that can affect test interpretation. Specific literature and didactic teaching should be developed by the training program so that trainees can become familiar with and understand the pathophysiology of motility disorders and the available studies. A library of motility tracings should be maintained for review by level 1 trainees.

### Level 2

Threshold numbers of proctored studies required before assessing competence in each of the motility investigations are listed in Table 5.

These numbers were derived by consensus among the members of the task force, each of whom has had extensive experience in working with trainees to enable them to become proficient in performing and interpreting motility studies. The numbers for

**Table 5 – Guidelines for Level 2 Training in Motility: Threshold Number of Proctored Studies Required Before Assessing Competence**

Studies	Required number
Standard esophageal motility	50
Gastric and small bowel motility studies (either perfused catheter or solid-state transducers, or impedance catheters)	25
Indications, interpretation, and significance of scintigraphic measurement of gastric emptying	25
Colonic motility studies (either perfused catheter or solid-state transducers)	20
Anorectal motility studies/anal sphincter manometric studies	30
Anal sphincter biofeedback training	10
Colonic transit with radiopaque markers or scintigraphy	20

most of these procedures have also been endorsed by the Subcommittee on Training of the American Motility Society.

To gain expertise in these procedures, trainees should be exposed to the management of patients with the disorders for which these tests are used. Although a proposed number of patients with each of these diseases to be seen by the trainee would be arbitrary, it is expected that trainees will have extensive clinical exposure to patients with motility and functional disorders.

In addition, a specific amount of time should be spent by trainees to become familiar with the appropriate indications for, to conduct, and to interpret these studies under the preceptorship of faculty members who are experienced in them. This should involve hands-on performance of the studies as well as analysis and interpretation of the results. The amount of time will vary from program to program,

depending on the level of activity at the motility laboratory at that institution. It will be the responsibility of the preceptors to design the training programs in such a way that they can certify that the trainees are trained appropriately. To be considered trained at level 2 for any specific motility test, the trainee should have a documented log demonstrating appropriate numbers of the types of studies performed and interpreted under supervision.

### **Assessment of Competence**

Knowledge of motility and functional illnesses should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to motility and functional illnesses should be included on the board examination and should reflect a general knowledge of this content.

# Training in Nutrition

## Importance

The major function of the gastrointestinal tract is to ingest, digest, and absorb nutrients. Therefore, patients with diseases of the gastrointestinal tract are at increased risk for developing nutritional abnormalities because of alterations in nutrient intake, decreases in nutrient digestion and absorption, and increased nutrient losses. Advances made during the last 3 decades have made it possible to feed all patients who are unable or unwilling to ingest or who are unable to absorb an adequate amount of nutrients. Certain interventional feeding techniques require endoscopic expertise.

Appropriate use of nutrition support requires an understanding of the principles of energy requirements, macronutrient and micronutrient metabolism, and fluid balance. The ability to evaluate the clinical efficacy of nutrition support and the clinical knowledge of the interaction between the patient's disease process and nutritional status is necessary to provide the appropriate nutrition support.

Many gastrointestinal conditions are treated with dietary manipulation and patients often ask for nutritional guidance even when dietary management is not established scientifically. An example of the former is use of a gluten-free diet in celiac disease. An example of the latter is use of a high-fiber diet for management of diverticulosis of the colon. Gastroenterologists should be familiar with dietary management of gastrointestinal and liver disease so that they can address their patients' needs.

In addition to understanding the principles of identifying and treating nutritional deficiencies, knowledge of overfeeding and obesity is also essential. Obesity can cause gastrointestinal diseases because of the adverse effects of excess adiposity on specific gastrointestinal organs. Currently, treatment of obesity consists of dietary advice, medications with limited efficacy, and, increasingly, surgery. However, new medications and endoscopic treatment for obesity that alters the anatomy of the gastrointestinal tract are on the horizon.

Therefore, clinical nutrition is an integral component of the management of many patients seen by gastroenterologists. To adequately treat these patients, it is strongly suggested that gastroenterologists understand the following:

1. Basic principles of nutrient requirements, ingestion, digestion, absorption, and metabolism in the healthy and diseased gut.
2. Assessment of nutritional status, including specific nutrient deficiencies and excesses, protein-energy malnutrition, and obesity.
3. Metabolic response to starvation and the pathophysiological effects of malnutrition.
4. Metabolic response to illness and injury and nutrient requirements during stress states.
5. Indications for nutrition support.

6. Implementation and management of nutritional therapy, including modified diets, enteral tube feeding, and parenteral nutrition.
7. Pathophysiology and clinical management of obesity.
8. Ethical and legal issues involved in provision and withdrawal of nutrition support.

## Goals of Training

Nutrition training for gastroenterology fellows is divided into two levels. Level 1 represents the basic training in nutrition that should be provided to all trainees. Level 2 represents advanced training for fellows who have a specific interest in nutrition and desire additional experience and proficiency in clinical nutrition and nutrition research.

### Level 1

The gastroenterology fellowship should provide a core curriculum that provides all trainees with a general understanding of the following topics:

1. **Basic nutritional principles.** Trainees should have an understanding of normal micronutrient and macronutrient function, requirements, digestion, absorption, and metabolism and the effects of gastrointestinal diseases and resection on these processes. They should understand the nutritional aspects of celiac disease and other mucosal diseases associated with malabsorption, Crohn's disease, liver disease, acute pancreatitis, pancreatic insufficiency, limited ileal resection, and short-bowel syndrome. Trainees should also understand the process of intestinal adaptation following massive small bowel resection.
2. **Nutritional assessment.** Trainees should be able to determine when a patient is at risk for malnutrition. They should be able to identify specific nutrient deficiencies and excesses and protein-energy malnutrition by using a focused history and physical examination and appropriate laboratory tests. The specific criteria that increase the patient's risk for malnutrition and associated medical complications, including abnormally low plasma nutrient concentrations, weight loss, and body mass index, must be understood clearly.
3. **Malnutrition.** Trainees should understand the physiological consequences of underfeeding, including the metabolic response to starvation, alterations in body composition and organ function that occur with inadequate protein and energy intake, and the clinical effects of specific nutrient deficiencies. The adverse effects of aggressive refeeding of the severely malnourished patient also must be understood.
4. **Stress states.** Trainees should understand the metabolic response to illnesses and injury and

the effects of illness and injury on nutrient metabolism and requirements.

5. **Specific gastrointestinal disease states.** Trainees should understand and be able to implement nutrition management plans that are based on current evidence-based literature, related to severe acute pancreatitis, liver disease and transplantation, inflammatory bowel disease, gastrointestinal fistulas, short-bowel syndrome, radiation enteritis, and celiac disease. Trainees should also understand how to systematically evaluate a patient with intestinal malabsorption such as chronic pancreatitis, bacterial overgrowth, celiac disease, and protein-losing enteropathy.
6. **Nutrition support.** Trainees should understand how to use oral, enteral, and parenteral feeding techniques to prevent or correct specific nutrient deficiencies and to provide appropriate protein, energy, fluid, vitamin, and mineral intake in patients who are unable to maintain an adequate oral intake of nutrients because of short-bowel syndrome, nausea and vomiting, inability to swallow, severe illness, psychiatric illness, or altered mentation. Specific knowledge of the following topics is essential:
  - a. Energy and macro- and micronutrient requirements
  - b. Indications for enteral and parenteral nutritional support
  - c. Appropriate timing of the initiation of nutritional support via enteral or parenteral nutrition
  - d. Benefits and complications associated with both enteral and parenteral nutrition in specific disease states
  - e. How to calculate and implement enteral and parenteral therapy, including indications, administration options, composition and proper selection of formulations, monitoring techniques, and evaluation for complications
  - f. Indications for and composition of diets modified in nutrients or consistency
  - g. The physiological principles of oral rehydration therapy and appropriate use of oral rehydration solutions
  - h. The use of enteral tube feeding, including indications, feeding tube options, tube placement techniques, composition and proper selection of liquid formulations, monitoring tube feeding, and complications
  - i. Proficiency in the endoscopic placement of PEG and PEJ feeding tubes
  - j. Management of access catheters for parenteral nutrition, including placement, maintenance, complications and their treatment
  - k. Criteria and indications for implementing home enteral and parenteral nutrition
  - l. Drug–nutrient interactions

Knowledge of these nutrition support principles is needed for both short-term (inpatient)

and long-term (home) therapy.

7. **Obesity.** Trainees should obtain a general understanding of the pathogenesis of obesity and the factors involved in the regulation of food intake and energy balance. They should understand the medical complications associated with obesity, particularly the gastrointestinal complications (gastroesophageal reflux disease, gallbladder disease, pancreatitis, liver disease, and colon cancer). Trainees should understand the principles of weight management, including behavior modification, diet, physical activity, pharmacotherapy, and surgical therapy. The trainees should also be aware of endoscopic and surgical treatments for weight loss. Trainees should understand how to appropriately diagnose and manage complications of obesity surgery, including stomal ulceration, stomal stenosis, intestinal hernias, and nutrient deficiencies.
8. **Ethical and legal issues.** Trainees should obtain an understanding of the ethical and legal issues involved in providing and withdrawing enteral and parenteral nutrition support for terminally ill patients, end-stage dementia, patients who are unable to give consent, and patients who refuse nutritional therapy but are unable to maintain adequate nutritional status without artificial feeding.

#### Level 2

Level 2 trainees must have an in-depth understanding and documented clinical experience in all areas required for level 1 training. In addition, the level 2 trainees should achieve the following:

1. Familiarity with nutrient requirements throughout the life cycle
2. Competency in the appropriate outpatient and inpatient nutritional management of diverse patient populations who might not have gastrointestinal diseases, such as those with diabetes, dyslipidemias, wasting diseases (e.g., cancer and AIDS), eating disorders, cardiovascular disease, osteoporosis, pulmonary diseases, renal disease, and those who are pregnant or lactating
3. Understanding of the importance of nutrition in health promotion and disease prevention
4. Familiarity with methods for assessing energy expenditure and body composition
5. Understanding of the organizational and administrative structure of inpatient and outpatient nutrition support services and outpatient weight management programs as well as the economic issues involved in managing such programs
6. Familiarity with the management of patients receiving home parenteral and enteral nutrition, including the indications for and complications of these therapies
7. Understanding the indications for isolated and combined liver and intestinal transplantation
8. Experience in teaching nutrition to other medical trainees, such as medical students, house staff, and level 1 gastroenterology fellows

After completion of level 2 training, trainees should be able to serve as consultants for both inpatient and outpatient nutritional issues, medical directors of inpatient nutrition support services, medical directors of home nutrition support programs, or medical directors of obesity treatment programs.

## Training Process

### Level 1

To obtain the core knowledge required for level 1 training, trainees should be exposed to didactic lectures, case conferences, selected readings (which can include CD-ROMs and Internet-based programs), and clinical experience that jointly cover all areas listed above. Trainees should be involved in providing and writing orders for enteral and parenteral nutrition support to hospitalized patients, including those in intensive care units, and nutritional management of outpatients. These clinical experiences can be obtained by rotation on an inpatient gastroenterology service, exposure to a nutrition support service, experience on other inpatient services, or participation in an outpatient clinic that involves nutrition counseling, such as management of patients receiving long-term enteral and parenteral nutrition support.

A faculty member who is knowledgeable in nutrition should be available at the base institution of training or be made available in a block rotation through an appropriate university affiliation. Trainees also should have active interaction with pharmacists and dieticians involved with nutritional support as part of a total team approach of caring for patients requiring nutrition support. Nutrition topics and cases should be included as part of routine lecture series and clinical conferences provided for gastroenterology training so that there is ongoing interdisciplinary involvement.

Trainees should receive formal training and hands-on experience in nasogastric and nasojejunal tube placement and endoscopic placement of percutaneous gastrostomy and jejunostomy tubes.

### Level 2

Level 2 training in nutrition can be obtained only at institutions where there are faculty members with expertise in clinical nutrition or nutrition research and established clinical nutrition services. Achievement of competence in level 2 training requires an average of 12 months of clinical nutrition and nutrition research, which can be provided as nutrition fellowships separate from the gastroenterology fellowships or as part of the third year of the gastroenterology training program. Trainees should spend at least 6 months participating in clinical nutrition activities, including inpatient (interdisciplinary nutrition support service) and outpatient (nutrition and weight management clinics) services. Trainees should serve as clinical nutrition consultants for other physicians in both inpatient and outpatient settings; at least 25% of the clinical experience should be gained in an inpatient setting and at least 25% in an outpatient setting. Trainees should be involved in the nutrition training of level 1 gastroenterology fellows and given guidance on presentation and teaching techniques. They should select a nutrition topic for the research component of their gastroenterology fellowships.

## Assessment of Competence

Knowledge of nutrition should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to nutrition should be included on the board examination and should reflect a general knowledge of this content.

# Training in Pathology

## Importance

An understanding of gastrointestinal and hepatic pathology, which includes surgical pathology (both gross and microscopic findings) and cytological pathology as well as the pertinent areas of clinical pathology, and diagnostic molecular biology, is essential to the practice of modern gastroenterology. Training in gastrointestinal pathology helps trainees in three ways. First, it is critical to an understanding of the etiology of gastrointestinal and hepatobiliary disorders. Second, it provides the basis for understanding the diagnostic usefulness and the limitations of pathological studies across the broad range of these disorders. Third, it provides the basis for productive discussions between clinician and pathologist regarding diagnostically challenging cases. Finally, the integration of these two areas of knowledge (i.e., the pathogenesis and the usefulness of specific pathological tests) permits the development of links between pathological test results and therapeutic possibilities, which form the basis of many treatment decisions.

## Goals of Training

The overall goal of such training is competency in recognizing and understanding the significance of the endoscopic, gross pathological, and/or histological characteristics of certain disorders and diseases. The following objectives are important in attaining such competence:

1. Trainees should appreciate the spectrum of normal histology for gastroenterological tissue.
2. Trainees should learn to recognize patterns of histopathologic change in gastrointestinal and hepatic disorders. These include normal architectural patterns and those reflecting inflammation, dysplasia, cancer, and the evolution of a disease over time.
3. Trainees should learn what constitutes an adequate biopsy sample appropriate for pathologic interpretation.
4. Trainees should master the art of correlative clinical information with pathological specimens to assist the pathologist in interpretation of biopsy tissue. Specifically,
  - a. provide appropriate background clinical information
  - b. provide appropriate macroscopic description of tissue with specific location of biopsy specimens
5. Trainees should become adept at understanding appropriateness of when to biopsy, how it may aid the diagnosis, as well as understand the limitations of biopsy. Examples include the need for submucosal tissue in ruling out amyloid, difficulty in differentiating ischemic from radiation changes and the approach to, timing of, flaws, risks and benefits of dysplasia surveillance in chronic inflammatory disorders, such as Barrett's esophagus and inflammatory bowel disease.
6. Trainees should be familiar with the clinical implications of the pathological findings in biopsies and in surgical specimens. Examples of this include being able to interpret changes in a wedge versus needle liver biopsy and understanding the problem of overdiagnosis of chronic inflammation in the gastrointestinal mucosa. Another example is understanding dysplasia and its therapeutic implications.
7. Trainees should know the value and limitations of exfoliative and aspiration cytology.
8. Trainees should become familiar with the mechanisms and the usefulness of new techniques, such as flow cytometry, immunohistochemistry, and tests based in molecular biology (e.g., polymerase chain reaction, in situ hybridization), as well as an understanding of special tissue handling procedures for some of these procedures.
9. Trainees should have a familiarity with specific special techniques and special stains as diagnostic aids in gastrointestinal and hepatic pathology, including in situ hybridization (e.g., immunoglobulin receptors and/or EBV assessment in lymphoma workups) and immunohistochemistry (e.g., CMV, HBV stains in viral infection workups, cytokeratin stains for bile ducts, differentiation markers of neuroendocrine tumors, oncogene and proliferation markers in premalignant and malignant lesions).
10. Trainees should gain familiarity with a broad range of gastrointestinal pathology to include unusual pediatric liver diseases, the recognition of opportunistic infections with HIV, and graft-versus-host disease, and the submission of pancreatobiliary biopsy and cytology specimens for detection of carcinoma or other pancreatic and bile duct changes.
11. Trainees should have an understanding of the utility and limitations of fine-needle aspiration and brush biopsy in the workup of gastrointestinal and pancreatobiliary pathology, especially as they relate to the use of endoscopic ultrasound procedures.
12. Trainees should understand when and how biopsies should be submitted to the pathology laboratory for other than routine processing in formalin (e.g., saline for lymphoma evaluation, electron microscopy fixative, etc.).
13. It is suggested that trainees be exposed to emerging technologies that may in the future, optimize traditional biopsy techniques, such as supravitally staining, autofluorescence spectroscopy, magnification endoscopy, and molecular pathology.

## Training Process

The teaching of gastrointestinal and hepatic pathology should rely heavily on multidisciplinary conferences of gastroenterologists and pathologists, weekly or bimonthly, to review biopsy and gross specimens. These conferences can take a variety of formats and may include any or all of the following: viewing endoscopic slides or videos, reviewing the histology of endoscopic or liver biopsy specimens, examining surgical specimens, and reviewing radiological films and videos. Combining these formats can enhance their value. For example, one useful combination would be to hold endoscopic slide/video review conferences, with the biopsy specimens taken from the same cases presented for histological review and dis-

cussion. Thus, the endoscopic and/or endoscopic ultrasound appearance of specific lesions would be reviewed at the same time as the usefulness and limitations of performing a biopsy on them, thereby maximizing the educational impact.

## Assessment of Competence

Knowledge of pathology should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to pathology should be included on the board examination and should reflect a general knowledge of this content.

# Training in Pediatric Gastroenterology

## Importance

Trainees in gastroenterology should have some experience in pediatric gastroenterology. Although their knowledge base and endoscopic skills relating to pediatric gastroenterology will not be sufficient to manage pediatric patients independently, they should achieve an understanding of congenitally acquired disorders and disease in the growing child. As they begin to assume care for these patients as adults, these experiences will be beneficial.

## Goals of Training

Trainees in gastroenterology should not be expected to achieve any level of competency in pediatric gastroenterology beyond general concepts. Competency requires completion of a pediatric gastroenterology training program. After their training is completed, it is suggested that trainees in pediatric gastroenterology should be able to do the following:

1. Appreciate the unique aspects of the field; a goal of the experience in pediatric gastroenterology is to increase awareness of the clinical problems of pediatric gastroenterology, not to develop competence.
2. Be prepared to participate in limited scope of care when, in underserved areas, pediatric gastroenterology consultation is not available.

It is unlikely that a broader scope of activity is possible because a prerequisite for subspecialty care of children must be adequate training in both pediatrics and gastroenterology (parallel to the requirements for the practice of internal medicine and gastroenterology).

It is suggested that the pediatric gastroenterology component of the curriculum should focus on several aspects. They include the following:

1. Age-related physiological and psychological variables of children and adults.
2. Unique aspects of the disease in the pediatric versus the adult patient. An example is hepatitis B; if the disease is acquired in early life, the rate of development of the chronic carrier state is up to 90%, whereas acquisition later in life is associated with lower carriage rates.
3. Manifestations of gastroenterologic diseases that span the pediatric and adult age groups (e.g., abdominal pain, constipation, gastroin-

testinal bleeding, diarrhea, cystic fibrosis).

Special emphasis should be given to the transition of care from the pediatric gastroenterologist to the adult gastroenterologist as the patient moves from adolescence to adulthood. Trainees should also be aware of differences in the presentation of these disorders and their management in the pediatric population.

4. Congenital abnormalities and gastrointestinal conditions that are much more common in infants and children than in adults, such as necrotizing enterocolitis, Meckel's diverticulum, intestinal intussusception, and mid-gut volvulus. Trainees should gain familiarity with causes of neonatal jaundice, conjugated and unconjugated hyperbilirubinemia encountered in pediatric patients, and inborn errors of metabolism leading to jaundice, such as disorders of carbohydrate and lipid storage.

## Training Process

It is strongly suggested that trainees attend regular clinical conferences at which pediatric cases are discussed. A limited experience with a pediatric gastroenterology service offers further exposure. In addition, an enrichment program might include lectures (or a visiting professorship) by a pediatric gastroenterologist. Finally, trainees should be encouraged to work with pediatric gastroenterologists in transitioning patients from the pediatric to adult practitioners as the patient moves from adolescence into adulthood. Because patients with congenital diseases, such as cystic fibrosis, are surviving longer as a result of improved long-term nutrition and medical treatment and as a result of liver and small intestinal transplantation, such interactions are becoming even more important.

## Assessment of Competence

Knowledge of the pediatric curriculum should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to pediatric gastroenterology should be included on the board examination and should reflect a general knowledge of this content.

# Training in Radiology

## Importance

An understanding of radiological principles, the ability to interpret images demonstrating gastrointestinal diseases, and familiarity with the appropriate use of imaging studies are important aspects of gastroenterology practice. Thus, because gastroenterologists are required to interpret imaging studies as well as to demonstrate knowledge of appropriate choices of imaging techniques that apply to specific problems in gastrointestinal disease, specific training in gastrointestinal radiology is necessary.

Gastroenterology trainees who will use fluoroscopy in their practices for monitoring stricture

dilations and performing endoscopic retrograde cholangiopancreatography must become familiar with radiation safety practices. Many state licensing boards require users of fluoroscopy to obtain a supervisor's certificate, which requires passing an examination in radiation safety.

## Goals of Training

Gastroenterologists in training should gain familiarity with the wide variety of radiological studies frequently used to evaluate the gastrointestinal tract and liver (see Table 6). As a result of this experience, trainees must:

**Table 6 – Radiological Studies/Techniques Important for Gastroenterology Training**

Study type	Examples
Plain abdominal film	Flat, upright, and decubitus films
Barium study	Esophogram (including use of a barium pill and fluoroscopy)
	Upper gastrointestinal series
	Small bowel follow-through series, enteroclysis
	Air contrast barium enema
	Defecography
Computed tomography (CT)	Abdominal/pelvic CT
	CT angiogram
	CT colonography
Magnetic resonance imaging (MRI)	Abdominal/pelvic MRI
	Magnetic resonance cholangiopancreatography
	Magnetic resonance angiography
Interventional/therapeutic study	Visceral angiography, portal venography
	Catheter drainage of cysts, abscesses
	Transjugular intrahepatic portosystemic shunt
	Fluoroscopic vessel embolization
	Interpretation of endoscopic cholangiopancreatography radiograms
	Placement of enteral tubes/catheters
Ultrasound	Complete abdominal/pelvic ultrasound (including Doppler studies)
	Ultrasound-guided liver biopsy
Nuclear medicine scan	Technetium-99m tagged red blood cell scan
	Gastric emptying scan
	Biliary scintigraphy
	Radiolabeled octreotide scan
Positron emission tomography (PET)	Tumor localization

1. Become familiar with radiological tests that are appropriate for evaluation of patients with gastrointestinal, biliary, and liver diseases, including ultrasound, computed tomography, magnetic resonance imaging, vascular radiology, contrast radiology, and nuclear medicine.
2. Understand the methods by which radiographic studies are performed.
3. Become familiar with radiological tests to gain expertise in recognizing normal anatomy and function of the alimentary tract and related organs.
4. Learn to identify structural defects and abnormalities of motility.
5. Understand the logical sequence of using these techniques in the evaluation of gastrointestinal and liver problems.
6. Have an appreciation for and understanding of the costs for different radiological studies.
7. Understand the indications and contraindications for interventional radiological studies.
8. Understand the advantages and limitations of these studies compared to endoscopy and other diagnostic modalities.
9. Gain familiarity with the detection of neoplasms of the colon during the performance of CT colonography and other similar techniques.

Trainees should be encouraged to consult with radiologists when interpreting studies, correlate findings with the clinical presentation, and develop the ability to make appropriate management decisions based on the findings. It is expected that careful review of specific studies with radiologists will facilitate accomplishment of the objectives highlighted above.

## Training Process

There are four major methods of providing education in the interpretation of radiological techniques and in the algorithmic approach to diagnostic imaging. These include the following:

1. Trainees must participate in work rounds on individual patients, which is integral to routine patient care, including specific review and discussion of radiology studies with a radiologists in the context of routine clinical care.

2. Trainees must have exposure at regular conferences that include a review of radiographic imaging studies in relation to gastrointestinal disease.

Further, it is suggested that:

3. Trainees have defined rotations on a radiology service.
4. Trainees participate in self-instructional programs in gastrointestinal radiology.

The didactic approach most widely available to gastroenterology trainees is exposure at regular conferences dealing with imaging interpretation and the choice of imaging studies. These include gastrointestinal radiology correlation conferences and multispecialty clinical conferences. Trainees must participate in joint multidisciplinary conferences, which include radiologists, to discuss specific patients. The process should also include some form of lecturing on specific, defined topics in gastrointestinal radiology. This includes the broad range of diagnostic modalities, the proper choice of diagnostic tests for specific clinical problems, and principles of interpretation.

Providing specific, dedicated time for rotating in a radiology department is effective for teaching gastrointestinal radiology and exposing trainees to all aspects of this subject. Although a rotation in radiology may not be applicable to or possible for all trainees, a 4-week rotation in gastrointestinal radiology with radiologists specializing in this area is suggested.

Self-instruction in radiology can be carried out using various techniques developed for this purpose. These include videotapes and videodisks, computer interactive teaching programs, and syllabi prepared for teaching gastrointestinal radiology. These techniques provide gastroenterology trainees with an opportunity for exposure to gastrointestinal radiology at times of their own choosing.

## Assessment of Competence

Knowledge of radiology should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to radiology should be included on the board examination and should reflect a general knowledge of this content.

# Training in Research

## Importance

The subspecialty of gastroenterology is dedicated to continued progress in the prevention, diagnosis, and treatment of gastrointestinal disorders. This mission requires the availability of talented and committed physician-investigators appropriately trained to elucidate biological mechanisms and the natural history of gastrointestinal diseases and to develop outcome-based approaches to treatment and the use of resources. It further requires that all future gastroenterologists be familiar with research principles and methods. It is suggested that all gastroenterology training be performed in institutions where research opportunities are readily available either on site or through programmatic affiliation with a research institution.

This document summarizes specific skills that trainees in gastroenterology who wish to pursue investigative careers (i.e., research track trainees) will need to acquire, elements of the training curriculum necessary to acquire these skills, and approaches to evaluating the training program and trainees to help ensure that the program objectives are met. The “research track” is defined as that involving an emphasis on basic research (i.e., laboratory-based) or clinical research (i.e., patient-based). Research-oriented gastroenterologists can ultimately pursue, independently or via collaboration, any of a number of different types of research. Several examples include the following: pure fundamental science, disease-oriented research, and patient-oriented research.

It is strongly suggested that continuous blocks of protected research time (at least 3–6 months) be set aside for fellows to pursue scholarly activity and research. It is expected that fellows publish a scientific manuscript in a peer-reviewed journal and/or present the results of their research activity at a national scientific meeting.

## Goals of Training

The specific skills or competencies that trainees seeking careers in basic research (primarily fundamental or disease-oriented) or clinical research (primarily patient-oriented) need to acquire are summarized below.

### Basic Research

Trainees seeking a career in basic research require advanced understanding of the physiology and pathophysiology of the part of the digestive tract they have focused on. They should be familiar with the principles of cellular and molecular biology. They also must acquire basic laboratory skills and become competent in identifying a research question or questions, formulating a working hypothesis, and developing a rationale study design. They must be trained in biostatistics, the appropriate use of animals, and state-

of-the-art techniques in cellular and molecular biology. They must develop a clear understanding of the current body of knowledge in their areas of interest, of unanswered questions most relevant to their research question(s). They need to acquire practical experience in critical analysis of current scientific literature, in the use of computers (e.g., literature review, gene or protein sequence analysis), in scientific writing and presentation, and in the preparation of research proposals for funding and for evaluation by institutional review boards. Trainees must understand the ethical issues surrounding conduct of research. They should be required to write abstracts and papers and submit them for publication.

### Clinical Research

Clinical research includes research in which the intact human is the unit of observation and includes clinical trials, physiologic or pharmacologic studies, epidemiological research, and behavioral studies. Clinical research, such as outcome research, retrospective studies, do not require face-to-face interaction between the investigator and a human subject. The disciplines relevant to clinical research are epidemiology, biostatistics, health policy, decision sciences, health services research, and technology development that may interface with engineering and other specialties. Trainees seeking careers in clinical research must acquire advanced and practical skills in state-of-the-art clinical research methods. The clinical researcher should be formally trained in critical appraisal, study design, decision sciences, biostatistics, data management, quality control, health quality, and health behavior. Trainees must develop a clear understanding of the current body of knowledge and important unanswered questions in their areas of interest and of the ethics of research and human investigation. They must understand and comply with current policies to protect health information. Trainees pursuing dedicated research training must acquire practical experience in the critical appraisal of current literature, in the use of computers (e.g., literature review, database management, analysis, and communication), and in the presentations of their work in written and oral forms. Trainees should have experience preparing proposals for funding and for evaluation by institutional review boards where appropriate. They should be required to write abstracts and papers and submit them for publication.

## Training Process

### 1. Research Mentors

Research mentors are essential elements of the training experience. They must have a commitment to and experience in the training of fledgling investigators, an established record of productivity in sponsored research, and excellence in their fields. Mentors may be faculty members in the gastroenterology training

program or engaged in research pertinent to gastrointestinal biology or disease in another division or department in the institution. Mentors must be aware of opportunities for collaborative interaction locally and nationally in the areas under study by the trainees and be principally responsible for fostering the development of the trainees into independent investigators. Mentors must have experience in scholarly activities, including performance of research, publication in peer-reviewed journals, and the procurement of extramural funding.

## 2. Structured Curriculum

Trainees should have the opportunity to participate in formal course work, taught by qualified faculty, to acquire the specific skills outlined above in laboratory-based research, including course work in cell biology, molecular biology, and molecular genetics. In patient-based research, this includes course work in clinical research methods, biostatistics, epidemiology, decision sciences, health policy, health services research, and ethics. In addition, all trainees should receive training in critical appraisal of the literature, writing of grants and papers, and ethical conduct of research.

## 3. Protected Time and Meeting Rigorous Clinical and Basic Research Training Needs

While preparation for a successful independent investigative career will typically require more than 1 year of supervised research experience beyond the period of training required for subspecialty board eligibility, trainees must have sufficient protected time during the training period to participate in the course work outlined above and to initiate a well-defined, prospective, hypothesis-driven research project. The period of protected time may vary depending on a variety of factors, including the specific career objectives of the applicants and the funding mechanism. Program directors should be given sufficient flexibility in organizing clinical training activities so as to comply with current National Institutes of Health (NIH) guidelines pertaining to trainees supported by individual or institutional National Research Service Awards.

Trainees who elect to pursue rigorous clinical or basic research training during their fellowship are typically supported by NIH T32 Training Grants (generally during their second and third year of training) that require they spend at least 75% of their time involved in research activities, but may also be supported by other means. This training must be added to the 18 months of minimum clinical patient care experience; of which, hepatology should comprise at least 5 months of this experience as required by the ACGME as part of the standard first 3 years of fellowship. The 18 months of clinical patient care experience need not be continuous, but a minimum of 9–12 months must be continuous. The remaining 6–9 months of the 18 months minimum clinical experience requirement may include direct clinical exposure, such as continuity clinic, endoscopy time, and patient-related activities or encounters during off-hour call responsibilities.

Trainees who pursue rigorous research training during their fellowship must be involved in an approved training activity for the remaining 18 months of the 3-year fellowship. In many settings, research training exceeds 18 months depending on the research training needs of the trainee. Examples of approved training activities include obtaining an MS degree in a clinically-related area, such as health research policy, clinical study design, public health or epidemiology), or research training under an NIH T32 Training Grant, or involvement in a well-defined and mentored research project. For some fellows, the training period may exceed the proscribed 3-year fellowship to meet the research objectives set forth in the NIH training grant.

## 4. Research Environment

The training should be conducted in a stimulating and intellectually rich research environment that provides scientific background in the particular discipline. Faculty of the training program must include individuals with established skills in basic or clinical research. Trainees should have the opportunity to participate in critical appraisal of the current scientific and clinical literature, in research conferences during which they present and defend their own work, and, under the supervision of their mentors, in the peer review of articles submitted for publication. Trainees should acquire practical experience in the development of questions, the conduct of basic and/or clinical research designed to answer these questions, and the preparation of abstracts, scientific reports, and funding proposals.

An integral feature in success within a research career is the ability to direct a laboratory and to mentor students, fellows, and technical and administrative staff. This aspect of research should be a topic of formal discussion between mentors and trainees, and trainees should be exposed to the styles and skills of more than one mentor. It is also recommended that training programs develop documents and workshops to instruct trainees on appropriate management and mentoring skills. These should include attention to the following:

- a. Responsibilities of members of the research team to design studies, communicate plans, and plan evaluative data
- b. Record-keeping, including notebooks and storage and cataloging of data
- c. Do's and don'ts of planning collaborations and sharing research materials
- d. Consideration of scope and feasibility of research projects for graduate students and fellows
- e. Information about important landmarks in doctoral and postdoctoral level training such as presentations at national meetings and publications
- f. Mechanisms to formally and informally evaluate the performance of individuals who are placed under the direction of the trainees
- g. Conflict management skills (handling and resolving difficulties)

- h. Appropriate behavior in the research workplace as it relates to possible problems due to discrimination based on race, ethnicity, gender, or sexual orientation or to sexual harassment

Humane treatment of animals and ethical treatment of patients are increasingly important topical issues. Although current ethics training courses address the theoretical basis and legalities of these issues, most trainees never see an application for Institutional Animal Care and Use Committee approval or Institutional Review Board approval until they become independent investigators. It is recommended that trainees participate in the preparation of such a document or receive some form of formal instruction in planning and preparing such documents as part of their training programs. Trainees should be trained in the responsible conduct of science and in the handling of protected health information in accordance with HIPAA regulations.

### Funding Opportunities

Trainees should be aware of funding mechanisms. Multiple funding opportunities are available, including the NIH, other government agencies, and private foundations. The most common means of funding research training are NIH-supported Ruth L. Kirschstein National Research Service Award institutional training grants (T32s) or individual fellowships (F32s). The NIH training website (<http://grants1.nih.gov/training/extramural.htm>) has details regarding trainee funding opportunities. The program director, division chief, or mentor(s) should guide trainees in applying for research training support and other funding opportunities appropriate for the fellow's level of training.

More advanced NIH training support comes in

the form of the Research Career Award series: K08 (for physician scientists interested in basic research) and K23 (for those interested in patient-oriented research), both immediately following fellowship training. Other options, like the K01 award, are available from some NIH Institutes for PhD trainees. The NIH also has two loan repayment programs for trainees interested in clinical or pediatric research careers (<http://www.lrp.nih.gov/>).

Additional information regarding training support opportunities is available through the:

- Department of Veterans Affairs (<http://www1.va.gov/resdev/>)
- Crohn's & Colitis Foundation of America (<http://www.cdfa.org/science/research/>)
- Howard Hughes Medical Institute (<http://www.hhmi.org>).

In addition, each of the gastroenterology societies has funding opportunities and travel awards including the:

- AASLD (<https://www.aasld.org/>)
- ACG (<http://www.acg.gi.org/>)
- AGA (<http://www.gastro.org/>)
- ASGE (<http://www.asge.org/>)

To locate all available funding opportunities, take advantage of GrantsNet (<http://www.grantsnet.org/>).

### Assessment of Competence

Knowledge of research should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to research should be included on the board examination and should reflect a general knowledge of this content.

# Training in Surgery

## Importance

Surgery is the primary and preferred method of management for some gastrointestinal disorders, such as acute appendicitis, colorectal cancer, and mechanical obstruction of the small intestine. In other conditions, surgical management becomes an option after an initial period of medical therapy, such as inflammatory bowel disease. Still other gastrointestinal problems rarely if ever require surgical management; there are many conditions in this category. Because the usual sequence is patient referral from a gastroenterologist to a surgeon, trainees in gastroenterology must be knowledgeable about the indications and contraindications for surgical treatment and general principles and complications of surgical procedures that may be used. Gastroenterologists frequently follow patients over the long-term postoperatively; therefore, trainees must be knowledgeable about the expected outcomes and complications of operations that are likely to be performed on their patients.

## Goals of Training

Additional training or separate rotations are not necessary to fulfill the goals of training in surgery. Instead, surgical training must be incorporated and integrated into the overall training process that occurs during a gastroenterology fellowship.

Trainees must learn the medical management of patients under surgical care for gastrointestinal and hepatic disorders and become thoroughly knowledgeable about the postoperative care of patients after major and minor surgical procedures. Trainees should learn the way that surgical procedures are conducted.

Trainees should learn the indications and contraindications for a variety of common operations for gastrointestinal and hepatic disorders. It is important for trainees to learn to judge whether a surgical procedure is necessary, what kind of operation is indicated, and when it should be performed. Surgical complications and their management should be explored, and trainees should become familiar with the long-term consequences of surgical treatment of gastrointestinal and hepatic diseases. Specifically, trainees should learn about antireflux procedures, ulcer operations, surgery for obesity, hepatobiliary operations, gallbladder surgery, pancreatic procedures for benign and malignant disease, surgery for inflammatory bowel disease of the small and large intestine, colonic procedures for diverticular disease or cancer, various anorectal operations, laparoscopic versus open procedures, portosystemic shunts, and hepatic trans-

plantation. They should be knowledgeable about esophageal procedures, surgery of the gastrointestinal, pancreatic and hepatobiliary tracts, gallbladder surgery and liver malignancies. Trainees must be knowledgeable about when to pursue endoscopic, interventional radiology, or surgical procedures and which route offers the best treatment option for an individual patient.

It is strongly suggested that trainees learn surgical anatomy and the important relationships of ductal, vascular, and luminal structures by participation in surgical procedures.

## Training Process

Indications and contraindications to surgical intervention can be taught through literature and by didactic teaching. Lectures constitute a convenient method of conveying knowledge about surgical procedures, and a systematic series of lectures organized by organ or disease process ensures comprehensive coverage. Trainees must participate in joint medical–surgical multidisciplinary conferences to discuss specific patients. Retention of information about surgical alternatives is most secure when learning is linked to individual patients. Personal learning through literature searches is an essential element in this effort.

It is suggested that trainees go to the operating room when their patients are undergoing surgical procedures. Observation of gross pathological abnormalities will help trainees correlate preoperative information with operative findings. Trainees also will gain an appreciation of the conduct of operations, the factors entering into surgical judgment, and the recognition and management of postoperative complications. A block of time on a rotation as a member of the surgical team on a busy gastrointestinal surgical service is advantageous but optional.

Trainees must learn the relative utility of laparoscopic, open surgical, endoscopic, or interventional radiologic methods for managing specific gastrointestinal and hepatobiliary diseases and be knowledgeable about when to pursue which method.

## Assessment of Competence

Knowledge of surgery should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology.

Questions relating to surgery should be included on the board examination and should reflect a general knowledge of this content.

# Training in Women's Health Issues in Digestive Diseases

## Importance

Women comprise 50.8% of the population (July 2003 Census figures). They make more than 580 million outpatient visits each year to physicians in the United States, which represents 59.6% of all ambulatory visits (CDC, National Ambulatory Medical Care Survey: 2002 Summary). Women make 11,714,000 visits each year to gastroenterologists in the United States, which represents 56.2% of all visits to gastroenterologists (2000 NDTI Data Source). Although many gastrointestinal and liver diseases are the same in women and men, many differences exist that require specific knowledge of gender-based biology and the pathophysiology of digestive diseases in women. Current research has shown that there are gender and cultural differences in the:

1. epidemiology of many gastrointestinal and liver diseases,
2. responses of patients to health and illness,
3. treatment responses and complications, and
4. ability to request and undergo a complete endoscopic evaluation, especially colonoscopy.

Appropriate delivery of subspecialty digestive disease care to women requires up-to-date knowledge of the pathophysiology of both health and disease states in women as well as an understanding of the special issues and concerns of female patients who have digestive diseases.

Pregnancy poses numerous challenges for the gastroenterologist. Recent improvements in therapy have enabled more women with chronic digestive diseases to become pregnant. This in turn has raised new issues regarding their management and treatment. Appropriate delivery of subspecialty care in digestive diseases to women requires an understanding of how gastrointestinal and liver diseases affect fertility and pregnancy and vice versa. Treatment of common problems of pregnancy such as heartburn (present in 80% of pregnant women) requires special knowledge of drug safety and pathophysiology of gastroesophageal reflux disease in pregnancy. Evaluation of potentially serious problems such as abdominal pain in pregnancy requires a special understanding of the causes and time of occurrence of this symptom during pregnancy.

The doctor-patient relationship is an integral part of understanding and caring for patients. This often requires addressing not only physical concerns but also psychosocial, cultural, and religious issues and needs. In addition, the interpersonal relationship between a woman and her physician is unique and different from that between a man and his physician.

Gastroenterologists need to be aware of these gender differences when caring for their female patients.

As recently as 1987, only 13.5% of the budget of the NIH was used to study women's health issues. Until only a decade ago, women were actually excluded from most clinical trials because of fears of pregnancy and potential harm to the fetus and/or that the menstrual cycle or other hormonal changes could skew some results. Results for men were extrapolated to women. Physicians should be aware of this and recognize that much prior research has not accounted for potential gender differences. A notable example in gastroenterology is one major study of the natural history of gallstone disease that principally studied men although the disease primarily affects women. Fortunately, this gender bias in clinical studies was recognized and in 1994, the NIH revised its inclusion policy to meet the NIH Revitalization Act of 1993 that mandated that women and minorities must be included in all of its clinical research studies. To understand health and disease states in women more accurately, researchers must include women in clinical trials, and all clinical trials should have separate analyses by gender.

## Goals of Training

The goals of training for gastroenterology fellows in women's health issues can be divided into three broad categories, all of which must be included in level 1 training. No additional training or separate rotation is necessary to fulfill the goals of training. Instead, women's health issues and awareness of gender differences must be incorporated into the overall gastroenterology fellowship. An important feature of this training is the ability to recognize gender differences in the pathophysiology of health and disease states and different responses to treatment.

The gastroenterology fellowship core curriculum should provide all trainees with an understanding of the following topics:

### I. General Women's Health Issues

1. Trainees must understand gender differences as they pertain to the doctor-patient relationship. Examples include methods of history-taking, listening, confidentiality, modesty, physical contact, active patient participation in treatment plans, and women's preference for a gender concordant endoscopist.
2. There are cultural and religious differences between men and women and the manner in which health care is perceived and sought after and with which recommendations are complied. Examples include certain cultures

that do not permit a man, including a male physician, to perform an examination on a female patient without the permission of a male family member. In addition, societal differences influence the likelihood of presentation of diseases; for example, men from India with irritable bowel syndrome are more likely to present to physicians for treatment than are Indian women, even though irritable bowel syndrome is more prevalent in females. Trainees should be aware of these cultural differences and should be exposed to cultural training as part of their gastroenterology fellowship.

3. Trainees should understand psychosocial issues as initiating factors in certain disease states, their contribution to ongoing clinical symptoms and pathology, and their impact on evaluation and treatment. Examples include sexual, physical, and emotional abuse and their consequences on gastrointestinal health issues. Trainees should be able to elicit an abuse history during the routine examination. They should have a working knowledge of local resources available for intervention in cases of ongoing abuse.
4. Trainees should recognize there are gender differences as well as changes during pregnancy in normal laboratory values, including liver tests, hematocrit, and creatinine values. They must recognize anatomic gender differences on diagnostic tests and changes in women with age and pregnancy.
5. Trainees should recognize gender differences in disease presentation as well as different thresholds between women and men in seeking medical care. In addition, there are differences in thresholds for pain perception in different disease states as well as among individual patients. For example, patients with irritable bowel syndrome have increased sensitivity for small intestinal and/or colonic distention at lower thresholds than healthy controls.
6. Women remain the major caregivers for their children and their own parents, yet 60.3% of women older than 19 years are now employed at least part time (seasonally adjusted, January 2005 figures). Trainees should be adept at eliciting a history of family, home, and work conflicts and responsibilities and be able to incorporate this understanding of competing demands and the need for flexibility into the treatment plan.

## II. Specific Digestive Diseases and Women's Health Issues

1. Trainees should understand gender differences in the normal functioning of the digestive disease tract in health. Trainees should understand the presentation and pathophysiology of all gastrointestinal and hepatic diseases in both women and men. In addition, trainees should

be aware that there are gender differences in the demographics, epidemiology, and pathophysiology of many gastrointestinal tract and liver disorders. One example is irritable bowel syndrome, which is the most common functional gastrointestinal disorder, with a prevalence of 15%–20% in adult Western populations; there is a clear predominance in women, because 70%–80% of patients with irritable bowel syndrome are women. Other examples include chronic constipation, autoimmune disorders, and gender differences in gastrointestinal manifestations of systemic diseases, chronic abdominal and/or pelvic pain, pelvic floor disorders, eating disorders, obesity, endometriosis, osteoporosis, gallstones, and biliary tract and liver diseases such as nonalcoholic steatohepatitis. Trainees must understand the effect of obesity on the gastrointestinal tract and liver function.

Women are less likely to be referred for endoscopic procedures such as screening colonoscopy by their primary care physicians. Moreover, numerous studies have found that colonoscopy is more difficult in women due to a longer, more redundant colon, and the fact that more of the colon lies within the pelvis, as compared to their male counterparts. Colonoscopy is also frequently more difficult posthysterectomy, with lower completion rates in this population. Trainees should understand this and a minimum of 25% of their procedures must be on female patients (see Training Process below).

Women with certain gastrointestinal tract and liver disorders are predisposed to other diseases. In conjunction with the patients' primary physicians, trainees must be able to advise and appropriately screen their otherwise asymptomatic patients for these diseases. Examples include steroid use and osteoporosis, inflammatory bowel disease and colon cancer, primary biliary cirrhosis and breast cancer as well as chronic diseases (including obesity) and nutritional disorders.

Trainees should understand that cancers that affect women, such as breast, ovarian, and uterine cancer, potentially increase a woman's risk of developing colorectal cancer and that the patient should therefore be screened appropriately.

Trainees should understand the psychosocial impact on many of these disorders as well as the effect that chronic disease has on a patient's daily life and that an effective treatment plan often includes a multidisciplinary approach.

2. Trainees should understand the effect of the menstrual cycle and menopause on gastrointestinal tract and liver function in both health and disease. This includes an understanding of estrogen and progesterone and the role

these and other hormones have on gastrointestinal tract and liver function, such as their influence on reflux symptoms and gastrointestinal tract motility. Trainees should understand the potential emotional and physical impact that premenstrual syndrome and menopausal symptoms have on female patients in both health and disease states.

3. Trainees should recognize and understand gender differences in medication pharmacokinetics, differences in prolongation of QT intervals, differences in metabolism and interactions of medications, and differences in the therapeutic response. Evolving areas of research such as gender differences in the absorption and metabolism of medications should be covered. They should understand and be able to anticipate side effects, complications, and interactions of medications that are used for the management of gastrointestinal and liver diseases in women as well as interactions of these medications with those prescribed by nongastroenterologists. Because obesity is more common in women, trainees should recognize the differences that obesity causes in drug metabolism.

### III. Pregnancy and Childbearing Issues

1. Trainees should be cognizant of the issues regarding fecundity, fertility, and pregnancy and be able to appropriately advise women with gastrointestinal and liver disorders who desire pregnancy. They should understand the impact that gastrointestinal and liver disorders have on women's ability to become pregnant. Trainees should have a basic knowledge of genetics as it pertains to gastrointestinal and liver disorders and the inheritance risk to the woman's unborn fetus.
2. Trainees should be knowledgeable about the following conditions during pregnancy:
  - a. Gastrointestinal and liver changes and disorders in normal pregnancy
  - b. The impact of gastrointestinal and liver disorders on a woman's ability to carry a healthy baby to term as well as the impact of her pregnancy on her gastrointestinal or liver disorder (e.g., IBD)
  - c. The initial clinical presentation during pregnancy of a gastrointestinal or liver disorder (e.g., gallstones)
  - d. Gastrointestinal and liver disorders that are unique to pregnancy, including, but not limited to, acute fatty liver of pregnancy and HELLP syndrome
  - e. The method of infant delivery that is most appropriate for the mother's disease state (e.g., Cesarean section vs. vaginal delivery in Crohn's disease)
  - f. The risk of maternal-fetal transmission of infectious agents and the appropriate treatment of both the mother and newborn infant

- g. The different pharmacokinetics and interactions of medications during pregnancy and breast-feeding
- h. Adequate and appropriate nutrition, including increased vitamin and mineral requirements during pregnancy
- i. The potential harm to the fetus of medications, sedation, endoscopic procedures, including ERCP, and diagnostic tests, including radiographic tests, (e.g., ultrasound, barium studies, MRI, and CT scanning, and the appropriate use of these during pregnancy)

In general, endoscopic procedures in the pregnant patient are only recommended in situations where not doing the procedure could result in harm to the mother or fetus. Potential indications include life-threatening gastrointestinal bleeding, suspicion of a colonic malignancy, or severe unremitting diarrhea with an unrevealing noninvasive evaluation. Maternal-fetal monitoring should be considered as well as standard patient monitoring. Preprocedure consultation with an obstetrician is recommended and care must be taken to avoid maternal hypoxia and hypotension, both of which are extremely detrimental to the fetus. The ASGE guidelines for endoscopy in pregnant and lactating women recommend the following general principles:

1. Always have a strong indication, particularly in high-risk pregnancies
2. Defer endoscopy to the second trimester whenever possible
3. Use the lowest effective dose of sedative medications
4. Wherever possible, use category A or B drugs
5. Minimize procedure time
6. Position the pregnant patient in the left pelvic tilt or left lateral position to avoid vena caval or aortic compression
7. The presence of fetal heart sounds should be confirmed before sedation is begun and after the endoscopic procedure
8. Obstetric support should be available in the event of a pregnancy-related complication
9. Endoscopy is contraindicated in obstetric complications such as placental abruption, imminent delivery, ruptured membranes, or eclampsia

There are gastrointestinal disorders that are caused or affected by delivery and that manifest themselves immediately in the postpartum period or years afterward that trainees should be able to recognize. Examples include rectal prolapse, urinary and/or fecal incontinence, and hemorrhoids. Trainees should understand the mechanisms and pathophysiology of these disorders and be able to appropriately treat their female patients.

### Training Process

All trainees must meet the goals of training in women's health issues in digestive diseases. In order to do this, trainees will need a variety of

teaching and learning experiences that should span the entire period of training. They should be exposed to didactic lectures (which can include CD-ROM and Internet-based programs), case conferences, self-directed learning, selected readings, and clinical experiences that jointly cover all areas discussed above.

It is anticipated that close alliances and consultations with obstetricians and gynecologists will be necessary for adequate training in the issues relating to endometriosis, fertility, pregnancy, and the postpartum period.

A minimum of 25% of the panel of patients who are evaluated and treated by trainees during their clinical experience, including inpatients, outpatients evaluated in the ambulatory continuity clinics, and procedures, must be women. At least one gastroen-

terologist with an interest and experience in women's health issues should be available for the trainees. At institutions where this does not exist, an alternative but less optimal strategy would be for the trainees to receive some or all of this training from nongastroenterologists who focus on women's health issues.

### **Assessment of Competence**

Knowledge of women's health issues in digestive diseases should be assessed as part of the overall evaluation of trainees in gastroenterology during and after the fellowship, as outlined in Overview of Training in Gastroenterology. Questions relating to women's health issues in digestive diseases should be included on the board examination and should reflect a general knowledge of this content.

# Appendix I

## Gastroenterology Core Curriculum Contributing Editors – 2006 Edition

The following gastroenterologists are acknowledged for their significant editorial contributions to the 2006 iteration:

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### Introduction

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### Overview of Training in GI

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Frank G. Gress, MD

Lee M. Kaplan, MD, PhD

Philip Katz, MD

Ann Ouyang, MD

Joel E. Richter, MD

Hugo R. Rosen, MD

Kenneth E. Sherman, MD, PhD

### Training in Motility, Diverticular Disease, and Functional Illnesses

Michael Camilleri, MD (Chair)

Ann Ouyang, MD

Douglas A. Drossman, MD

Peter J. Kahrilas, MD

James M. Richter, MD

Reza Shaker, MD

### Training in Acid-Peptic Disease

Mark Feldman, MD

### Training in Biliary Tract Diseases and Pancreatic Disorders

Sum P. Lee, MD, PhD

Peter Franks, MD

### Training in Inflammation, Enteric and Infectious Disease

Stephen B. Hanauer, MD

### Training in Gastrointestinal Malignancy

C. Richard Boland, MD (Chair)

Dennis J. Ahnen, MD

Steven H. Itzkowitz, MD

### Training in Hepatology

Lee M. Kaplan, MD, PhD, (Chair)

Kenneth Sherman, MD, PhD (Co-Chair)

Hugo R. Rosen, MD

Nathan M. Bass, MD, PhD

### Training in Gastrointestinal Endoscopy

Frank G. Gress, MD (Chair)

Russell D. Brown, MD

Lawrence Friedman, MD

Peter D. Stevens, MD

### Training in Nutrition

Sanuel Klein, MD (Chair)

Jamie Aranda-Michel, MD

Alan L. Buchman, MD, MSPH

Martin H. Floch, MD

William D. Heizer, MD

### Training in Pediatric Gastroenterology

Harland S. Winter, MD

### Training in Gastrointestinal and Hepatic Pathology

Christina M. Surawicz, MD (Chair)

Charles Bernstein, MD

Wilifred M. Weinstein, MD

### Training in Gastrointestinal Radiology

Thomas W. Faust, MD (Chair)

Richard F. Harty, MD

### Training in Surgery

Deborah D. Proctor, MD

Arun J. Sanyal, MD

### Training in Research

Bruce F. Scharschmidt, MD (Chair)

Nathan M. Bass, MD, PhD

David A. Brenner, MD

Jay H. Hoofnagle, MD

Stephen Hulley, MD

David A. Lieberman, MD

David A. Peura, MD

Joel E. Richter, MD

### Training in Gastrointestinal Cellular and Molecular Physiology

Richard V. Benya, MD (Chair)

James E. McGuigan, MD

Mrinalini C. Rao, PhD

Catia Sternini, MD

John F. Valentine, MD

### Training in Geriatric Gastroenterology

Karen E. Hall, MD, PhD (Chair)

Bashar M. Attar, MD, PhD

Peter R. Holt, MD

Makau P. Lee, MD, PhD

Charlene M. Prather, MD

### Training in Women's Health Issues in Digestive Diseases

Deborah D. Proctor, MD (Chair)

James M. Anderson, MD, PhD

Rosemarie L. Fisher, MD

Jacqueline L. Wolf, MD

# Appendix II

## Diagnostic Colonoscopy Procedural Competency Form

### A. Preprocedural assessment

Displays appropriate knowledge for the indications for the procedure, including risks, benefits, and alternative testing/procedures.

Unsatisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Displays appropriate knowledge for the use of preprocedural antibiotic coverage.

Unsatisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Effectively obtains informed consent.

Unsatisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

### B. Procedural assessment

Effectively administers sedation and analgesia. Utilizes physiologic monitoring and supplemental oxygen appropriately.

Unsatisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

#### Procedural Components

##### Technical

Passes instrument from rectum to splenic flexure.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Passes instrument from splenic flexure to hepatic flexure.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Passes instrument from hepatic flexure to cecum.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Intubates the terminal ileum.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Able to retroflex the instrument to examine the rectum.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Able to perform mucosal biopsy.

Instructor intervention required					Average				Outstanding
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	

Able to perform polypectomy.

Instructor intervention required					Average				Outstanding
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	

Able to perform other required therapeutic intervention (list)\_\_\_\_\_.

Instructor intervention required					Average				Outstanding
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	

**Cognitive**

Appropriately recognizes anatomic landmarks.

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

Recognizes abnormalities.

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

**C. Postprocedural assessment**

Provides postprocedural effective communication to patient, including endoscopic findings and management plan.

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

Recognizes and appropriately treats complication(s).

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

**D. Overall assessment of trainee's performance**

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Was this reviewed with the trainee?

Yes \_\_\_\_\_ No \_\_\_\_\_

Instructor's signature \_\_\_\_\_ Trainee's signature \_\_\_\_\_

## Diagnostic Upper Endoscopy Procedural Competency Form

### A. Preprocedural assessment

Displays appropriate knowledge for the indications for the procedure, including risks, benefits, and alternative testing/procedures.

Unsatisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Displays appropriate knowledge for the use of preprocedural antibiotic coverage.

Unsatisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Effectively obtains informed consent.

Unsatisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

### B. Procedural assessment

Effectively administers sedation and analgesia. Utilizes physiologic monitoring and supplemental oxygen appropriately.

Unsatisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

#### Procedural Components

##### Technical

Passes instrument from oral cavity to hypopharynx.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Intubates the esophagus.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Traverses the GE junction.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Traverses the pylorus.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Able to pass the endoscope from the bulb to second duodenal portion.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Able to retroflex the instrument to examine the fundus/cardia.

Instructor intervention required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Average	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outstanding
	1	2	3	4	5	6	7	8	9

Able to perform mucosal biopsy.

Instructor intervention required					Average				Outstanding
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	

Able to perform other required therapeutic intervention (list)\_\_\_\_\_.

Instructor intervention required					Average				Outstanding
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	

**Cognitive**

Appropriately recognizes anatomic landmarks.

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

Recognizes abnormalities.

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

**C. Postprocedural assessment**

Provides postprocedural effective communication to patient, including endoscopic findings and management plan if necessary.

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

Recognizes and appropriately treats complication(s).

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

**D. Overall assessment of trainee's performance**

Unsatisfactory					Average				Outstanding
<input type="checkbox"/>									
1	2	3	4	5	6	7	8	9	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Was this reviewed with the trainee?

Yes \_\_\_\_\_ No \_\_\_\_\_

Instructor's signature \_\_\_\_\_ Trainee's signature \_\_\_\_\_

