

MEDINFO 80

Proceedings of the Third World Conference
on Medical Informatics

September 29-October 4, 1980

edited by

d. a. b. lindberg and s. kaihara

PART 2

MEDINFO 80

Proceedings of the Third World Conference
on Medical Informatics
Tokyo, September 29 – October 4, 1980

Edited by

DONALD A. B. LINDBERG

*Information Science Group,
School of Medicine,
University of Missouri,
Columbia, Missouri*

and

SHIGEKOTO KAIHARA

*Hospital Computer Centre,
University of Tokyo Hospital, Tokyo*

Part 2



1980

NORTH-HOLLAND PUBLISHING COMPANY – AMSTERDAM • NEW YORK • OXFORD

© IFIP, 1980

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright owner.

(Part 2)

ISBN 0 444 860312 (Volume 2)

ISBN 0 444 860290 (Set number)

Published by:

NORTH-HOLLAND PUBLISHING COMPANY
AMSTERDAM • NEW YORK • OXFORD

Sole distributors for the U.S.A and Canada:

ELSEVIER NORTH-HOLLAND, INC.
52 VANDERBILT AVENUE
NEW YORK, N.Y. 10017

Library of Congress Cataloging in Publication Data

World Conference on Medical Informatics. 3rd. Tokyo.
1980.
Medinfo 80.

(IFIP world conference series on medical informatics ;
v. 3)

Includes index.

I. Medicine Data processing Congresses. I. Lindberg, Donald A. B. II. Kaihara, Shigekoto.

III. Title. IV. Series: International Federation for Information Processing. IFIP world conference series on medical informatics ; v. 3.

R858.A2W67 1980 610'.28'54 80-20452

ISBN 0-444-86029-0 (Elsevier North-Holland)

PRINTED IN JAPAN

TABLE OF CONTENTS

<i>Foreword</i>	v
<i>Editors' Preface</i>	vii
A. Cormack: EARLY CAT SCANNING AND RECENT DEVELOPMENTS	ix
 Session 1: COMPUTERS IN RADIATION THERAPY	 1
Y. Umegaki: (Chairman's Paper) USE OF COMPUTERS IN RADIOTHERAPY - SURVEY PAPER. (Japan)	2
G. T. Y. Chen: THE ROLE OF COMPUTERS IN CHARGED PARTICLE RADIOTHERAPY. (USA)	4
S. J. Dwyer III, K. R. Lee, C. Mansfield, S. L. Fritz, W. H. Anderson, P. Nong Cook: DISPLAY STRATEGIES USING CT SCAN DATA FOR RADIATION THERAPY PLANNING. (USA)	9
T. Matsuda: COMPUTER CONTROLLED CONFORMATION RADIOTHERAPY. (Japan)	14
M. Matsuo, S. Kimura, S. Fujii, Y. Kaneda, M. Yoshida, H. Mure: A THREE-DIMENSIONAL DISPLAY SYSTEM FOR RADIATION THERAPY PLANNING. (Japan)	18
P. Minnaar, O. van Reenen, J. D. Anderson: ELEMENT ACTIVATION IN CANCER PATIENTS DURING THE TREATMENT WITH A 16MeV LINEAR ACCELERATOR. (So. Africa)	23
I. R. Neilsen, J. M. Slater, D. W. Shreyer: CT SCANNER ASSUMES KEY ROLE IN COMPUTER-BASED RADIOTHERAPY PLANNING SYSTEM. (USA)	25
Y. Onai, K. Kawashima, Y. Umegaki: SURVEY ON THE PRESENT STATE OF ARTS IN THE USE OF COMPUTERS IN RADIATION THERAPY. (Japan)	29
 Session 2: HOSPITAL CARE, NURSING, CARE PLANS, MEDICAL INFORMATION SYSTEMS	 33
P. Reichertz: (Chairman's Paper) COMPUTERS IN HOSPITAL CARE MANAGEMENT. (FRG)	34
B. I. Blum, R. E. Lenhard, Jr.: EXPERIENCE IN IMPLEMENTING A CLINICAL INFORMATION SYSTEM. (USA)	38
H. Buhaug, P. Bergsjø, L. S. Bakketeig: QUALITY CONTROL IN AN OBSTETRICAL DEPARTMENT. (Norway)	43
E. Chigira, T. Yokoyama, H. Kuma, H. Miyake: A NEW SYSTEM CONFIGURATION OF THE MEDICAL INFORMATION PROCESSINGS. (Japan)	47
S. M. Daunt, R. M. James, J. M. Roberts, P. W. Harvey: A COMPUTERIZED PROTOCOL TO ASSIST IN THE PRESCRIPTION OF DRUGS WITH A NARROW THERAPEUTIC RATIO. (UK)	52
R. M. James, J. M. Roberts, R. I. Cooper, W. G. Park, J. D. Bellis, P. W. Harvey: "COMPUTAFEED" - A METHOD OF COMPUTER ASSISTED INTRAVENOUS FEEDING. (UK)	55

F. A. Leguit: INTEGRATING IN A HOSPITAL INFORMATION SYSTEM, A NECESSITY OR A LUXURY. (The Netherlands)	58
A. Ohsato, T. Sekiguchi, T. Nakai, K. Yamazaki: INFORMATION PROCESSING FOR NURSING BY FUZZY RELATION. (Japan)	62
W. D. Regester: A PRACTICING PHYSICIAN'S VIEW OF A COMMUNITY HOSPITAL'S USE OF A COMPUTERIZED MEDICAL INFORMATION SYSTEM WITH EMPHASIS ON HOW IT IMPACTS THE HOSPITAL'S THREE MOST IMPORTANT AREAS: A - PATIENT'S CARE; B - STAFF PHYSICIANS' ROUTINE IN DAILY PRACTICE; AND C - HOSPITAL PROCEDURES. (USA)	67
M. Scholes, B. Barber: TOWARDS NURSING INFORMATICS. (UK)	70

ABSTRACTS

E. A. Butler, B. J. Hay: A NURSING SICKNESS, ABSENCE AND ATTENDANCE COMPUTER SYSTEM. (UK)	74
R. J. Schteingart, R. R. Jamschon: THE FIRST HOSPITAL INFORMATION SYSTEM IN ARGENTINA. (Argentina)	74
A. M. Vossepoel, H. C. Bisterbosch: THE INFORMATION SYSTEM OF LEIDEN THROMBOSIS CENTER. (The Netherlands)	74

Session 3: CLINICAL RESEARCH 75

H. Abe, H. Inada, M. Naito, M. Inoue: (Chairman's Paper) PRESENT STATUS AND TENDENCY OF CLINICAL INVESTIGATION IN MEDICAL INFORMATICS. (Japan)	76
K. Akita, H. Kuga: DIGITAL PROCESSING OF COLOR OCULAR FUNDUS IMAGES. (Japan)	80
A. C. Anderson, K. S. Fu: CLASSIFICATION OF LEUKOCYTES USING A LINEAR BINARY TREE CLASSIFIER. (USA)	85
H. Joly, E. Sanchez, J. Gouvernet, J. Valtz: APPLICATION OF FUZZY SET THEORY TO THE EVALUATION OF CARDIAC FUNCTION. (France)	91
M. Kikuchi, E. Machiyama, N. Kabei, A. Yamada, Y. Sakurai, Y. Hara, A. Sano: ADAPTIVE CONTROL SYSTEM OF BLOOD GLUCOSE REGULATION. (Japan)	96
J. Michel, G. S. Vasadze, G. G. Dumbadze, H. Cammann, V. Lange, B. Gurath, E. Hiller, G. B. Dumde: AUTOMATED SYSTEM-ANALYTIC INVESTIGATIONS OF THE HUMAN ORGANISM. (GDR)	101
J. Sabatier, Cl. Hendrick, J. P. Schaaps: INTERACTIVE COMPUTER-AIDED SYSTEM TO STORE AND RETRIEVE PERINATAL DATA. (Belgium)	106
J. L. Steimer, R. Jouvent, F. Imbert, G. LeMoel, A. des Lauriers, A. Mallet, J. F. Boisvieux: INDIVIDUALIZED LITHIUM DOSAGE REGIMEN USING LITHIUM RENAL CLEARANCE. (France)	111
M. Tanaka, K. Tanaka: AN AUTOMATIC TECHNIQUE FOR FUNDUS-PHOTOGRAPH MOSAIC AND VASCULAR NET RECONSTRUCTION. (Japan)	116
A. M. Vossepoel, A. W. M. Smeulders: DELINEATING MICROSCOPIC OBJECTS AND COMPUTING THEIR PRINCIPAL PARAMETERS. (The Netherlands)	121

ABSTRACTS

- T. Kubo, T. Akatsuka, K. Fujii, S. Minoura:** A REVISED METHOD OF ESTIMATING FETAL WEIGHT IN UTERO. (Japan) 126
- G. Ravindran, G. Jayaraman, S. Thanickachalam, C. Lakshmikanthan:** SEGMENTAL CONTRACTION OF PATIENT WITH TETRALOGY OF FALLOT. (India) 126

Session 4: SYSTEMS, COMMUNICATIONS AND NETWORKS 127

- B. H. McCormick, S.K. Chang:** (Chairman's Paper) DISTRIBUTED INFORMATION SYSTEMS FOR HEALTH CARE DELIVERY. (USA) 128
- K. Bohm, M. Knobloch:** STEPS TOWARDS REALIZING A COMPUTER NETWORK IN A MEDICAL RESEARCH INSTITUTION. (FRG) 132
- C. M. Cinto:** A TELEPROCESS NETWORK IN A MODERN UNIVERSITY HOSPITAL: HOSPITAL CLINICO DE LA UNIVERSIDAD COMPLUTENSE DE MADRID. (Spain) 137
- J. Dudeck, Th. Becker, L. Habicht, G. Junghans:** THE NETWORK-COMPUTER SYSTEM OF GIESSEN UNIVERSITY HOSPITAL. (FRG) 142
- N. Ehara:** COMPUTER NETWORK SYSTEM IN A HOSPITAL AND ITS ADVANTAGES. (Japan) 147
- T. Kaminuma, J. Kariya, T. Tango, I. Suzuki, S. Kurashina:** A COMPREHENSIVE DATA ANALYSIS SYSTEM FOR MEDICINE. (Japan) 152
- J. Kashio, H. Tsutamune, Y. Tomaru:** THE BASIC DESIGN OF THE HEALTH CARE NETWORK SYSTEM. (Japan) 157
- R. MacMillan, F. Poole, J. Anderson:** A HOSPITAL INFORMATION SYSTEM BASED ON A NETWORK OF MICROCOMPUTERS. (UK) 162
- K. Morishita, N. Ehara, H. Kuma:** DISTRIBUTED DATA PROCESSING SYSTEMS WITH MULTI-LOOP MICROCOMPUTER NETWORK FOR MEDICAL APPLICATIONS. (Japan) 166
- I. R. Neilsen, C. D. Zimmerman, J. Ronan:** MMCS (MULTI-MINICOMPUTER-SYSTEM) - THIRD GENERATION SYSTEM ARCHITECTURE FACILITATES MODELING APPLICATIONS. (USA) 171
- M. L. Zeichner:** MULTI-MEDIA INFORMATION DISTRIBUTION FOR HOSPITALS BY USING COAXIAL CABLE. (USA) 174

Session 5: IMAGING, X-RAY, ULTRASOUND, NUCLEAR MEDICINE 179

- M. Onoe:** (Chairman's Paper) REVIEW OF IMAGING IN MEDICINE. (Japan) 180
- S. Fujii, Y. Kaneda, M. Matsuo, M. Yoshida, Y. Kobashiri, H. Mure:** COMPUTER AIDED THREE DIMENSIONAL RECONSTRUCTION AND IMAGING SYSTEM FOR CT IMAGES. (Japan) 185
- C. Gaudeau, M. Boiron, C. Longevialle, P. Cojan, P. Rouleau, J. Thouvenot:** AUTOMATIC ANALYSIS OF GASTRIC DEFORMATION FROM X-RAY FILMS. (France) 190
- H. Harms, A. Rueter, M. Haucke, H. M. Aus:** DIGITAL CELL CLASSIFICATION USING PARAMETERS OF CHROMATIN ARRANGEMENT AND STRUCTURE. (FRG) 196

R. Knopp, H.-P. Breuel, M. Bahre, C. Winkler: QUANTITATIVE HEART SCINTIGRAPHY, TECHNICAL BASIS AND CLINICAL RESULTS. (FRG)	200
T. Kobayashi: CURRENT STATUS OF BREAST ULTRASONOGRAPHY AND ULTRASOUND TISSUE CHARACTERIZATION OF BREAST CANCER. (Japan)	205
M. Kuwahara, S. Eiho, H. Kitagawa, K. Ishimi: AUTOMATIC ANALYSIS OF TWO-DIMENSIONAL ECHOCARDIOGRAMS. (Japan)	210
Y. Nose, Y. Watanabe, S. Sanefuji, H. Yano, R. Hisanou, T. Inoue, M. Yokota, M. Nakamura: NON-INVASIVE ESTIMATION OF THE VOLUME AND THE SURFACE AREA OF LEFT VENTRICLE FROM TWO DIMENSIONAL ECHOCARDIOGRAMS. (Japan)	214
T. Shimazu, M. Inoue, M. Hori, K. Tsujioka, M. Naito, H. Inada, H. Abe, M. Ikeda, M. Yachida, S. Tsuji, H. Kusuoka: AUTOMATED IMAGE PROCESSING SYSTEM FOR THE ANALYSIS OF CINE LEFT VENTRICULOGRAMS. (Japan)	217
K. Takaya, K. Sato: CHROMOSOME CLASSIFICATION USING ASSOCIATIVE MEMORY TECHNIQUES. (Canada)	222

ABSTRACTS

T. A. Iinuma, T. Nagai, K. Fukuhisa, T. Matsumoto, Y. Sasaki, K. Murata, T. Inouye: INTER-INSTITUTIONAL EVALUATION OF ²⁰¹ Tl IMAGE EFFICACY ON THE DETECTION OF MYOCARDIAL INFARCTION. (Japan)	226
H. Mori, H. Niki, T. Yamada, E. Nakagomi, F. Takayama, M. Takagi, H. Akabane: A COMPUTER SCREENING OF GASTRIC X-RAY FILMS IN ERECT ANTERO-POSTERIOR POSITION. (Japan)	226

Session 6: COMPUTERIZED ELECTROCARDIOGRAPHY 227

P. M. Rautaharju, M. Okajima: (Chairman's Paper) COMPUTERIZED ELECTROCARDIOGRAPHY: OLD PROBLEMS AND NEW CHALLENGES. (Canada)	228
S. Cerutti, E. Gatti, L. Masciadri: DIGITAL FILTERING AND BASELINE-DRIFT CORRECTION ALGORITHMS IN THE COMPUTERIZED PRE-PROCESSING OF ECG TRACINGS. (Italy)	231
J. Kutschera, G. Barthel, J. Dudeck, F. Bernhardt, K. Meinke: THE MICROPROCESSOR BASED GIESSEN ECG SYSTEM: FIRST RESULTS ON THE VALIDATION OF THE REALTIME RHYTHM MONITORING SECTION. (FRG)	236
H. Nagoshi, Y. Tatsuzawa, Y. Goto, S. Aso: SOME SPECULATIONS ON THE UTILIZATION OF A TELEPHONE NETWORK IN COMPUTER-AIDED ECG INTERPRETATION. (Japan)	239
B. Richards, C. L. Bray, C. Jeffery, N. Khadr: AN ASSESSMENT OF THE ACCURACY OF THE BONNER/IBM E.C.G. ANALYSIS PROGRAM WHEN COMPARED WITH AUTOPSY EVIDENCE. (UK)	244
J. L. Talmon, A. Hasman: AN EVALUATION OF ALGORITHMS FOR QRS-TYPIFICATION. (The Netherlands)	249
H. Tanaka, K. Yajima, T. Ihara, T. Furukawa: AN INVERSE SOLUTION IN ELECTROCARDIOLOGY - ESTIMATION OF EPICARDIAL POTENTIAL MAPPING USING SPHEROIDAL HARMONICS. (Japan)	254
J. Toyama, O. Tabata, M. Okajima, K. Yamada: MICROCOMPUTER PROCESSING SYSTEM FOR BODY SURFACE ISOPOTENTIAL MAP AND EPICARDIAL ISOCHRON-MAP. (Japan)	259

Y. Yamashita, T. Takahashi: ON THE PROPERTIES OF THE INVERSE SOLUTION IN ECG: DETERMINING EPICARDIAL FROM BODY-SURFACE POTENTIALS BY USING THE FINITE ELEMENT METHOD. (Japan)	264
C. Zywiets: PROCEDURES AND RECOMMENDATIONS FOR COMPUTERIZED ECG ANALYSIS. (FRG)	269
ABSTRACTS	
J. C. Helder, P. H. Schram, H. Verweij, E. O. Robles de Medina, F. L. Meijler: INTEGRATED PROCESSING OF ELECTROCARDIOGRAMS IN A HOSPITAL INFORMATION SYSTEM. (The Netherlands)	274
P. Rubel, N. Saccal, J. L. Sourrouille, P. Arnaud, M. C. Forlini: MULTIDIMENSIONAL TECHNIQUES FOR THE OPTIMAL DISPLAY OF TRENDS IN SEQUENTIAL VCG's. (France)	274
H. Tsuruta, N. Ikeda, T. Sato: AN OPTIMAL LEAD SYSTEM FOR BODY SURFACE MAPPING. (Japan)	274
Session 7: MEDICAL-SOCIAL-LEGAL-ETHICAL ISSUES, PRIVACY, SECURITY, RELIABILITY	275
A. Westin: (Chairman's Paper) PRIVACY AND HEALTH DATA SYSTEMS: EXPERIENCES OF 1960-1980 AND PROJECTIONS FOR THE 1980's (USA)	276
R. Burkhardt: MEDICAL ETHICS IN CONTROLLED CLINICAL TRIALS. (FRG)	284
U. Gerdin Jelger, A. C. Boden, I. Holmback, U. B. Johansson: A TRADE UNION EDP POLICY. (Sweden)	288
R. Greiller, K. Uberla: DATA SECURITY AND DATA SAFETY IN DISTRIBUTED SYSTEMS EXEMPLIFIED BY THE MEDICAL DATA PROCESSING SYSTEM MUNICH. (FRG)	292
M. J. Kochanski: PUBLIC-KEY ENCRYPTION - AN ELECTRONIC HIPPOCRATES? (UK)	299
J. M. L. Kouwenberg, A. R. Bakker: DATA PROTECTION IN AN INTEGRATED HOSPITAL INFORMATION SYSTEM: A CASE STUDY. (The Netherlands)	303
T. Tsubo: SAFETY AND SECURITY OF MEDICAL INFORMATION SYSTEM. (Japan)	308
J. Werner, R. Graener: HIGHER RELIABILITY OF MEDICAL DATA PROCESSING BY USE OF DISTRIBUTED AND REDUNDANT MICROPROCESSOR SYSTEMS. (FRG)	311
B. Ziegler-Jung: DATA PROTECTION IN MEDICAL RESEARCH. (FRG)	316
Session 8: MEDICAL, PARAMEDICAL, USER OR PATIENT EDUCATION	319
J. Anderson: (Chairman's Paper) THE CHALLENGE OF COMPUTER AIDED AND MANAGED LEARNING IN THE 1980s. (UK)	320
T. Akazome, M. Fukushima, K. Nagasawa, H. Nagoshi, Y. Takai, Y. Tatsuzawa, Y. Tomaru: PREPARATION OF CAI COURSEWARE FOR STUDYING ECGs. (Japan)	323
J. Elfstrom, J. Gillquist, H. Holmgren, S. Hagglund, O. Rosin, O. Wigertz: A CUSTOMIZED PROGRAMMING ENVIRONMENT FOR PATIENT MANAGEMENT SIMULATIONS. (Sweden)	328

A. Hasman, H. v. d. Woord: TRAINING IN MEDICAL INFORMATICS USING A DATABASE WITH PATIENTS HAVING CONGENITAL HEART DISEASE. (The Netherlands)	333
N. Ikeda, J. Yamagami, A. Takeuchi, H. Tsuruta, H. Miyahara, T. Sato: COMPUTER-ASSISTED SYSTEM FOR ANTIMICROBIAL THERAPY. (Japan)	338
K. Ishikawa, M. Fukushima, M. Fukunami, M. Naito, H. Inada, M. Inoue, H. Abe: COMPUTER ASSISTED EDUCATION SYSTEM FOR ARRHYTHMIA (CAESAR). (Japan)	342
T. S. Murray, W. R. Dunn, R. W. Cupples, J. H. Barber, D. B. Scott: THE POTENTIAL OF COMPUTER ASSISTED LEARNING IN MEDICAL EDUCATION. (Scotland)	346
O. Rienhoff: FROM MEDICINE TO BIOSCIENCE, A MODIFIED CONCEPT FOR THE EDUCATION OF DOCUMENTATION CLERKS. (FRG)	349
J. H. van Bommel: THE SYSTEM BEHIND MEDICAL COMPUTER APPLICATIONS. GUIDING PRINCIPLES FOR COURSES AND TRAINING. (The Netherlands)	353
J. Zimmerman, J. Achtenberg, D. Sherertz: EDUCATION IN MEDICAL COMPUTING - THE MUMPS USERS' GROUP EXAMPLE. (USA)	358

ABSTRACTS

K. Erat, S. McGrath: A COMPUTER EDUCATION EXPERIENCE FOR NURSES IN LEADERSHIP ROLES. (USA)	362
K. Shindo, T. Yasaka: A COMPUTER-AIDED MEDICAL EDUCATION FOR BASIC AND CLINICAL STUDIES OF THE COLON AND RECTAL CARCINOMA. (Japan)	362

Session 9: BIOMEDICAL RESEARCH, BIOMATHEMATICS, SIGNAL ANALYSIS 363

K. Aihara, T. Utsunomiya: A MACROSCOPIC ANALYSIS ON LARGE SCALE NETWORKS OF NEURONLIKE ELEMENTS WITH REFRACTORY. (Japan)	364
S. Akiyama, K. Sekiya, M. Takahashi, Y. Saito: NOISE SUPPRESSION METHODS IN INTERFACE CIRCUITS FOR ON-LINE DATA ACQUISITION OF BIOLOGICAL DATA. (Japan)	369
R. Gemperlein: FOURIER INTERFEROMETRIC STIMULATION (FIS). A NEW METHOD FOR THE ANALYSIS OF SPECTRAL PROCESSING IN VISUAL SYSTEMS. (FRG)	372
M. Hudec: SOME METHODOICAL REMARKS TO THE ANALYSIS OF CENSORED SURVIVAL DATA. (Austria)	377
K. Ikeda, S. Kato, A. Watanabe, M. Saito: MICROPROCESSOR APPLICATION FOR SLEEP MONITORING AND CONTROL. (Japan)	381
B. H. Jansen, A. Hasman, R. Lenten, R. Pikaar: AUTOMATIC SLEEP STAGING BY MEANS OF PROFILES. (The Netherlands)	385
H. Miyake, I. Fujimasa, K. Imachi, N. Takido, M. Nakajima, N. Iwai, A. Kouno, T. Ono, K. Atsumi: ARTIFICIAL HEART ANIMAL PATHOPHYSIOLOGICAL STATUS EVALUATION BY MULTIVARIATE ANALYSIS ON BLOOD CHEMICAL DATA. (Japan)	390
K. Sakurai, K. Nakazawa, S. Kan, T. Matsubayashi: COMPUTER ANALYSIS OF CT IMAGES OF THE BRAIN. (Japan)	395

ABSTRACTS

- M-P. Franchi-Zannettacci:** ENUMERATION OF WORDS IN THE ANALYSIS OF PROTEIN STRUCTURE. (France) 400
- C. Gaudeau, D. Dzeidzina, C. Longevialle, P. Morand, J. Thouvenot:** EVALUATION OF BIOMECHANIC MYOCARDIAL PROPERTIES FROM AUTOMATIC ANALYSIS OF CINEANGIOCARDIOGRAPHY. (France) 400
- A. Mallet, R. Gardette, J. P. Nakache, J. L. Steimer, J. F. Boisvieux, J. C. Bisconte:** AUTOMATIC RECOGNITION AND QUANTITATIVE ANALYSIS OF CEREBELLUM DENSITOMETRIC PATTERNS. (France) 401
- I. Suzuki, J. Kariya, S. Kurashina, T. Kaminuma:** EXPERIENCE OF INTERACTIVE PATTERN ANALYSIS SYSTEM FOR MEDICAL APPLICATION. (Japan) 401

Session 10: MODELING 403

- N. T. J. Bailey: (Chairman's Paper)** MODELLING AND INFORMATICS IN HEALTH CARE MANAGEMENT. (WHO, Geneva) 404
- B. Dousset, J. Raybaud:** NON-LINEAR DISTRIBUTED MODEL OF CARDIOVASCULAR SYSTEM. (France) 409
- W. Duchting, G. Dehl:** SPATIAL TUMOR GROWTH: MODELING AND SIMULATION. (FRG) 414
- J. Estreicher, J-R. Scherrer:** A GENERAL NON-LINEAR COMPARTMENTAL MODEL CONVENIENT FOR FEED-BACK PROCESSES. (Switzerland) 419
- F. Kajiya, N. Hoki, M. Kagiya:** IDENTIFICATION OF RATE CONSTANTS AND OPTIMAL SAMPLING DESIGN IN COMPARTMENTAL ANALYSIS WHEN THE STRUCTURE IS GIVEN BEFOREHAND. (Japan) 423
- H. Kusuoka, S. Kodama, M. Hori, K. Tsujioka, H. Inada, M. Inoue, H. Abe, F. Kajiya:** OPTIMAL DRUG ADMINISTRATION BASED ON A CONTROL THEORY. (Japan) 427
- S. Takasugi, D. A. B. Lindberg, D. Goldman, E. C. DeLand:** INFORMATION CONTENT OF CLINICAL BLOOD CHEMISTRY DATA. (Japan) 432
- T. Tango, T. Tsukada:** COMPARISON OF SEVERAL MODELS FOR DETERMINING MEAN PLATELET SURVIVAL TIME USING ^{51}Cr -LABELED PLATELETS. (Japan) 437

ABSTRACTS

- T. Kagawa, M. Mochizuki:** EFFECT OF DIFFUSION HETEROGENEITY ON OXYGEN TENSION IN TISSUE. (Japan) 442
- C. Monot, J. Martin, J. Lacoste, A. Bertrand:** VENTILATION/PERFUSION PULMONARY MATHEMATICAL MODEL FOR INTERPRETATION OF A NEW TOPOGRAPHIC AND DYNAMIC STUDY OF ^{133}Xe FUNCTIONAL RESPIRATORY TEST. (France) 442
- A. A. Romanyukha:** MODELING AND ANALYSIS OF CLINICAL DATA FOR HEPATITIS. (USSR) 442
- S. M. Zuev:** STOCHASTIC MODEL FOR CLINICAL-LABORATORY DATA PROCESSING. (USSR) 442

Session 11: DATA BASE OR MEDICAL RECORD APPLICATIONS 443

- K. Sauter: (Chairman's Paper)** DATABASES IN MEDICAL INFORMATION SYSTEMS. (FRG) 444

S. Altemark, M. Jainz, S. Johansson, A. Persson, T. Risch, W. Schneider: A PORTABLE AND USER ORIENTED DATABASE MANAGEMENT SYSTEM AND ITS APPLICATIONS IN THE MEDICAL FIELD. (Sweden)	453
R. L. Blum: AUTOMATING THE STUDY OF CLINICAL HYPOTHESES ON A TIME-ORIENTED DATABASE: THE RX PROJECT. (USA)	456
A. Bongers, A. R. Bakker, A. Bastiaans, L. de Hoogh: DEACTIVATION AND REACTIVATION OF DATA IN A HIS. (The Netherlands)	461
T. Ishikawa, S. Nozaki, Y. Sato, T. Nishiyama: PRACTICAL MEDICAL RECORD SYSTEM AT HITACHI GENERAL HOSPITAL. (Japar)	465
J. Klonk, K. Sauter: STEPS TOWARDS A METHODOLOGY FOR DATA BASE DESIGN. (FRG)	470
F. J. Leven: TRENDS IN DATA BASE TECHNOLOGY AND THEIR IMPACT ON MEDICAL DATA BASE APPLICATIONS. (FRG)	475
J. Milan, R. E. Bentley: A CLINICAL DATA BASE FOR RESEARCH APPLICATIONS USING MUMPS. (UK)	480
Y. Satomura, K. Era, N. Otsuka, H. Ishii, K. Suzuki: MEDICAL RECORD MANAGEMENT AND DATA BASE SYSTEM OF CHIBA UNIVERSITY HOSPITAL. (Japan)	484
K. Suzuki, T. Saito: EDUCATION AND RESEARCH ORIENTED MEDICAL DATABASE SYSTEM USING CASES SUMMARY FORMS. (Japan)	488
ABSTRACTS	
Y. Hirota, N. Ooishi, K. Ueda, T. Omae: HIH (HISAYAMA INFORMATION OF HEALTH) - A DATA BASE FOR LONG-TERM FOLLOW-UP STUDY. (Japan)	493
K. Yamamoto: MEDICAL RECORD MANAGEMENT SYSTEM USING STANDARD MUMPS. (Japan)	493
Session 12: MINI OR MICRO COMPUTER APPLICATIONS	495
J. C. Hirel: (Chairman's Paper) TRENDS IN MICROCOMPUTERS FOR THE NEXT DECADE. (France)	496
B. Auvert, P. LeBeux, J. L. Monier, J. F. Boisvieux: AN INTEGRATED RHEOLOGICAL MEASURING SYSTEM CONTROLLED BY A MICRO-COMPUTER. (France)	500
A. R. Bakker: SCOPE AND LIMITATIONS OF A MINI-BASED CENTRALIZED HOSPITAL INFORMATION SYSTEM. (The Netherlands)	505
M. Fukunami, M. Inoue, M. Hori, K. Tsujioka, T. Kubo, H. Inada, H. Abe: COMPUTERIZED SYSTEM FOR PRECORDIAL ECG MAPPING ANALYSIS AND ITS CLINICAL APPLICATION. (Japan)	510
M. Fukushima, K. Ishikawa, M. Naito, H. Inada, M. Inoue, H. Abe, S. Ishimoto, M. Okamoto, S. Hine, K. Omura: ARRHYTHMIA MONITORING SYSTEM WITH MULTI-MICRO-COMPUTERS. (Japan)	515
C. Moreau, J. Duchene, J-P. Derenne, P. LeBeux: A DUAL MICROPROCESSOR SYSTEM FOR REAL TIME ACQUISITION AND PROCESSING OF RESPIRATORY INVESTIGATION SIGNALS. (France)	520
Y. Ohgushi, H. Yamamoto, H. Yamabayashi, Y. Kaneko, H. Kodera: A PULMONARY FUNCTION ANALYSING SYSTEM. (Japan)	524

N. Ohya, J. Huang, T. Fukunaga: COMPUTER ANALYSIS OF THE MAXIMUM EXPIRATORY FLOW VOLUME CURVE. (Japan)	529
S. Stiller, H. Mann, F. Raab: MICROPROCESSOR BASED UNIVERSAL DIALYSIS CALCULATOR FOR INDIVIDUALIZATION OF ARTIFICIAL KIDNEY THERAPY. (FRG)	534
J. Terdiman, T. Canning, B. D'Ambrosio, A. Sandberg, R. Tuttle, J. Yanov: A MICRO/MINICOMPUTER BASED ORDER ENTRY SYSTEM FOR THE CLINICAL LABORATORY. (USA)	539

ABSTRACTS

G. Fleischli: BIOMEDICAL PROGRAM DESIGN FOR PERSONAL MICROCOMPUTERS. (USA)	544
K. Oikawa, T. Murai: LABORATORY SYSTEM CONTROLLED BY TWO MINICOMPUTERS. (Japan)	544
A. J. Payne: MICROPROCESSORS IN MEDICAL RECORD PROCESSING. (New Zealand)	544
J. Rothmeier: MINI COMPUTERS IN A LARGE MEDICAL CENTER: SERVING THE NEEDS OF PHYSICIANS, RESEARCHERS AND ADMINISTRATORS. (USA)	544

Session 13: CLINICAL LAB, PATHOLOGY, EEG 545

J. H. van Bommel: (Chairman's Paper) NEW FRONTIERS IN LABORATORY AUTOMATION. (The Netherlands)	546
H. Bastien, L. Dusserre, F. Cayot, C. Mottot, R. Michiels, B. Viry, P. Cinquin: THE USE OF MINI-COMPUTER IN PATHOLOGY TO CREATE A REGIONAL DATA BASE. (France)	548
D. Bloch, B. Barnes, K. McClatchey, N. Hassan: THROUGHPUT REPORT: COMPUTER MANAGEMENT TOOL FOR CLINICAL LABORATORIES. (USA)	551
B. Bull, R. A. Korpman: PITFALLS AND PRIORITIES IN LABORATORY COMPUTER SYSTEM DESIGN. THE RATIONALE BEHIND THE TECHNICON LDM 8000. (USA)	556
L. Herez: EXPERIENCE WITH A MULTIHOSPITAL COMPUTERIZED INFORMATION SYSTEM FOR PATHOLOGY. (Canada)	561
I. Itoh, K. Motegi, N. Uchida, T. Ozaki, Y. Iizamanaka: TOKYO METROPOLITAN KOMAGOME HOSPITAL CLINICAL LABORATORY SYSTEM. (Japan)	566
T. Kanno, K. Sudo, I. Takeuchi, N. Nagaya, M. Akatsuchi: AUTOMATED MONITORING SYSTEM OF INDIVIDUAL LABORATORY DATA. (Japan)	571
D. Koberl, P. Rottger, W. Feigl: FREE TEXT ANALYSIS OF FINDINGS IN PATHOLOGY. (Austria)	576
M. Nakamura: A SYSTEMATIC APPROACH TO AUTOMATIC ANALYSES OF TRANSIENTS IN ELECTROENCEPHALOGRAPHY. (Japan)	581
S. Ninomiya, M. Matsubara, J. A. Wada: AUTOMATIC SPIKE DETECTION FROM HUMAN EEG RECORDED OVER. (Japan)	586
H. Peterson, A. Isaksson, B. Lindelow, O. Ramgren: REGIONAL CLINICAL LABORATORY SYSTEMS. (Sweden)	590

Session 14: HEALTH CARE PLANNING, UTILIZATION, EVALUATION	595
K. Atsumi: (Chairman's Paper) HEALTH CARE PLANNING UTILIZATION, EVALUATION, EMERGENCY SYSTEM. (Japan)	596
B. Barber, A. Cundy: EVALUATING EVALUATION - SOME THOUGHTS ON A DECADE OF EVALUATION IN THE N.H.S. (UK)	602
P. Degoulet, J. Menard, C. Devries, C. Berger, J. C. Hirel: COMPUTERIZED EVALUATION OF MEDICAL ACTIVITIES IN HYPERTENSION CARE. (France)	607
M. de Heaulme, C. Tainturier, Y. Grosogeat, F. Gremy: MEDICAL ACTIVITY ANALYSIS: INTEREST OF MEDICAL LANGUAGES LIKE REMEDE: EXPERIENCE ON 3000 REPORTS IN CARDIOLOGY. (France)	611
C. D. Flagle: INFORMATION REQUIREMENTS FOR EVALUATION AND PLANNING OF INNOVATIVE HEALTH SERVICES. (USA)	615
I. Fujimasa, K. Atsumi, M. Nobukuni: A MACRO-ECONOMETRIC MODEL FOR FORECASTING EXPENDITURE ON HEALTH—A SCENARIO OF HEALTH CARE SYSTEMS AND HEALTH CARE INFORMATION SYSTEM FORECAST IN 1985, 1995 AND 2005. (Japan)	620
H. Helm, O. Rienhoff: SYSTEMATIZATION OF SYSTEM SELECTION - A WORTH ANALYSIS MODEL FOR COMPUTERIZED MEDICAL REPORTING SYSTEMS: (FRG)	625
A. E. Rikli, M. S. Leonard, M. A. Thomas, C. R. Evans: END-STAGE RENAL DISEASE FORECASTING LIMITATIONS. (USA)	630
B. Sandblad, L. Gustafsson, I. Hesselius, A. Lycksell, W. Schneider: REGIONAL PLANNING OF ONCOLOGICAL CARE, BASED ON SIMULATION OF CARE PROGRAMS. (Sweden)	635
Y. Sekita, S. Fujisaku: COST-BENEFIT EVALUATION OF MEDICAL CARE SERVICES IN A HOSPITAL. (Japan)	641
I. Widegren, S. Lof: THE DESIGN AND EXPERIENCES OF MEDLOG—A SYSTEM FOR MEDICAL CARE PLANNING. (Sweden)	646
ABSTRACTS	
P. C. J. de Koning: A NUMERICAL DATA BASE FOR REGIONAL STRATEGIC PLANNING FOR HOSPITALS: IDENTIFICATION OF COMPLICATIONS. (The Netherlands)	652
J. F. Murphy, J. L. Finney, H-M. Yian, H. C. Comstock: PATIENT EXAM COST EFFECTIVENESS USING PLEASANT HOUR EQUIVALENTS. (USA)	652
Session 15: ADMINISTRATIVE OR FINANCIAL SYSTEMS	653
S. Huesing: (Chairman's Paper) DISEASE COSTING - A FINANCIAL MANAGEMENT DIRECTION FOR THE FUTURE. (Canada)	654
F. Agbalajobi: THE UNSTRUCTURED APPROACH TO MEDICAL COMPUTING IN NIGERIA. (Nigeria)	656
H. Bastien, L. Dusserre, N. Le Rumeur, M. Bordes: PROCEDURE FOR EVALUATION OF MEDICAL CARE IN INTRAEPITHELIAL CARCINOMA OF UTERINE CERVIX IN AN ADMINISTRATIVE UNIT OF FRANCE. (France)	660
K. A. Duncan: THE TREND TOWARD A NATIONAL HEALTH INFORMATION SYSTEM IN THE UNITED STATES. (USA)	663

W. J. Hofdijk: TOREN, AN ONLINE FINANCIAL AND STATISTICAL OUTPUT REGISTRATION AND INVOICING SUBSYSTEM EMBEDDED IN A HIS. (The Netherlands)	669
Y. Kanaoka: THE MEDICAL CLERICAL OPERATION SYSTEM OF NATIONAL UNIVERSITY HOSPITALS AND ITS DATA BASE. (Japan)	673
K. E. Kendall, S. M. Lee: BLOOD REDISTRIBUTION: A GOAL PROGRAMMING APPROACH. (USA)	678
H. Kuma, K. Morishita, N. Ehara: HOSPITAL ACCOUNTING SYSTEM "HIMEC-10" USING A DISTRIBUTED MICRO-COMPUTER TECHNOLOGY. (Japan)	683
Y. Mizuno, O. Masaki, S. Kawabata: UTILITY OF MUMPS LANGUAGE IN COMPUTERIZATION UNDER THE WHOLE NATIONAL HEALTH INSURANCE SYSTEM IN JAPAN. (Japan)	688
J. Takatani, S. Nakagawa, Y. Ikeda, H. Sunagawa, S. Fujita: MEDICAL RECORD STORAGE SYSTEM. (Japan)	691

ABSTRACTS

R. Boorla: DESIGN CONSIDERATIONS FOR RESERVATIONS MODULE OF A HOSPITAL INFORMATION SYSTEM. (USA)	693
N. Tomita: MEDICINE CONTROL SYSTEM UTILIZING THE CLAIMING SPECIFICATIONS FOR MEDICAL FEE AND ITS TREND SURVEY. (Japan)	693

Session 16: SOFTWARE 695

M. Saito: (Chairman's Paper) MEDICAL SOFTWARE - WHAT IS THE REAL NECESSITY? (Japan)	696
A. Caltoun, E. Genberg, K. Thomas: SOFTWARE ARCHITECTURE, KEY TO FLEXIBILITY IN BURROUGHS HOSPITAL INFORMATION SYSTEM (BHIS). (USA)	698
A. Fujie, N. Katoh, T. Nagai, K. Ueda, T. Ohta: EX. LIMD—AN EXTENDED LANGUAGE INTERFACE FOR DISTRIBUTED MUMPS DATABASES. (Japan)	703
J. C. Helder, H. Verweij: SEMI-AUTOMATIC ENCODING AND REPORT GENERATING OF MEDICAL INFORMATION. (The Netherlands)	708
H. Kitagawa, T. L. Kunii, M. Harada, S. Kaihara, N. Ohbo: A LANGUAGE FOR OFFICE FORM PROCESSING (OFP) - WITH APPLICATION TO MEDICAL FORMS. (Japan)	713
H. P. Meinzer: COMMAND LANGUAGES IN APPLICATION PROGRAMMING. (FRG)	719
H. Mori, H. Akabane: PICTURE INTERPRETATION LANGUAGE PIL-1 APPLIED TO A GASTRIC IMAGE MEASURING SYSTEM. (Japan)	723
M. Okada, M. Okada: THE DECENTRALIZED SOFTWARE ORGANIZATION IN THE MEDICAL INFORMATION SYSTEM. A NEW MICROCOMPUTER SOFTWARE FOR THE CLINICAL STAFFS. (Japan)	728
W. Schneider, J. Dudeck, W. Sager, J. Kinnling, R. Dittrich, P. Wendt: KLAUKON - A MICROPROCESSOR-BASED DATA AND FREE TEXT ACQUISITION SYSTEM WITH AUTOMATIC CONTROL IN THE CLINICAL ENVIRONMENT. (FRG)	733
A. M. Tjoa, R. R. Wagner: SOME CONSIDERATIONS ON THE RELEVANCE OF RELATIONAL DATA-MANIPULATION-LANGUAGES FOR MEDICAL RESEARCH. (Austria)	738

Session 17: DIAGNOSIS 749

- T. Furukawa, H. Tanaka, K. Yajima: (Chairman's paper) THEORY IN COMPUTER-AIDED DIAGNOSIS: INTRODUCTORY REMARKS. (Japan) 750
- A. Angel, S. Gal, J. Raviv: OPTIMAL PROCEDURES FOR SEQUENTIAL DISCRIMINATION BETWEEN TWO CLASSES. (Israel) 754
- R. Boom, R. Maass, G. Manrique, P. Morales, F. Montano, O. Ortiz: IMPROVEMENT OF INTERNISTS' DIAGNOSTIC PERFORMANCES BY SYSTEMATIC COMPUTER EVALUATIONS. (Mexico) 760
- M. Fieschi, M. Joubert, D. Fieschi, M. Roux: MEDICAL DIAGNOSTIC AID: APPLICATION OF THE METHOD OF REFUTATION OF DAVIS AND PUTNAM. (France) 764
- S. Fukushima, T. Soma, K. Hayashi, Y. Akasaka: APPROACHES TO COMPUTERIZED DIAGNOSIS OF STOMACH RADIOGRAMS. (Japan) 769
- Y. Kitazawa, S. Shirato, F. Mizoguchi: EVALUATION OF THE G4-EXPERT GLAUCOMA CONSULTATION SYSTEM. (Japan) 774
- B. Richards, C. Jeffery: THE COMPUTER DIAGNOSIS OF CONGENITAL MALFORMATIONS. (UK) 779
- R. Sambuc, E. Sanchez, J. Gouvenet, J. L. San Marco: Φ FUZZY FUNCTIONS. APPLICATION TO MEDICAL DIAGNOSIS. (France) 784
- J. L. Talmon, R. D. Ryneke, E. S. Gelsema, C. A. Ascoop: IMPROVEMENT OF THE DIAGNOSTIC VALUE OF THE EXERCISE ECG: AN OPTIMIZATION WITH THE AID OF AN INTERACTIVE SYSTEM FOR PATTERN ANALYSIS. (The Netherlands) 789
- S. M. Weiss, C. A. Kulikowski: DATA BASE ANALYSIS AIDS FOR DESIGNING CONSULTATION SYSTEMS. (USA) 794

ABSTRACTS

- L. Ciganek, F. Gliviak: COMPUTERIZED NEUROLOGIC TOPOGRAPHICAL DIAGNOSIS. (Czechoslovakia) 798
- J. Gouvenet, S. Ayme, E. Sanchez, J. F. Mattei, F. Giraud: DIAGNOSIS ASSISTANCE IN MEDICAL GENETICS BASED ON BELIEF FUNCTIONS AND A TREE STRUCTURED THESAURUS: A CONVERSATIONAL MODE REALIZATION. (France) 798
- M. Nishioka, J. Nawata, T. Takemoto, T. Fukuda: CLINICAL STAGING SCHEME FOR HEPATOCELLULAR CARCINOMA GIVEN BY A DISCRIMINANT ANALYSIS. (Japan) 798

Session 18: CLINICAL DECISION MAKING 799

- D. Salmon, F. Gremy: (Chairman's Paper) COMPUTER-AIDED DECISION RULES FOR PATERNITY DIAGNOSIS. (France) 800
- C. H. Clanton, B. J. Boyle: COMPUTERS AND MEDICAL REASONING. (USA) 805
- L. R. Gieszl: AN INTERACTIVE INTELLIGENCE SYSTEM FOR MEDICAL DECISION AIDS. (USA) 809

R. A. Greenes, B. J. McNeil: MODELING OF DIAGNOSTIC TEST ORDER DECISIONS: A COMPUTER TECHNIQUE FOR PROSPECTIVELY AIDING THE CLINICIAN. (USA)	815
T. Groth: PATHOPHYSIOLOGICAL MODELS AS INFORMATION PROCESSING ELEMENTS IN CLINICAL DECISION MAKING. (Sweden)	819
S. Kurashina, A. Ishida, S. Suzuki, T. Kaminuma: COMPARATIVE STUDY OF COMPUTER-AIDED CLINICAL DECISION MAKING SYSTEMS. (Japan)	825
H. Mishima, N. Katoh, T. Hattori, Y. Nomura, M. Nakamura: A FUZZY DECISION ANALYSIS FOR THE MANAGEMENT OF PANCREATIC CANCER. (Japan)	830
C. Peev Peev, S. Kaihara: DEALING WITH UNCERTAINTY IN MEDICAL DECISION-MAKING. (Japan)	835
R. Salamon, J. F. Dartigues, J. P. Castel: DETERMINATION OF AN OPTIMAL STRATEGY. EVALUATION OF THE UTILITY OF INTRA-CRANIAL PRESSURE MEASUREMENT OF ADULTS PRESENTING HYDROCEPHALUS. (France)	840
G. Soula, J. Gouvernet, A. Barre, J. L. San Marco: APPLICATION OF FUZZY RELATIONS TO MEDICAL DECISION MAKING. (France)	844

ABSTRACTS

K.-P. Adlassnig, G. Grabner: COMPUTER-ASSISTED DIAGNOSIS IN GASTROENTEROLOGY. (Austria)	849
M. Joubert, M. Fieschi, M. Roux: REPRESENTATION OF MEDICAL KNOWLEDGE BY SYMBOLIC LOGIC IN MEDICAL DECISION MAKING. (France)	849

Session 19: PHYSICIAN OFFICE MANAGEMENT, PRIMARY OR AMBULATORY CARE 852

C. Vallbona: (Chairman's Paper) COMPUTERIZED INFORMATION SYSTEMS FOR AMBULATORY CARE. (USA)	852
G. O. Barnett, N. Justice, P. D. Beaman: THE USE OF A COMPUTER-BASED MEDICAL INFORMATION SYSTEM (COSTAR) IN AMBULATORY PRACTICE AND QUALITY ASSURANCE. (USA)	857
R. Bostyn, J. L. Martin, J. C. Hirel: AMBULATORY MICROPROCESSOR SYSTEM FOR PHYSIOLOGICAL PARAMETERS ACQUISITION. (France)	859
J. E. Bowie, B. D. Kerlin: A MULTI-CLINIC IMPLEMENTATION OF COSTAR V. (USA)	862
K.-H. Ellsäßer, E. Hönicke, C. O. Köhler, K.-H. Offenhäuser, I. Vogt-Moykopf: INSTRUCTION CONCEPT IN THE SYSTEM KRAZTUR. (FRG)	867
L. A. Evans, C. Vallbona, C. Speck: AN AMBULATORY CARE SYSTEM FOR A NETWORK OF COMMUNITY HEALTH CENTERS. (USA)	871
R. H. Friedman, J. Horwitz, T. Concannon, J. G. Krikorian, J. A. Lopez: AN INFORMATION SYSTEM FOR CLINICAL RESEARCH: THE CANCER DATA MANAGEMENT SYSTEM (CDMS). (USA)	876
M. Naito, H. Inada, M. Fukushima, H. Takeda, Y. Ishida, M. Mishima, K. Ishikawa, M. Inoue, H. Abe: ISCHEM: INFORMATION SYSTEM FOR CORONARY HEART EVALUATION AND MANAGEMENT. (Japan)	881
B. Schwarz, P. L. Reichertz: COMPUTER IN DOCTOR'S OFFICE: SYSTEM DESIGN, PHYSICIAN'S MOTIVATION AND REACTION. (FRG)	886

G. R. Viviani, K. Ahmed: COMPUTERIZED CLINICAL INFORMATION SYSTEM FOR AMBULATORY CARE APPLIED TO ORTHOPAEDICS. (Canada)	891
ABSTRACTS	
F. Agbalajobi, A. Elithorn, K. Wolfenden: AN INTERACTIVE MONITOR FOR THE ASSESSMENT OF PSYCHOLOGICAL CHANGE. (Nigeria)	895
J. P. Schaaps, J. Sabatier, J. C. Hendrick: CLINICAL USE OF AN INTERACTIVE SYSTEM IN PREGNANCY SURVEY. (Belgium)	895
M. Tamura, M. Shinbori, H. Atsumi, M. Hase, T. Yasaka: EXPERIENCES IN THE USE OF A METABOLIC DISEASE INFORMATION SYSTEM. (Japan)	895
 Session 20: PHARMACY, DRUG INFORMATION SYSTEMS	 897
H. Ducrot: (Chairman's Paper) THE USE BY CLINICIANS OF DRUG DATA SYSTEMS.	898
A. J. M. M. Beijssens, H. Abcouwer-McCarron: DRUG-DRUG INTERACTIONS CONTROL IN THE TILBURG HOSPITALS. (The Netherlands)	901
L. Benamghar, C. Monot, A. Larcen, J. Martin: INTERACTIVE SYSTEM TO IDENTIFY SOLID MEDICINES BY THEIR EXTERNAL CHARACTERISTICS. (France)	902
R. Hama, N. Hashimoto, Y. Okamoto, K. Mori, M. Kuroda, K. Katsumura, I. Mochizuki, Y. Kimura: ADVERSE DRUG REACTION MONITORING SYSTEM USING THE AMBULATORY DISEASE REGISTRATION SYSTEM. (Japan)	905
S. G. Johansson, P. Manell: DATABASE TECHNOLOGY IMPACT ON A DRUG INFORMATION SYSTEM. (Sweden)	910
J-P. Marmorat, J-P. Rigault, J-P. Cano: A MINICOMPUTER SYSTEM FOR CLINICAL PHARMACOKINETICS. (France)	913
M. E. Roach, K. O. Rosenkranz: VIEWDATA - A NEW MEDIUM FOR DRUG INFORMATION. (UK)	917
R. D. Trusty, J. T. Nazzaro: A TRI-SERVICE REGIONALIZED PHARMACY INFORMATION SYSTEM TEST AND EXPERIENCE. (USA)	921
S. Ura, T. Aoki, T. Ogawa, A. Kawaguchi, S. Kondow: ADVANCED PATIENT ORIENTED PHARMACY SYSTEM (APO-S). (Japan)	924
J. Yokoyama, A. Fukuda: PRESCRIPTION ORDER SERVICE IN KANTO TEISHIN HOSPITAL INFORMATION SYSTEM. (Japan)	929
ABSTRACTS	
M. Andrew: DRUG CONSUMPTION STATISTICS IN NORWEGIAN HOSPITALS-METHODOLOGY AND APPLICATIONS. (Norway)	934
A. M. Weissman: PHARMACY COMPUTERIZATION IN A TOTAL HOSPITAL INFORMATION SYSTEM. (USA)	934
 Session 21: PREVENTIVE, OCCUPATIONAL, ENVIRONMENTAL CARE	 935
H. R. Beukers: AN AUTOMATED SYSTEM FOR ACTIVITIES IN OCCUPATIONAL MEDICINE. (The Netherlands)	936