Principles and Practice of

INHALATION THERAPY

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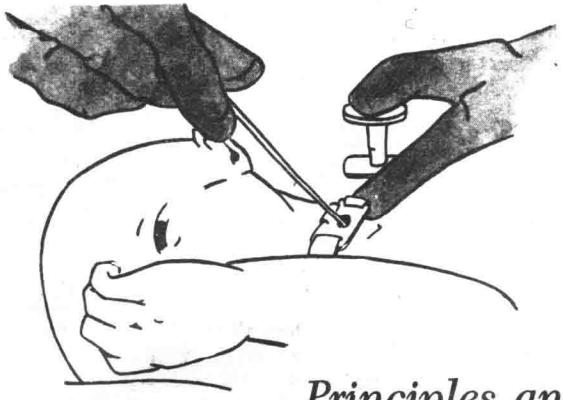

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INHALATION THERAPY

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Preface

As ONE OBSERVES the historical evolution of health care, certain patterns occur again and again. One of these, which is a direct result of forces such as the "medical and technological knowledge explosion" and the greatly increased demand for services, is the emergence of groups of specialty practitioners to bridge the gap between knowledge and delivery of care.

No area of specialty illustrates this evolutionary pattern better than "Inhalation Therapy." From the early days of administration of oxygen to the development of complex mechanical devices, the duration of years has been very short indeed. This development has been so rapid that the term "Inhalation Therapy" at present is probably a misnomer. Perhaps a more appropriate term to encompass what is done would be "Life Support Systems Specialist," with particular emphasis on internal and external environmental control.

The need to train large numbers of physicians and therapists to provide this care to infants, children, and adults has been painfully apparent. The authors have been engaged in formal training programs for "Inhalation Therapy" during the past 5 years. This book is an outgrowth of the course structure of these training programs. Accordingly, appreciation is expressed to the Harvard Teaching Hospitals and Northeastern University School of Inhalation Therapy for use of course materials.

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CHAPTER 1

Organization and Administration of Clinical Departments of Inhalation Therapy

WITH THE ADVANCES in engineering design that have evolved since 1950, major changes have taken place in the mechanical devices used in the treatment of respiratory diseases. Changes in medical, surgical, hospital administration and nursing care have occurred concurrently with the mechanical advances.

It has been clearly pointed out that the number of patients requiring respiratory care is increasing (Table 1). Patients who require respiratory care have one or more of the following defects: alveolar hypoventilation, abnormal ventilation-perfusion relationship, reduced gas transfer and hypoxia or acidosis from nonpulmonary causes. Since 1958, there has been

TABLE 1.—UNITED STATES NATIONAL HEALTH SURVEY—1962

NUMBER OF BEDRIDDEN DAYS*		REASONS FOR CONFINEMENT % OF PATIENTS	
Average male	6.9	Respiratory	49.0
Average female	8.7	Circulatory	13.2
Patients under		Digestive	8.6
5 years	5.8	Infectious and parasitic	8.1
5–14	7.8	Chronic impairments	7.5
15–24	6.3	Injuries	6.7
25–44	5.8	Genitourinary	5.3
45–64	8.8	Arthritis and rheumatism	5.1
over 65	16.7	All others	21.3

*Average person is sick in bed 7.8 days a year, and 50% of this confinement period is due to respiratory conditions.

a marked increase in the use of intermittent positive pressure breathing therapy.

Many hospitals in the past decade had so-called "oxygen" services whose main function was to control the supply of medical gases. The role of the Inhalation Therapy Department of today has changed. For a department to be clinically effective, the following categories must be well thought out and planned for:

1. Organizational functions
2. Personnel
3. Design
4. Equipment
5. Inventory
6. Records

Organizational Functions

In organizing an Inhalation Therapy Department, there should be general agreement as to its place within the hospital organization and particularly to its relationship to other departments. An Inhalation Therapy Department should have multiple functions related to respiratory care and should not be so organized as to inhibit future growth. Some of the functions should be:

1. Treatment of cardiopulmonary diseases
2. Cardiopulmonary diagnostic evaluation
3. Monitoring of ventilatory equipment
4. Chest physiotherapy
5. Maintenance of inhalation equipment
6. Controlling of medical gas supply and its usage
7. Teaching and education of medical, surgical and nursing staff in the field of inhalation therapy

The Department of Anesthesiology usually assumes the medical direction of the department. The medical problems arising in inhalation therapy are similar to those in anesthesiology and require a basic understanding of respiratory physiology. In addition, there is similarity in the equipment used in both fields. Another important factor is that the medical director of the department should be able to deal directly with the hospital administrator in matters pertaining to budget, purchasing, personnel and charges. Since the anesthesiologist's practice is located in the hospital, his availability for such day-to-day tasks is ideal. However, it is felt that any physician having proper qualifications and interest may fill the role of medical director of the department.

Departmental Personnel

The number of personnel required varies with the size of the hospital and the scope of the services offered. The department should offer 24-hour coverage, 7 days a week. The general categories of personnel should be as follows: A medical director, chief therapist, staff therapists, equipment technicians and administrative personnel. In small institutions, one person may fill more than one of these roles.

MEDICAL DIRECTOR.—The medical director must have adequate time to devote to consultation, education and administration. The qualifications for a medical director usually are:

1. Knowledge of respiratory physiology and pathology
2. Familiarity with advances in the field of respiratory therapy
3. Mechanical knowledge of equipment
4. Teaching ability
5. Familiarity with cost and accounting procedures
6. Administrative ability
7. Knowledge of intensive care procedures and techniques
8. Adequate background in research
9. A background in inventory and computer methods

CHIEF THERAPIST.—The chief therapist is considered the technical director of the department and, as such, is directly responsible to the department head. The chief therapist supervises all departmental personnel and procedures, including all records systems, and supervises disinfection, sterilization and maintenance of equipment, in accordance with accepted technical standards and nursing procedures. The chief therapist is also responsible for keeping an accurate inventory and ordering major supplies and replacement parts. The chief therapist should be familiar with all types of inhalation therapy equipment. A procedure manual is usually prepared by the chief therapist.

With the cooperation of the medical director, the organization and administration of an in-service education program is essential for both therapists and hospital personnel. The program should adequately cover the following areas:

1. Frequent reviews of respiratory anatomy and physiology
2. Pathology of the respiratory tract (i.e., ventilation-perfusion problems, clinical conditions, obstruction)
3. Current trends and advances in respiratory care (i.e., oxygen toxicity treatment, humidification and nebulization)

4. Blood gas analysis and conditions producing alterations in their values
5. Cardiopulmonary resuscitation (i.e., intubation, closed-chest cardiac massage)
6. Discussion on methods and use of monitoring devices and basic interpretation of results
7. Lung physiotherapy as an adjunct to respiratory care
8. Review of principles of ventilation and associated mechanical devices

STAFF THERAPISTS.—The personnel in this capacity are required to perform the necessary therapeutic procedures as ordered by the attending physicians or the medical director of the department. They should be completely familiar with the apparatus used in inhalation therapy. They should make rounds on all patients receiving respiratory care and should answer all pages. Whenever possible, staff therapist employment should be limited to candidates registered by the American Registry of Inhalation Therapists. When applicants with this qualification are not available, the medical director and the chief therapist have an even stronger responsibility for assuring themselves that each staff member be "fully trained and competent in the procedures to which he is assigned."

Design

Once an institution has decided to establish an Inhalation Therapy Department, the hospital administration must be prepared to provide the necessary space and facilities for immediate and future department needs. The area should not be less than 3,000 square feet for a general hospital of 500-bed capacity and about 1,000 square feet or more for smaller hospitals. The design should allow for a smooth flow of incoming and outgoing equipment. It is important that the department be located in close proximity to patient-care areas, with easy access to these areas. Figure 1 is an example of design.

Equipment

Equipment lists are available in the literature. Before the establishment of an Inhalation Therapy Department, the medical director, hospital administrator and the chief inhalation therapist should make an inventory of apparatus on hand and the needs of the future based on an evaluation of the projected usage, related to current trends and recent developments in respiratory care.

Consideration of the above factors will usually give a reasonably accurate