Practical Imaging Informatics
Practical Imaging Informatics

Foundations and Applications for PACS Professionals
For the four who laid the flagstones
And the three who walk behind,
   Eyes wide with wonder

And for Cara
Always for Cara

BFB

To my wife Terry, a font of affection and inspiration.

DLR

This book is dedicated to my family, your love and support strengthens me.
Philippians 4:13.

DSG

To my wife Janet, for her transcendent love, encouragement, and support.

DLW

The Editors are indebted to Ms. Caroline Wilson; without her tireless efforts, this book never would have come to fruition.
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Introduction

Barton F. Branstetter IV

The Evolution of the Imaging Informatics Professional

Within the last decade, medicine has undergone a dramatic transformation to a digital environment. Radiology has been at the leading edge of this change, with Picture Archiving and Communication Systems (PACS) becoming almost ubiquitous across the United States. As PACS developed and matured and became a mission-critical component of patient care, radiologists realized that a dedicated team of individuals would be needed to ensure that the PACS functioned continuously and reliably.

But where to find these individuals? A strong computer background would be essential, but a computer programmer or IT professional might not understand the clinical needs that underlie the PACS. After all, most IT systems do not require support that is timely and urgent, with patient-care decisions hanging in the balance. Changing from the IT culture to the medical culture can be difficult. So, a clinical background (e.g., technologists, nurses) is also critical. But relatively few people in these careers had the computer background to maintain a system as complex as a PACS. Even fewer had an interest in switching to an untested and uncertain career path.

Thus was born the PACS administrator – that rare breed with knowledge of both clinical workflow and information technology. Unfortunately, there were not enough people with the requisite skills to fill these roles. A few motivated, self-taught individuals from a variety of backgrounds found ways to fill the gaps in their own knowledge and become a bridge between the clinical and IT communities.

As PACS evolved, so did the training and background required of a PACS administrator. Keeping the PACS working was no longer sufficient – the ability to improve the PACS, work with the vendors, and even make the PACS communicate with other IT infrastructure in the hospital became critical to the job. Other specialties outside of radiology began to need similar services, and the obvious person to play that role was the PACS administrator.

But, this transition was not easy. Not only was the traditional training inadequate, the terminology describing the job was also inadequate. Seeing that the knowledge base developed in radiology was becoming needed
throughout the medical enterprise, the Society for Computer Applications in Radiology transformed itself into the Society for Imaging Informatics in Medicine, and the PACS administrator was transformed into the Imaging Informatics Professional (IIP), who has responsibilities far beyond the boundaries of the PACS itself.

With the new terminology, the core knowledge needed for the job had widened. The clinical knowledge base had widened to include medical specialties outside of radiology, and the IT knowledge base required an understanding of software interactions and networking across the entire enterprise. Who can fill this role? Who has the skills and knowledge to do the job? How can employers be sure that applicants for an IIP position will be able to serve the physicians and patients who are the ultimate clients of the digital infrastructure?

That is where certifying organizations such as the American Board of Imaging Informatics (ABII) come in. This organization, and others like it, was created to certify individuals from varying backgrounds in IT and clinical care, and to ensure that everyone who calls themselves an IIP has the knowledge and skills needed not just to keep the PACS afloat but also to keep the entire medical imaging infrastructure running smoothly, and improve efficiency for the whole medical enterprise.

Who Should Read This Book

The primary audience for this book is Imaging Informatics Professionals (and those who want to become IIPs). A certification test, such as the Certified Imaging Informatics Professional (CIIP) test offered by the ABII, is certainly a good reason to master the wealth of information in this book! But, it is worth noting that this book, like all educational programs offered by the Society for Imaging Informatics in Medicine (SIIM), is independent of the ABII and the CIIP certification program. The authors of this book do not have any inside information about the CIIP test.

Hopefully, this book will also be useful to IIPs long after the test is completed and passed, as a reference and troubleshooting guide for everyday imaging informatics. The layout and format of the book are designed with one major purpose in mind: quick reference. Our goal was to make sure that anyone who had read the book could look up a critical piece of information in the minimum amount of time. If you flip to the correct chapter, the key words and key concepts should jump out at you, and hopefully, the information you need should be right there, easy to find. Important definitions, checklists, and concepts are set off in color-coded boxes that draw the reader’s eye. Sources of additional information are clearly highlighted. IIPs are masters of workflow efficiency, so the textbook that supports them had better be efficient to use!
Although IIPs are the primary audience for this book, other professionals will hopefully find it useful. IT staff working in medicine, even if not in the formal role of PACS administrator, will benefit from understanding the clinical references that pervade their work. Physicians and trainees interested in informatics will find the information pertinent to their practice, and the knowledge base formed by reading this book can serve as a basis for more in-depth study. Administrators supervising or hiring IIPs may also find the book of use, to better communicate with those who are maintaining the digital infrastructure.

The Organization of This Book

The book is divided into six sections. The first two sections are the foundations sections, in which the basics of information technology and clinical image management are introduced. Depending on your background, some of these chapters may seem overly simplistic. The goal of these sections is to bring everyone up speed on areas of knowledge that they might not bring with them from their previous fields of study.

The third and fourth sections of the book are devoted to daily operations – the issues that arise on a day-to-day basis for IIPs, like customer relations and downtime procedures. These sections also contain chapters about the clinical environment in which images are used and interpreted.

The fifth and sixth sections deal with administrative issues that arise less frequently, but have a major impact on the life of the IIP. Decisions such as choosing a PACS vendor and long-range strategic planning fall into these sections of the book.

The field of imaging informatics is rapidly changing. As with all technological fields, newer and better software and solutions are continually developed. No printed textbook can be completely current or exhaustive on topics such as these. The purpose of this book is to answer commonly asked questions and provide a basis for continuous learning. To this end, many of the suggested readings in the chapters are links to websites that are likely to be updated as technology improves.

It is important to remember that every hospital or imaging site is unique. Solutions that work in one location may be totally inappropriate for other enterprises, or even elsewhere within the same enterprise. But some shared themes run through all of medical imaging; hopefully, we have focused on those in this book.

The bottom line – our main goal – was to provide pertinent information to IIPs at the point when it matters most (in medical terminology, “support at the point of care”). With this book at your desk, you should be able to rapidly find the information you need to troubleshoot urgent situations – the sorts of situations faced every day by Imaging Informatics Professionals.
Part I

Technology: Getting Started

Associate Editor: Daniel L. Rubin