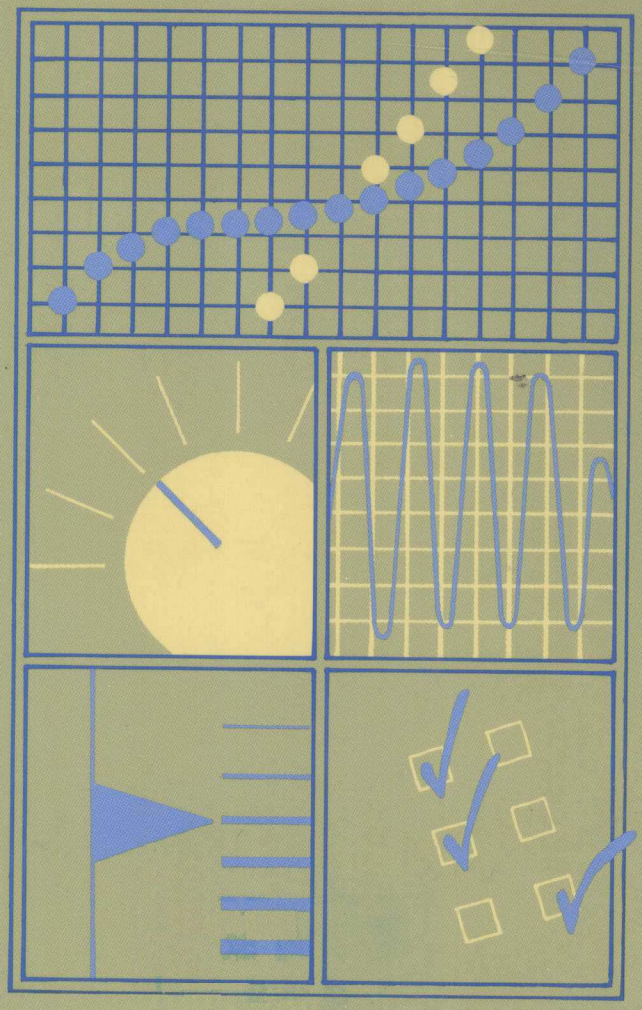
LABORATORY EXERCISES IN RESPIRATORY CARE



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J. B. LIPPINCOTT COMPANY
Philadelphia

London
Mexico City
New York
St. Louis
São Paulo
Sydney

Acquisitions Editor: Lisa A. Biello
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Compositor: Progressive Typographers
Printer/Binder: R. R. Donnelley & Sons Company

3 5 6 4

Library of Congress Cataloging-in-Publication Data

Grady, Daniel J.
Laboratory exercises in respiratory care.

Includes bibliographies.
1. Respiratory therapy—Laboratory manuals.
I. Title. (DNLM: 1. Respiratory Therapy—examination questions. 2. Respiratory Therapy—laboratory manuals. WF 25 G733L)
RC735.I5G73 1986 615.8'36 86-7398
ISBN 0-397-50767-4

PREFACE

Within the past three decades, respiratory care has emerged as a new health profession. As the profession evolved, numerous textbooks addressing respiratory care theory and equipment have been published. To date, very few introductory laboratory manuals have been available. *Laboratory Exercises in Respiratory Care* was written to introduce students to respiratory care procedures and equipment in the laboratory setting. Because laboratory courses frequently precede clinical application, it is hoped that this book may bridge the gap between introductory laboratory work and the clinical practice of respiratory care. The purpose of this book is to develop the cognitive and psychomotor skills of respiratory care students through laboratory practice.

Laboratory Exercises in Respiratory Care contains a number of unique features. The book has been designed specifically for students who may have had no previous exposure to respiratory care laboratory practices. Contained within the book are 48 different topics and more than 250 exercises. Each exercise is described in a detailed, step-by-step approach. The following elements are an integral part of each chapter: an introduction, behavioral objectives, requisite equipment, individual exercises, laboratory reports, recommended reading, and performance evaluation checklists. A concerted effort has been made to provide illustrations of critical performance elements and the technical apparatus needed to perform the exercises. The book also contains sections on laboratory safety and recommended laboratory techniques. In addition, the outline format moves the beginning student smoothly from the fundamental to the advanced procedures.

The individual exercises contained within each chapter were designed to be both flexible and clinically relevant. Many different brands of equipment may be used in completing the exercises. In several exercises, illustrations of "generic" equipment have been provided to allow fundamental component identification by the student. This design provides the instructor with the flexibility to select either available brands of equipment or the brands that the student is most likely to encounter in regional clinical settings.

Many of the exercises in *Laboratory Exercises in Respiratory Care* are clinically relevant because they involve the performance of respiratory care procedures, physiologic measurements, or the determination of "unknown" samples. As an example of an exercise requiring the determination of an "unknown," a student may be asked to analyze the oxygen concentration in a high flow system that had been previously set up and analyzed by the laboratory instructor. Exercises of this type provide both the student and the instructor with valuable feedback concerning the student's accuracy in laboratory practice. In addition, with creativity and careful planning, the laboratory instructor may develop an infinite number of exercises requiring individual determinations of an "unknown."

Because of the great variance in the clinical practice of respiratory care, it has been difficult to identify topics and procedural performance elements that are universally acceptable to most instructors. For these reasons, many of the topics relate to the competencies expected of entry-level respiratory care practitioners that have been identified by the National Board for Respiratory Care (NBRC). Since an actual patient care environment does not exist in the laboratory, only the performance elements relevant to the laboratory setting are emphasized.

Laboratory Exercises in Respiratory Care describes one way (not necessarily the only way) to perform procedures. Although I have tried to synthesize an enormous amount of technical information from widely dispersed sources, additional research is needed to establish firmly the scientific basis of respiratory care procedures.

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ACKNOWLEDGMENTS

LABORATORY EXERCISES IN RESPIRATORY CARE has been possible because of the dedication, commitment, and hard work of many people. The authors would like to express their sincere thanks to ***Mary S. Grady, R.R.T.****, for the original illustrations and excellent visual art;* ***Carolyn Mitchell*** *for manuscript preparation;* ***Carole Browning*** *for secretarial services;* ***Kathleen Butz*** *for graphic design and preparation;* ***Arletta Gardner, R.T.(R.)****, and* ***Barbara McCullough, R.N.****, for technical research;* ***John Winks, C.R.T.T.****, for manuscript review and advice;* ***Dr. Vaud Travis*** *for motivation and support;* ***Dr. F. Farrell Collins*** *for inspiration; the authors who have kindly granted permission for reproduction of their work; the entire professional staff at* ***J. B. Lippincott Company*** *for advice, assistance, and support;* ***Jack Grady*** *for book design; and finally to our families, friends, and colleagues who sacrificed much while this book was being written.*

INTRODUCTION

Laboratory Exercises in Respiratory Care has been written for the purpose of reinforcing respiratory care concepts and theory through laboratory practice. The exercises contained within this book are intended to supplement the material taught in didactic courses, and the book is not intended to be used exclusively as a textbook. For additional information on a specific topic, a recommended reading list is included at the end of each chapter.

The topics presented in the table of contents are not necessarily the sequence that may be selected by the laboratory instructor. I have noted, however, a consistently positive student response to laboratory work by beginning with the topics related to basic life support and cardiopulmonary resuscitation (CPR). As noted by the University of Hawaii Medical School faculty, an early introduction to CPR provides a practical foundation upon which to build concepts of cardiopulmonary anatomy, physiology, and pathology. In addition, students may recertify in CPR the following year and become eligible to meet the requirements for instructor certification.

The exercises in *Laboratory Exercises in Respiratory Care* should be set up before the scheduled laboratory session. Equipment function should be checked before demonstrations. Laboratory instructors may find it desirable to set up stations identified by letters ("A," "B," "C," and so forth) that correspond to individual exercises. In general, the laboratory functions best when supervised by an instructor.

Laboratory Safety

The following guidelines must be observed during all laboratory sessions.

GENERAL

1. Smoking, eating, and drinking are not allowed in the laboratory.
2. Instructor permission must be obtained before removing any equipment from the laboratory.
3. Instructor supervision is required if invasive procedures are practiced on classmates.
4. The administration of all medications and gases other than air or oxygen must be supervised by an instructor.
5. "No-smoking" signs must be posted during oxygen administration.

GAS CYLINDERS

1. Protective valve caps must be used whenever cylinders are transported or are not in use.
2. Gas cylinders must never violently strike another object.
3. Gas cylinders must be stabilized in a cart by a restraining chain or strap.
4. Small gas cylinders must be stabilized by a cart or stand.
5. Gas cylinder valves must never be opened or "cracked" while facing another person.
6. Equipment designed for a single gas type must not be modified or used for another gas type.
7. Oil and grease must never be allowed to come into contact with cylinder valve outlets or oxygen administration equipment.
8. The gas cylinder label should always match the color code. If the label does not match, do *not* use the cylinder.
9. Gas cylinders without a label should never be used.

Laboratory Techniques

PLANNING • NOTEBOOKS • REPORTS • INSTRUCTION • EVALUATION • EQUIPMENT

1. PLANNING

Efficient use of laboratory time is dependent upon adequate preparation by the student. Assigned topics should be reviewed before the scheduled laboratory session.

Students are highly encouraged to practice the performance of laboratory procedures. Extensive practice may be required in order to master invasive procedures.

2. LABORATORY NOTEBOOK

A loose-leaf notebook should be maintained. The laboratory notebook should contain all laboratory procedures, experiments, results, and reports.

3. LABORATORY REPORTS

Completed laboratory reports must be turned in no later than 1 week after the assigned topic. Late reports will be penalized. Incomplete laboratory reports are not acceptable.

4. METHOD OF INSTRUCTION

A lecture and demonstration of the assigned procedure will precede each laboratory session. After the lecture and demonstration, the student may complete the assigned procedure during the remaining time period or at any time that the laboratory is open. Available laboratory time will be posted.

5. METHODS OF EVALUATION

The student is evaluated by written reports and laboratory performance. Completion of individual procedure performance evaluations is required. The student should schedule an appointment or see the laboratory instructor for procedure performance evaluation.

6. EQUIPMENT CLEANING AND STORAGE

All equipment used by the student is to be completely disassembled, cleaned, and properly stored after use.

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