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Edited by Stephanie J. Doniger
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Every effort has been made in preparing this book to provide accurate and
up-to-date information which is in accord with accepted standards and
practice at the time of publication. Although case histories are drawn from
actual cases, every effort has been made to disguise the identities of the
individuals involved. Nevertheless, the authors, editors, and publishers can
make no warranties that the information contained herein is totally free from
error, not least because clinical standards are constantly changing through
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of material contained in this book. Readers are strongly advised to pay careful
attention to information provided by the manufacturer of any drugs or
equipment that they plan to use.

I am so excited that such a talented and experienced group of authors contributed their wealth of knowledge to this text. I am fortunate to be a part of such a small, but growing field of Pediatric Emergency Ultrasound. I look forward to seeing the development of pediatric ultrasound, and how it can positively impact the care of our smallest and most vulnerable of patients.

First and foremost, I dedicate this text to my parents who have served as models and encouraged me along the way. To my father Marvin who has taught me the value of hard work and inspired me in his superhuman battle against all medical odds. To my mother Marsha who has dedicated her life to her family and over the years has become my very best friend.

Along the way, I have been fortunate to have some amazing mentors. To J. Christian Fox, who initially planted the idea of ultrasound eventually being useful in Pediatric Emergency Medicine, while in the Flying Samaritans clinic in El Testerazo, Mexico. To Resa Lewiss, who took a chance on me as the first Pediatric Emergency Medicine-trained physician to do an Emergency Ultrasound fellowship. To my mentor Ghazala Sharieff whose invaluable advice, guidance, and mentorship have helped shape my career, and who has become a close friend. To my colleagues at Children's Hospital Oakland – I am so privileged to have joined your family, and am constantly inspired by all of you. It has been such a joy to see that even the most experienced of physicians is excited by ultrasound. I look forward to continuing to teach you, and to learn from you. To all of my colleagues that I am constantly learning from, this text would not have been possible without you.

A special thank you to Wendi Karam and Kelly Kroll, who provided their beautiful children to be photographed in this text; to Ricky Knack, the talented nurse, photographer, and friend who photographed them. To Laura Berg, MD, also did a tremendous last-minute job rescuing the illustrations. To my international colleagues who constantly inspire me and remind me why I went into medicine in the first place. I will always have a particular place in my heart for the people in El Testerazo, Mexico and Roatan, Honduras.

And last but certainly not least, to my patients and their families who give me the unique opportunity to enter their lives and help them in their most vulnerable times of need. Thank you for letting me into your lives to treat your most precious gifts – your children.

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[More information](#)

Contents

Foreword page ix
J. Christian Fox and Rebecca Kasl
List of contributors x

Section 1 Ultrasound fundamentals

S1 **Introduction** 1
Stephanie J. Doniger

1 **Physics and “knobology”** 4
Alyssa Abo

2 **Getting started** 21
Jason A. Levy

3 **Ultrasound in austere environments** 27
Dana R. Sajed and Vicki E. Noble

Section 2 Diagnostic ultrasound

S2 **Introduction** 35
Stephanie J. Doniger

4 **The extended focused assessment with sonography for trauma (E-FAST)** 40
Samuel H. F. Lam

5 **Focused cardiac ultrasound** 57
Stephanie J. Doniger

6 **Pulmonary ultrasound** 71
Fernando Silva and Roberto Copetti

7 **Inferior vena cava, aorta assessment** 86
Faiza Al Talaq and Vicki E. Noble

8 **HEENT (head, ears, eyes, nose, throat): ocular, sinus, neck ultrasound** 97
Jennifer R. Marin and Arun Nagdev

9 **Renal, bladder** 119
David Kessler

10 **The pediatric abdomen** 134
Adam B. Sivitz

11 **Hepatobiliary** 160
Alexander C. Arroyo

12 **Male genitourinary: scrotal pain, swelling** 178
Joshua Rempell and Andrew S. Liteplo

13 **Pelvic obstetrics** 191
Heidi Ladner and Tony Berger

14 **Pelvic: gynecology** 210
Katja Goldflam and Resa E. Lewiss

Section 3 Procedural ultrasound

S3 **Introduction** 225
Stephanie J. Doniger

15 **Vascular access** 233
Dave Spear and Stephanie J. Doniger

16 **Bladder ultrasound for catheterization and suprapubic aspiration** 251
Alexander C. Arroyo

17 **Ultrasound-guided lumbar puncture** 260
Alyssa Abo

18 **Soft tissue applications** 269
Daniela Ramirez-Schrempp and Andrew S. Liteplo

19 **Orthopedics: extremity fractures, reductions, and arthrocentesis** 279
Antonio Riera and Lei Chen

20 **Peripheral nerve blocks** 294
Jason W. Fischer

21 **Pericardiocentesis, thoracentesis, and paracentesis** 305
Rebecca L. Vieira

22 **Cutting-edge procedures: the airway** 315
Randall T. Rhyne, Jamie A. Jenkins, and Beatrice Hoffmann

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Frontmatter
[More information](#)

Contents

Section 4 Special populations

- S4 **Introduction** 323
Stephanie J. Doniger
- 23 **Neonates and infants** 325
Alaa A. Eldemerdash, Mahmoud Elbarbary, and Stephanie J. Doniger

- 24 **The critically ill: respiratory and hemodynamic support** 342
Mahmoud Elbarbary

Index 352

Foreword

The chief religious and political authority of the 1600s was the Roman Catholic Church. It is under their traditional worldview that Galileo’s heliocentric planetary model constituted the heart of the debate among his scholarly colleagues. While this rift between Church and State is the one popularized, the real conflict was between conservative and progressive attitudes of the scientists themselves. Though no invention of his own, the telescope that Galileo used was admired throughout Europe. Initially, many other respected scholars of his time such as Johannes Kepler did not own, or even know how to use, this “spyglass.” This lack of familiarity transformed into an excuse for others not to fully *believe* what Galileo had seen with his own eyes. The key word here is “initially.” Once others learned how to grind the lenses to develop their own telescopes, they (grudgingly) swallowed their pride and confirmed his observations that the moon did indeed have a rocky surface and Jupiter had four moons.

In 1816, the stethoscope was invented and to this day serves as the current method of performing a physical examination of a patient in a doctor’s office, hospital bed, or in the emergency room. In fact not much about the physical examination has really changed substantially since the time of Hippocrates. When a patient complains of pain, presently, physicians examine the patient based on their knowledge of human anatomy. In the doctor’s mind are images of organs beneath the skin that may be related to an ailment; the physician seeks to probe or listen to those organs by manual palpation or listening with a stethoscope. But only the most obvious of abnormalities are detected in this manner.

What if physicians instantly had access to more precise visual information about those organs? With the advent of compact, battery-powered, handheld ultrasound machines, doctors can now peer through the skin at internal organs to see abnormalities even without having to expose patients to radiation. These devices are truly revolutionary tools that are profoundly enhancing the doctor/patient relationship throughout diagnostic medicine. Handheld ultrasound units, unlike their cart-based older siblings, can be deployed in every clinical arena, easily carried about by the physician. The time it takes to perform the examination is similar to what would be required for a routine standard hand/stethoscope examination, while the return on this small investment is significantly greater. More specifically, handheld ultrasound devices can uncover many diseases and pediatric conditions at an earlier time before the patient is in crisis. In any healthcare setting, portable ultrasound devices *transform* the typically

passive role of the physician, family, and patient alike into one that engages all in proactive and, at times, even preventative healthcare. This is satisfying for both the practitioner and patient, and can lead to effective and more cost-efficient health outcomes. This has far-reaching implications, not only in large urban medical communities but also in rural medicine and in telemedicine, where ultrasound imaging may be the only definitive link to a patient’s illness or injury.

This incoming wave of innovation changes the way patients and physicians work together to address medical issues that may not be revealed by the manual physical examination. To demonstrate how point-of-care ultrasound has revitalized the pediatric physical examination, Stephanie Doniger and colleagues have done an outstanding job in bringing these concepts to life by supplying us with high-quality images. These images can be referred to in our busy clinical areas, or when studied separately may trigger a consideration in the differential diagnosis of a clinical conundrum not possible without the knowledge of the capabilities inherent in this powerful device.

Other ways to image our patients involve exposing them to radiation. A single computed tomography (CT) scan of the abdomen and pelvis is roughly equivalent to receiving 500 chest-X-rays-worth of ionizing radiation. Of course, one must always consider risk/benefit when evaluating the ill child; however, if the answer can come via sound instead of beta rays then we should be ashamed to NOT reach for ultrasound in these children. After all, it was Hippocrates who first told us to “do no harm.” In no other place is our oath more relevant than in our youngest patients who have no voice in the matter.

In the end, humans are creatures of habit, and thus, as doctors, we find ourselves complacent and happy with our daily routine. We show up to work and engage in a familiar pace and role with our nurses and patients, well within a comfort zone that was established way back in residency training. Yet it is our responsibility to achieve more. Galileo permanently changed humankind’s perception of the planets in our universe because he knew a feasible, revolutionary invention when he saw one, and the story today about ultrasound is not so different. Ultrasound has the capacity to alter thinking in powerful ways that will shape the future for years to come. The physicians of tomorrow will wonder how we ever got by without this knowledge.

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