

**E. Ammenwerth¹, P. Knaup¹,
C. Maier², V. Mluddek¹,
R. Singer², S. Skonetzki¹,
A. C. Wolff¹, R. Haux¹,
C. Kulikowski³**

¹ University of Heidelberg, Institute for Medical Biometry and Informatics, Department of Medical Informatics, Heidelberg, Germany

² University of Applied Sciences, Department of Medical Informatics, Heilbronn, Germany

³ Rutgers University, Department of Computer Science, Piscataway, New Jersey, USA

1. Background and significance of digital libraries

For centuries, libraries have played an important role in collecting and communicating knowledge. Originally, libraries collected hand-written or printed media. During the digital revolution, information technology became an important component of library work. First, the main emphasis was placed on cataloging the available media. Now, as electronic media become increasingly widespread, the vision of a "digital library" is beginning to emerge. This term includes the idea that the human knowledge, stored in electronic form, can be accessed quickly and easily from any point of the world at any time. In addition to text-based knowledge, images, sound and other media can also be stored and made accessible. Therefore, digital libraries are today, almost always multimedia libraries.

In the medical and health sciences, digital libraries offer completely new ways of exchanging up-to-date information about patients and medical knowl-

Digital Libraries and Recent Medical Informatics Research

Findings from the IMIA Yearbook of Medical Informatics 2001

Abstract: The Yearbook of Medical Informatics is published annually by the International Medical Informatics Association (IMIA) and contains a selection of recent excellent papers on medical informatics research (<http://www.med.uni-heidelberg.de/mi/yearbook/index.htm>). The special topic of the just published Yearbook 2001 is "Digital Libraries and Medicine". Digital libraries have changed dramatically and will continue to change the way we work with medical knowledge. The selected papers present recent research and new results on digital libraries. As usual, the Yearbook 2001 also contains a variety of papers on other subjects relevant to medical informatics, such as Electronic Patient Records, Health Information Systems, Health and Clinical Management, Decision Support Systems, Education, as well as Image and Signal Processing. This paper will briefly introduce the contributions covering digital libraries and will show how medical informatics research contributes to this important topic.

Keywords: Medical Informatics, International Medical Informatics Association, IMIA, Digital Library, Yearbook

edge to support patient care, patient information, and education. Outstanding examples of medical digital libraries are: the image databases of the Visible Human Project, the genomic databases of the Human Genome Projects, and the medical reference libraries of the National Library of Medicine. Those digital libraries have changed dramatically and will continue to change the way we work with medical knowledge.

2. The IMIA Yearbook of Medical Informatics 2001

The IMIA Yearbook has been published annually since 1992, by the International Medical Informatics Association (IMIA). It contains a selection of recent, excellent and original research papers in the area of medical informatics. Traditionally, it structures the selected papers according to main sections: Electronic Patient Records, Health Information Systems, Health and Clinical Management, Decision Support Systems, Education, and Image

and Signal Processing. In addition, a special topic is selected every year, representing a topical and significant field of medical informatics research. Due to the emerging significance of digital libraries, they have been selected as the special topic of the IMIA Yearbook 2001 [1].

The special section on digital libraries of the Yearbook 2001 offers interesting insights into recent research through six selected papers. In addition, another 14 of 41 papers selected overall also contribute to the practice and theory of digital libraries (cp. Figure 1).

The detailed table of contents of IMIA Yearbook 2001 can be found in Table 1.

3. Digital libraries and the IMIA Yearbook 2001

We will now briefly introduce those articles of the Yearbook 2001, which deal with or contribute to digital library research.

The preface of the Yearbook 2001, "Seeking the digital library", written

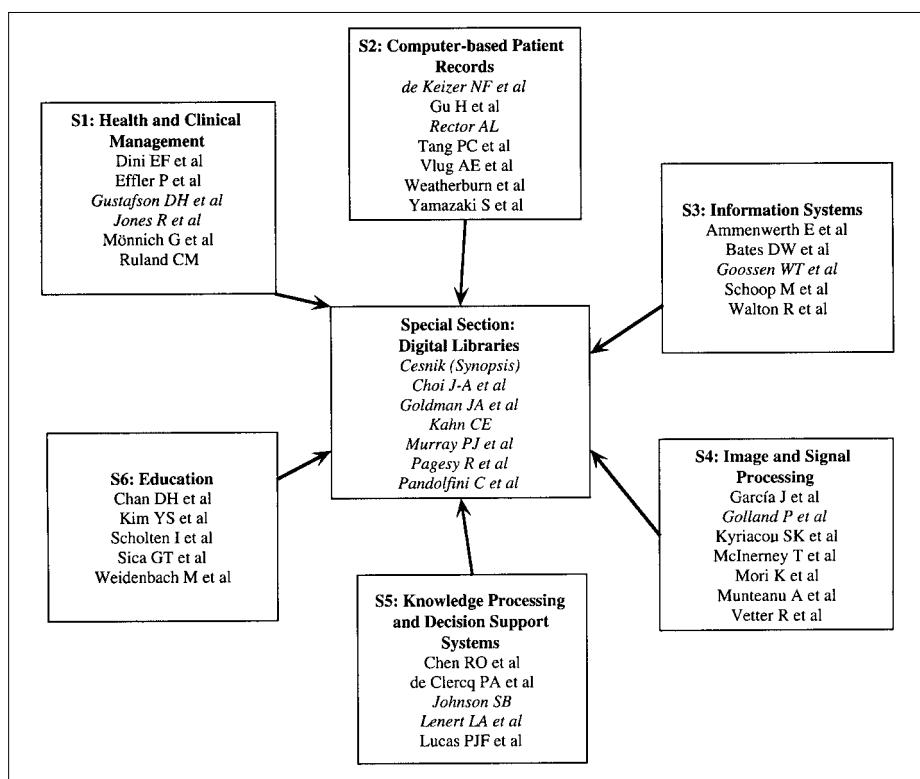


Fig. 1 Sections and main authors of the 41 papers contained in the different sections of the IMIA Yearbook 2001 (including the special section on Digital Libraries). Papers contributing to research pertaining to digital libraries are set in italics.

by Donald Lindberg, who is director of the National Library of Medicine in Bethesda, MD, USA, represents the perspectives of a leading developer of medical digital libraries and its contents. After briefly introducing the concept of a “digital library”, D. Lindberg discusses some of the most important challenges facing digital libraries. In his opinion, these challenges include, establishing methods and tools for acquisition, organization, storage and dissemination of digital information, using the Internet as a new means of sharing information, and considering new audiences for medical digital libraries such as patients and their relatives. He also sees important challenges in the sheer volume of biomedical digital data and the need to ensure its permanence.

Yu-Chuan Li has written a review on digital libraries in medicine. He identifies three main trends: the aggregation of digital data into useful collections of information, the virtualization of digital library services, and the two-way integration of digital libraries and electronic health records. In his opinion, the

future challenges are not only technical, but also social and political in nature, such as standardization and copyright issues.

The special section on digital libraries contains six papers, introduced through a synopsis by Branko Cesnik. He begins with a historical overview of libraries from the traditional to the modern, digital libraries which now allow great savings in space and inexpensive storage of multimedia information. In his opinion, neither storage nor speed will be the limiting factors for digital libraries. In contrast to the conventional archiving of information, digital libraries have the potential to develop into a dynamic, changing and growing resource, which can help the clinical user access and use vast amounts of knowledge to support concrete tasks. In his opinion, digital libraries will play an important role in patient care in the future.

In summary, the most important challenges facing digital libraries, as discussed by D. Lindberg and B. Cesnik, are:

1. Digital libraries comprise a vast amount of partly unstructured in-

formation which must not only be collected, but also analyzed.

2. In digital libraries, certain terminological standards must be used when recording information in order to allow understanding and exchanging of information
3. Information in digital libraries must be presented in a way which matches the needs of the users.
4. The quality and reliability of information in digital libraries must be guaranteed.
5. Digital libraries make it possible to address new target groups and to evaluate new forms of use.

To address these challenges seems an important precondition for the broader use of digital libraries. We next consider all papers of the Yearbook 2001 which deal in certain ways with digital libraries and will discuss how they contribute solutions to the above challenges.

3.1 Analysing massive amounts of partly unstructured information

In his article, JA Goldman presents a technique for data mining text databases. This supports the automatic search for specific patterns or distributions in texts (“knowledge discovery”) and therefore supports the analysis of unstructured or partly structured texts.

The article by SB Johnson’s discusses an approach for representing semantic information about words and phrases extracted from existing UMLS sources. This approach taken by natural language processing programs can support the analysis of medical narratives.

3.2 Terminological standards

NF de Keizer presents a framework for the description of terminology systems. With the help of this framework, five clinical terminologies are described. The detailed understanding of the structure of terminologies is a precondition for constructing, comparing and evaluating clinical terminologies.

AL Rector analyses the most important problems facing clinical reference terminologies in his article. He presents ten reasons why standardized clinical terminologies are still not in broad use. For example, the conflict between standardization on the one hand, and

Table 1 Table of contents of IMIA Yearbook of Medical Informatics 2001 (this table can also be found in the Internet under <http://www.med.uni-heidelberg.de/mi/yearbook/index.htm>).

Preface	Lindberg DAB. Seeking the digital library.
Editorial	Kulikowski C, Haux R. Digital Libraries and Medicine.
Review Section	Kuhn KA, Giuse DA. From Hospital Information Systems to Health Information Systems - Problems, Challenges, Perspectives. Li Y-C. Toward a medical information collective: trends in the development of digital libraries in medicine. Luscombe NM, Greenbaum D, Gerstein M. What is bioinformatics? An introduction and overview.
Research and Education Section	Gardner R. University of Utah Medical Informatics Research and Training. Grant AM. Research and Education at the Centre for Research and Evaluation in Diagnostics (CRED), University of Sherbrooke Jaspers MW, Limburg M, Ravesloot JJ. Medical Informatics in Amsterdam: Research and Education. Kors JA, van der Lei J, van Bommel JH. Medical Informatics Research and Education at the Erasmus University Rotterdam.
IMIA White Paper	International Medical Informatics Association, Working Group 1: Health and Medical Informatics Education: Recommendations of the International Medical Informatics Association (IMIA) on Education in Health and Medical Informatics.
Special Section: Digital Libraries and the Web	Cesnik B. Digital Libraries. Synopsis. Choi J-A, Sullivan J, Pankaskie M, Brufsky J. Evaluation of Consumer Drug Information Databases. <i>J Am Pharm Assoc (Wash)</i> 1999;39(5):683-7. Goldman JA, Chu WW, Parker DS, Goldman RM. Term Domain Distribution Analysis: a Data Mining Tool for Text Databases. <i>Methods Inf Med</i> 1999;38(2):96-101. Kahn CE Jr. Standard Generalized Markup Language for self-defining structured reports. <i>Int J Med Inf</i> 1999;53(2-3):203-11. Murray PJ, Anthony DM. Current and future models for nursing e-journals: making the most of the web's potential. <i>Int J Med Inf</i> 1999;53(2-3):151-61. Pagesy R, Soula G, Fieschi M. Improving knowledge navigation with adaptive hypermedia. <i>Med Inform Internet Med</i> 2000;25(1):63-77. Pandolfini C, Impicciatore P, Bonati M. Parents on the Web: Risks for Quality Management of Cough in Children. <i>Pediatrics</i> 2000; 105(1):1-8.
Section 1: Health and Clinical Management	Hanmer LA. Information Systems to facilitate Health and Clinical Management.. Synopsis. Dini EF, Linkins RW, Sigafos J. The Impact of Computer-Generated Messages on Childhood Immunization Coverage. <i>Am J Prev Med</i> 2000;18(2):132-9. Effler P, Ching-Lee M, Bogard A, Jeong M-C, Nekomoto T, Jernigan D. Statewide System of Electronic Notifiable Disease Reporting From Clinical Laboratories. Comparing Automated Reporting With Conventional Methods. <i>JAMA</i> 1999;282(19):1845-50. Gustafson DH, Hawkins R, Boberg E, Pingree S, Serlin RE, Graziano F, Chan CL. Impact of a Patient-Centered, Computer-Based Health Information/Support System. <i>Am J Prev Med</i> 1999;16(1):1-9. Jones R, Pearson J, McGregor S, Cawsey AJ, Barrett A, Craig N, Atkinson JM, Harper Gilmour W, McEwen J. Randomised trial of personalised computer based information for cancer patients. <i>BMJ</i> 1999;319(7219):1241-7. Mönnich G, Wetter T. Requirements for Speech Recognition to Support Medical Documentation. <i>Methods Inf Med</i> 2000;39:63-9. Ruland CM. Decision Support for Patient Preference-based Care Planning: Effects on Nursing Care and Patient Outcomes. <i>J Am Med Inform Assoc</i> 1999;6(4):304-12.
Section 2: Computer-based Patient Records	Wigertz OB. Computer-based Patient Records. Synopsis. de Keizer NF, Abu-Hanna A. Understanding Terminological Systems II: Experience with Conceptual and Formal Representation of Structure. <i>Methods Inf Med</i> 2000;39(1):22-9. Gu H, Perl Y, Geller J, Halper M, Liu L-M, Cimino JJ. Representing the UMLS as an Object-oriented Database: Modeling Issues and Advantages. <i>J Am Med Inform Assoc</i> 2000;7:66-80. Rector AL. Clinical Terminology: Why Is it so Hard? <i>Methods Inf Med</i> 1999;38(4-5):239-52. Tang PC, LaRosa MP, Gorden SM. Use of Computer-based Records, Completeness of Documentation, and Appropriateness of Documented Clinical Decisions. <i>J Am Med Inform Assoc</i> 1999;6:245-51. Vlug AE, van der Lei J, Mosseveld BM, van Wijk MA, van der Linden PD, Sturkenboom MC, van Bommel JH. Postmarketing Surveillance Based on Electronic Patient Records: The IPCI Project. <i>Methods Inf Med</i> 1999;38(4-5):339-44. Weatherburn GC, Bryan S. The effect of a picture archiving and communication system (PACS) on patient radiation doses for examination of the lateral lumbar spine. <i>Br J Radiol</i> 1999;72:534-45. Yamazaki S, Satomura Y. Standard Method for Describing an Electronic Patient Record Template: Application of XML to Share Domain Knowledge. <i>Methods Inf Med</i> 2000;39(1):50-5.

patient-centered individual documentation and the other are mentioned. He stresses the necessity of validating reference terminologies in routine use.

CE Kahn describes the use of SGML to encode medical observations, in

which case, reporting concepts are linked to external vocabularies, such as the UMLS. He promotes the use of open standards, such as SGML, as an important step towards universally comprehensible structured reports.

WT Goossen presents the development of a Nursing Minimum Data Set (NMDSN) for the Netherlands. In his opinion, those minimum data sets are a precondition for the systematic collection of patient-related care data, which

Table 1 Continuation.

Section 3: Information Systems	<p>Clayton PD. The state of clinical information systems after four decades of effort. Synopsis.</p> <p>Ammenwerth E, Buchauer A, Bludau B, Haux R. Mobile information and communication tools in the hospital. <i>Int J Med Inf</i> 2000;57:21-40.</p> <p>Bates DW, Teich JM, Lee J, Seger D, Kuperman GJ, Ma'Luf N, Boyle D, Leape L. The Impact of Computerized Physician Order Entry on Medication Error Prevention. <i>J Am Med Inform Assoc</i> 1999;6:313-21.</p> <p>Goossen WT, Epping PJ, Van den Heuvel WJ, Feuth T, Frederiks CM, Hasman A. Development of the Nursing Minimum Data Set for the Netherlands (NMDSN): identification of categories and items. <i>J Adv Nurs</i> 2000;31(3):536-47.</p> <p>Schoop M, Wastell DG. Effective Multidisciplinary Communication in Healthcare: Cooperative Documentation Systems. <i>Methods Inf Med</i> 1999;38(4-5):265-73.</p> <p>Walton R, Dovey S, Harvey E, Fremantle N. Computer support for determining drug dose: systematic review and meta-analysis. <i>BMJ</i> 1999;318(7189):984-90.</p>
Section 4: Image and Signal Processing	<p>Adam D. Image and signal processing. Synopsis.</p> <p>García J, Wagner G, Sörmmo L, Lander P, Laguna P. Identification of the Occluded Artery in Patients with Myocardial Ischemia Induced by Prolonged Percutaneous Transluminal Coronary Angioplasty Using Traditional vs Transformed ECG-Based Indexes. <i>Comput Biomed Res</i> 1999;32:470-82.</p> <p>Golland P, Kikinis R, Halle M, Umans C, Grimson WE, Shenton ME, Richolt JA. AnatomyBrowser: A Novel Approach to Visualization and Integration of Medical Information. <i>Comput Aided Surg</i> 1999;4:129-43.</p> <p>Kyriacou SK, Davatzikos C, Zinreich SJ, Bryan RN. Nonlinear Elastic Registration of Brain Images with Tumor Pathology Using a Biomechanical Model. <i>IEEE Trans Med Imaging</i> 1999;18(7):580-92.</p> <p>McInerney T, Terzopoulos D. Topology Adaptive Deformable Surfaces for Medical Image Volume Segmentation. <i>IEEE Trans Biomed Eng</i> 1999;18(10):840-50.</p> <p>Mori K, Hasegawa J, Suenaga Y, Toriwaki J. Automated Anatomical Labeling of the Bronchial Branch and Its Application to the Virtual Bronchoscopy System. <i>IEEE Trans Med Imaging</i> 2000;19(2):103-14.</p> <p>Munteanu A, Cornelis J, Cristea P. Wavelet-Based Lossless Compression of Coronary Angiographic Images. <i>IEEE Trans Med Imaging</i> 1999;18(3):272-81.</p> <p>Vetter R, Vesin J-M, Celka P, Scherrer U. Observer of the Human Cardiac Sympathetic Nerve Activity Using Noncausal Blind Source Separation. <i>IEEE Trans Biomed Eng</i> 1999;46(3):322-30.</p>
Section 5: Knowledge Processing and Decision Support Systems	<p>Fieschi M. Knowledge Processing and Decision Support Systems. Synopsis.</p> <p>Chen RO, Altman RB. Automated Diagnosis of Data-Model Conflicts Using Metadata. <i>J Am Med Inform Assoc</i> 1999;6(5):374-92.</p> <p>de Clercq PA, Blom JA, Hasman A, Korsten HH. A strategy for developing practice guidelines for the ICU using automated knowledge acquisition techniques. <i>Journal of Clinical Monitoring and Computing</i> 1999;15:109-17.</p> <p>Johnson SB. A Semantic Lexicon for Medical Language Processing. <i>J Am Med Inform Assoc</i> 1999;6(3):205-18</p> <p>Lenert LA, Cher DJ. Use of Meta-analytic Results to Facilitate Shared Decision Making. <i>J Am Med Inform Assoc</i> 1999;6(5):412-9.</p> <p>Lucas PJF, Tholen A, van Oort G. An intelligent system for pacemaker reprogramming. <i>Artif Intell Med</i> 1999;17:249-69.</p>
Section 6: Education	<p>Oliveri N. Education. Synopsis.</p> <p>Chan DH, Leclair K, Kaczorowski J. Problem-Based Small-Group Learning via the Internet Among Community Family Physicians: A Randomized Controlled Trial. <i>MD Comput</i> 1999;16(3):54-8.</p> <p>Kim YS, Vetter R. An International Distance Learning Nursing Course in the U.S. and Japan. <i>J Cult Divers</i> 1999;6(2):48-56.</p> <p>Scholten I, Russell A. Learning about the Dynamic Swallowing Process Using an Interactive Multimedia Program. <i>Dysphagia</i> 2000;15:10-6.</p> <p>Sica GT, Barron DM, Blum R, Frenna TH, Raemer DB. Computerized Realistic Simulation: A Teaching Module for Crisis Management in Radiology. <i>AJR Am J Roentgenol</i> 1999;172(2):301-4.</p> <p>Weidenbach M, Wick C, Pieper S, Quast KJ, Fox T, Grunst G, Redel DA. Augmented Reality Simulator for Training in Two-Dimensional Echocardiography. <i>Comput Biomed Res</i> 2000;33:11-22.</p>

can then be used to answer general questions in nursing research or nursing management.

3.3 Presentation of information in a user-dependent way

R Pagesy presents an approach to support finding relevant information from the diffuse data in the Internet and to return that information according to the specific needs of a user. He demonstrates his approach by presenting an adaptive hypermedia system for knowledge navigation.

R Jones examines the usefulness of a personalized computer based informa-

tion system for cancer patients. In addition to general information, this system also offers, personalized information which directly refers to information taken from the medical record of the user. System evaluation results show a high acceptance of personalized information.

LA Lenert describes an Internet-based approach to patient decision support which has been developed for patients with benign prostatic hypertrophy. This service does not only present general information, but also calculates the probability of the success of certain therapies, depending on patient specific data. He promotes his approach

as an important step to integrate patients in the medical decision support process.

3.4 Guarantee the quality and reliability of information

C Pandolfini examines the quality of free medical information in the Internet. He uses a checklist to compare websites related to the home management of cough in children with current sources of medical knowledge. He finds incomplete and even wrong information and therefore demands strategies for the validation of online medical information.

J-A Choi presents an evaluation of the quality of prescription drug information of six consumer drug information databases. He finds significant differences between the available databases, both with regard to content and quality. He proposes to make health care professionals aware of the quality of information provided.

3.5 Address new target groups and new usage forms

PJ Murray analyzes available nursing e-journals in the Internet using a taxonomy of nursing e-journal models. He advocates the development of innovative and interactive nursing e-journal technology and their further specialization on specific topics.

In the article by DH Gustafson, the impact of an Internet-based information resource for HIV patients on the patients' quality of life and on self-care is presented. The results show that such a tool can improve the quality of life of the patients and allows a more efficient use of available health care resources.

P Golland presents an anatomy browser which allows the visualization of three-dimensional surface models. The browser offers the user rich interaction possibilities. The tool has explicitly been developed so that it can be used on normally equipped client computers and, therefore, is well-suited to be used for medical education.

4. Discussion

The two most important factors influencing the usefulness of digital libraries will be

- the quality of information stored in the digital library and
- the quality of access to this information.

The content of the IMIA Yearbook 2001 demonstrates that medical informatics research can contribute in a variety of ways to reach the necessary quality. Major results can be expected from research on medical terminology, knowledge processing, as well as

methods and tools for the Internet. The broad availability of the Internet is an ideal platform for providing access to digital libraries. Due to the large amount of medical knowledge and the diversity of various user groups, developing effective digital libraries in medicine is particularly challenging. Especially, since the user groups have very different levels of medical knowledge and skills. Therefore, it can be expected that medical informatics research will contribute considerably to the development of digital libraries in general quite beyond its medical horizons.

In addition to this exciting topic, the IMIA Yearbook 2001 impressively represents the considerable versatility and quality of current medical informatics research. Evaluations of medical informatics tools and methods can be found in all of the other sections: health and clinical management, computer-based patient records, information systems, image and signal processing, knowledge processing and decision support, and education. The variety of topics reaches from speech recognition to automated anatomic labeling and clinical practice guidelines. A detailed list of all papers is provided in Table 1.

Outlook

The next IMIA Yearbook, 2002, will appear in March, 2002. Its special topic will be "Medical Imaging Informatics". For the first time the main sections will be completed by a new main section on "bioinformatics". The preface will be written by Nicholas Ayache (France). International researchers have already agreed to write reviews about dedicated topics such as organizational issues, standardization issues, and brain imaging informatics. Up-to-date information about the current and future issues of the IMIA Yearbook is available at <http://www.med.uni-heidelberg.de/mi/yearbook/index.htm>.

Acknowledgment

We would like to thank Martina Hutter, Steve Huesing, Thomas Kleinöder and the Schattauer publishing company for their support in the creation and publishing of the IMIA Yearbook 2001.

Editors of the IMIA Yearbook 2001 are Reinhold Haux, Heidelberg (Germany), and Casimir Kulikowski, Rutgers (United States). Managing Editors of the Yearbook 2001 are Elske Ammenwerth, Petra Knaup, Christoph Meier, Volker Mluddek, Reiner Singer, Stefan Skonetzki and Astrid Wolff.

Reviewer of the IMIA Yearbook 2001 were: H. Åhlfeldt, Sweden, E. Coiera, Australia, P. P. Degoulet, France, M. D. Denz, Switzerland, M. Dugas, Germany, C. Dujat, Germany, M. Fieschi, France, G. Gell, Austria, U. Giani, Italy, A. M. Grant, Canada, L. Hanmer, South Africa, H. Heathfield, United Kingdom, W. Horn, Austria, A. Horsch, Germany, M. W. M. Jaspers, The Netherlands, G. Kachukhashvili, Georgia, M. Klück-Stumpf, Brazil, G. Kozmann, Hungary, P. Le Beux, France, G. Lechleitner, Austria, T. Lehmann, Germany, R. Lenz, Germany, C. Ludwig, Switzerland, R. Macerattini, Italy, J. Mantas, Greece, O. Y. Mayorov, Ukraine, A. Merzweiler, Germany, A. Michel, Germany, G. I. Mihalas, Romania, J. Möhr, Canada, P. W. Moorman, The Netherlands, J. Murphy, United Kingdom, C. Nøhr, Denmark, J. Pilz, Germany, D. J. Protti, Canada, J. Roberts, United Kingdom, N. Saranummi, Finland, R. Schubert, Germany, I. H. Symonds, New Zealand, H. Tange, The Netherlands, D. UaConaill, Ireland, A. Winter, Germany, J. Wyatt, United Kingdom, J. J. Yang, Norway, J. Zvárová, Czech Republic.

REFERENCE

1. Haux R, Kulikowski C. (eds). IMIA Yearbook of Medical Informatics 2001: Digital Libraries and Medicine. Stuttgart: Schattauer, 2001.

Address of authors:

Dr. Elske Ammenwerth
University of Heidelberg
Institute of Medical Biometry and Informatics
Department of Medical Informatics
Im Neuenheimer Feld 400
D-69120 Heidelberg
Germany
E-mail: Elske_Ammenwerth@med.uni-heidelberg.de
Phone: 00 49/62 21/56 54 81
Fax: 00 49/62 21/56 49 97

TEST IT

THE BEST

30% discount

Schattauer



For more than 39 years **Methods of Information in Medicine** has covered various topics in the field of medical informatics: Communication, management and information systems for hospitals, analytical systems for laboratories and clinics, recording, monitoring and controlling systems as well as medical data processing, transfer, and documentation.

Methods of Information in Medicine is the official journal of the European Federation for Medical Informatics – EFMI.

We would like to invite you to a test subscription to **Methods**. We do grant a **discount of 30%** for the first year of subscription.

Our journal will be delivered, carriage paid – it could not be more convenient.

<http://www.methods-online.com>

Methods of Information in Medicine

2001. Volume 40 (5 issues)
ISSN 0026-1270

Editor-in-Chief: van Bommel, J.H.
Associate Editors:
Haux, R.; Lindberg, D.A.B.
Senior Editor: Wagner, G.

Please send this order form to: Schattauer GmbH, PO Box 10 45 43, D-70040 Stuttgart, Germany Fax +49/711/2 29 87 50, e-mail: info@schattauer.de

ORDER FORM

Yes, I accept your offer for a test subscription to **Methods** (5 issues). A special **discount of 30%** will be granted for the first year of subscription. My subscription will continue as a standing order if you don't receive my cancellation at November 1st.

- Institutional subscription**
Europe DEM 348.60¹ instead of DEM 498.00¹
Non-Europe US \$ 221.20² instead of US \$ 316.00²
- Personal subscription**
Europe DEM 220.50¹ instead of DEM 315.00¹
Non-Europe US \$ 144.20² instead of US \$ 206.00²
- Members EFMI/IMIA**
Europe DEM 133.00¹ instead of DEM 190.00¹
Non-Europe US \$ 86.00² instead of US \$ 124.00²

¹ Germany: mailing costs included / Europe: +7% VAT
² + mailing costs US \$ 22.00

Terms of Payment:

- check enclosed
- please bill me
- please charge my credit card
 - American Express VISA
 - Eurocard/MasterCard

Card Number

Expiration Date

I hereby commission you, to draw in the price according to the above mentioned procedure.

Name and exact postal address
Street
City
State
Date Signature

All prices are subject to change without notice