

CONTENTS

Preface	xi
Brian R. Smith	

The Goals of Resident Training in Laboratory Medicine in Combined Anatomic Pathology/Clinical Pathology Programs: An Overview	229
Alan Wells and Brian R. Smith	

Training of residents in the discipline of laboratory medicine is confounded by the diversity of the subdisciplines of clinical pathology each with specific knowledge sets, and the career goals of the residents who are focused on different aspects of clinical pathology. What guides this training is not the detailed knowledge sets or the specific technologies per se, but a focus on the principles that undergird all of laboratory medicine. Thus, the goal of clinical pathology training is to develop a clinical consultant who can apply laboratory-derived, population-based clinical data and laboratory-based therapeutics, along with a firm knowledge of the underlying biotechnology from which these are derived, to the benefit of individual patients. Furthermore, this pathologist must be steeped in the skills required for lifelong learning and adaptation.

Proposed Research Training Guidelines for Residents in Laboratory Medicine	241
Ellinor I.B. Peerschke, Yashpal Agrawal, C. Bruce Alexander, Edwin Bovill, and Michael Laposata	

It is expected that the role of the clinical pathologist will evolve from the more passive role of managing testing facilities to one of active service provider, using powerful molecular, cell biologic, and biochemical tools. The scope of knowledge required to be an effective physician scientist or an accomplished practicing clinical pathologist, however, cannot be acquired through clinical training

alone and requires dedicated, structured research learning time. The goal of this article is to consider mechanisms that effectively integrate research training and scholarly activity into residency education in laboratory medicine/clinical pathology. The proposed curricula are purposely unstructured to allow maximum flexibility for training programs to meet the needs and career goals of individual residents.

Innovative Methods in Laboratory Medicine

Resident Teaching

255

Henry M. Rinder and Brian R. Smith

Many methodologies have been employed in training laboratory medicine (clinical pathology) residents. Apprenticeship activities (observing and reproducing the job of an attending clinical pathologist in a direct practice setting) likely remain the most popular for trainees and arguably one of the most effective. The utility and current status of morning report, journal club, resident-led—grand rounds style presentations, faculty didactics, research by residents, placing residents specifically in the role of teachers themselves, hands-on activities in clinical laboratories, and emerging computer-based learning modalities are compared with each other and to similar exercises in other medical disciplines.

Assessing Resident Competency in Laboratory Medicine

269

C. Bruce Alexander

Validation of the competence of laboratory medicine (LM) residents for independent practice and to sit for the examination in clinical pathology rests with the program director. Assessing knowledge and basic skills were the primary measure of residents until 2000. The Accreditation Council of Graduate Medical Education and the ABMS launched the Outcome Project in 2000 as a response to the public. A shift in emphasis from “process” to a more “outcomes driven” assessment came with the Outcome Project. As of July 2006, the training of LM residents must incorporate the six competencies of the Outcome Project within each resident experience (rotation). In this article, comparison of historic and current methods of assessing residents is noted. Current and future outcomes and the pivotal role of consultation in LM are noted.

The American Society for Clinical Pathology Resident In-Service Examination: Does Resident Performance Provide Insight into the Effectiveness of Clinical Pathology Education?

283

Barbara J. McKenna

The resident in-service examination in pathology is an in-training exercise that is taken by virtually all pathology residents in the United States as well as by some participants in Canada, Ireland, and Lebanon. Although all of the anatomic pathology topics in the examination, with only one exception—forensic pathology, show

significant improvement in scores over the 4 years of residency training, three areas of clinical pathology training (laboratory administration, clinical chemistry, and microbiology) show significantly lower improvement in performance over the years of residency training. By contrast, transfusion medicine, hematology and the special topics section of the examination all demonstrate improved performance by residents over time. While the reason behind these differences must remain speculative at this time, these findings suggest that measures to improve effectiveness in clinical pathology training might be suggested by examining the differences between residency training practices between higher and lower performing areas of clinical pathology.

Resident and Fellow Training in Transfusion Medicine

293

YanYun Wu, Christopher Tormey, and Gary Stack

This article focuses on the design of transfusion medicine residency and fellowship training programs in the context of the Accreditation Commission for Graduate Medical Education (ACGME) competencies. Transfusion-specific examples of the six ACGME competencies are discussed, a transfusion medicine curriculum with designated training stages for specific curriculum elements is proposed, and examples of training activities are given. The authors also discuss transfusion service rotation design and how to build in graduated responsibility as training proceeds. Finally, methods for assessing the competency of transfusion medicine trainees and the effectiveness of the training program and teaching faculty are described. It is hoped that this article will provide a blueprint for how to design and implement a successful transfusion medicine residency and fellowship training program.

Resident Training in Clinical Chemistry

343

Jonathan R. Genzen and Matthew D. Krasowski

Practicing clinical chemists responded to an anonymous, open-ended questionnaire designed to define the state of clinical chemistry education in pathology training programs in the United States. Survey respondents identified many ideas for educational improvements and offered criticism regarding aspects of clinical chemistry education that are not working particularly well. Many of these findings are generalizable to other subspecialties of clinical pathology. It is hoped that this analysis will allow readers to compare their programs with national trends and identify new ways of improving clinical chemistry training at their institutions.

Resident Training in Laboratory Hematology

359

Sandeep Gurbuxani and Jonathan L. Miller

The authors of this article formulate a strategy to guide residents and faculty in laboratory hematology. The authors build upon the recommendations of the Academy of Clinical Laboratory

Physicians and Scientists (ACLPS) published earlier as well as draw from their own experiences, in discussing principles that should be considered when implementing a program that effectively trains residents to be competent pathologists in the various settings that they may encounter once they complete training.

Resident Training in Microbiology

369

Barbara L. Haller

To meet the challenges of diagnosis and management of infectious diseases, clinical pathology residents must receive comprehensive training in microbiology, learn to think critically, develop problem-solving skills, and take active roles as laboratory consultants. Residents well trained in clinical microbiology become capable laboratory professionals, developing cost-effective testing strategies, decreasing risk for medical errors, and improving patient care. Newer methods for diagnosing infectious disease, such as real-time polymerase chain reaction, microarrays for pathogen detection, and rapid assays for antigen or antibody detection, have become standard. Knowledge of infectious disease principles, drug therapeutic options, and drug resistance is also important. Suggestions for training and for assessing resident competency in clinical microbiology are presented.

Training in Laboratory Management and the MBA/MD in Laboratory Medicine

381

Ronald L. Weiss

The business of medicine requires more than just the knowledge and skills necessary to provide quality patient care. A growing number of opportunities are available for physicians to learn how to better manage the business side of their practices. Today's clinical laboratories, particularly those in health care organizations under pressure to efficiently use limited resources, benefit from having management and leadership specifically trained for these roles.

Resident Training in Point-of-Care Testing

397

Sheldon Campbell and Peter J. Howanitz

Although central laboratory testing has been the norm for the last few decades and point-of-care testing (POCT) is considered an emerging area, physicians were performing POCT long before the existence of central laboratory testing. As medical directors of POCT programs, pathologists need the basic knowledge and skills associated with directing laboratory-based testing programs as well as additional knowledge and skills about testing at the point of care. Although the essential elements of quality testing are the same for laboratory-based and POCT, the enormous variety of settings, technologies, and workers involved present unique challenges.

Teaching Medical Students Basic Principles of Laboratory Medicine 411

Yara A. Park and Marisa B. Marques

Laboratory medicine is a distinct medical discipline and a tool for patient care that is used in all specialties. It is based on underlying concepts that govern the proper use and interpretation of laboratory tests. This article suggests how to educate medical students about important preanalytic, analytic, and postanalytic variables that affect laboratory results. The authors postulate that laboratory medicine training requires a combination of focused lectures and a constant reinforcement of its principles throughout clinical rotations.

The MD/PhD Pathway to a Career in Laboratory Medicine 425

Samuel A. Santoro, Claudio A. Mosse, and Pampee P. Young

Laboratory medicine offers attractive opportunities for individuals who have MD and PhD degrees and advanced training in medicine and the underlying basic biomedical sciences, and these individuals have much to contribute to the field. The modern era of basic biomedical sciences has produced a wealth of genomic, postgenomic, and proteomic knowledge. As a bridge discipline, a major challenge and opportunity for laboratory medicine is to bring these advances to the diagnostic, prognostic, and therapeutic care of patients. The authors believe that, for many reasons, the field of laboratory medicine represents an excellent, although underrecognized, career choice for graduates of MD/PhD programs.

Education of the PhD in Laboratory Medicine 435

Mitchell G. Scott, Wm. Michael Dunne,
and Ann M. Gronowski

Throughout the history of laboratory medicine, the PhD scientist has played a role in developing new methods and algorithms that have contributed significantly to the field. Although the number of formally trained PhDs in laboratory medicine is currently small, they continue to play an important role in large, primarily academic, clinical laboratories and departments and in the in vitro diagnostics industry. This article discusses the importance of the formally trained PhD in today's laboratory medicine environment and the necessary training process, and approach for training PhDs at the postdoctoral level to have successful careers in laboratory medicine.

Index 447