

Managing the Respiratory Care Department

John W. Salyer, RRT, MBA, FAARC

Director Respiratory Care
Children's Hospital and Regional Medical Center
Seattle, Washington



JONES AND BARTLETT PUBLISHERS

Sudbury, Massachusetts

BOSTON TORONTO LONDON SINGAPORE

World Headquarters

Jones and Bartlett Publishers
40 Tall Pine Drive
Sudbury, MA 01776
978-443-5000
info@jbpub.com
www.jbpub.com

Jones and Bartlett Publishers
Canada
6339 Ormindale Way
Mississauga, ON L5V 1J2
CANADA

Jones and Bartlett Publishers
International
Barb House, Barb Mews
London W6 7PA
United Kingdom

Jones and Bartlett's books and products are available through most bookstores and online booksellers. To contact Jones and Bartlett Publishers directly, call 800-832-0034, fax 978-443-8000, or visit our website www.jbpub.com.

Substantial discounts on bulk quantities of Jones and Bartlett's publications are available to corporations, professional associations, and other qualified organizations. For details and specific discount information, contact the special sales department at Jones and Bartlett via the above contact information or send an email to specialsales@jbpub.com.

Copyright © 2008 by Jones and Bartlett Publishers, Inc.

All rights reserved. No part of the material protected by this copyright may be reproduced or utilized in any form, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without written permission from the copyright owner.

The authors, editor, and publisher have made every effort to provide accurate information. However, they are not responsible for errors, omissions, or for any outcomes related to the use of the contents of this book and take no responsibility for the use of the products and procedures described. Treatments and side effects described in this book may not be applicable to all people; likewise, some people may require a dose or experience a side effect that is not described herein. Drugs and medical devices are discussed that may have limited availability controlled by the Food and Drug Administration (FDA) for use only in a research study or clinical trial. Research, clinical practice, and government regulations often change the accepted standard in this field. When consideration is being given to use of any drug in the clinical setting, the health care provider or reader is responsible for determining FDA status of the drug, reading the package insert, and reviewing prescribing information for the most up-to-date recommendations on dose, precautions, and contraindications, and determining the appropriate usage for the product. This is especially important in the case of drugs that are new or seldom used.

Production Credits

Executive Editor: David Cella
Acquisitions Editor: Kristine Johnson
Editorial Assistant: Lisa Gordon
Production Director: Amy Rose
Associate Production Editor: Wendy Swanson
Marketing Manager: Jennifer Bengtson
Manufacturing and Inventory Supervisor: Amy Bacus

Interactive Technology Manager: Dawn Mahon Priest
Cover Design: Anne Spencer
Text Design: Graphic World, Inc.
Composition: Graphic World, Inc.
Printing and Binding: Malloy, Inc.
Cover Printing: Malloy, Inc.

Library of Congress Cataloging-in-Publication Data

Salyer, John.

Managing the respiratory care department / John Salyer.

p. ; cm.

Includes bibliographical reference and index

ISBN-13: 978-0-7637-4044-3 (casebound : alk. paper)

ISBN-10: 0-7637-4044-6 (casebound : alk. paper) 1. Hospitals—Respiratory therapy services—Administration.

I. Title.

[DNLM: 1. Respiratory Care Units—organization & administration. WF 27.1 S186m 2008]

RA975.5.R47S35 2008

362.196'2—dc22

2007026915

6048

Printed in the United States of America

11 10 09 08 07 10 9 8 7 6 5 4 3 2 1

Table of Contents

Preface		v
Acknowledgments		vii
Introduction		ix
Chapter 1	Preparations for Becoming an RT Manager	1
Chapter 2	How Hospitals Are Organized.....	17
Chapter 3	Structuring a Department.....	47
Chapter 4	Measuring Department Performance.....	85
Chapter 5	Staffing Systems	139
Chapter 6	Billing Systems	165
Chapter 7	Budgeting.....	189
Chapter 8	Evaluating Technology	223
Chapter 9	Staff Development.....	275
Appendix A	Colleges and Universities Offering a Bachelor's Degree in Respiratory Therapy	313
Appendix B	Respiratory Therapist Job Descriptions and Performance Evaluation Forms	321
Appendix C	Glossary of Reimbursement Terminology	359
Appendix D	Samples of Capital Budgeting Forms.....	369
Appendix E	Common Mistakes Made by Directors–Managers	395
Appendix F	Resources	399
Appendix G	Documents Used in an Evaluation and Selection of Mechanical Ventilators.....	407
Appendix H	Orientation and Training Documents	431
Index		475

Preface

Return My Breath

—John Salyer

So tired, but sleep cannot be found
Upon this night of gasping want
In blue green robes, arriving now
This lack of breath they come to daunt

With eyes alert and listening too
They prod, examine and prescribe
A heart so kind, and mind keen too
They touched my wheeze, it did subside

Then off it is to noisier place
Where bright lights shine throughout the night
Machines, whirring, clamorous flow
The reaper grim they came to fight

Who are these warriors, from whence they come
Carried on a comfort wind
With fluids, switching, desperate speed
Tubing and steel and gases to blend

Anonymous at times they seem
And yet, they're called to me again
Sometimes by name, but often not
They stand at the beginning, and at the end

From the forceps to the stone
In houses tall, with healing filled
From darkened rooms to stark white tile
The fluttering, fearful, they can still

Breath and flow, these are their goals
Scopes and screens their tools of trade
Hands that touch and sense and feel
The breath of life they contemplate

When asked, they often will defer
To tell you of their moral cause
For why they labor with low compense
It's what I do, they say with pause

A therapist I am they'll say
The breath of life, my expertise
I came to help you, to make relief
The symptoms of your lung disease

Well, I for one am glad they came
To render unto me this eve
Their ministrations, sound and true
I'll call them back, I do believe.

Acknowledgments

Writing a book is an adventure. To begin with, it is a toy and an amusement; then it becomes a mistress, and then it becomes a master, and then a tyrant. The last phase is that just as you are about to be reconciled to your servitude, you kill the monster, and fling him out to the public.

—Winston Churchill

It is said that to steal the work of one is plagiarism, but to steal the work of many is research. In writing this book, I have stolen the work of many. I have had the honor and pleasure to work with and learn from many wonderful, committed professionals in my short journey through this forest. I wish to thank all the people who knowingly or unknowingly contributed to this book. Some of the examples of educational material and various forms in this book were developed collaboratively with me as outliner and editor and many staff therapists, supervisors, and managers providing input. Specifically, I want to thank Dave Crotwell, Rob Diblasi, Christina Collin, Don Foubare, Ann Korn, Kevin Jacques, Kevin Cleary, Tina Whitby, Dianne Hale, David Hartman, and Cary (the bass master) Jackson. Thanks also to the respiratory leadership team at Children’s Hospital, Seattle who have taught me so much and are some of the best people I have ever worked with, including Susan Nanninga, Joy Gilmore, Jenny Reid, and Dan Hernandez.

Going further back in time, there were many people from whom I learned a great deal and whose collaboration and friendship I still value even though the winds of time and fate have taken some of our respective ships in different directions. These include Rob (Master Po) Chatburn, Tom (Special K) Kallstrom, Roger Butler, Karen Kay Burton, RN, Kathy and John Davidson, Jim Keenan, J. Michael Dean, Phaedrus, Slip Kid, and Big Chief Bromden.

This book, such as it is, would not have happened without the unflinching support of my family. To my spousal unit Ellen and my children, Jeremiah, Hannah, and Joel I say mucho gracias and ain’t you glad this is over (til the next one)?

I love deadlines. I particularly like the sound of them as they go whooshing by. I wavered at many passing deadlines in writing this book, and I want to acknowledge the editorial staff at Jones and Bartlett, particularly Lisa

Gordon, who had the unpleasant job of trying to get me to finish this (expletive deleted) thing. Thanks to all of you for your patience. For my writing skills, for what they are worth, I have to mention my mentor and friend, Jim Gish.

I also feel compelled to thank Phil Keaggy, Pink Floyd, The Who, Johann Sebastian Bach, the Easy Star All-Stars, John Prine, Harry Chapin, Michael Hedges, The Mothers of Invention, the Chad Lawson Trio, Diana Krall, Steely Dan, Kansas, Al Di Meola, Mozart, Alice in Chains, Wes Montgomery, and G. F. Handel for providing the soundtrack for this book.

And finally, and most importantly, thanks to all the great respiratory therapists I have had the good fortune to work with. You are legion. I have been blessed to be an observer of an amazing transformation of the environment of care for those whose lives are threatened by respiratory disease. This transformation would not have been possible without the skills and commitment of that unique variant of the healthcare professional: the respiratory therapist.

Introduction

A man is known by the company he organizes.

—Ambrose Bierceⁱ

Books on management principles and theories are a dime a dozen. You can find lots of them in any good book store. If you pursue a degree in business, you will be forced to buy lots of them and at least pretend to have read them. This book is intended to be more focused than all those other admirable, yet pedestrian texts; it covers the specific topic of managing a hospital department (in this case a respiratory therapy service). The principles and practices included here are sort of a quasi-concordance of my learning, both didactic and experiential, after over 30 years in respiratory therapy, 23 of which have been in various management positions.

Because this book is about managing people and processes, it will, regrettably, force us to at least touch on the topic of management theory. Let's go ahead and get this over with, and then we won't have to touch on this disagreeable topic again. Like most good theories, management theory is an amorphous, moving, ever-changing thing. It wriggles and squirms and stumbles its way from one era to another, changing with the passage of time, the accumulation of new learning, according to the culture in which it operates. Many theories of how best to manage organizations of people have been put forth. Premodern theories on management are probably to be mostly avoided because they resulted in such notable institutions as indentured servitude and slavery.

The overall history of modern management theory can be broadly divided into three phases: scientific management theory (1890–1940), bureaucratic management theory (1930–1950), and the human relations movement (1930 to today).ⁱⁱ These schools of thought have been somewhat evolutionary in that

ⁱAmbrose Bierce (1842–1914) was an American satirist, critic, poet, short story (horror) writer, editor, and journalist who was known for his dark, sardonic views and vehemence as a critic.

ⁱⁱIt is instructive to remember that the Roman Legions had some fairly effective management theories 2100 years ago, including a very classical hierarchical structure and well-defined job responsibilities with excellent managerial controls. Of course, when their employees failed to follow policies, they were flogged with a cat-o'-nine-tails or killed outright, so we may want to be careful when applying some of their ideas to the modern workplace.

each school has built on the work of the previous school. Scientific management theory developed as human organizations grew in size and complexity, and the tasks that people did became routine and repetitive, which was a necessary evil to manufacture the wide variety of products now associated with modern life. Industrialized countries came to highly value scientific and technical matters, including careful measurement and specification of activities and results. Frederick Taylor developed the scientific management theory which promoted a careful specification and measurement of all organizational tasks. Activities were to be standardized as much as possible. Workers were to be rewarded and punished. Modern hospitals seem to have forgotten much of this.

Max Weber further developed scientific management theory with his bureaucratic theory. He focused on establishing strong lines of authority and control, dividing organizations into hierarchies. Comprehensive and detailed standard operating procedures were to be created for all routine tasks. Maybe we have forgotten some of this too?

Unfortunately, overzealous managers and supervisors used these theories in ways that had dehumanizing effects. During the human relations period, the belief has developed that the organization will prosper if its workers prosper as well. Imagine that. Human resource departments were added to organizations. The behavioral sciences helped us to learn how the needs of workers and the organization could be better aligned. Various new theories were spawned, many based on the behavioral sciences, most of which espoused a more participative management style. Current trendy management theories incorporate aspects from all of these movements. However, if someone came into today's workplace and tried to lead a group of people using management principles and practices from the 1950s, they would probably foment rebellion among the staff, develop an ulcer, and decide that maybe they should have gone to accounting school like cousin Hector. Fifty years ago, many FORTUNE 500 companies gave all prospective employees a Rorschach ink blot test. Today this is very rare.

Don't be frightened. This book will not be a turgid, painful, dry dissertation on management theory. I like my readers too much to put them through that, and I like myself too much to compose such a thing. Here is a simple summary of my management theory that might help you. Good management practices incorporate a balanced approach—not too autocratic, but not too mealy-mouthed either. A very nice acronym for developing a management theory or philosophy is ART (accountability-respect-teamwork).

We hold one another accountable for good work, we treat one another with respect, and we value the principles and practices of teamwork.

Instead of arid theoretical dissertations, this book is mostly about what I have learned, and I learned most of it the hard way. It is about trying to lead people in accomplishing difficult tasks, and as much as possible, standardizing and improving the work we do. My general observation is that it is pretty amazing that more than two of us together ever accomplish anything. Humans, and especially that particular regional variant, the Americans, are notoriously individualistic, even iconoclastic. They have their own ideas, don't want to work too hard if they don't have to, are sometimes pretty stubborn, have a practically inbred (and often well deserved) distrust of authority, and can be as easy to organize as a herd of cats. They also typically take a great deal of pride in their work, come to work wanting very much to do a good job, and desperately want to be led by people whom they trust and respect. This is why management can be so much fun. If it were too easy, it would be boring.

Some book introductions are a thinly disguised rehash of the table of contents. I am operating under the assumption that you can read the table of contents, so I won't go over it again.

Here is a warning about this book. Throughout it you will encounter my *immutable truths* (see Table I-1). These are axioms (sometimes pompous) that I have smashed into, tripped over, or have had fall on my head in my journeys through the corridors of hospital management. Let's get right to it.

Immutable Truth #1: Management and leadership are not the same thing. You can manage without leading. It is vastly more difficult to lead without managing. The Latin root for management (*manu agere*) means to lead by the hand. To lead, you first must answer the seminal question: Why in the world would anyone want to follow me? Or, more appropriately for the context of this book, why would anyone want to listen to what I have to say, do what I ask, or believe what I say? Do I have any credibility to pontificate on a given subject? Do I have any idea what I am doing? I personally have a lot of trouble putting much stock in the advice of alleged experts (the notorious "consultants") unless they clearly have a proven track record related to what they are preaching (and they are willing to hang around and help me troubleshoot the systems they have dreamed up). In my case, you will have to be the judge of my credibility. Along the way, I have taken charge of two different respiratory therapy departments that were in the deep weeds (and managed in two others). Both departments had gone

Table I-1. Immutable Truths

Immutable truth #1	Management and leadership are not the same thing.
Immutable truth #2	One way you learn to make good decisions is by making bad ones.
Immutable truth #3	Don't get too close to the people you are leading.
Immutable truth #4	The plural of anecdote is not data.
Immutable truth #5	It is a good idea to like your job.
Immutable truth #6	Good listening doesn't just happen, you have to work at it.
Immutable truth #7	No margin, no mission.
Immutable truth #8	It's all about processes.
Immutable truth #9	You cannot manage what you do not measure.
Immutable truth #10	Do not sacrifice the good for the perfect.
Immutable truth #11	The main thing is to keep the main thing, the main thing.
Immutable truth #12	<i>Someone</i> is going to be in charge.
Immutable truth #13	If you are coasting, it probably means you are going downhill.
Immutable truth #14	The law of unintended consequences is as ubiquitous as gravity.
Immutable truth #15	If a hospital can shut down your department, it should.
Immutable truth #16	Unwarranted variation is usually not good in health delivery systems.
Immutable truth #17	Not everything that counts can be counted, and not everything that can be counted counts.*
Immutable truth #18	The cycle of fear rules.
Immutable truth #19	Directors—managers are often the last ones to know what is going on in their departments.
Immutable truth #20	Sleep deprivation, derangement, and disruption makes unhappy campers.

Table I-1. Immutable Truths *(Continued)*

Immutable truth #21	Generally speaking, most folks don't read much, if any, of the stuff you send to them.
Immutable truth #22	There is wisdom in the counsel of many.
Immutable truth #23	The burden of proof is on the advocate.
Immutable truth #24	All measurements are erroneous.
Immutable truth #25	All evidence is not created equal.
Immutable truth #26	All assumptions are suspect until proven otherwise.
Immutable truth #27	The Six P Principle: Proper Planning Prevents Piss Poor Performance.
Immutable truth #28	It is very hard to have too much training.

*OK, I admit it. I did not think this one up, although I wish I had. This has been attributed to Einstein. It is unclear to me whether he was the author or not. It is reported to have been a sign posted on his office wall. One of my favorite Einstein quotes: "Reality is merely an illusion, albeit a very persistent one."

This table contains the sometimes disturbing musings of a self-described sage. They are allegedly immutable truths. The reader will enter at their own risk and judge for themselves.

leaderless for some time before my arrival. Both departments had a lot of native talent but almost no well-designed systems for ensuring high quality patient care and business operations, and both departments experienced a substantial turnaround. Like all organizations made up of humans, they were, and remain, far from perfect, but in reshaping those operations I learned and learned and learned.

Immutable Truth #2: One way you learn to make good decisions is by making bad ones. I know this because I have made plenty of bad decisions. And through the good offices of my own suffering, I may be able to offer you some advice about how to avoid some of the same mistakes I have made. Don't worry though. If this book doesn't dissuade you from considering or continuing a career in healthcare management, then you will have the opportunity to make plenty of mistakes that you too can proudly call your very own.

Also, I have traveled around a bit and these wanderings have given me a fairly broad perspective on leadership styles and management techniques. My entry into the world of respiratory therapy began in 1975 while I was a Navy

Hospital Corpsmanⁱⁱⁱ at the Great Lakes Naval Regional Medical Center in Waukegan, Illinois. I had noticed that some of the corpsmen had a pretty cool job running mechanical ventilators^{iv} in a blood gas laboratory. I decided I wanted to try that and landed a job in the Inhalation Therapy Department. After stints as a medic with the Marine Corps and a couple of years of full-time college, I went back to respiratory therapy and never left again. I have held management positions at Kaiser Hospital in Fontana, California; Rainbow Babies and Children's Hospital in Cleveland; Primary Children's Medical Center in Salt Lake City; and Children's Hospital and Regional Medical Center in Seattle. I have also worked as a staff therapist at quite a few other hospitals, which, for the sake of decorum, will remain unnamed. Along the way, I did several years of full-time health services research, got a bachelor's degree in healthcare management and a master's degree in business administration, and amassed an extensive Pink Floyd collection. I have had the fortune to work with a lot of great clinicians and managers as well as a few who should have given thoughtful consideration to another field of endeavor. From these folks I have learned a lot about what to do, and, more importantly, what not to do to be an effective clinician, leader, and manager. As you progress through this text you will read many case studies and anecdotes. The names have all been changed to protect the innocent and the guilty. You may be tempted to speculate about which hospital these episodes occurred in. Don't bother. Not every anecdote or story you will read is from my own experience. Some were recounted to me by other managers and directors. And the episodes I did participate in have all been changed in ways that make it very hard indeed to figure out which hospital I am talking about, but not enough to change the message of the story.

The people I have had the opportunity to lead might give you a mixed message about me if you were to question them all. Some have had a high regard for me. Others do not. Some of this was undoubtedly due to my many and various shortcomings, but some was a result of my occasionally pushing the boundaries and raising the bar of what it meant to be a respiratory therapist.

ⁱⁱⁱThe Navy Hospital Corps, the only enlisted corps in the U.S. military, is the single most decorated rating of all branches of the military. Twenty-three Hospital Corpsmen have received the Medal of Honor, the most of any single group in the U.S. Navy. Fourteen ships have been named after Hospital Corpsmen. Hospital Corpsmen performed 14 unassisted appendectomies while in a submarine in World War II. The career and skill set of Hospital Corpsmen were recognized in an article published in the *Journal of the American Medical Association* in 1961, and they were considered to be ideal students for the pilot class of physician assistants in 1965 at Duke University Medical Center.

^{iv}Emerson Post-ops and a single brand new MA-I.

The fact that you are reading this now indicates that you appear to be crazy enough to be considering a job in management (or have already foolishly decided to take such a position). Those of you who are already managers will understand what I am about to ask: “*Are you nuts?*” Indeed, being a manager can be one of the most rewarding jobs imaginable. It provides you with an opportunity to make a real difference in how hospitals operate and, either directly or indirectly, improve the quality of patient care. If you do the job right, you can substantially improve the working conditions of your staff, and you can implement lasting changes of which you can be very proud. You can help people develop their potential, solve intractable problems, and, in the end, contribute to the greater good. Healthcare management is like that. It is a larger calling in a sense. At the heart of all the processes and systems and plans and procedures are sick people whom you can help to heal or at least help by easing their passage.

But here’s the catch. It can also be very tough, emotionally draining, isolating, scary, infuriating, tense, boring, tiring, complicated, and sometimes very unrewarding. I think this is why they call it work. There are times when you walk down the hall knowing that you would, at that very moment, like to be anywhere else on earth doing anything but what you are about to have to do. Other times you will lie awake in the blackness of night trying to figure out what in the world to do about the latest crisis. New and incumbent managers need to expect this as part of the drill and learn to accept it. Of course, it is easy to spout such platitudes, and sometimes it is not so easy to survive in management positions.

I only bring this up to help you embrace management with your eyes wide open. If promoted to a management position, you are no longer “one of the crew.” The staff will regard you differently, as well they should. This doesn’t mean that you cannot have wonderful relationships with your staff; indeed, you had better have good relationships with your staff if you want to survive. But it does mean that the way you interact with other people in your department will subtly change. For new managers, this can be a very difficult adjustment, and I have known some very capable people who moved from staff into management positions only to eventually choose to go back to staff, in part because of the difficulty of this adjustment.

Here comes another rule: *Immutable Truth #3: Don’t get too close to the people you are leading.* This can make doing your job much harder than it needs to be sometimes. The demands of management make it necessary at times for you to correct the behavior of others, which becomes very

emotionally complicated if you are too close to them. This is a mistake I have made in the past, and it can lead to you being unable to do the tough things that your job might require. It is a continuing challenge for me, and I have to remind myself to keep some emotional distance between myself and those who report to me.

Respiratory therapy is a great field. The U.S. Department of Labor reports that there were 115,540 respiratory clinicians (therapists and technicians) employed in the United States in 2004.¹ The American Association for Respiratory Care puts the number much higher at 151,000.² About 78% of these therapists are employed in hospitals. There are approximately 5759 hospitals in the United States. Table I-2 lists the number of hospitals by type in the United States.

If you have the experience, education, and references needed, it is not too difficult to land a job in respiratory therapy management with one significant caveat: You must sometimes be willing to relocate. Certainly hospitals like to develop home-grown talent, but my experience is that many manager-director jobs go to people hired from the outside and often from outside the region, especially for director positions in larger hospitals.

Salary data for managers of respiratory therapy departments varies widely from region to region and is very dependent on the size of the hospital and thus the size of the staff you are managing. The interquartile range of salaries nationwide for managers is \$65,838 to \$83,290 with a median of \$74,324 (in 2005 dollars). Just in case your statistics class was not the most inspiring and memorable episode of your college experience, I will remind you that the interquartile range describes the 25th to the 75th percentiles of a range of numbers. Half of all salaries fall within this range. Said another way, 25% of all salaries are both above and below this range. While these salary data may not make you feel particularly well paid, your pain might be eased by remembering that the median income in the United States for 2001–2004 was \$44,473.³ Not too shabby because you can get into front line clinical supervision with a 2-year degree in respiratory therapy, and you can usually get a managers job with a 4-year degree, assuming, of course, you have all the other requisite skills and experience.

There are some things that are not in this book to which other RT managers might take exception. There is not a chapter on managing blood gas labs. Approximately three-fourths of all blood gas operations are managed by respiratory therapy departments. But for the last 16 years my path has led me to work in hospitals where the blood gas labs were not part of the RT operation,

Table I-2. Numbers and Types of U.S. Hospitals

Total number of all U.S. registered hospitals	5759
Number of U.S. community hospitals	4919
Number of nongovernment not-for-profit community hospitals	2967
Number of investor-owned (for-profit) community hospitals	835
Number of state and local government community hospitals	1117
Number of federal government hospitals	239
Number of nonfederal psychiatric hospitals	466
Number of nonfederal long-term care hospitals	112
Number of rural community hospitals	2003
Total staffed beds in all U.S. registered hospitals	955,768
Staffed beds in community hospitals	808,127
Total admissions in all U.S. registered hospitals	36,941,951
Admissions in community hospitals	35,086,061
Total expenses for all U.S. registered hospitals	\$533,853,359,000
Expenses for community hospitals	\$481,246,587,000

Source: Data from www.aha.org as of January 2006.

and thus I have no meaningful recent experience and wisdom to offer you on this topic. I recommend to anyone who does use blood gases or manages a blood gas laboratory to read the delightful history of this technology written by Astrup and Severinghaus.⁴

This book does not contain a chapter on the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). A great deal has been published by and about the JCAHO, and the interested student should have absolutely no trouble whatsoever finding some excellent material to help you be compliant with JCAHO guidelines.

REFERENCES

1. Bureau of Labor Statistics. May 2004 national occupational employment and wage estimates: healthcare practitioner and technical occupations. U.S. Department of Labor Bureau of Labor Statistics Web site. <http://www.bls.gov/oes/home.htm>.
2. American Association for Respiratory Care. Respiratory therapist: human resources study. *American Association for Respiratory Care*. 2005.
3. DeNavas-Walt C, Proctor BD, Lee CH. Income, poverty, and health insurance coverage in the United States: 2004. *U.S. Census Bureau*. August 2005.
4. Astrup P, Severinghaus JW. *The history of blood gases, acids and bases*. Copenhagen: Munksgaard, Radiometer; 1986.