

CONTENTS

<i>Chapter</i>		<i>Page</i>
	GLOSSARY OF TERMS	xii
	GLOSSARY OF ACRONYMS	XIII
1.	INTRODUCTION AND SUMMARY	3
	Summary	4
	Case Studies: Issues Related to the Assessment of Efficacy and Safety..	5
	Techniques for Estimating Efficacy and Safety	5
	Current Assessment Programs	5
	Implications and Status of Efficacy and Safety Information	6
	Policy Alternatives.	7
	Section One: Congressional Alternatives	7
	Section Two: Identifying Technologies That Need Assessment.	8
	Section Three: Requiring, Stimulating, Conducting, or Funding Studies	8
	Section Four: Synthesizing Information	8
	Section Five: Disseminating Information	8
	Scope of the Report	8
	Organization of the Report.	9
2.	THE CONCEPTS OF EFFICACY AND SAFETY	13
	The Nature of Efficacy and Safety Knowledge	13
	Efficacy	13
	Safety	17
	Efficacy and Safety.	18
3.	EFFICACY AND SAFETY ASSESSMENT: HISTORY AND CASE STUDIES	23
	Evolution of Interest in Efficacy and Safety Estimation.	23
	Cases Illustrating Efficacy and Safety Issues	25
	Case 1: Pap Smear for Cervical Cancer.	26
	Case 2: Amniocentesis	29
	Case 3: Chicken Pox Vaccine	31
	Case 4: Mammography	33
	Case 5: Prophylactic Oral Antibiotics in Elective Colon Surgery.	36
	Case 6: Skull X-Ray	37
	Case 7: Electronic Fetal Monitoring	39
	Case 8: Surgery for Coronary Artery Disease.	42
	Case 9: Tonsillectomy	44
	Case 10: Appendectomy.	45
	Case 11: Hysterectomy.	47
	Case 12: Drug Treatment for Hypertension.	48
	Case 13: Drug Treatment for Otitis Media in Children	50
	Case 14: Cast Application for Forearm Fracture	51
	Case 15: Treatment of Hodgkin's Disease.	52

Contents—continued

<i>Chapter</i>	<i>Page</i>
Case 16: Chemotherapy for Lung Cancer	53
Case 17: Hyperbaric Oxygen Treatment for Cognitive Deficits in the Elderly.	55
4. ESTIMATING EFFICACY AND SAFETY	59
Preclinical	59
Informal	60
Epidemiological and Statistical.	61
Controlled Clinical Trials.	62
Formal Consensus Development	64
5. CURRENT ASSESSMENT ACTIVITIES	67
Federal Government Activities.	67
Food and Drug Administration.	67
Prescription Drugs: Statutory Authority.	67
Prescription Drugs: Regulation	68
Medical Devices: Statutory Authority	68
Medical Devices: Regulation.	69
National Institutes of Health.	70
Statutory Authority	71
Clinical Trial Support.	71
Consensus Development.	73
Alcohol, Drug Abuse, and Mental Health Administration	76
Health Services Administration	76
National Center for Health Services Research.	77
Office of Health Practice Assessment	78
Health Standards and Quality Bureau.	79
Other Federal Programs	80
Veterans Administration.	80
Department of Defense	80
Private Sector Activities.	81
6. STATUS AND IMPLICATIONS OF EFFICACY AND SAFETY ASSESSMENT	85
Uses and Users of Efficacy and Safety Data.	85
A System for Assessing Efficacy and Safety	87
Shortcomings of Current Systems and Programs	89
Identification	90
Testing	91
Synthesis	92
Dissemination	93
Status of Efficacy and Safety Information.	93
7. POLICY ALTERNATIVES	97
Section One: Congressional Alternatives	97
Section Two: Identifying Technologies That Need Assessment.	98
Section Three: Requiring, Stimulating, Conducting, or Funding Studies.	100
Section Four: Synthesizing Information	101

Contents—continued

<i>Chapter</i>	<i>Page</i>
Section Five: Disseminating Information	103
Using Information	103
Appendix A—DEVELOPMENT AND DIFFUSION OF MEDICAL TECHNOLOGIES	107
Appendix B—METHOD OF THE STUDY	111
BIBLIOGRAPHY,	117

LIST OF TABLES

<i>Table Number</i>	<i>Page</i>
1. Selected Definitions of "Efficacy"	14
2. National Institutes of Health 1975 Inventory of Clinical Trials (Amount of NIH Support for Clinical Trials Active in Fiscal Year 1975 by Institute and Type of Support).	72
3. National Institutes of Health 1975 Inventory of Clinical Trials (Number of Clinical Trials Supported by NIH in Fiscal Year 1975 by Institute and Type of Support)	72
4. National Institutes of Health 1975 Inventory of Clinical Trials (Number of and Amount of Support for NIH Supported Clinical Trials Active in Fiscal Year 1975 by Institute and Type of Intervention). , ,	73
5. Consensus Development Conferences	75
6. Alcohol, Drug Abuse, and Mental Health Administration 1975 Inventory of Treatment Assessment Research (Number of and Amount of Support for ADAMHA Supported Treatment Assessment Research Projects Ac- tive in Fiscal Year 1975 by Institute and Type of Intervention)	77
7. Alcohol, Drug Abuse, and Mental Health Administration 1975 Inventory of Treatment Assessment Research (Amount of ADAMHA Support for Treatment Assessment Research Projects Active in Fiscal Year 1975 by In- stitute and Type of Support).	77
8. Users of Efficacy and Safety Information	86
9. Possible Sites for Carrying Out Four Key Tasks in Efficacy and Safety Assessment.	99

LIST OF FIGURES

<i>Figure Number</i>	<i>Page</i>
1. The Process of Developing and Disseminating Information on Efficacy and Safety	88
2. Simplified Process for Developing and Disseminating Efficacy and Safety Information	89

GLOSSARY OF TERMS

Controlled clinical trial—An experimental research method by which human or animal subjects are assigned, in accordance with predetermined rules, either to an *experimental* group in which subjects receive technology or dosage levels of uncertain efficacy or safety or to a *control* group in which subjects receive some other technology or dosage level, usually the standard one or a placebo. If the predetermined rules specify that the subjects are assigned to groups randomly, the result is a *randomized controlled clinical trial*. The vast majority of randomized clinical trials are also controlled trials.

Device—Any physical item, excluding drugs, used in medical care (including instruments, apparatus, machines, implants, and reagents).

Drug—Any chemical or biological substance that may be applied to, ingested by, or injected into humans in order to prevent, treat, or diagnose disease or other medical conditions.

Effectiveness—Same as efficacy (see below) except that it refers to “. . . average conditions of use.”

Efficacy—The probability of benefit to individuals in a defined population from a medical technology applied for a given medical problem under ideal conditions of use.

Epidemiology—The study of the frequency, distribution, and determinants of diseases and disabilities in human populations and the impact of interventions on them.

Medical technology—The drugs, devices, and medical and surgical procedures used in medical care, and the organizational and supportive systems within which such care is provided.

Morbidity—Illness, injury, impairment, or disability in an individual.

Mortality—The death of an individual; often used in epidemiological studies where mortality rates for a population for a certain disease or injury are calculated.

Placebo—An inactive substance or procedure that is often used in controlled clinical trials to evaluate efficacy. It is also used in medical practice to satisfy a symbolic need for therapy.

Procedure—A medical technology involving any combination of drugs, devices, and provider skills and abilities. Appendectomy, for example, may involve at least drugs (for anesthesia), monitoring devices, surgical devices, and physicians', nurses', and support staffs' skilled actions.

Reliability—The extent to which an experiment, test, or measurement yields the same results on repeated trials.

Risk—A measure of the probability of an adverse or untoward outcome occurring and the severity of the resultant harm to health of individuals in a defined population associated with use of a medical technology applied for a given medical problem under specified conditions of use.

Safety—A judgment of the acceptability of relative *risk* in a specified situation.

Validity—The extent to which the measures used to assess efficacy and safety accurately reflect the performance of the technology under study.

GLOSSARY OF ACRONYMS

AAMI	—Association for the Advancement of Medical Instrumentation	NCHS	—National Center for Health Statistics
ACS	—American Cancer Society	NCHSR	—National Center for Health Services Research
ADAMHA	—Alcohol, Drug Abuse, and Mental Health Administration	NCI	—National Cancer Institute
ANSI	—American National Standards Institute	NDA	—New Drug Application
ASTM	—American Society for Testing and Materials	NEI	—National Eye Institute
BCDDP	—Breast Cancer Detection Demonstration Project	NHLBI	—National Heart, Lung, and Blood Institute
CDC	—Center for Disease Control	NIAAA	—National Institute on Alcohol Abuse and Alcoholism
CON	—Certificate of Need	NIAID	—National Institute of Allergy and Infectious Disease
CT	—Computed Tomography, or Computerized Axial Tomography	NIAMDD	—National Institute of Arthritis, Metabolism, and Digestive Diseases
DOD	—Department of Defense	NICHHD	—National Institute of Child Health and Human Development
ECMO	—Extracorporeal Membrane Oxygenator	NIDA	—National Institute on Drug Abuse
EFM	—Electronic Fetal Monitoring	NIDR	—National Institute of Dental Research
EKG	— Electrocardiogram	NIGMS	—National Institute of General Medical Sciences
ESRD	—End Stage Renal Disease	NIH	—National Institutes of Health
FDA	—Food and Drug Administration	NIMH	—National Institute of Mental Health
GMP	—Good Manufacturing Practice	NINCDS	—National Institute of Neurological and Communicative Disorders and Stroke
GNP	—Gross National Product	NSF	—National Science Foundation
HCFA	—Health Care Financing Administration	OHPA	—Office of Health Practice Assessment
HEW	—Department of Health, Education, and Welfare	OMB	—Office of Management and Budget
HIP	—Health Insurance Plan of Greater New York	OTA	—Office of Technology Assessment
HMO	—Health Maintenance Organization	PHS	—Public Health Service
HRA	—Health Resources Administration	PSRO	—Professional Standards Review Organization
HSA	—Health Services Administration	SSA	—Social Security Administration
HSQB	—Health Standards and Quality Bureau	TAR	—Treatment Assessment Research
IND	—Notice of Claimed Investigational Exemption for a New Drug	VA	—Veterans Administration
IPPB	—Intermittent Positive Pressure Breathing	VZ	—Varicella-Zoster
MRFIT	—Multiple Risk Factor Intervention Trial		
NASA	—National Aeronautics and Space Administration		