



THIRTEENTH EDITION

THE  
MERCK  
MANUAL

OF  
DIAGNOSIS AND THERAPY

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*Published by*

MERCK SHARP & DOHME RESEARCH LABORATORIES

*Division of*

MERCK & CO., INC.

Rahway, N.J.

1977

THIRTEENTH EDITION

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*Rahway, N.J.*  
*U.S.A.*

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*West Point, Pa.*

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Library of Congress Catalog Card Number 1-31760

ISBN Number 911910-02-6

ISSN Number 0076-6526

First Printing—September 1977

Second Printing—December 1977

Third Printing—February 1978

Fourth Printing—August 1978

Fifth Printing—November 1979

Sixth Printing—April 1980

Seventh Printing—January 1981

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# THE MERCK MANUAL

THIRTEENTH EDITION



1st Edition - 1899  
2nd Edition - 1901  
3rd Edition - 1905  
4th Edition - 1911  
5th Edition - 1923  
6th Edition - 1934  
7th Edition - 1940  
8th Edition - 1950  
9th Edition - 1956  
10th Edition - 1961  
11th Edition - 1966  
12th Edition - 1972  
13th Edition - 1977

# FOREWORD

Under the wise direction of Charles E. Lyght, M.D., who was Editor from 1947 to 1966, THE MERCK MANUAL became established as one of the world's most widely used medical textbooks. The tradition, quality, and success of the book were upheld in the Twelfth Edition under the direction of David N. Holvey, M.D., who guided the initial processes of this edition until his untimely accidental death in 1973. The Thirteenth Edition is respectfully dedicated to Dr. Holvey.

MERCK'S MANUAL OF THE MATERIA MEDICA first appeared in 1899 as a slender 262-page text. It was expressly designed to meet the needs of general practitioners in selecting medications, noting that "memory is treacherous" and even the most thoroughly informed physician needs a reminder "to make him at once master of the situation and enable him to prescribe exactly what his judgment tells him is needed for the occasion." By the Sixth Edition (1934) the book was a 1379-page text widely used and known as THE MERCK MANUAL OF THERAPEUTICS AND MATERIA MEDICA. Since the Eighth Edition (1950), the title has been THE MERCK MANUAL OF DIAGNOSIS AND THERAPY. In order to keep pace with new knowledge and changing needs, much more than the name of the book has changed. However, its purpose remains the same—to provide useful information to practicing physicians.

Today, fewer physicians attempt to manage the whole range of medical disorders that can occur in infants, children, and adults, but those who do must have available a broad spectrum of current and accurate information. Further, the more specialized physician requires precise information about subjects outside his area of greatest expertise. All physicians need ever more information, and review of large areas of subject matter covered succinctly and completely is increasingly required. THE MERCK MANUAL continues to try to meet these needs, excluding mainly details of surgical procedures.

This edition of THE MERCK MANUAL follows the basic format of its immediate predecessor, but it has been almost completely rewritten and the content has been increased by more than 50%. While emphasis remains on diagnosis and treatment, the discussions of basic physiologic, pathologic, and other factors essential to rational diagnostic reasoning and effective therapy have been enriched. More discussions of symptoms and signs have been added, as have suggestions for approaching the problems that patients present to their doctors. Almost every section is larger (e.g., the Cardiovascular Disorders section has twice the content of the Twelfth Edition and the Pediatrics and Genetics section has been more than doubled). A new section has been added to reflect advances in Clinical Pharmacology, and some sections, such as Immunology and Allergic Disorders, have been totally redone and greatly expanded.

Owing to the extensive subject matter covered and a successful tradition, the style and organization of THE MERCK MANUAL differ somewhat from most other texts. Many readers are not fully aware of either the scope of the symptoms, disorders, tests, reference tables, etc. that are covered or their interrelationships. Therefore, to expedite and enhance consultation of the book, readers are urged to spend a few minutes reviewing the Guide for Readers (p. viii), the table of contents at the beginning of each section, and the index (p. 2081).

By definition, a "manual" is a small book—one that can be carried in the hand. By implication, it should be a book that one wishes to carry about and use frequently. Although managing the size of the Thirteenth Edition has been a challenge, the book is only a fraction of an inch taller, broader, and thicker than its predecessor. There are approximately 200 additional pages, but the type is slightly larger than in the last edition.

More important than the quantitative aspects of the book are those relating to quality. We have had contributions from more than 250 authors from the United States, Canada, England, and other countries, as well as guidance and review by an outstanding editorial board. Our debt of gratitude cannot be fully paid, but, for the first time, contributors have been identified and are listed in the front of the book. I wish also to express appreciation and pay special tribute to my Consulting Editor, John H. Talbott, M.D., to my Senior Manuscript Editor, Gloria R. Hamilton, and to my other manuscript editors—Mariam A. Cohen, Doris C. Ferguson, Ruth M. Heckler, Miriam P. Kepner, Frank E. Manson, and Barbara D. Markey—all of whom have worked hard and long with devotion and skill to create this book. Finally, our entire effort could not have succeeded without the experience, patience, and remarkable skills of my secretary, Catherine J. Humber, and the cooperation and proficiency of my format coordinator, Sandra K. Vitale.

We hope that this edition of *THE MERCK MANUAL* will be a welcome visitor to you, our readers—cordial to your needs and worthy of frequent return invitations. Discussions relating to the next edition have begun and suggestions for improvement or additions will be warmly welcomed and carefully considered.

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# GUIDE FOR READERS

- The **Contents** (p. vii) shows the pages where readers will find names of contributors, abbreviations and symbols, titles of sections (groupings of related chapters), and the index. **Thumb-tabs** with appropriate abbreviations and section numbers mark each section and the index.
- Each **Section**, designated by the symbol §, begins with its own table of contents, listing the chapters and subchapters in that section.
- **Chapters** are not numbered serially from the beginning to the end of the book; rather, each chapter is numbered according to its order in each section.
- The **Index** contains many cross-entries; page numbers in bold type signify major discussions of the topics. In addition, the text in THE MANUAL gives numerous cross-references to other sections and chapters.
- Each **Page Head** carries (1) the page number (page numbers run serially from the beginning to the end of the book); (2) if space permits, the titles of the relevant chapter and the last subchapter on that page; and (3) the section identification number (on left-hand pages) or chapter number (on right-hand pages).
- **Abbreviations and Symbols**, used liberally as essential space savers, are listed on pp. ix and x.
- The **Tables and Figures** found throughout the text are referenced appropriately in the index but are not listed in a table of contents.
- Commonly used **Clinical Procedures** and an extensive discussion of **Laboratory Medicine**, as well as **Ready Reference Guides**, are found in the section under the thumb-tab **REF**.
- **Drugs** are designated in the text by generic (nonproprietary) names. In the last chapter of the Clinical Pharmacology section, most of the drugs mentioned in the book are listed alphabetically with each generic term followed by one or more trademarks.
- The authors, reviewers, editors, and publisher of this book have made extensive efforts to ensure that treatments, drugs, and dosage regimens are accurate and conform to the standards accepted at the time of publication. However, constant changes in information resulting from continuing research and clinical experience, reasonable differences in opinions among authorities, unique aspects of individual clinical situations, and the possibility of human error in preparing such an extensive text require that the reader exercise individual judgment when making a clinical decision and, if necessary, consult and compare information from other sources. In particular, the reader is advised to check the product information included in each package of drug before prescribing or administering it, especially if the drug is unfamiliar or is used infrequently.

# ABBREVIATIONS AND SYMBOLS

<b>ACTH</b>	adrenocorticotrophic hormone	<b>ft</b>	foot; feet (measure)
<b>ADH</b>	antidiuretic hormone	<b>FUO</b>	fever of unknown origin
<b>ADP</b>	adenosine diphosphate	<b>GFR</b>	glomerular filtration rate
<b>ASO</b>	antistreptolysin O (titer)	<b>GI</b>	gastrointestinal
<b>ATP</b>	adenosine triphosphate	<b>Gm</b>	gram(s)
<b>BCG</b>	Bacillus Calmette-Guerin (vaccine)	<b>G6PD</b>	glucose-6-phosphate dehydrogenase
<b>b.i.d.</b>	2 times a day	<b>GU</b>	genitourinary
<b>BMR</b>	basal metabolic rate	<b>h</b>	hour(s)
<b>BP</b>	blood pressure	<b>HA</b>	hemagglutination, hemagglutinating
<b>BSA</b>	body surface area	<b>Hb</b>	hemoglobin
<b>BSP</b>	sulfobromophthalein	<b>HCl</b>	hydrochloric acid; hydrochloride
<b>BUN</b>	blood urea nitrogen	<b>HCO<sub>3</sub></b>	bicarbonate
<b>C</b>	centigrade	<b>Hct</b>	hematocrit
<b>CBC</b>	complete blood count	<b>Hg</b>	mercury
<b>CF</b>	complement fixation, fixating	<b>HI</b>	hemagglutination-inhibition, inhibiting
<b>Ch.</b>	chapter	<b>Hz</b>	hertz (cycles/second)
<b>Ci</b>	curie	<b>IgA, etc.</b>	immunoglobulin A, etc.
<b>Cl</b>	chloride, chlorine	<b>IM</b>	intramuscular(ly)
<b>cm</b>	centimeter(s)	<b>in.</b>	inch(es)
<b>CNS</b>	central nervous system	<b>IPPB</b>	inspiratory positive pressure breathing
<b>CO</b>	carbon monoxide	<b>IU</b>	international unit(s)
<b>CO<sub>2</sub></b>	carbon dioxide	<b>IUD</b>	intrauterine device
<b>CPK</b>	creatine phosphokinase	<b>IV</b>	intravenous(ly)
<b>CSF</b>	cerebrospinal fluid	<b>IVP</b>	intravenous pyelogram
<b>cu</b>	cubic	<b>kcal</b>	kilocalorie (food calorie)
<b>cu mm</b>	cubic millimeter(s)	<b>kg</b>	kilogram(s)
<b>CVA</b>	cerebrovascular accident	<b>17-KGS</b>	17-ketogenic steroids
<b>CVS</b>	cardiovascular system	<b>17-KS</b>	17-ketosteroids
<b>D &amp; C</b>	dilation and curettage	<b>L</b>	liter
<b>DDT</b>	chlorophenothane (dichlorodiphenyl-trichloroethane)	<b>lb</b>	pound(s)
<b>dL</b>	deciliter(s)	<b>LDH</b>	lactic dehydrogenase
<b>DNA</b>	deoxyribonucleic acid	<b>LE</b>	lupus erythematosus
<b>DTP</b>	diphtheria-tetanus-pertussis (toxoids/vaccine)	<b>m</b>	meter(s)
<b>D/W</b>	dextrose in water	<b>M</b>	molar
<b>ECG</b>	electrocardiogram	<b>mCi, mc</b>	millicurie(s)
<b>EEG</b>	electroencephalogram	<b>MCH</b>	mean corpuscular hemoglobin
<b>ENT</b>	ear, nose, and throat	<b>MCHC</b>	mean corpuscular hemoglobin concentration
<b>ESR</b>	erythrocyte sedimentation rate	<b>MCV</b>	mean corpuscular volume
<b>F</b>	Fahrenheit	<b>mEq</b>	milliequivalent(s)
<b>FDA</b>	U.S. Food and Drug Administration	<b>mg</b>	milligram(s)
<b>FEV</b>	forced expiratory volume	<b>Mg</b>	magnesium
<b>Fr</b>	French (catheter size)	<b>min</b>	minute(s)
		<b>mIU</b>	milli-international unit(s)



# x Abbreviations and Symbols

ml	milliliter(s)
MLD	minimum lethal dose
mm	millimeter(s)
mM	millimole(s)
mo	month(s)
mol wt	molecular weight
mOsm	milliosmole(s)
N	nitrogen; normal (strength of solution)
ng	nanogram (= millimicrogram)
nm	nanometer (= millimicron)
NPH	neutral protein Hagedorn (insulin)
17-OHCS	17-hydroxycorticosteroids
oz	ounce(s)
P <sub>CO<sub>2</sub></sub>	phosphorus, pressure carbon dioxide pressure (or tension)
P <sub>O<sub>2</sub></sub>	oxygen pressure (or tension)
Pa <sub>CO<sub>2</sub></sub>	arterial carbon dioxide pressure
Pa <sub>O<sub>2</sub></sub>	arterial oxygen pressure
PA <sub>O<sub>2</sub></sub>	alveolar oxygen pressure
PBI	protein-bound iodine
pg	picrogram (= micromicrogram)
pH	hydrogen-ion concentration
p o	orally
PPD	Purified Protein Derivative (tuberculin)
ppm	parts per million
p.r.n.	as needed
psi	pounds per square inch
PSP	phenolsulfonphthalein
pt	pint(s)
q	every
q 4 h, etc.	every 4 hours, etc.
q.i.d.	4 times a day
qt	quart(s)
R, r	roentgen(s)
RA	rheumatoid arthritis
RBC	red blood cell
RF	rheumatoid factor
RNA	ribonucleic acid

Sa <sub>O<sub>2</sub></sub>	arterial oxygen saturation
SBE	subacute bacterial endocarditis
s.c.	subcutaneously
SGOT	serum glutamic oxaloacetic transaminase
SGPT	serum glutamic pyruvic transaminase
SLE	systemic lupus erythematosus
sp gr	specific gravity
sq	square
sq m	square meter
STS	serologic test(s) for syphilis
TB	tuberculosis
tbbsp	tablespoon(s)
t.i.d.	3 times a day
tsp	teaspoon(s)
u.	unit(s)
URI	upper respiratory infection
USPHS	United States Public Health Service
WBC	white blood cell
wk	week(s)
wt	weight
yr	year(s)
μ	micro-, micron(s)
mμ	millimicron(s) (= nanometer)
μCi, μc	microcurie(s)
μg, mcg	microgram(s)
mμg	millimicrogram(s) (= nanogram)
μμg	micromicrogram(s) (= picogram)
μmol	micromole(s)
μOsm	micro-osmole(s)
/	per
<	less than
>	more than
≈	equal to or less than
≥	equal to or more than
≅	approximately equal
±	plus or minus
§	section

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