Jan H. van Bemmel[1]
Alexa T. McCray[2]
Editors

[1] Institute of Medical Informatics, Erasmus University Rotterdam, Rotterdam, The Netherlands
[2] National Library of Medicine, Bethesda MD, USA

Editorial

The Promise of Medical Informatics

For the present Yearbook, the editors asked themselves the question: "what early promises in health and medical informatics were made that had a considerable impact on developments in the past 25 to 40 years? What ideas were perhaps very good, but were never brought into practice? What will be the agenda for the next decade?

This question was forwarded to 20 experts in the field. Because the field of medical and health informatics is very broad, a representative as possible selection was made of 17 early papers, which could be considered as "high impact papers". For each paper a commentary was written by one of 17 experts in the field. In addition, three other colleagues were approached to sketch the promise of medical informatics in three geographical areas in the world where in the past many ideas have been brought into practice: Don Lindberg, USA, to cover the Americas, Shigekoto Kaihara, Japan, for South-East Asia, and George de Moor, Belgium, for Europe. The preface to the Yearbook has been written by Hans Peterson from Sweden, renowned early pioneer in health informatics from Sweden and one of the former presidents of IMIA.

The above considerations are the reason that the title of the 1999 Yearbook is called: *The Promise of Medical Informatics*. In short, in this Yearbook we wanted to take a critical look both backwards and forwards. What were the early expectations and what was the outcome? What is to be expected for the next decade? In what way and to what extent can health care benefit from the accomplishments of medical and health informatics?

In addition to the "Promise" section, papers were, as usual, selected from the refereed literature, published during the previous year, by a process in which for each paper at least three international reviewers were requested to rank the paper. Seven guest editors wrote Synopses of the selected papers included in the Yearbook and about 25 referees assisted in the selection of the papers (see below). This year, because of the inclusion of the "Promise" papers and commentaries, the usual description of Research and Education programs in medical and health informatics has not been included. The Guest Editors who wrote the Synopses of selected papers were the following colleagues:

- Pierre Le Beux, France, for the Section on Health and Clinical Management.
- Günther Gell, Austria, for the Section on Information Systems.
- Dario Giuse, USA, for the Section on Knowledge Processing and Decision Support Systems.
- Casimir Kulikowski, USA, for the Section on Image and Signal Processing.
- Peter Moorman, The Netherlands, for the Section on Computer-Based Patient Records.

Areas with Early Promises

The 17 papers that were considered to have impact on the development of medical and health informatics can roughly be grouped into four main categories:

1. Electronic Patient Records

It would be naive to think that R&D on computer-based patient records was started only in the 1990s. On the contrary. Very early ideas were developed and papers in this context were written by, for instance, Larry Weed in 1968 on medical records for guiding and teaching clinicians [1] (a commentary on this paper is presented by Hiroshi Takeda, Japan); Morrie Collen on the general requirements for a medical information system, written in 1970 [2] (commentary by Reinhold Haux, Germany); Roger Côté (1979), on a most important aspect for all electronic patient records: the systematized nomenclature of medicine (SNOMED) and its predecessor SNOP for pathology, an article from 1979 [3] (commentary by François Roger France, Belgium); an early article

(1979) by Peter Reichertz et al., entitled: Evaluation of a field test of computers for the doctor's office [4] (commentary by Jochen Moehr, Canada); and one of many early papers by Octo Barnett et al. on a computer-based medical information system for ambulatory care, that is, his COSTAR system [5] (commentary by Glyn Hayes, UK).

2. Clinical Support Systems

In fact, medical informatics started with many developments specifically in the domain of clinical support systems. The most early applications were, perhaps, laboratory automation and radiotherapy planning. However, equally early were papers on biosignal processing in a variety of domains, such as cardiology, lung physiology and neurophysiology. Of even greater importance today are the imaging and image processing systems. Because of limited space available, only two papers have been selected, one on biosignal processing and one on imaging. In the former area, a very early publication (1961) of Hubert Pipberger et al. was selected on the automatic screening of normal and abnormal electrocardiograms by means of a digital electronic computer [6] (commentary by Pentti Rautaharju, USA), and in the latter a representative publication of the early work that took place at the Mayo Clinic in the team of Earl Wood, a publication by Richard Robb et al. on dynamic three-dimensional X-ray computed tomography of the heart, lungs and circulation, published in 1979 [7] (commentary by Karl-Hans Englmeier, Germany).

3. Decision-support Systems

Over the years, the area of decision-support systems has drawn many researchers, starting in the early years of computers in medicine. Developments in this area are still going on or, better, ideas on the role of decision-support systems in health care are continuously being changed and renewed. From the commentaries written to the papers on this subject it will become clear that many challenges are still ahead of us. Early papers that were selected from a host of publications in this field are the following: Robert Ledley and Lee Lusted's paper on reasoning foundations for medical diagnosis from as early as 1959 [8] (commentary by Marius Fieschi, France); Anthony Gorry's publication of 1968 on sequential diagnosis by computer [9] (commentary by François Borst, Switzerland); Homer Warner's work on the HELP system, a program for medical decision making integrated in the hospital information system in Salt Lake City [10] (commentary by Hans Ahlfeldt, Sweden), Steven Pauker and Jerome Kassirer's publication on cost-benefit analysis of therapeutic decision making [11] (commentary by Joanny Gouvernet et al., France); one of the publications of Tim de Dombal et al. on computer-aided diagnosis of acute abdominal pain [12] (commentary by Arie Hasman, the Netherlands); Clem McDonald's research on protocol-based computer reminders, the quality of care and the non-perfectability of man [13] (commentary by Paul Tang, USA); Ted Shortliffe and Bruce Buchanan's work on a model of inexact reasoning in medicine, lying at the root of MYCIN and its successors [143] (commentary by Jeremy Wyatt, United Kingdom); and Randy Miller, Harry Pople and Jack Myers's developments on INTERNIST, published under the title: An experimental computer-based diagnostic consultant for general internal medicine [15], later succeeded by QMR (commentary by Astrid van Ginneken, the Netherlands). All of these articles were innovative at the time and still have impact on the field and its research.

4.Ethical and Philosophical Aspects

We could not and did not want to avoid papers on the ethical and philosophical side of medical informatics. Many papers have been published in this area, but two early ones in particular deserve to be mentioned: François Grémy's paper on why to teach information sciences in medicine; whether they will contribute to a solution for the present crisis of medicine [16], still a very relevant subject (commentary by Jan van Bemmel, the Netherlands), and Marsden Blois' chapter on the proper use of men and machine, from his book on *Information and Medicine. The Nature of Medical Description* [17] (commentary by Alexa McCray, USA).

These 17 papers and their commentaries together with the three "geographical" commentaries form a representative cross-section of the early developments in medical and health informatics. Together, they are rich lessons from the past and form perhaps a guide for the future. Medical informaticians who do not know their history are condemned to repeat the errors of the past.

Information on IMIA

As usual, the Yearbook contains extensive information on IMIA, its Member Societies and its Working Groups and Special Interest Group. Because the 1999 Yearbook appears only 6 months after the 1998 Yearbook, the section on IMIA member societies in the present Yearbook is largely the same as in the last one. Dr. Nancy Lorenzi, IMIA's vice president for working groups and special interest groups, has written a summary on the restructuring of the working groups that is presently taking place within IMIA. The other information is based on material from IMIA's Member Societies, provided by IMIA Representatives from most countries.

A full list of Presidents, Secretaries and IMIA Representatives of IMIA Member Societies and their addresses is included in the Yearbook.

The Year 2000 Yearbook

The next IMIA Yearbook of Medical Informatics will be the first in the new century and will be devoted to a most relevant theme for the years to come: *Citizen-Centered Health Informatics*. Again, the editors plan to invite a host of review writers to contribute with their visions to this forthcoming Yearbook.

Because several IMIA member societies preferred to receive the Yearbook earlier in the year, to be able to distribute the books at their annual conferences, from now on the Yearbook will be published six months earlier than usual, that is, in February of each year, starting with this 1999 Yearbook.

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List of Referees who contributed to the selection of articles in the 1999 IMIA Yearbook of Medical Informatics:

H. Ahlfeldt, Sweden
P. Le Beux, France
C. Ceinos, Spain
J.S. Duisterhout, The Netherlands
U. Engelmann, Germany
E.S. Gelsema, The Netherlands
A.M. van Ginneken, The Netherlands
S.J. Grobe, USA
A. Hasman, The Netherlands
W. Hole, USA
M.G. Kahn, USA
H.P. Lehmann, USA
F.J. Leven, Germany
J.R. Möhr, Canada
K.D. Nielsen, Denmark
C. Nøhr, Denmark
J. Roberts, UK
N. Saranummi, Finland
W.V. Slack, USA
I.H. Symonds, New Zealand
J.L. Talmon, The Netherlands
H. Tange, The Netherlands
J. Zvárová, Czech Republic