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BECOMING A CONSUMMATE CLINICIAN

What Every Student, House Officer, and Hospital Practitioner Needs to Know

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Society of Hospital Medicine
Hospitalists, Transforming Healthcare,
Revolutionizing Patient Care.

WILEY-BLACKWELL
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For

Erin, Ellen, and Nicki
Annabel, Tabitha, and Quinn
and for Lexy
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PREFACE

You’ve had the usual busy day. Just finished seeing and writing up the last of six patients admitted overnight to your service (including one who had to be transferred to the ICU with sepsis). Sent in an application to the medical center’s curriculum committee for a proposed new course, “The Golden Glove: Defining, Detecting, and Eradicating Medical Errors.” Late for a hospital committee meeting on the new quality initiative to improve care in postoperative patients.

When you return to your office, two of the 59 new e-mails in your inbox catch your eye. The first is from a third-year medical student who presents with the complaint that “I feel disoriented and confused only one day after starting my medical clerkship.” This note is not a request for a neurological consult but, rather, a distress signal from one of your mentees who has been touching base with you throughout her clinical years without any indication of prior problems.

The second e-mail, from a friend and colleague, says: “Work and teaching rounds took four hours today! How can we teach students and house officers to present more clearly and concisely and how to frame a differential diagnosis?”

This book is written for hyper-busy clinicians/teachers and their trainees who face these types of challenges related to apparent gaps between the world of the class and the world of the wards. Despite the best-intended efforts of courses with names such as “The Doctor–Patient Encounter,” students and their preceptors often express the sense that essential but hard-to-identify components are missing from
our training efforts. These missing links contribute to the types of frustrations voiced above. We have adopted the term *interstitial curriculum* as a way of defining selected necessary concepts and practices that seem to fall between the disciplinary cracks of contemporary medical education programs.

Throughout the book, we highlight these concepts with mini-case examples. Most are drawn from internal medicine; further, a cardiovascular bias will unmask the specialty orientation of the authors, but hopefully will not prove limiting.

The complementary processes of constantly rethinking assumptions, researching information, and reformulating basic mechanisms are fundamental to practicing all types of medicine successfully. Such processes also help to avoid potentially lethal errors and help to rigorously and compassionately advance the inseparable sciences of prevention and healing. These deep and multidimensional challenges are central to the ongoing pursuit of becoming the consummate clinician.

Ary L. Goldberger
Zachary D. Goldberger
We wish to acknowledge our many students, colleagues, and patients over the years, and the many others who inspired this short book. Finding oneself adrift in a turbulent clinical sea midway through medical school is, to say the least, daunting. Finding others with similar questions and existential anxieties is therapeutic, but what we really want are the keys to the kingdom where medical house staff and residents seem to speak that mysterious dialect of *clinicaleses* with high fluency, and possess apparently uncanny reasoning and communication skills. Having read the same textbooks, taken similar preclinical lectures, and passed similar exams, we wondered whether we had all inadvertently missed some extracurricular but essential mentoring sessions somewhere along the way. Could this bridging knowledge be restored?

The discovery that the classroom-to-clinic gap was more the rule than the exception became a prime motivator for writing the book. Many people played important roles, including students at Yale School of Medicine, University of California–San Diego, University of Washington, Harvard Medical School, and University of Michigan.

A number of colleagues have read sections and have offered important critical reviews. Among those are our wives, Erin Fouch, M.D., and Ellen Goldberger, J.D., and colleagues, Tom Delbanco, M.D., Richard Schwartzstein, M.D., Vikas Sukhatme, M.D., Ph.D.,
Michael Volk, M.D., M.S., Colin R. Cooke, M.D., M.Sc., and Madalena Costa, Ph.D.

Zachary D. Goldberger would like to offer special thanks to Drs. Rod Hayward, Caroline Richardson, and Sandeep Vijan for their methodological instruction and to Drs. Michael Shea, Daniel Eitzman, and David Coleman for their superb clinical mentorship.

Zachary D. Goldberger was supported by a grant from the Robert Wood Johnson Foundation Clinical Scholars Program while writing this book and Ary L. Goldberger by a grant from the G. Harold and Leila Y. Mathers Charitable Foundation. However, the views expressed do not necessarily reflect those of either foundation.

Our intrepid editor at Wiley-Blackwell, Thom Moore, and his assistant Ian Collins, played key roles in shaping the material and in inviting us to join the Hospital Medicine book series edited by Scott Flanders and Sanjay Saint.

However, we take full responsibility for any errors, and the gratitude expressed to our critical readers in no way indicates their agreement or endorsement. If the lessons of this text are crafted successfully, readers will critically rethink what we say here as well as everything else they read. We also recognize that some of the topics and their presentations are not without general controversy and urge our readers to contact us via the publisher or through e-mail if they wish. Even better, discuss these issues on rounds.

Finally, we note that the process of becoming a consummate clinician is never-ending and rarely predictable. This book is a guide to clinically perplexed trainees and their attendings. On your unique and unforgettable journeys, we wish you grand luck—the serendipity that favors the well-prepared, but not overly rehearsed mind.
INTRODUCTION

SURVIVING AND THRIVING IN
WARD WORLD

Plutarch, a first-century Greek moralist.

_Becoming a Consummate Clinician: What Every Student, House Officer, and Hospital Practitioner Needs to Know_, First Edition.
Ary L. Goldberger and Zachary D. Goldberger.
The mind is not a vessel to be filled but a fire to be kindled.
—Plutarch (ca. A.D. 46–120)

The most important failure was one of imagination.
—The 9/11 Commission Report: The National Commission on Terrorist Attacks on the United States; General Findings, Section 509

This book addresses a number of audiences. For clinical clerks and house officers, it is intended as a springboard or launching pad to help them hit the ground running on the wards. We hope to provide some immediately applicable tips and to guide trainees in avoiding common pitfalls and pratfalls of gathering, processing, and communicating medical information. For more experienced hospital-based practitioners, hopefully it will provide an organizing framework for coping with some of the daily challenges in both patient care and mentoring that somehow escape mention in lengthier texts.

For trainees, who readily and understandably feel lost in their early rotations, this is also intended as a kind of clinical GPS—a way of helping you locate and track your clinical coordinates and keep your bearings in the face of major new challenges and the inherent uncertainties of clinical medicine.

What/how should I be thinking upon hearing the following chief complaints? What does an experienced, active clinical listener actually think?

• A 30-year-old man presents with a fainting spell.
• A 60-year-old woman presents with shortness of breath.

Part 1 (Chapters 1 to 6) is called Medical Musts and Must-Not. These discussions are geared toward more basic and essential issues (the must-knows) of information gathering from the history and physical exam, as well as formulating differential diagnoses. Special emphasis is given to avoiding common mistakes and offering tips toward achieving the clinical savvy of more experienced physicians. These chapters also include perspectives from the attending’s side:
how to listen to and interact with presentations by team members and enhance the teaching value of rounds.

Part 2 (Chapters 7 to 12) is called *Medical Masteries*. Leveraging off the material in Part 1, these chapters deal with aspects of critical analysis of medical data and invite a reexamination of some of the ways we “think about thinking” in clinical medicine. Topics include reducing medical errors, revisiting evidence-based medicine, deconstructing Sutton’s “law” and other widely cited medical aphorisms, the perils of a major but rarely discussed source of medical bias (semantic bias), and transforming information and knowledge into deeper understanding.

In Chapter 12 we examine two central and coupled questions for students and attendings that are almost never asked in the formal medical school curriculum: “What is health?” and “What is disease?” These omissions are remarkable given that two central goals of medicine are devoted to maintaining and restoring the former, and to curing or palliating the latter, both in practice and in research.

Another provocative question that helped to motivate this book was posed by a non-M.D. colleague: Is there a way for medical students and others to “get inside the heads” of their more experienced clinical mentors, short of being an actual apprentice? As in every other aspect of our professional lives, no substitute exists for real-world clinical experience and expert tutelage. But realistic recognition of the limitations of any enterprise is not a statement of its futility.

The good news for students is that certain general principles of clinical thinking and practice—what we call the *interstitial curriculum*—although not the substance of most textbook presentations, can be taught as part of a type of a *facilitated apprenticeship* toward clinical mastery. Further, some of these essentials can be conveyed concisely in guidebook form, especially to those who already have some medical background or interest.

We emphasize that the term *interstitial curriculum*—what’s not explicitly taught but should be—is *not* to be confused with the *hidden curriculum*, a subject that is receiving increasing attention. The latter refers to the unspoken biases that warp both medical and nonmedical education (i.e., what shouldn’t be taught but somehow is). For doctors,
the hidden curriculum has been used, for example, to describe the disparaging and nonempathic behavior that students and trainees may absorb from their seniors. Readers interested in the applications of the hidden curriculum in medical education are referred to the literature, with selected references given in the bibliography.

**THREE KEY CHALLENGES FOR STUDENTS AND PRACTITIONERS**

Three central and closely related challenges for every practitioner of medicine at all levels, from student to senior hospitalist attending, are:

1. *To enrich the way we think* about diagnosis, therapy, and prognosis, especially at the warp speed of ward world, which increasingly lurches between the frazzled and the frantic.

2. *To enhance our communication skills:* developing good habits for presenting information and preventing or curing some counterproductive habits.

3. *To help reduce, and to the extent possible, eradicate medical errors.* Asking some relatively simple questions as a routine part of self-examination during rounds can literally transform an entire hospital’s systems for the better.

Learning and practicing critical thinking skills that often resist conventional wisdom, actively looking for anomalous findings (making “outlier” rounds), and harnessing the energies of imagination are essential components of clinical medicine and powerful antidotes to cognitive errors (Chapter 7). From a more positive perspective, the combination of critical plus imaginative thinking is the source of successful therapeutic interventions and clinical discoveries. Helping students and trainees acquire and master these skills and render them in a compassionate manner are perhaps the most challenging goals in medical didactics. For busy practitioner-mentors, in particular, not losing touch with foundational attributes and being able to transmit these skills is one of the most demanding aspects of medical education, and one most at risk in the age of information overload and “high-throughput” patient care.
UNCOMPLICATING LIFE IN A COMPLEX WORLD

The nature of critical thinking essential to bedside and basic medicine is also much more general and applies to coping with virtually all complex systems where prediction, diagnosis, forecasting, and prevention are always at play. The words “at play” may seem ill-chosen for such a daunting and serious set of obligations. Yet the stunning “failure of imagination” critique in the 9/11 Commission Report indicates a dearth of creativity—a lack of general inventiveness that informs the best science and promotes optimal ways of protecting society at large and its members. An unexpected link between the terrorist attacks of 9/11 and one aspect of public health—risk of sudden death in areas outside the lower Manhattan explosion sites—is described briefly in Chapter 12.
Although we cannot predict future events and discoveries, we can anticipate that the rate of information expansion will continue at a lightning (if not always enlightening) pace. Indeed, Moore’s law, proposed in 1975, famously posited that the number of transistors placed on integrated circuits will double about every two years for the foreseeable future. This exponential growth of microprocessing capacity, resulting in smaller and smaller and less expensive computers, is related to the expanding amounts and accessibility of information, including biomedical data. Whether Moore’s prediction turns out be a law or more of a useful approximation, it is certainly more relevant to medicine than Sutton’s Law (Chapter 10). But our point here is that the continuing explosion of computer processing capability and with it of information/data, captured in Moore’s provocative prediction, does not neatly translate into knowledge or understanding on the wards. Indeed, as noted above, information/data overload can, paradoxically, imperil creative and critical thinking.

We can only anticipate one thing with great certainty: that the future will always include surprises—expect the unexpected. This “certainty of uncertainty” law compels the need for flexible cognitive infrastructures and strategies for handling and making the most of the information available. Exercising and refining cognitive tools are essential to clinical success, just as adaptability and plasticity are fundamental to the health of ecosystems, species, and individuals. Indeed, the best intended efforts to codify clinical judgment into clinical rules (even if only intended as guidelines) and the development of ever more sophisticated algorithmic trees are inherently limited. Furthermore, such efforts sometimes undermine efforts to foster the desired three R’s of rigor, rationality, and reliability central to evidence-based medical practice.

**UNEXPECTED INNOVATION**

The fortuitous discovery of penicillin, the first antibiotic, by the Scottish bacteriologist Alexander Fleming on September 3, 1928, is one of the best examples of Louis Pasteur’s dictum: “Chance favors the prepared mind.” Fleming had just returned to his laboratory in London
after a vacation. He had been culturing *Staphylococcus aureus* and was discarding petri dishes from leftover experiments. He looked down and noticed that one of his cultures was contaminated with mold. A clear area around the mold caught his eye and prompted him to surmise that the contaminant was secreting a bactericidal substance. With the help of a colleague, Fleming grew a pure culture of what is now known to be *Penicillium notatum*.

This account has been embellished and even mythologized to a certain extent, but these facts seem reasonably solid. Also of note is that the purification and characterization of the compound and, shortly thereafter, the mass production of penicillin—what we would call the translational medicine aspects—did not occur until years later. Like many discoveries, Fleming’s breakthrough was not part of a carefully crafted game plan, any more than the discovery of x-rays or magnetic resonance followed a linear path from original design to bedside applications. Quite the opposite—these triumphs of translational medicine were not motivated by or even initially connected to the practice of medicine. Instead, scientific, including clinical, creativity most often erupts unexpectedly from a combination of intuition, imagination, and observation, combined with intellectual rigor and a special type of fearless intensity. Sir Isaac Newton commented: “An essential aspect of creativity is not being afraid to fail.”

For students and trainees of medicine, as well as their mentors, the wards offer perhaps the richest—and sometimes the most intimidating—precincts for discovery and learning, which can transform the lives of single patients and entire groups. But to make these contributions (e.g., preventing a potentially lethal drug–drug interaction in a patient on your first rotation on the wards and then helping to set up fail-safe measures for others) requires that you first overcome the daunting gap between the preclinical and clinical worlds.

*Mini-summary and Preview:* Perhaps the most difficult challenges faced by practitioners of medicine at all levels are those that deal with navigating the gap between the classroom and the clinic, between the textbook pages we read and the urgent text pages we receive.
After the first day of their medical clerkships, students may be left wondering:

- What happened to the textbook tables and electronic guides that describe how clinicians think about diagnoses?
- Why didn’t someone tell me how cases are really presented on rounds? (Their hospital-based attendings and house officers also ask the same question.)
- Why don’t the algorithms for the diagnosis and treatment of a given condition account for the individual patient I am treating?
- Why did the drug listed under “antiarrhythmics to treat atrial fibrillation” in our pharmacology book induce a cardiac arrest in my patient? How can elegantly targeted therapy to treat diabetes or certain forms of cancer land so far off-target?
- What actually is evidence-based medicine, and where is the evidence?

The goal of the 12 chapters ahead is to invite students, house officers, and their more senior colleagues to rethink basic issues
that previously may have seemed self-evident and even trivial (e.g., gravity before Newton, or the inevitability of infections before modern medicine). These challenges turn out to be deep and multi-dimensional. Most important to busy students and practitioners is that these challenges have enormous practical ramifications for critical thinking, basic research, and bedside patient care.