

Book Review

Handbook of Telemedicine

Reviewed by TIM REARDON, M.S.

DEFINING A CORE BODY OF KNOWLEDGE for the rapidly evolving field of telemedicine is a formidable challenge for the most broadly representative team of experts. The twenty plus authors of the *Handbook of Telemedicine* (edited by Olga Ferrer-Roca and Marcelo Sosa-Iudicissa, IOS Press, Amsterdam, 1998, US\$83.00, 295 pages) provide a wealth of perspectives from more than a half dozen European countries and a variety of technical disciplines. Their objective is to provide the basic infrastructure of knowledge needed by people working in telemedicine.

Funded in part by the Commission of the European Communities, the book is similar in concept to the output of some consensus panels funded by U.S. government healthcare agencies. The content consists largely of technically oriented materials generated from a three-year project on the educational needs of telemedicine workers. Multidisciplinary contributions from academics in medicine, engineering, and law provide insights into the interplay of modern information and telecommunications technologies and medical care. The chapters of the handbook cover the following topics, defined as the core body of knowledge about telemedicine:

1. History of Telemedicine
2. Minimal Technical Requirements
3. Main Telemedicine Applications
4. Basic Technical Knowledge
5. Quality Control and Assessment
6. Use and Indication of Telematic Tools in Telemedicine: Internet
7. Training, Including Distance Training, Teletworking, and Teleteaching

8. Data Security and Privacy
9. Liability and Legal Aspects
10. Health Economics in Telemedicine
11. Technology Transfer and Social Aspects
12. Emerging Issues

These topics fill almost 200 densely packed pages. Another 74 pages of appendices provide an array of useful technical material on such topics as color theory, visual perception, electronic transactions, and standardization activities that apply to telemedicine.

The discussion of the minimum core knowledge about telemedicine begins with a history of it, providing an often-ignored international perspective. The unique contribution of the handbook begins as the subsequent chapters address the types and standards of telecommunication; technologies used in the presentation and manipulation of medical care information; and telemedicine specialty applications. Technology specifications for applications provide important engineering detail for specialty telemedicine, such as characteristics and technical strengths and weaknesses of different communications, networking, and imaging approaches. The collaboration of medical, legal, and engineering experts in the discussion of telemedicine requirements and uses sets the handbook apart from other books on telemedicine. Much of the resulting information is not readily available in current telemedicine literature.

Especially noteworthy is the technical detail provided in the discussion of telemedicine imaging systems, data transactions, and legal issues. For example, an overview of display

system technology includes the specifications of resolution, color, and image formats needed for telemedicine applications. Corresponding appendices on color theory, display technologies, and human perception include material essential for most practitioners of telemedicine. In addition, telemedicine practitioners should be aware of the data security and privacy considerations addressed in the sections on cryptographic procedures, Internet security tools, and legal protections.

Other sections of the handbook address critical areas of telemedicine knowledge. However, these consider general issues found in many non-telemedicine sources or provide limited development of important telemedicine topics. The discussions of quality assurance, statistical methods, and economic analyses are too general for students of telemedicine policy and administration. At the same time, many of the sections addressing telecommunications, networking, and the Internet provide intimidating detail not needed by most telemedicine users. Readers specifically interested in these topics may be better served by selecting from many good publications outside of telemedicine. Otherwise, technical overviews in these areas, along with well-documented references for more detail, will better serve most telemedicine workers. Nonetheless, the Internet chapter of the handbook does provide an excellent summary of important topics, despite a disappointingly limited focus on unique telemedicine issues.

Some readers may be discouraged by limitations in the handbook. The articles vary substantially in their organization and clarity, diminishing the accessibility of the publication. Minor errors in grammar and occasional missing words can be overlooked, but missing transitional information needed to link concepts and inconsistent formatting of text and tables make a challenging read. Perhaps more important for a handbook, footnotes are inconsistent and surprisingly limited for the type of technical information being presented. Bibliographies at the end of chapters provide a reasonable reference list on the subjects of discussion, but a handbook is generally expected to direct readers to specific publications with additional information. Moreover, while Web

page references are often provided, being buried among chapter endnotes encumbers their usefulness. This subtlety of placement may not be significant for many readers, but traditional publications often have trouble providing timely information on technical telemedicine issues; more accessible, better-structured listings of Web sources would greatly enhance the resource value of the handbook.

In summary, while sometimes difficult to read, the *Handbook of Telemedicine* is a compilation of important technical information for people in telemedicine. Perhaps its key contribution to the telemedicine literature is in its general focus on medical care information processing standards. Standards relevant to telemedicine are presented and defined throughout. Information, telecommunication, and Internet specialists know about most of these standards. Yet, this book makes a laudable contribution in pulling together the breadth of relevant standards. Further, the description of standardization activities among organizations world-wide makes the handbook a particularly useful reference and starting point for telemedicine policy and administration. These discussions complement the stated mission of the handbook—that is, to standardize the minimal knowledge among telemedicine workers. Nevertheless, this work also brings into focus the need for further discussion on optimal strategies for developing technical standards for telemedicine as well as the educational requirements of telemedicine workers. At what point will standardization promote the potential of telemedicine? Moreover, how can an international dialogue be initiated to advance the discussion? A future extension of the handbook might include more dynamic access to information through a Web extension of these reference materials and a framework for furthering international dialog on telemedicine concepts, training, and standards.

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