

COMPREHENSIVE RESPIRATORY THERAPY EXAM PREPARATION GUIDE THIRD EDITION

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Family Dedication

Normally, it is the author of a book who writes the dedication. Craig Lawrence Scanlan, EdD, RRT, FAARC, a leader in the field of respiratory therapy, passed away in 2016 after playing a major role as primary editor, until his death, in the revision of this new edition. Over the years, Craig was a committed, dedicated author and editor on this book as he was passionate about supporting the profession of respiratory care and the students and professionals working in this field. Craig was an educator, author, editor, and presenter but also a friend and family member, and he was deeply committed to all those he knew. The hundreds of students he taught over the years are out on the front lines of the medical profession, where they are saving lives and improving the health and well-being of patients. While we who knew him best have suffered a great loss, so too has the profession itself. Each of us will remember Craig in our own way.

Craig, I thank you for your steadfast dedication to me, our family, your colleagues, and students.

We all benefited from your humble intellect, moral compass, and ethical queries.

You lived every day seeking truth in life and freely offered it to others.

We were nurtured well because of you and your tireless work.

Not often does life offer an eternal gift as you.

In my heart forever.

— **Love, Barrie Scanlan (Spouse)**

Children usually don't notice the career accomplishments of their parents. They are "mom" and "dad," not "doctor," "professor," or "master educator." As a child, I remember my shock when my father responded to a question at a respiratory therapy conference trivia contest with "me"! The master of ceremonies denied him, and the other team replied with "who is Dr. Craig L. Scanlan." I was astounded—my dad was an answer in a trivia contest!

You, the reader, are embarking on a career in respiratory therapy. Use my father's knowledge and insights contained herein to pass your respiratory therapy exams and to become an ethical leader, mentor, and a tireless innovator in this field. That would mean the most to him—and to us as well. I hope that you someday become an answer in a Sputum Bowl too.

—Craig Patrick Scanlan (Son)

My brother Craig was one of those late-1960s kids who, at first glance, seemed to be headed to an uncertain future. But he found the field of respiratory therapy and never looked back. Diligent, committed to his students, and always teaching both the techniques and the ethical and moral standards, Craig became a leader in the field and an acknowledged expert on the latest developments, technology, and the best ways to create both understanding and enthusiasm in his students. He also knew the need to reach a wider audience and did so through books, articles, presentations, and research. But beyond all of his students, colleagues, and friends, he was my brother—funny, serious, a car guy like me, and someone whom I will always miss.

—Eugene A. Scanlan (Brother)

Co-Author Dedications

We have been blessed in many ways and one of them has been to have the privilege to have had a teacher, colleague, mentor, and friend like Craig L. Scanlan, one of the co-authors of this textbook. Though we all had many positive influences in our life, Craig is credited for shaping our professional development as respiratory care educators and scholars. Though he is gone from this earth, his sustained and substantial contributions to respiratory care will always be felt for decades to come. As his last published work, this textbook is dedicated to his memory and the profound mark he has left on our profession and our personal lives.

Al Heuer, PhD, MBA, RRT, RPFT, FAARC

Narciso Rodriguez, BS, RRT-NPS, RPFT, ACCS

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New to This Edition

- An updated introduction which provides the content and layout of the most up-to-date information about the Therapist Multiple-Choice (TMC) examination and how to use this book to succeed in it.
- Chapters which are organized in the same sequence as the content areas for the 2015 TMC examination matrix.
- Chapter content updated to reflect the current standard of care and the practices used in the “NBRC Hospital” and the 2015 NBRC Detailed Content Outlines for the TMC and CSE.
- A new chapter on evidence-based medicine which highlights an overview of the categories of research, search engines and strategies which may be used to locate published literature, and some of the most prominent research-based practices in respiratory care.
- Updated content on preparing for and taking the TMC and Clinical Simulation Exam (CSE).
- Updated CSE Case Management Pearls which provide relevant details including the etiology, manifestations, and treatment of over 30 respiratory diseases and dysfunctions which are most likely to appear in the CSEs.
- Dozens of new questions added to pre-post chapter testing regarding new topics for the TMC/CSE examinations.
- 15 new Clinical Simulation Exam Practice Problems added to the Navigate 2 Premier Access.

Introduction

USING THIS BOOK AND ONLINE RESOURCES: YOUR ROADMAP TO SUCCESS

Craig L. Scanlan

To become a Certified Respiratory Therapist (CRT), you currently must pass the National Board for Respiratory Care (NBRC) Therapist Multiple-Choice Examination (TMC) at the CRT level. To become a Registered Respiratory Therapist (RRT), you must pass the TMC at the higher RRT cut score and pass the NBRC Clinical Simulation Exam (CSE). Preparing for and passing these exams is no small task. Each year, despite intensive schooling, many candidates fail one or both of these exams, often requiring multiple attempts to achieve their goal. And because most states require that you pass the CRT exam to become licensed (with some now mandating the RRT credential), you simply cannot afford to do poorly on that portion of your boards.

To accomplish any major task, you need the right plan and the right tools. This book and the Navigate 2 Premier Access digital product provides you with both. Our plan is based on decades of experience in helping candidates pass their board exams. Underlying our plan is a set of tried-and-true tools that have helped thousands of candidates become licensed and get registered. Follow our plan, and you, too, can obtain the NBRC credentials you desire!

BOOK OVERVIEW

This book and its online resources provide you with everything you need to pass the 2015 NBRC exams. Following this introduction, Section I provides 17 chapters covering the *topical content* tested on both the TMC and CSE exams (see the accompanying box). Each chapter in Section I covers the corresponding NBRC exam topic. This approach lets you concentrate on the exact knowledge tested in each area. Organizing these chapters by NBRC topic also is helpful if you have to retake the TMC examination. The best way to ensure success when retaking the TMC examination is to focus your efforts on those topics where you previously did poorly. To do so, simply review your NBRC written exam score report to identify the major topics where you scored lowest, and then focus your work on the corresponding text chapters.

Because the same 17 major topics underlie the CSE exam, Section I also is useful in preparing for that portion of the NBRC test battery. However, due to the CSE's unique structure and case-management approach, this text provides a separate three-chapter section on preparing for and taking the CSE exam.

Section I: Shared Topical Content (Chapters 1–17)

Chapter Objectives and What to Expect

Each chapter begins with a set of *Objectives* and a brief description of *What to Expect* on the corresponding section of the NBRC exams. Chapter objectives delineate the specific knowledge you need to master. The *What to Expect* descriptions specify the number and level of questions you will encounter on the current exams. This information is intended to help you set your study priorities. For example, with 19 questions (the largest section on the TMC examination) topic III-E—Ensure Modifications Are Made to the Respiratory Care Plan—is almost 10 times larger than topic II-B, Ensure Infection Control (2 questions). Based on this knowledge, you would logically give much more attention to the larger/more important topic when preparing for the TMC/CSE exams. And because the length of

Topical Content Areas Covered on the NBRC TMC and CSE Exams

- I. PATIENT DATA EVALUATION AND RECOMMENDATIONS
 - A. Evaluate Data in the Patient Record
 - B. Gather Clinical Information
 - C. Perform Procedures to Gather Clinical Information
 - D. Evaluate Procedure Results
 - E. Recommend Diagnostic Procedures
- II. TROUBLESHOOTING AND QUALITY CONTROL OF EQUIPMENT, AND INFECTION CONTROL
 - A. Assemble and Troubleshoot Equipment
 - B. Ensure Infection Control
 - C. Perform Quality Control Procedures
- III. INITIATION AND MODIFICATION OF INTERVENTIONS
 - A. Maintain a Patent Airway Including the Care of Artificial Airways
 - B. Perform Airway Clearance and Lung Expansion Techniques
 - C. Support Oxygenation and Ventilation
 - D. Administer Medications and Specialty Gases
 - E. Ensure Modifications Are Made to the Respiratory Care Plan
 - F. Utilize Evidence-Based Medicine Principles
 - G. Provide Respiratory Care Techniques in High-Risk Situations
 - H. Assist a Physician/Provider in Performing Procedures
 - I. Initiate and Conduct Patient and Family Education

our chapters roughly corresponds to the topical emphasis on the NBRC exams, you also can gauge the needed exam prep time by the relative length of the chapters.

What You Need to Know: Essential Content

The *Essential Content* section is the “meat” of each Section I chapter. We have distilled this content down to what we consider the essential *need-to-know* information most likely to appear on the NBRC exams, with an emphasis on bulleted outlines and summary tables.

T⁴—Top Test-Taking Tips

Each chapter includes our unique T⁴ feature, where we provide specific tips regarding key topical knowledge frequently tested on the NBRC TMC examination (over 350 tips in total). Our insight for these tips derives from both feedback that recent candidates have provided to us and our own experience in taking these exams for voluntary recertification.

Chapter Post-Tests and Mock TMC Exams

To confirm your mastery of each chapter’s topical content, you should create a content post-test, available online via the *Navigate 2 Premier Access for Comprehensive Respiratory Therapy Exam Preparation Guide, Third Edition*, which contains Navigate TestPrep (access code provided with every new text). You can create multiple topical content post-tests varying in length from 10 to 20 questions, with each attempt presenting a different set of items. You can select questions from all three major NBRC TMC sections: Patient Data Evaluation and Recommendations; Troubleshooting and Quality Control of Equipment, and Infection Control; and Initiation and Modification of Interventions. A score of at least 70 to 80% indicates that you are adequately prepared for this section of the NBRC TMC examination. If you score below 70%, you should first carefully assess your test answers (particularly your wrong answers) and the correct answer explanations. Then return to the chapter to re-review the applicable content. Only then should you re-attempt a new post-test. Repeat this process of identifying your shortcomings and reviewing the pertinent content until your test results demonstrate mastery.

A word of warning: Some candidates try to memorize as many questions and answers as possible in hopes that doing so will help them pass the NBRC exams. *This is a huge mistake and a waste of your time.* The likelihood of seeing the exact same questions from any source on the NBRC exams is very small.

In order to prepare for the TMC practice exams, you can generate a TMC-like exam online using the *Navigate 2 Premier Access for Comprehensive Respiratory Therapy Exam Preparation Guide, Third Edition* via Navigate TestPrep. This exam is randomly generated from a pool of over 600 questions, so—as with the chapter post-tests—each attempt will be different. You can easily customize the exam topics (Patient Data Evaluation and Recommendations; Troubleshooting and Quality Control of Equipment, and Infection Control; and Initiation and Modification of Interventions) and the number of questions you want in the exam in order to mimic the NBRC TMC exam.

Section II: Clinical Simulation Exam (CSE) Preparation (Chapters 18–20)

Most candidates know that the CSE has a unique structure. What most candidates fail to appreciate—and the reason why so many do not pass the CSE—is that the skills assessed on this exam also differ significantly from those tested on the TMC. Yes, the CSE shares the same topical content with the TMC. However, mastering topical content alone will not get you a passing score on the CSE because the CSE also tests your *case-management abilities*.

Section II of the text helps you prepare for the CSE by emphasizing case-management preparation. Chapter 18 reviews the seven disease categories from which current CSE cases are drawn and outlines a specific review strategy that focuses on disease management skills. Chapter 19 discusses the different reasoning needed to do well on the information gathering and decision-making sections of CSE problems, while also recommending both general Do's and Don'ts and specific choices likely to help you boost your scores. Chapter 20 completes the CSE section with over 30 case-management pearls covering the clinical problems most likely to appear on the CSE.

Appendices Available on the Navigate 2 Premier Access

In addition to Appendix A in the text, there are two supplemental appendices available on the Navigate 2 Premier Access. Appendix B provides a set of *Test-Taking Tips and Techniques*, designed to help you improve your multiple-choice test “wiseness” and boost your TMC scores. For those needing a review of common formulas and computations that can appear on the TMC exam, Appendix C provides a comprehensive summary of common *Cardiopulmonary Calculations*.

TEST PREPARATION STRATEGY

TMC Test Preparation

Figure 1 outlines the strategy we recommend that you follow to prepare for the TMC examination. Based on our experience in guiding candidates, *you should devote at least 4 weeks to this process.* One of the most common reasons why candidates fail the TMC examination is hasty or last-minute preparation. Do yourself a favor and follow a deliberate and unhurried process. Remember—it was the slow-and-steady tortoise who won the race, not the hurrying hare!

Some of you will implement this strategy on your own, whereas others may be guided in their preparation while still in a respiratory therapy program. In either case, it is important to proceed systematically through each chapter and not to move forward until you have mastered the relevant content.

For Those Who Have Not Been Successful

If you purchased this text because you failed an NBRC exam, you are not alone. For example, approximately one in five candidates is unsuccessful in passing the TMC examination the first time around, with only about a third of repeaters passing on subsequent attempts. Although you likely are unhappy with your test results, such an event gives you an advantage over those who have never taken the exam. First, you know what to expect regarding the testing procedures. Second, your score report can help you identify where you did well and where you did poorly.

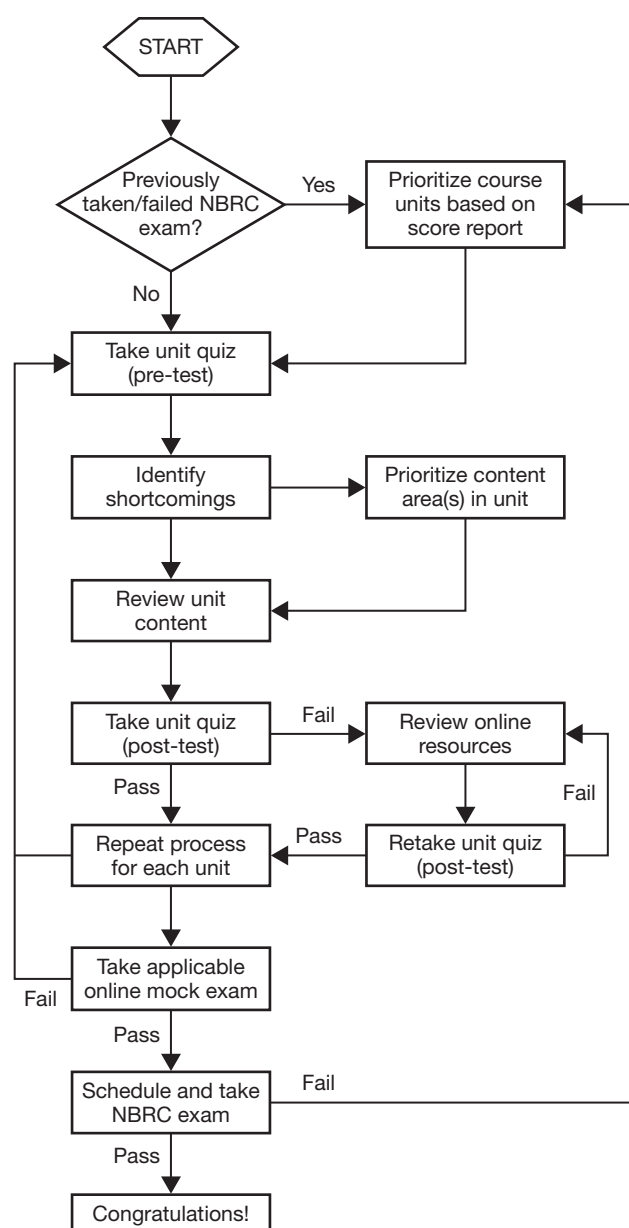


Figure 1 Recommended Preparation Strategy for the TMC Examination

The current NBRC TMC score report provides your overall score and the scores for each of the three major content sections (i.e., Patient Data Evaluation and Recommendations; Troubleshooting and Quality Control of Equipment and Infection Control; and Initiation and Modification of Interventions). Based on this information, we recommend that you compute the percentage of correct questions for each of the three content areas on your NBRC score report. For example, if you correctly answered 10 of the 20 questions on Section II of the TMC examination (Troubleshooting and Quality Control of Equipment, and Infection Control), you would compute your percentage correct as $10/20 = 0.50$ or 50%. *We recommend that you flag any major section on which you scored less than 75%.* You should then focus your attention on these flagged sections and their corresponding book chapters in preparing to retake the exam. Of course, you should still review chapters in the major content areas where you scored more than 75%—*but only after attending to your high-priority needs.*

Topical Chapter Review Process

For this strategy to succeed, it is essential that you proceed systematically through each chapter. This normally involves the following steps:

1. Review the applicable chapter content.
2. Take the chapter post-test to assess your mastery of that topic.
3. Repeat steps 1 to 2 for each chapter until the mastery level is achieved.

Regarding step 3, we recommend that you set a goal of achieving *at least 70 to 80% correct as the measure of chapter mastery*. In addition, if you follow our advice, your chapter post-test scores generally should rise with each new attempt, which confirms that you are indeed learning and moving toward mastery.

Take a Mock TMC Examination on the Navigate 2 Premier Access

Mock TMC exams created in the Navigate 2 Premier Access TestPrep are intended to simulate the corresponding NBRC test. Like the chapter post-tests, this online exam gives you feedback on every question, including the correct answers and their corresponding explanations.

With this feedback, these mock exams serve as an additional learning tool in your path to success on the TMC exams. First, your overall score on the mock exams will tell you how well you have mastered the content covered in the book. Second, a careful review of the question explanations should enhance your understanding of the concepts likely to be tested on the NBRC TMC examination. Finally, review of these explanations can help you identify any remaining areas of weakness you need to address before scheduling your exam date.

Because a mock TMC examination serves as a bridge between the book and the actual NBRC TMC examination, we recommend that you take it only *after* mastering all 17 of the book's topical content chapters, as indicated by a "passing" score of at least 70 to 80% on each of their post-tests. We also recommend that you complete a mock TMC examination *at least a week* before you are scheduled to take the actual NBRC TMC examination. This way, you will have enough time to review any persistent areas of misunderstanding and can avoid the anxiety that last-minute cramming always creates.

We also recommend that you track your time when taking a mock TMC examination. *Based on the number of questions included and the NBRC time limits, you will need to complete approximately one question per minute*. If you find yourself taking significantly longer on each question, you will need to increase your testing pace before taking the actual NBRC exam.

What if you do not score well on our mock TMC exams? If you carefully follow the strategy we outline here, it is highly unlikely that you will do poorly on this test. In the unusual case where you score less than 70%, it's "back to the books." In this case, a careful review of the test items you got wrong on our mock TMC exam should help you identify the content areas and book chapters that need additional review.

Schedule and Take the Exam

After successfully mastering all topical chapters and passing a mock TMC examination, it is time to schedule and take the real thing. If you have not already done so, we strongly recommend that you use some of the time you have set aside to review the *Test-Taking Tips and Techniques* guidance in Appendix B. Also, consider taking a practice trip to and from your NBRC testing center, ideally at the same time at which your exam is scheduled. This run-through can help you gauge travel time and iron out little details, such as where you will park and where you can get a cup of coffee before the exam.

What if you do not pass the NBRC TMC examination? There are several Do's and Don'ts associated with a failed attempt on the exam. First, the Don'ts:

- Don't get disheartened or give up.
- Don't immediately reschedule a retake.

Instead, take a proactive approach. Do the following:

- Do carefully analyze your NBRC score report.
- Do use your score report to prioritize content areas needing further study.

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- Do revisit the key-content-area resources we provide in the book and online.
- Do give yourself adequate time to implement your new study plan (at least 3–4 weeks).

Last, if you want or need access to regularly updated content, additional practice written tests based on larger pools of NBRC-like questions, and additional CSE practice problems (more than 30 in total), we recommend that you consider the *RTBoardReview.net* review course available online at <http://rtboardreview.net>.

CSE Test Preparation

To be eligible to take the CSE, you must first score at the RRT level (upper cut score) on the NBRC TMC examination. Although there currently is no “published” RRT-level cut score, you should strive to achieve a TMC score of at least 67 to 70% if you expect to qualify for the CSE.

If you achieve the RRT cut score on the TMC, you can then go ahead and schedule the CSE exam. *Don't make the mistake of immediately attempting the CSE!* As emphasized in Chapter 18, we strongly recommend that you also devote at least 3 to 4 weeks to preparing for the CSE. Besides avoiding the anxiety caused by last-minute preparation, this approach lets you apply your TMC results to your study plan.

As previously discussed, the CSE shares the same topical content as is covered on the TMC examination. Consequently, preparation for the CSE should begin with a review of all 17 Section I book chapters. As discussed in Chapter 18, you should use your TMC results to identify the topics needing the most attention, and then proceed with their review.

However, the topical review should *not* be the primary focus of your CSE preparation. Why? There are three reasons. First, to be eligible for the CSE, you already had to demonstrate topical content mastery by passing the TMC at the RRT level. Second, *the primary focus of the CSE is case management, not topical knowledge*. Third, the CSE's structure requires that you develop and apply special test-taking skills specific to its unique test format.

In terms of case management, we recommend that you devote most of your time to reviewing the management of specific cases likely to appear on the CSE. Chapter 18 applies this important information and outlines our recommendations on the resources you should use to strengthen your case-management knowledge.

In regards to test-taking proficiency, the unique format of the CSE requires a different set of skills from those needed to succeed on multiple-choice exams (the test-taking tips covered in Appendix B). For this reason, we provide a separate chapter designed to help you develop CSE-specific testing proficiency (Chapter 19). You should review these tips before working through the online practice simulation problems.

To give you experience with the CSE format and help you apply the case-management and CSE test-taking skills, the Navigate 2 Premier Access provides 15 practice simulation problems. If you score poorly on any individual practice problem or consistently have difficulty with either information gathering or decision making, we recommend that you review the test-taking skills in Chapter 19 and the corresponding case-management “pearls” provided in Chapter 20. Then retake the applicable practice problems until you achieve the required minimum passing scores.

After completing the practice problems and applying their results to your exam preparation, it is time to take the NBRC CSE. The same general guidance we recommend for scheduling and taking the NBRC TMC applies to the CSE.