

# CONTENTS

<i>Chapter</i>		<i>Page</i>
1.	SUMMARY AND ANALYSIS . . . . .	3
	Introduction . . . . .	3
	Organization of the Report . . . . .	4
	Conclusions. . . . .	4
	Implications. . . . .	6
2.	COMPUTER TECHNOLOGY IN EDUCATION AND ASSESSMENT. . . . .	13
	The Technology. . . . .	13
	Description . . . . .	13
	Trends. . . . .	18
	Computer-Based Education . . . . .	20
	Methods. . . . .	20
	Strategies. . . . .	21
	Funding . . . . .	23
	Limitations and Capabilities. . . . .	24
3.	MEDICAL EDUCATION AND ASSESSMENT . . . . .	29
	Introduction . . . . .	29
	Undergraduate Medical Education. . . . .	30
	Admissions . . . . .	30
	Curriculum . . . . .	32
	Assessment of Student Performance. . . . .	33
	Graduate Medical Education . . . . .	34
	Licensure and Specialty Certification. . . . .	35
	Licensure . . . . .	35
	Specialty Certification . . . . .	37
	Emerging Developments. . . . .	38
	Clinical Practice. . . . .	39
4.	COMPUTER APPLICATIONS IN MEDICAL EDUCATION AND ASSESSMENT. . . . .	47
	Introduction . . . . .	47
	Computer-Supported Independent Study Program in the Basic Medical Sciences . . . . .	48
	The Use of Computer-Based Simulations in Education and Assessment . . . . .	55
	Introduction. . . . .	55
	Pediatric Fellowship Examination of the Royal College of Physicians and Surgeons of Canada . . . . .	57
	The Computer-Based Examination (CBX) Project of the American Board of Internal Medicine and the National Board of Medical Examiners . . . . .	60
	A Model for Evaluation and Recertification Through Individualized Testing (MERIT) of the American Board of Internal Medicine. . . . .	60
	Computer-Based Medical Consultation Systems . . . . .	63
	Computer Uses in Quality Assurance Data Management Systems. . . . .	65
	Medicaid Management Information System. . . . .	65
	Professional Standards Review Organization . . . . .	65
	Computer-Stored Ambulatory Record System . . . . .	66
	Problem Oriented Medical Information System . . . . .	66
	Summary. . . . .	67

5.	DEVELOPMENT AND DISSEMINATION OF COMPUTER-BASED EDUCATION . . . . .	71
	Overview . . . . .	71
	Institutional Development and Use . . . . .	71
	The Ohio State University College of Medicine . . . . .	73
	The University of Illinois School of Basic Medical Sciences. . . . .	76
	Massachusetts General Hospital. . . . .	79
	Networks, Consortia, and Other Dissemination Mechanisms . . . . .	80
	The Health Education Network . . . . .	81
	The Computer-Assisted Teaching Systems Consortium . . . . .	84
	Milliken Communications Corporation , . . . . .	85
	APPENDIX I-EXAMPLES OF SIMULATIONS OF THE PATIENT-PHYSICIAN ENCOUNTER. . . . .	91
	REFERENCES . . . . .	125

LIST OF TABLES

<i>Table Number</i>		<i>Page</i>
1.	Computer-Based Education Course Development . . . . .	19
2.	A Sample Spread of Computer-Based Education Funding and Development Sources as of 1974 . . . . .	24
3.	Thirty-two Studies of Computerized Simulations and Testing . . . . .	25
4.	Number of Medical Schools, Graduates, and Physicians in Practice, Selected Years . . . . .	32
5.	Jurisdictions With Authority to Require Continuing Medical Education for Reregistration of the License to Practice Medicine . . . . .	38
6.	Implementation of Recertification by the Specialty Boards, . . . . .	39
7.	The Independent Study Program Curriculum Outline . . . . .	49(5)
8.	Sample Practice Profile to Select Appropriate CASEs. . . . .	62
9.	Institutions Producing Computer-Based Materials . . . . .	73
10.	Computer-Assisted Instruction Regional Education Network (CAIREN) Membership Profile. . . . .	74
11.	Accreditation of Computer-Based Continuing Education Courses by Professional Societies . . . . .	75
12.	The Ohio State University College of Medicine Computer-Based Education Programs Indexed by Audience . . . . .	75
13.	College of Medicine Computer-Based Education User Group Summary. . . . .	76
14.	Computer-Based Education Utilization Summary for the College of Medicine . . . . .	77
15.	Massachusetts General Hospital: Computer-Assisted Continuing Medical Education Program (1979) . . . . .	80
16.	Health Education Network . . . . .	83
17.	Continuing Education Seminars Currently Marketed by Milliken Communications Corporation . . . . .	86

LIST OF FIGURES

<i>Figure Number</i>		<i>Page</i>
1.	Sample Interactive Computer Configuration . . . . .	14
2.	Sample Interactive Computerized System in Which the Computer Simulates the Patient . . . . .	15
3.	Sample Interactive Computerized System in Which the Computer Acts as the Teacher/Tutor. . . . .	1b

4.	Schematic of a Tutorial Computer-Based Education Question . . . . .	22
5.	The Medical Education and Assessment Continuum . . . . .	31
6.	Years of Graduate Medical Education . . . . .	36
7.	Student Flow Through a Typical Module. . . . .	50
8.	Part of a Student-Computer Dialog . . . . .	51
9.	Sample Computer-Based Management System Reports . . . . .	52
10.	Item Statistics Report. . . . .	53
11.	Example of an INDEX Case Interaction Printout . . . . .	57
12.	Cumulative Number of Courses Involving CBE Versus the Year in Which They Were First Taught . . . . .	72
13.	Data Base and CBE System User Group Overview . . . . .	76
14.	CBE Usage Profile for the College of Medicine (1977). . . . .	77
15.	Average User Dollar Expenditures: Computer-Assisted Instruction Regional Education Network (CAIREN) . . . . .	78

# ACRONYMS

AAFP	- American Academy of Family Physicians	MCE	- Medical Care Evaluation (MCE)
ABIM	- American Board of Internal Medicine	MERIT	- Model for Evaluation and Recertification Through Individualized Testing
ABMS	- American Board of Medical Specialties	MGH	- Massachusetts General Hospital
ACEP	- American College of Emergency Physicians	MMIS	- Medicaid Management Information System
AMA	- American Medical Association	NBME	- National Board of Medical Examiners
CAI	- computer-assisted instruction	NRMP	- National Residency Matching Program
CAIREN	- Computer Assisted Instruction Regional Education Network	OSU	- Ohio State University
CASE	- Computer-Assisted Simulation of the Clinical Patient Encounter	OTA	- Office of Technology Assessment
CAT	- computer-assisted testing	PACE	- Physician Ambulatory Care Evaluation
CATS	- Computer-Assisted Teaching Systems Consortium	PAS	- Professional Activities Study
CBE	- computer-based education	PLATO	- Programed Logic Automated Teaching Operation
CMI	- computer-managed instruction	PMIS	- PSRO Management Information System
COSTAR	- Computer-Stored Ambulatory Record System	PMP	- patient management problem
CPMP	- Computerized Patient Management Problems	PSRO	- Professional Standards Review Organization
CPHA	- Commission on Professional and Hospital Activities	QAM	- quality assurance monitor
CQE	- Comprehensive Qualifying Exam	RAMS	- Retrospective Analysis of Medical Services (RAMS)
FLEX	- Federal Licensing Examination	SOPHIE	- Sophisticated Instructional Environment
GME	- graduate medical education	S/UR	- Surveillance and Utilization Review
HEN	- Health Education Network	TES	- tutorial evaluation studies
HEW	- Department of Health, Education, and Welfare	TICCIT	- Time-Shared Interactive Computer-Controlled Information Television
ISP	- independent study program	UNDDS	- Uniform Hospital Discharge Data Set
JCAH	- Joint Committee on Accreditation of Hospitals	UPRO	- Utah Professional Review Organization
MCAAT	- Medical College Admissions Test (MCAT)		
MCC	- Milliken Communications Corporation		