Volume I

Todd • Sanford • Davidsohn

CLINICAL DIAGNOSIS *and* MANAGEMENT by LABORATORY METHODS

Sixteenth Edition

JOHN BERNARD HENRY, M.D.

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PREFACE

With this sixteenth edition, Todd and Sanford reaches the mature age of 70 years of service to at least three generations of clinical pathologists and medical laboratory personnel (especially technologists and medical technicians), medical students, and physicians in training and in practice, i.e., family physicians, internists, surgeons, and pediatricians, in particular.

Our goals in this edition include the following:

1. Identify appropriate measurements and examinations for diagnosis, confirmation of a clinical impression, therapeutic or management guideline data, prognosis, and screening or detection of disease.
2. Indicate the order in which such measurements and examinations should be requested.
3. Interpret and translate laboratory measurements and examinations.
4. Recognize pitfalls, problems, and limitations of laboratory data, including discussion of quality control and drug interaction as well as relative merits in terms of methodology, patient preparation, communication, and cost effectiveness.
5. Understand pathophysiology or sequence of disease as reflected by clinical pathology data.
6. Appreciate and understand the importance of laboratory organization and management for efficient and cost-effective medical care delivery.

The content of this edition has been reorganized to represent more closely the working structure of the modern clinical pathology laboratory and to be more useful in solving medical problems.

It is significant that this edition begins with a discussion of bias and random variation in laboratory measurements and concludes with material on monitoring the quality of laboratory measurements. These two subjects identify a basic approach and understanding of laboratory medicine and currently play vital roles in effective utilization of the laboratory.

In terms of the six parts, with their constituent chapters, the organization of the laboratory is reflected in a functional manner:

1. Chemical Pathology and Clinical Chemistry
2. Medical Microscopy and Examination of Other Body Fluids
3. Hematology and Coagulation
4. Immunology and Immunopathology
5. Medical Microbiology
6. Administration of the Clinical Laboratory

The thrust of special competence in clinical pathology and subspecialization in medicine is consistent with the restructuring of this edition.

The sixty-three chapters in this edition represent a virtual doubling of the number of chapters from the previous edition and also reflect the comprehensive and intensive development of laboratory medicine and its application to medical care in recent years.

Not only is the massive technology of clinical pathology expanded as well as delineated, but also the role of the physician in terms of laboratory medicine is

emphasized. Among these six parts, Immunology and Immunopathology represents a recent thrust in laboratory medicine which, by virtue of its technology as well as scientific and clinical applications, could for all practical purposes embrace most other areas of the laboratory. Cellular as well as humoral aspects of the immune response and laboratory applications are emphasized throughout this part. These range from a consideration of the immune response and discussion of the antibody as reagent to immunogenetics, immunohematology, and hemotherapy.

The second greatest impact in laboratory medicine since the previous edition is reflected in Chemical Pathology and Clinical Chemistry. What was embraced in the previous edition in terms of a chapter on Clinical Chemistry, as well as several other chapters, has been extensively revised. This includes blood gases, carbohydrates, lipids, proteins, water, electrolytes and renal function, metabolites and inorganic ions, liver function and clinical enzymology, and the sophisticated and substantial developments in evaluation of endocrine function, including radioimmunoassay and also therapeutic drug monitoring. Radioisotopic pathology in terms of *in vitro* assays or radioimmunoassays replaces nuclear medicine in the previous edition.

The final chapter of this part underscores quantitative approaches used in evaluating laboratory measurements and other types of data emphasizing the likelihood of values, e.g., probability that the patient is a member of a clinical class or probability of one outcome occurring. This important approach embraces probabilistic reasoning, which makes even greater demands on the clinician, necessitating a keen awareness of the various assumptions and conditions intrinsic in an approach embracing values of multiple variates and discriminate analysis.

Cytogenetics, as well as various topics ranging from urinalysis, cerebrospinal fluid, amniotic fluid, semen, and sputum to pancreatic function, gastric analysis, malabsorption, diarrhea and examination of feces, is reviewed in the Medical Microscopy part of this edition.

Hematology and Coagulation, which were considered in two chapters in the previous edition, here constitute seven chapters: basic hematology, including a section on physiologic variations; hematopoiesis, including revised concepts of blood cell production; erythrocyte disorders and leukocyte disorders, each occupying an extensively revised chapter; the role of blood vessels in hemostasis, and normal and disordered platelet function, each discussed in a new chapter; and a new chapter on coagulation, which incorporates many of the extensive advances in this area.

In Medical Microbiology not only are all the elements of this broad discipline reviewed in 14 chapters, but special attention is given to antimicrobial susceptibility testing, mycoplasmal, viral, and chlamydial infections, and spirochetes, as well as quality control and hospital infection control. The important subject of hospital infection control pertains not only to the laboratory but to the entire hospital and thus has been expanded and updated.

Finally, in a part entitled Administration of the Clinical Laboratory—which embraces the organization and operation of the clinical laboratory, including fiscal—communication and data processing, personnel administration, and effective utilization are reviewed at length.

In summary, the sixteenth edition embraces a complete as well as thorough revision that is consistent with the new title of this text, as well as the role of the laboratory through its professional staff in not only translating this information into patient care, but also facilitating and amplifying the effectiveness of medical care delivery through sophisticated medical technology coupled with medical and scientific skills and knowledge.

Even the appendices provide information which is useful to the clinician and laboratorian, in terms of reference (normal) values and intervals. An introduc-

tion to SI units has been added not only on the inside cover but also in Appendix 4. New terminology has been incorporated not only with the reference intervals, but also throughout the text whenever feasible and consistent with optimal medical care.

My own special interest in effective utilization of the laboratory is reflected on the inside cover, which outlines an alternative strategy for ordering blood in elective surgery.

After working with Israel Davidsohn, M.D., on the two previous editions, I have enthusiastically assumed the burden of responsibility for this effort. Although I have missed my former association with Israel Davidsohn in this role, to some extent this has been replaced by the opportunity to work closely with several new colleagues in this endeavor. In addition to my associates at the Upstate Medical Center who have participated in this edition, Douglas Nelson, M.D., and Russell Tomar, M.D., I have enjoyed working with and appreciate the tremendous contribution of John Washington, M.D., as well as William McLendon, M.D., and Bernard E. Statland, M.D., Ph.D. Chosen for their extensive knowledge and current activity in their respective disciplines, distinguished scientists and physicians have been attracted as additional contributors to this edition.

I am grateful to my associate and assistant editors as well as contributors, who have been faithful to their task and gracious in cooperation.

I accept full responsibility for any errors of omission or commission and welcome any comments or reactions to this edition.

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