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PEDIATRICS for Medical Students

Daniel Bernstein
Steven Shelov

Third Edition

Wolters Kluwer Health | Lippincott Williams & Wilkins

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

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for MEDICAL STUDENTS

THIRD EDITION

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We dedicate this book to our present and former students who have always kept us on our toes, and to our future students who will continue to challenge us to be the best teachers possible. We also dedicate this book to our families: Bonnie, Alissa, and Adam Bernstein; and Marsha, Joshua, Danielle, Eric Shelov, and their spouses and children for their patience and support. We also thank the late Drs. Henry Barnett and Lewis Fraad; Drs. Michael Cohen and the late Gerald Nathenson; the late Richard Kravath; and Abraham Rudolph; as well as Jen Clements for her artwork; and Susan Rhyner, Jennifer Verbiar, Catherine Noonan, and Joy Fisher-Williams at Lippincott Williams & Wilkins for their perseverance in seeing this educational adventure through to fruition.

PREFACE

A revolution is occurring in the world of medicine, one that will have profound effects not only on the way medicine is practiced, but also on the way medicine is taught to students at all levels. New terms and phrases such as managed care, health care reform, covered lives, evidence-based practice, insurance exchanges, and capitation have filtered into our vocabulary alongside more traditional terms such as tetralogy of Fallot, bronchopulmonary dysplasia, and thrombocytopenic purpura. For health sciences students, perhaps the greatest change will be in the venue in which patients are encountered. There has been a significant shift in health care delivery from the inpatient ward to the outpatient setting, whether a private office or satellite clinic, an ambulatory surgery unit, or a day hospital. The focus of most general pediatric care has shifted from the inpatient ward to the outpatient setting and also from episodic treatment to prevention. At the same time, biomedical and technological advances have made inpatient care even more complex and high-acuity, and have increased the number of vulnerable children with complex chronic diseases surviving into adulthood. In many settings, roles traditionally carried out by physicians are being performed by other health care providers such as physician assistants, nurse practitioners, and health care technicians.

Pediatrics for Medical Students was written in the midst of this health care revolution to serve as an introductory text for students during their clinical medical school experiences. It strives to do something no other text has attempted: to concentrate on evaluative skills and logical approaches to both common and uncommon pediatric problems and on the development of rational differential diagnoses, rather than serving as an exhaustive reference. In doing so, this text provides students with insight into the clinical diagnostic thinking of some of today's premier pediatric clinicians. To these experienced clinicians, the process of developing and refining a differential diagnosis is akin to solving an elegant puzzle. *Pediatrics for Medical Students* also stresses the essentials of modern pediatric medicine with a view toward the challenges of pediatric practice in the 21st century. It has links to a sophisticated companion Web site and a robust library of visuals now available as a result of Internet accessibility. It also contains revised questions based on Pediatric Content Specifications developed through the leadership of academic pediatrics and The American Board of Pediatrics. It emphasizes the pediatrician's unique developmental perspective and opportunity to actively prevent future illness by altering life habits at an early stage. Finally, it has received the endorsement of the American Academy of Pediatrics as its recommended textbook for medical students, and should also serve as a key resource for allied health professionals on their pediatrics rotations.

Contributors to *Pediatrics for Medical Students* have been chosen from the attending staffs at several major medical schools, based primarily on their communicative skills, teaching abilities, and agreement with the educational philosophy of the text. The contributors have imparted the sense of challenge and accomplishment associated with arriving at a well-conceived differential diagnosis and management plan.

Pediatrics for Medical Students is organized to help students make the transition from the systems-oriented approach of the preclinical years to the problem-oriented approach of the clinical years. Some chapters focus on the general practice of pediatrics; these allow students to appreciate the normal preventive visit, including extensive discussions of preventive strategies and anticipatory guidance. More traditional systems-oriented chapters describe a uniform, systematic approach to developing a differential diagnosis that will serve as a model for assessing all clinical problem situations. Other chapters focus on emerging areas of health care, including medical ethics, health care economics in the midst of health care reform, and social and cultural issues in pediatrics.

With the growing complexity of modern pediatric medicine, it is increasingly difficult for beginning students to master all the details of pediatric diseases. *Pediatrics for Medical Students* views pathophysiology as a key to students' understanding of disease; this approach helps students develop differential diagnoses and logical management. The text emphasizes differential diagnosis, which goes hand in hand with an appreciation of the appropriate use of diagnostic tests. Medical cost containment issues are interwoven throughout the text. By teaching sound medical practice, students automatically learn cost-effective medical practice. Finally, *Pediatrics for Medical Students* emphasizes, both in a separate chapter and in appropriate context, the medical, epidemiologic, and social implications of our multicultural pediatric population.

Suggested readings at the end of each chapter include several components: one or two recommended textbooks for those desiring a more detailed examination of the subject, several well-written review articles in easy-to-find journals such as *Pediatrics* or *Pediatrics in Review,* and several seminal journal articles in the field. These references are intended for those students whose interest has been piqued and who wish to explore the latest developments in both basic science and clinical research as applied to a particular pediatric illness.

Pediatrics for Medical Students has several unique features, including:

- **Pediatric pearls:** Each chapter contains several key, "take-home" pieces of information that all students should know.
- **Companion Web site:** Additional figures, diagrams, tables, and other information keyed to each textbook chapter.
- **USMLE-type questions:** Questions based on the subject matter in each chapter, with explanations of the answers, both correct and incorrect, are included on the Web site.
- **Updated references:** A combination of up-to-date review articles and seminal references that have made major advances to the field are included for each section of each chapter.

We hope that students enjoy these important learning tools, find the organization and content of the book useful, and enjoy working with children.

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CONTENTS

INTRODUCTION

Steven P. Shelov and Daniel Bernstein

Being a medical student or student in the allied health professions nowadays is not easy. Not that it ever was "easy," for surely our selective memory of those years has protected us from remembering the difficult times and has permitted us to glorify the more convivial and rewarding times disproportionately. Nevertheless, we truly believe that current health care students have to contend with elements that did not confront students in the past.

Pediatrics for Medical Students is intended to present a large variety of pediatric "information" in as understandable and usable a fashion as possible, but it would be an error not to take some time to recognize a number of issues relating to education during clinical clerkships that often go unstated and unrecognized. Some of this material is drawn from a landmark article entitled, "The Vulnerability of the Medical Student," published in the journal *Pediatrics* in 1976 by Drs. Edwenna Werner and Barbara Korsch to honor the memory of their mentor, Dr. Lorin L. Stephens. This reference is one we continuously cite to our medical students, residents, and physician assistant students during the course of their training. Other material is drawn from the increasingly important issues of medical issues and accountability for adverse health care outcomes. Still other material is derived from our own cumulative experience of some 50 years of exposure to young trainees in this specialty. Finally, there is material that focuses on the medical student as a learner and an evolving teacher. Through a combination of these four sources, we hope to bring some context to the material offered in the chapters to follow.

DEALING WITH UNCERTAINTY

The majority of learning and teaching strives toward some sense of achieving certainty. The basic sciences, especially those assembled for your appreciation in preclinical training (i.e., the first 2 years of medical school), have emphasized the need to strive to a level where we are certain about what we do. Whether we are talking about biochemical pathways, the genetic determinants of sickle cell disease, or any of the many facts that you have committed to memory from those years of basic science, your teachers have stressed that there is a great deal of certainty about your evolving knowledge base.

In addition, you learned that the more you applied yourself, the more of these "certain facts" you would know. To be successful in medicine, you are repeatedly told that certainty is always the achievable goal. During the upcoming clinical years, many of your teachers will imply that certainty in clinical medicine is also an achievable goal. Thus, as you jump into that first clinical clerkship, you are no doubt eager to apply your newly mastered knowledge base from the basic sciences to clinical practice. However, you learn that you have not been well prepared for the wall of uncertainty that you encounter as soon as you begin to work up that first patient.

Indeed, you soon learn that clinical medicine is *far from certain* and that any attempt to make it certain quickly leads to a sense of frustration, disappointment, and confusion. Some of this confusion and frustration is avoidable if you recognize that *medicine is often uncertain* and that *in spite of this fact we can still do much for our patients and derive much satisfaction from the careful application of what we have learned.*

We believe that the simple recognition that certainty is not always attainable is an important first step for the beginning clinician. Once you realize that and yet strive to apply all that is known to achieving a more certain state, you will find a more livable sense of balance in your role as a health care provider and, no doubt, a more satisfying sense of who you are and what you can and cannot do (i.e., you have limitations).

The major reasons for the inability to achieve certainty all of the time (actually, much of the time) are our incomplete knowledge base and the fact that the subjects of our combined art and science are *real people,* not idealized textbook examples. Children with meningitis do not all present in the same way; some children with fever are truly more ill than others, yet we may not always know how to spot them. What is the best diagnostic approach?

What is the highest yield from a particular test? Parents differ in their ability to recognize developmental delay or aberrances in their child's behavior. How can you best advise them to change their child's behavior?

With those multiple-choice questions we have all spent so much time answering, the answers are *certain*; in clinical medicine, the answers vary. They vary sometimes because of things that may be measurable and other times because of things that are not measurable. The hallmark of a good clinician is the ability to account for these variables. As long as you are systematic in your thinking, eager to embrace alternative explanations, open to suggestions, and *willing to listen at all levels,* you will be successful. Each day you will learn more, experience more, and grow as a clinician, moving a little more from uncertainty to certainty. But be prepared to carry around with you a continued supply of uncertainty, and do not feel you are very different in substance from even the most senior of clinicians you meet; you are different only in degree.

IDENTIFICATION WITH THE PATIENT

Although it may be difficult to remember, you had another life before you became a health care professional. Throughout your past and present life, you witnessed much and incorporated many different experiences and observations into your present persona. You are a function of your parents and friends, your previous life situations, and your original makeup. These parts of you do not disappear when you encounter your first patient; they are, in fact, incorporated into every patient encounter you will have. It is inevitable that you will frequently and often unconsciously compare your present experiences with your previous ones, adapt to them, and allow them to alter your present makeup. Many of these changes occur consciously, but there are many others of which you are not aware.

Some clinical encounters are difficult situations that unconsciously remind you of your own fears, your past or present relationships, or your own family. Those situations, which evoke an overidentification response, are often the most complex. It may be difficult to identify and become conscious of them. Nevertheless, these reminders will play havoc with your sense of stability and create unease and anxiety that you may have difficulty sorting out. Often, overidentification with a patient or family results in a driving need to rectify or fix a problem for which there is no easy solution. To highlight the pitfall of overidentification, we often cite a special quote from the article by Werner and Korsch:

> I believe I would have been a better intern and a better young physician, and that I would have learned more and suffered less, if someone could have told me explicitly, repeatedly, and patiently that the dying at hand was not my own, that the patient whose death I attended was not, in fact, myself, nor was it my wife, nor my child, nor my parents, nor, fortunately, was it often my friend. And most important, I needed to be told and taught that the dying which I was attending did not, in itself, increase my vulnerability nor the vulnerability of those for whom I cared most deeply. The confusion involved in the sympathetic relationship, wherein identities merge and blur—this is what is intolerable and excruciating and blinding.

You can become aware of when this is happening to you if you are sensitive to your own feelings, realizing that some anxiety should be expected. However, you should recognize that if these feelings begin to affect you in such a way as to influence your satisfaction with your clinical role or your ability to make clear decisions, it may be stronger than you realize and needs to be dealt with in some way. One method that we have found useful is regularly scheduled mentoring groups with students or residents. When discussing overidentification and related issues, other members of the group, including faculty mentors, often share similar experiences and feelings. Once these feelings of anxiety related to overidentification become "fair game" for discussion, the resistance to discussion drops, and each participant is able to contribute his or her own experiences and reactions. The individuals in such a group often come to the realization that their past experiences are inextricably interwoven with their present situations. Because these encounters often deal with life-and-death matters, their relevance becomes highlighted. Recognizing that this is a shared experience with your colleagues is usually the first step in the course of regaining some control over these situations.

SENSE OF RESPONSIBILITY—DEALING WITH LIFE AND DEATH

For medical students, who are protected from the real world by the comfort of the classroom, the basic science years are often just a continuation of the years of college, just more intense and with greater stakes. The clinical years are a different story. Medical students in TV shows embody many of the responses characteristic of new clinicians. At times bragging and confident, at other times sheepish and lacking confidence, and at still other times frustrated when the role confusion is maddening—all are part of the clinician trainee's mental state.

You, too, are immediately thrust into a "real world" of sick people who may convey signals of helplessness, neediness, illness, anxiety, and uncertainty about their present or future existence, as well as an often overwhelming sense that without your help they will no longer be able to "make it." Much of this has to do with, and is created in response to, the multiple roles and responsibilities demanded of you in dealing with real people undergoing a traumatic loss of who they are because of illness. And you, with all of your newfound wisdom, are expected to make it all better.

The fact of the matter is that there is no way you can possibly do that. You are just at the stage of attempting to integrate your newly learned, although fragile, knowledge base into this whole new world of real patients. Each new clerkship places you in new settings that keep you enough off balance so that you often develop self-doubts. How are you ever going to be able to learn enough, be confident enough in your knowledge and decisions, and just be calm enough to see yourself through successfully in any of these new roles? You will succeed with time. That is why clinical training takes place over years, not months, and why clinical confidence in new roles is a graduated series of responsibilities rather than something you are immediately expected to succeed at in the first few months of clinical experience. Unfortunately, someone forgot to tell your sense of your own expectations about these reservations regarding your level of responsibility. To quote once again from the article by Werner and Korsch:

> The study of medicine is in fact the study of living and dying. No more central nor enormous concern seems to exist: or at least this seems so for the peculiar and puzzling species of men and women who elect to take upon themselves the role of physician. And the innermost mystery of all, the most frightening, the most compellingly interesting, the most inescapable truth encountered in this journey is that one cannot learn about living and dying only in others. One cannot help but make inferences about one's own life and death . . . it seems true beyond doubt that upon one's comprehension of living and dying depends one's ability to serve as a physician.

The solution is for you to feel that you are shouldering a level of responsibility appropriate for your present level of training. You may need some help recognizing this at times, and those more senior to you may also need to be reminded about it. Feeling that you have an overwhelming responsibility for particular patients or their patient outcome will interfere with some of the growth that is essential for your future security as a clinician. This is not to say that you should not eagerly and enthusiastically engage your clinical responsibilities head on. You will gain much more from clinical experiences in which you play an active role. However, being an active participant does not mean you have ultimate responsibility for all of the outcomes, good or bad. The time will come in the future where your level of responsibility will increase; with that will come the increased knowledge and experience and the comfort that is part of that seniority.

YOU, THE ADULT LEARNER AND MENTOR IN THE MAKING

It is important that you begin to fully apply those principles of adult learning that for your future will dictate your ongoing success. As such a learner, you will follow the principles of adult learning, made clear by Knowles (1970), which are the following:

1. Establish or be learning in a climate that is safe and comfortable to be fully expressive.
2. Involve yourself and other learners in understanding methods of developing curricular content.
3. Assess your own learning needs as well as those of others.
4. Encourage yourself and others to develop your learning objectives.
5. Identify resources and strategies for using those resources to meet your own and learning objectives of others.
6. Support other learners in carrying out their plans and seek support on carrying out yours.
7. Be prepared to evaluate your own learning and develop skills in self-reflection.

These adult learning skills are the framework by which you will learn throughout all of your clerkships, your residency training, and your ongoing education when you finish formal training. As you move further along the educational paradigm, you will also be asked to educate others along the way. In those important encounters with younger trainees, try to apply the SEVEN principles of good educational practice developed by Chickering. These practices are:

1. Encourage contact between yourself and the learner.
2. Develop a degree of reciprocity and cooperation among the learners.
3. Encourage ACTIVE learning.
4. Give prompt feedback.

5. Emphasize time on task.
6. Communicate high expectations.
7. Respect diverse talents and ways of learning.

Following these principles of education, based on adult learning theory, will prepare you for the clinical learning and teaching you will do over the next 2 years and beyond through residency. As Parcell and Bligh (2001) have described, clinical teaching is a major part of a clinician's professional life and development. If one learns to teach well, it will, by definition, allow for the exploration of new ideas and methods. Collaboration among learners and teachers is the key to being successful in both areas. The five questions you need to ask yourself are:

1. What do I need to know to be an effective clinical teacher?
2. What roles do I need to adopt?
3. What attributes do I need to possess?
4. What teaching strategies do I need to apply, and in what circumstances?
5. How do I know my clinical teaching is effective?

Finally, the following list includes ideas that students tell us they would like included as part of their clinical teaching experiences (Copeland and Hewson, 2000).

1. Increasing responsibility for patient care
2. Consistent observation and feedback
3. Appropriate probing questions to link existing and new knowledge
4. Opportunity to process technical and problem-solving skills
5. Clear and timely answers to problems
6. Seeing patients first
7. Enthusiastic teachers (interesting, stimulating and enjoyable)
8. Mentors (knowledge, skills, and attitudes)
9. Opportunity to reflect on clinical experiences
10. Encouraging self directed learning

Utilizing the previous principles with the needs expressed by students should serve as a template for how to approach every learning opportunity you will face during your clinical years.

TO ERR IS HUMAN . . . (ARE ERRORS PERMISSIBLE?)

In 1999, the Institute of Medicine issued a report entitled *To Err is Human: Building a Safer Health System.* This highly publicized and critiqued white paper brought the issue of the consequences of medical errors to the forefront. It gives a relatively scathing account of the dire consequences of medical errors in the hospital setting and challenges the universe of the health care setting to develop remedies for these problems. Although many experts have stated the data are poorly drawn from overly high-risk settings and do not pertain to *their* situation, the overwhelming consensus is that much of what the report contains is on target.

As students, you will be thrust into settings in which you have to grapple with health and safety issues as they pertain to a particular setting. Our advice is to learn from the approaches to system change that are taking place around you; apply the principles of critical self-study and change when necessary; and become part of the solution, not part of the problem. Hospitals are complex places, and great care is necessary to ensure that the systems work for the patients, not against them. Reducing medical errors is *everyone's business*. You are in an ideal setting to see the benefits of a positive approach to change. Take advantage of those opportunities to learn and grow.

COMMUNICATION IS THE KEY

> To write prescriptions is easy, but to come to an understanding with people is hard.
>
> Franz Kafka

It is not always easy to effectively find out the things you need to know about your patients. Many times it is even harder to tell them about things that are happening to them, especially the difficult things. Nevertheless, good patient communication is the key to becoming a good clinician. In addition, the most difficult and often least clear-cut issues revolve around the psychosocial aspects of a patient's condition. You will quickly discover that diseases are not often explained by one factor alone and that there is much truth in Engel's "unified concept

of disease," which holds that every disease has multiple components—a biologic, an emotional, and a social component. These components are the challenge to clinical medicine, and uncovering them depends on clear communication and the ability to recognize the importance of psychosocial issues. We also recognize that it is often harder to relate to patients who present with a predominance of these issues.

> In a county-type hospital, when everyone's social ills are really in a lot of ways more important than the immediate pneumonia, it is quite a distraction. At County Hospital a patient with terminal cancer is much easier for me to deal with than four or five chronic alcoholics that come in with another pneumonia, and they're starting a decompensate again. You know that no matter what kind of medical treatment you give these people, the society, for them at least, is such that they will be back again. . . . When I have a real patient with real ills that I can handle, I'm very happy.

It is important to combat any resistance that occurs, diminish your skepticism, and realize that the process is a dynamic one. You will come to realize that if you are open to hearing about these "other issues," your patients will feel well served and feel that they have truly made a connection to "their doctor."
Two quotes of Dr. Stephens', from the last two pages of the article by Werner and Korsch, are pivotal and should be required reading for all those who are students or teachers of clinical medicine.

> If the issues described above are disregarded or dealt with only incidentally or accidentally, the students, in large number, will stumble in their desperation into the maladaptive roles seen all around us in graduate physicians. The students will meet these issues by transmuting their patients into abstractions, which offer neither the pain nor gratification of human intimacy. They will take refuge from human responsibility in obsessive attention to detail, to the particular. They will, in futility and panic, resist what they perceive as encroachment on their territorial imperatives in the form of health-care delivery evaluation, or even physician review processes. They will find other sources of gratification than in professional excellence: the talk in the surgeons' dressing room more often concerns the Dow-Jones averages and the golf course than it does patients, for many reasons, but some of the above pertain. All-gullible, they will accept the force-feeding of the detail man or the latest surgical vogue as the treatment of the lesion. They will avoid the dying patient rather than threaten the protection afforded by their illusory defenses. They will continue to get inferior medical care for themselves. They will not allow themselves fascination with the infinite variety of patients' problems and physicians' solutions.

> There are those who will tell you that being a physician is a curse, a life of endless and ambiguous work, where at best we are consumed in a holding action—and all that, without experiencing appropriate appreciation of our sacrifice.

> I do not feel that way. Being a physician I consider the highest privilege I can imagine. Along with the joys from my family, my life as a physician has provided me with moments of epiphany, transcendental moments of lucidity . . . To be a physician—to be permitted, to be invited by another human being into his life in the circumstances of that crucible which is illness—to be a trusted participant in the highest of dramas—for these privileges I am grateful beyond my ability to express . . .

These statements reflect the caution and optimism that occurs as you embark on the long journey of becoming a clinician. It is with these thoughts, encouragements, and reflections that we welcome you to this, your introduction to the world of children's health and disease. Enjoy these times; it is our hope that the material enclosed will help make your journey toward certainty a little bit easier and a great deal more satisfying.

SUGGESTED READINGS

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