Competencies Needed by Graduate Respiratory Therapists in 2015 and Beyond

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The American Association for Respiratory Care has established a task force to identify potential new roles and responsibilities of respiratory therapists (RTs) in 2015 and beyond. The first task force conference confirmed that the healthcare system in the United States is on the verge of dramatic change, driven by the need to decrease costs and improve quality. Use of evidence-based protocols that follow a nationally accepted standard of practice, and application of biomedical innovation continue to be important competency areas for RTs. The goal of the second task force conference was to identify specific competencies needed to assure safe and effective execution of RT roles and responsibilities in the future. The education needed by the workforce to assume the new responsibilities emerging as the healthcare system changes starts with a close look at the competencies that will be needed by graduate RTs upon entry into practice. Future specialty practice areas for experienced RTs are identified without defining specific competencies. We present the findings of the task force on the competencies needed by graduate RTs upon entry into practice in 2015. *Key words: respiratory care; respiratory therapist; manpower; education; training; competency; licensure; credentialing; accreditation; credentials; specialty; protocols.* [Respir Care 2010;55(5):601–616.

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Robert M Kacmarek PhD RRT FAARC has disclosed relationships with Covidien, Dräger, Hamilton, General Electric, Newport, and Maquet. Woody V Kageler MD MBA has disclosed a relationship with Nurtur. The other authors have disclosed no conflicts of interest.

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Introduction

The American Association for Respiratory Care (AARC), the professional organization for respiratory therapists (RTs), is sponsoring a project to help ensure the competency and future of the respiratory therapy workforce. The 2015 and Beyond project has brought together stakeholders representing employers, insurers, professional organizations, foundations, state and federal government agencies, patients and consumers, the education community, accrediting and credentialing agencies, and state licensure boards. This process is examining how the profession needs to change to meet the demands of patient care in the future. The 2015 conferences have assumed the difficult task of identifying changes needed to enable the current education system to produce RTs with the skills, knowledge, and competencies necessary to provide optimal care in 2015 and beyond. To achieve these goals, 3 conferences were developed. The first conference, Creating a Vision for Respiratory Care in 2015 and Beyond, held in March 2008, created a foundation for the following 2 conferences by projecting how the changing healthcare delivery system will need to respond to patient needs within the context of diagnosis, treatment, and management of patients with acute and chronic respiratory disorders.

The first conference[1] reported that healthcare in general is expected to undergo marked changes as the country adjusts to its increasing population, large numbers of Baby Boomers turn 65 years old,[2] and attempts are made to improve quality while decreasing the overall cost of healthcare. It is expected that there will be increased emphasis on managing chronic care, wellness, and prevention.[3] An increasing proportion of care in the future will be delivered in lower-cost environments.[4] The introduction of technology will provide greater access to knowledge and enable the public to make more informed choices about their healthcare.[5]

Maintaining a sufficient number of highly skilled healthcare workers will become an increasing challenge. Clinical demands will increase the need for highly skilled practitioners faster than the workforce can expand.[6] The aging of the current workforce will compound this problem. A shortage of respiratory therapy faculty may limit the numbers of students that can enter college and university programs.[6]

The information age of the future will be replete with changes in the scope of practice. The science of respiratory care will continue to expand at the same pace as medicine. Projections regarding the profession must incorporate new technology, new therapeutic approaches, and data-management skills, which the future RT will need to be successful in the workplace. Clinical decisions will be increasingly data driven; with evidence-based medicine guiding the activities of the therapist.[7] The need for therapists to be actively involved in research will continue to grow. The use of protocols to guide respiratory care within and outside the intensive care unit (ICU) will continue to expand.[1] Respiratory care technology will expand, and ven-

Table 1. Conference Program Presentations

Topic	Speaker(s)
Welcome and Introductory Remarks	Sam P Giordano MBA RRT FAARC, American Association for Respiratory Care
Outcomes of the First Conference	Robert M Kacmarek PhD RRT FAARC, Massachusetts General Hospital, Boston, Massachusetts John R Walton MBA RRT FAARC, Resurrection Health Center, Chicago, Illinois
Educating the Future Respiratory Therapist Workforce: Identifying the Options, Planning Assumptions, and Questions to Be Answered	Thomas A Barnes EdD RRT FAARC, Northeastern University, Boston, Massachusetts Woody V Kageler MD MBA, Tarrant County College, Hurst, Texas
Review of Competencies and Supporting Roles Defined in the First Conference	Thomas A Barnes EdD RRT FAARC, Northeastern University, Boston, Massachusetts
Delivery of Respiratory Therapy Via Protocol	Lynda T Goodfellow EdD RRT FAARC, Georgia State University, Atlanta, Georgia
Delivery of Respiratory Therapy to Critically Ill Patients	Robert M Kacmarek PhD RRT FAARC, Massachusetts General Hospital, Boston, Massachusetts
Delivery of Respiratory Therapy to Chronically Ill Patients	David L Vines MSHS RRT FAARC, Rush University, Chicago, Illinois
A View From the Top: How Healthcare Executive Decisions Impact Workforce Mix	Lynn LeBouef BSRC RRT, Tomball Regional Medical Center, Tomball, Texas
Historical and Present-Day Trends in Health Science Accreditation	David D Gale PhD, Eastern Kentucky University, Richmond, Kentucky
Current and Future Accreditation of Respiratory Therapists	Shelley C Mishoe PhD RRT FAARC, Committee on Accreditation of Respiratory Care
Current and Future Credentialing of Respiratory Therapists	Sherry L Barnhart RRT-NPS FAARC, National Board for Respiratory Care
Current and Future Licensing of Respiratory Therapists	Christopher H Logsdon MBA RRT, Ohio Board for Respiratory Care
Taxonomy of Entry and Advanced Level Competencies	Robert L Williams PhD, University of Georgia, Athens, Georgia

tilators will become more sophisticated and incorporate more closed-loop control modes of ventilation. Enhanced monitoring techniques will be incorporated into the basic operation of the mechanical ventilator.[1] An explosion of drugs delivered via aerosol and aerosol devices are on the verge of clinical availability.[1] Drugs affecting many organ systems as well as gene-replacement therapy will be delivered via aerosol.[8] Simpler and more efficient extracorporeal gas-exchange devices will continue to be developed. Care teams will become the standard for providing care in the hospital. These teams may frequently be led by therapists. Therapists will become increasingly involved in patient and staff education, disease management, and the provision of respiratory care in the home.

The second AARC conference, Educating the Future Respiratory Therapist Workforce: Identifying the Options, was similar in format to the first conference.[1] The goal of the second conference was to identify and reach a general agreement on the competencies required to fulfill the scope of practice described in the first conference for graduate RTs and the RT workforce. Graduate RTs are defined as those who begin practice immediately after completion of an accredited education program. The RT workforce is defined as practitioners with varying amounts of work experience and number of credentials. The assumption, taken by the second conference attendees, is that the workforce must be at least as competent as the new graduate RT in 2015. The third conference will be held in 2010. The goal of this conference will be to agree on a plan that ensures by 2015 the RT workforce and graduates of RT education programs have developed the competencies identified by the second conference.

Methods

The genesis, planning, and goals for the 3 AARC conferences on the future of respiratory care have previously been described.[1] The second conference, held in Dallas, Texas, on April 6-8, 2009, started with presentations (Table 1) designed to facilitate discussion from 42 stakeholder representatives in attendance (Appendix 1). Appendix 2 lists the stakeholders who were invited to participate in the conference by the Task Force on the Future of Respiratory Care (Appendix 3). The conference started with presentations about respiratory care practice, education, certification, licensure, and professional roles for the RTs in the future. Following the last presentation, 6 small groups, guided by a facilitator, identified graduate therapist and specialty competencies needed in 2015. The goal of the small groups was to identify the competencies needed by new graduate RTs in 2015 and to identify the minimum competencies required of experienced RTs. Each participant in the 6 small groups wrote, without speaking, on 5 × 8-inch index cards the competencies they thought were needed by graduates in 2015. The competency cards were then discussed, one at a time, and placed on a white sticky board. Similar items were grouped together and discussed until a consensus was reached on competencies that were needed by graduate RTs in 2015. The same consensus strategy was used in the small group meetings to identify specialty practice areas. Complete transcription of the competency statements generated in each small group were prepared overnight and distributed to the entire group on the last morning of the conference. In the plenary session, the composite of 6 small group clusters of competencies was presented on a large white board, discussed and refined until general agreement was reached. Next, small groups provided competency definitions in each major area. An edited version of the competencies developed during the conference was distributed to all conference participants. The conference attendees were asked to complete a Web-based survey designed to register their approval or disapproval with 73 competencies needed by graduate therapists and the RT workforce in 2015. The survey used a 5-category Likert design (5 = strongly agree, 4 = agree, 3 = undecided, 2 = disagree, 1 = strongly disagree) to determine the extent of approval with the competency definitions. Point values for each Likert cat-

Table 2. Competency Area I: Diagnostics*

Descriptor	Definition
A. Pulmonary Function Technology	1. Perform basic spirometry, including adequate coaching, recognition of improperly performed maneuvers, corrective actions, and interpretation of test results.
	2. Compare and evaluate indications and contraindications for advanced pulmonary function tests (plethysmography, diffusion capacity, esophageal pressure, metabolic testing, and diaphragm stimulation) and be able to recognize normal/abnormal results.
B. Sleep	1. Compare and evaluate the indications and contraindications for sleep studies.
	2. Understand results in relation to types of respiratory sleep disorders.
C. Invasive Diagnostic Procedures	1. Explain the indications and contraindications, and general hazards and complications of bronchoscopy.
	2. Describe the bronchoscopy procedure and describe the respiratory therapist's role in assisting the physician.
	3. Monitor and evaluate the patient's clinical condition with pulse oximetry, electrocardiogram, exhaled gas analysis, and other related diagnostic devices.
	4. Perform arterial puncture and sampling and blood analysis.

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.

Table 3. Competency Area II: Disease Management*

Descriptor	Definition
A. Chronic Disease Management	1. Understand the etiology, anatomy, pathophysiology, diagnosis, and treatment of cardiopulmonary diseases (eg, asthma, chronic obstructive pulmonary disease) and comorbidities. 2. Communicate and educate to empower and engage patients. 3. Develop, administer, and re-evaluate the care plan: a. Establish specific desired goals and objectives. b. Evaluate the patient. c. Apply a working knowledge of the pharmacology of all organ systems. d. Provide psychosocial, emotional, physical, and spiritual care. e. Education on nutrition, exercise, wellness. f. Environmental assessment and modification. g. Monitoring and follow-up evaluation. h. Development of action plans. i. Apply evidence-based medicine, protocols, and clinical practice guidelines. j. Monitor adherence through patient collaboration and empowerment, including proper and effective device and medication utilization. k. Implement and integrate appropriate patient-education materials and tools. l. Utilize appropriate diagnostic and monitoring tools. m. Document and monitor outcomes (economic, quality, safety, patient satisfaction). n. Communicate, collaborate, and coordinate with physicians, nurses, and other clinicians. o. Assess, implement, and enable patient resources support system (family, services, equipment, personnel). p. Ensure financial/economic support of plan/program and related documentation.
B. Acute Disease Management	1. Develop, administer, evaluate, and modify respiratory care plans in the acute-care setting, using evidence-based medicine, protocols, and clinical practice guidelines. 2. Incorporate the patient/therapist participation principles listed in chronic disease management (see IIA.).

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.

egory were assigned only for data analysis purposes to determine the median approval level, and were not shown on the survey form. General agreement on competencies was determined by > 80% of the survey respondents indicating approval or strong approval of the item. The survey was available online to conference participants for 37 days. Three e-mail reminders were sent to improve the response rate.

Results

Large and small group meetings at the conference developed definitions of competencies needed by graduate therapists and the RT workforce in 2015 (Tables 2–11). The results reported are for graduate competency, with the understanding that the workforce must also have, at a minimum, the same knowledge, skills, and attributes. A Web-based survey designed to record approval or disapproval with the competency definitions was completed by 28 (76%) of 37 eligible conference participants (5 AARC staff members were excluded). An 80% or higher approval was used to determine general agreement on 69 of the 73 competency definitions on the survey (Table 12). Limited agreement was reached on 4 competency definitions that were approved by only 61–72% of the survey respondents (Table 13). The sense of the group was that, upon entry into practice in 2015, a graduate RT and RTs already in the workforce must possess 69 competencies in 7 major areas (see Tables 2–11):

Table 4. Competency Area III: Evidence-Based Medicine and Respiratory Care Protocols*

Descriptor	Definition
A. Evidence-Based Medicine	1. Review and critique published research. 2. Explain the meaning of general statistical tests. 3. Apply evidence-based medicine to clinical practice.
B. Respiratory Care Protocols	1. Explain the use of evidence-based medicine in the development and application of hospital-based respiratory care protocols. 2. Evaluate and treat patients in a variety of settings, using the appropriate respiratory care protocols.

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.

Table 5. Competency Area IV: Patient Assessment*

Descriptor	Definition
A. Patient Assessment	1. Complete the assessment through direct contact, chart review, and other means as appropriate, and share the information with healthcare team members.
	2. Obtain medical, surgical, and family history.
	3. Obtain social, behavioral, and occupational history, and other historical information incident to the purpose of the current complaint.
B. Diagnostic Data	1. Review and interpret pulmonary function studies (spirometry).
	2. Review and interpret lung volumes and diffusion studies.
	3. Review and interpret arterial blood gases, electrolytes, complete blood cell count, and related laboratory tests.
C. Physical Examination	1. Inspect the chest and extremities to detect deformation, cyanosis, edema, clubbing, and other anomalies.
	2. Measure vital signs (blood pressure, heart rate, respiratory rate).
	3. Evaluate patient breathing effort, ventilatory pattern, and use of accessory muscles.
	4. Measure and document oxygen saturation with oximetry under all appropriate conditions (with or without oxygen at rest and during sleep, ambulation, and exercise).

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.

Table 6. Competency Area V: Leadership*

Descriptor	Definition
A. Team Member	Understand the role of being a contributing member of organizational teams as it relates to planning, collaborative decision making, and other team functions.
B. Healthcare Regulatory Systems	Understand fundamental/basic organizational implications of regulatory requirements on the healthcare system.
C. Written and Verbal Communication	Demonstrate effective written and verbal communication with various members of the healthcare team, patients, families, and others (cultural competence and literacy).
D. Healthcare Finance	Demonstrate basic knowledge of health-care and financial reimbursement systems and the need to reduce the cost of delivering respiratory care.
E. Team Leader	Understand the role of team leader: specifically, how to lead groups in care planning, bedside decision making, and collaboration with other healthcare professionals.

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.

- Diagnostics
- Disease management
- Evidence-based medicine and respiratory care protocols
- Patient assessment
- Leadership
- Emergency and critical care
- Therapeutics

Also identified in small group meetings at the conference were competencies in specialty areas of respiratory care practice where board certification examinations exist to document competency (Table 14). An attempt to reach general agreement on specialty areas of respiratory care practice needed in 2015 was not made.

Discussion

How Healthcare Executive Decisions Impact the Workforce

Almost a "perfect storm" was the descriptor used by a hospital chief executive at the second conference to describe the impact of the economy on healthcare delivery.[9,10] Many hospital administrators believe the healthcare financing system is broken. Medicare payments have been declining since 2000. To survive economic difficulties, hospitals are taking steps to increase productivity and enhance quality by consolidating staff functions (Table 15).[9] Due to the shortage of nurses, healthcare workers are being asked to take a larger supportive role as adjuncts to traditional nursing functions. Case management and disease management are examples where non-nursing staff, including RTs, have begun to assume new responsibilities. Understanding and implementation of evidenced-based protocols and best practices are important competencies for these expanded duties. Skills as patient educators and a perspective on healthcare outside of technical areas are needed to support these expanded responsibilities (see Table 3). Strategies for reducing healthcare costs, such as increasing productivity, consolidation of service lines, and a greater emphasis on wellness are needed.

The respiratory care profession is in a better position than most to assume new roles (eg, rapid response teams throughout the United States have an RT as one of only 3 or 4 team members). Respiratory distress has been reported to be the highest reason (36%) for rapid response calls.[11] Hospital administrators have observed that RTs can make a difference on a rapid response team by improving oxygenation and ventilation, thereby avoiding cardiac arrest and adding intensive care cost to the system.[11] Hospital administrators need a therapist who can follow the patient until discharge, provide patient education, de-

Table 7. Competency Area VI: Emergency and Critical Care*

Descriptor	Definition
A. Emergency Care	1. Perform basic life support (BLS), advanced cardiovascular life support (ACLS), pediatric advanced life support (PALS), and neonatal resuscitation program (NRP) according to American Heart Association (AHA) guidelines.
	2. Maintain current AHA certification in BLS and ACLS.
	3. Perform endotracheal intubation.
	4. Perform as a member of the rapid response team (medical emergency team).
	5. Participate in mass-casualty staffing to provide airway management, manual and mechanical ventilatory life support, medical gas administration, aerosol delivery of bronchodilators and other agents in the resuscitation of respiratory and cardiovascular failure.
	6. Provide intra-hospital transport of critically and chronically ill patients, provide cardiopulmonary life support and airway control during transport.
	7. Apply knowledge of emergency pharmacology and demonstrate ability to recommend use of pharmacotherapy.
B. Critical Care	1. Apply to practice knowledge, understanding, and analysis of invasive and noninvasive mechanical ventilators.
	2. Apply to practice all ventilation modes currently available on all invasive and noninvasive mechanical ventilators, as well as all adjuncts to the operation of modes.
	3. Interpret ventilator data and hemodynamic monitoring data, and calibrate monitoring devices.
	4. Manage airway devices and sophisticated monitoring systems.
	5. Make treatment recommendations based on waveform graphics, pulmonary mechanics, and related imaging studies.
	6. Apply knowledge, understanding, and analysis of use of therapeutic medical gases in the treatment of critically ill patients.
	7. Apply knowledge and understanding of circulatory gas exchange devices to respiratory therapy practice.
	8. Participate in collaborative care management based on evidence-based protocols.
	9. Deliver therapeutic interventions based on protocol.
	10. Integrate the delivery of basic and/or advanced therapies in conjunction with or without the mechanical ventilator in the care of critically ill patients.
	11. Make recommendations and provide treatment to critically ill patients based on pathophysiology.
	12. Recommend cardiovascular drugs based on knowledge and understanding of pharmacologic action.
	13. Use electronic data systems in practice.

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.

velop a care plan, manage each case individually, and work with the physician to move the patient through the system as quickly as possible. In an environment of cost-containment, administrators will expect RTs to be comfortable with patient information, to know what to do with it, to adapt to a rapidly changing environment, and be willing to take on additional responsibilities. A competent RT workforce in 2015 and beyond must focus on: improving quality and reducing costs through utilization of evidence-based practice protocols and improving patient movement across the continuum of care. The workforce will soon be asked to assume new responsibilities, and RT graduates will enter a profession with an expanded scope of practice. The second AARC conference has identified 69 competencies that will be expected of the graduate RT in 2015 and beyond (see Tables 2–11).

Graduate Respiratory Therapist Competencies Needed in 2015

The second conference worked with the limitation of trying to achieve consensus among a large group of attendees. The decision to use a "general agreement" approach was deemed reasonable if a high threshold was used ($>$ 80% approval for each competency definition). This strategy yielded 4 competency definitions (see Table 13) that received only "limited agreement" (approval by 61–72% of the attendees who completed the post-conference online survey). We believe that these 4 competency definitions were either too broad (in the case of IC5 Invasive Procedures and IVB4 Diagnostic Data) or fell into specialty practice areas (in the case of IA3 Cardiopulmonary Exercise Studies and IB3 Evaluate Sleep Study Results).

There was general agreement on the other 69 competencies needed by graduate RTs. The sense of the group was that graduates in 2015 must be better prepared to enter the workforce and provide basic and critical respiratory care than graduates of today. Graduate therapists must be able to fully operate ICU ventilators and discuss all commonly used modes of ventilation as well as their indications and limitations. They must be able to provide ventilator care based on protocols. Graduate RTs must be capable of operating and applying new approaches to patient monitoring that are currently being researched. They must fully understand the tenets of evidence-based medicine, including the ability to critically read and critique the medical literature and discuss the meaning of statistical

Table 8. Competency Area VII: Therapeutics*†

Descriptor	Definition
A. Assessment of Need for Therapy	Assess the need for therapies in all patient settings (acute, non-acute): 1. Medical gas therapy 2. Humidity therapy 3. Aerosol therapy 4. Hyperinflation therapy 5. Bronchial hygiene therapy 6. Airway management 7. Mechanical ventilation
B. Assessment Prior to Therapy	1. Review order or implement protocol. 2. Review patient history, laboratory results, imaging data. 3. Determine indications for therapy. 4. Interview and conduct physical examination of patient. 5. Determine appropriateness of order. 6. Determine need for physician communication.
C. Administration of Therapy	1. Select and assemble equipment. 2. Apply and administer therapy. 3. Educate and instruct patient. 4. Recognize and rectify equipment malfunction (troubleshooting). 5. Maintain infection control.
D. Evaluation of Therapy	1. Recognize complications and adverse affects. 2. Respond to complications. 3. Recommend therapy modifications. 4. Assess therapy effectiveness. 5. Document therapy.

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.
† See Tables 9–11 for application of competencies to respiratory care practice.

analysis. Therapists must have a broad understanding of pharmacology for all organ systems and a detailed knowledge of drugs delivered via the respiratory system. A working knowledge of the clinical management of all forms of cardiopulmonary disease is essential for all new graduates. They must have a working proficiency of sleep medicine, disease management, alternate-site respiratory care, and home care. Therapists must continue to be able to administer and interpret the results of basic respiratory care techniques, pulmonary function, radiographic, and laboratory studies. The graduate RT in 2015 must be proficient as a member of a care team and must understand leadership characteristics as well as be proficient in patient and staff education techniques and the provision of culturally sensitive care, and be ready to assume a patient advocate role when appropriate. The graduate therapist must be prepared to actively participate in planning patient care, by providing direction and input into the decisions regarding the provision of respiratory care in all care settings. Graduate RTs must understand that their role is to be an expert on respiratory care and they must possess the ability to consult on the provision of respiratory care. There was general agreement (70% strongly agreed, 23% agreed) among the conference participants that delivery of respiratory therapy via protocol would become more widely adapted by the RT workforce by 2015 (see Tables 4 and 12).

The Need for Delivery of Respiratory Therapy Via Protocol

The delivery of respiratory care via protocol is directly linked to evidence-based medicine and control of quality and cost of healthcare delivery.[1] The second conference took protocols a step further and identified the competencies needed to deliver respiratory care via protocol. RTs of 2015 should be able to explain the use of evidence-based medicine in the development and application of hospital-based respiratory care protocols, and be able to evaluate and treat patients in a variety of settings, using appropriate respiratory care protocols (see Table 4). Delivery of respiratory therapy via protocol has been defined by the AARC Protocol Implementation Committee as "Initiation or modification of a patient care plan following a predetermined, structured set of physician orders, instructions or interventions in which the therapist is allowed to initiate, discontinue, refine, transition, or restart therapy as the patient's medical condition dictates."[12] Protocols for delivery of respiratory therapy were first described by Tietsort in 1981, as a new therapy delivery system.[13] Nearly 3 decades later, the use of a comprehensive protocol service is considered an important characteristic of change readiness in RT departments.[14] The technology and medical advances that the RT will encounter in 2015 will require the ability to recommend changes in respiratory therapy protocols.[1] To do this, RTs will need to understand the principles of evidence-based medicine and to identify when protocols need to be updated based on the best evidence reported from randomized controlled trials.[15] Following established evidence-based medicine protocols does not remove the need for critical thinking and problem solving by RTs.[16]

Graduate therapists need to begin RT practice with excellent critical thinking skills, to deal with complex technology and protocols (see Tables 7 and 16). Problem solving skills are needed to calibrate, operate, and troubleshoot complex technology, such as microprocessor-driven, multimode mechanical ventilators and other sophisticated life-support equipment.[1] Patient management decisions must be made when using RT protocols such as evidence-based ventilator weaning.[16] When a patient fails a weaning trial, critical thinking decisions must include a search for other causes or complicating factors such as adequacy of pain control, appropriateness of sedation, fluid status, bronchodilator need, and control of myocardial ischemia and other disease processes

Table 9. Competency Area VII: Therapeutics - Application to Respiratory Care Practice*

Descriptor	Definition
A. Medical Gas Therapy	Apply knowledge, understanding, and troubleshooting skills to gas delivery systems for adult, pediatric, and neonatal patients. 1. High-pressure cylinders 2. Regulators and flow meters 3. Liquid-oxygen systems (stationary and portable) 4. Oxygen concentrators (stationary and portable) 5. High-flow air-entrainment systems (eg, Downs flow generator, Caradyne Whisper Flow, Maxtec) 6. Oxygen and air-flow-meter mixing systems (requires competence in algebra) 7. Air/oxygen blenders 8. Hyperbaric oxygen systems 9. Sub-ambient oxygen delivery systems (neonatal only) 10. Nasal cannulas 11. High-flow nasal cannulas (eg, Vapotherm, Aequinox, Maxtec) 12. Reservoir cannulas 13. Nasal masks 14. Non-reservoir masks 15. Reservoir masks 16. Air-entrainment masks 17. Hood/head-enclosures (neonatal only) 18. Aerosol mist tents 19. Transtracheal oxygen therapy 20. Nitric oxide therapy 21. Helium/oxygen therapy
B. Humidity Therapy	Apply knowledge, understanding, and troubleshooting skills to humidity therapy systems for adult, pediatric, and neonatal patients. 1. Unheated bubble humidifiers 2. Active and passive heat-and-moisture exchangers (HMEs) 3. Heated humidifiers for medical gas delivery systems via mask or tracheal catheter

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.

that can affect discontinuation attempts.[1] Randomized controlled trials have established that the economic and clinical outcomes of mechanically ventilated patients managed under protocols by RTs were better than those of control patients managed with standard care.[17-19] The use of protocol-driven ventilator weaning by RTs has been shown to reduce use of mechanical ventilation, rate of early re-intubation, and ventilator-associated pneumonia.[20,21]

RTs in 2015 must assume greater responsibility for acute and chronic disease management (see Tables 3 and 6), in order to reduce the cost of healthcare.[22] The necessary critical thinking skills can be broken down into 3 domains: technology, patients, and clinicians (Table 17).[23] Further delineation of critical thinking skills needed by RTs has been identified by Mishoe, in 7 key areas: prioritizing, anticipating, trouble-shooting, communicating, negotiating, decision making, and reflecting (see Table 16).[23] A high level of critical thinking skills and the ability to apply the appropriate best-practice protocols was identified by both AARC conferences as a requisite for treatment of critically ill patients in ICUs and emergency departments.

Respiratory Care Delivered to Critically Ill Patients by Respiratory Therapists

Respiratory care delivered to critically ill patients by RTs was identified in the first conference as a major competency area.[1] The second conference explored in more detail the competencies needed by RTs in the future to deliver respiratory care to critically ill patients (see Table 7). Increasingly more sophisticated care and equipment is the hallmark of intensive care. The graduate RT must be prepared to enter this work environment as the expert on respiratory care and be ready to consult on the provision of respiratory care. This requires a working knowledge of the approaches used to provide mechanical ventilation to patients with various disease states (eg, chronic obstructive pulmonary disease, acute lung injury/acute respiratory distress syndrome, sepsis, trauma, postoperative care, asthma, and pneumonia).[18] Operational proficiency with a variety of mechanical ventilators used in adult and pediatric ICUs is essential. The graduate therapist must understand the differences among these ventilators, and be capable of

Table 10. Competency Area VII: Therapeutics - Application to Respiratory Care Practice*

Descriptor	Definition
C. Aerosol Therapy	Apply knowledge, understanding, and troubleshooting skills to aerosol systems for adult, pediatric, and neonatal patients. 1. Non-medicated (water/saline): Large-volume pneumatic nebulizers, via mask, T-piece, or tracheostomy collar; heated and unheated 2. For delivery of medication a. Small-volume pneumatic nebulizers for nebulization of liquids b. Intermittent c. Breath-actuated d. Nebulizers for bronchial challenge testing 3. Nebulizers for continuous nebulization 4. Ultrasonic nebulizers 5. Pressurized metered-dose inhalers 6. Inhalers and dry-powder inhalers 7. Nebulizers using porous membranes 8. Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: a. Adrenergics b. Anticholinergics, cholinergics c. Decongestants, antimicrobials d. Mucolytic/proteolytics e. Pulmonary vasodilators 9. Peak flow meters and inspiratory flow meters 10. Mathematics required: competency in algebraic calculation of and modification of drug dosing: (1) based on weight of patient; (2) conversion of dosing based on mg, mL, and % strength or ratio
D. Hyperinflation Therapy	Apply knowledge, understanding, and troubleshooting skills to hyperinflation equipment for adult, pediatric, and neonatal patients. 1. Incentive spirometers (flow-based and volume-based) 2. Continuous positive airway pressure (CPAP) devices 3. Expiratory positive airway pressure (EPAP) devices 4. Intermittent positive-pressure breathing devices 5. Manual hyperinflation with bag-valve-mask devices

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.

discussing the positives and negatives of each unit. They must have a working knowledge of common modes of ventilation currently available on all mechanical ventilators. Graduate therapists must be proficient in the operation of these modes and understand the physiology supporting the use of each mode so that they can lead discussions on appropriate application. They must have a working knowledge of the indications, contraindications, risks, and benefits of each mode of ventilation.[21]

RTs must be able to apply evidence-based protocols to the management of mechanically ventilated patients (eg, the Acute Respiratory Distress Syndrome Network protocol, see Table 7).[19] Critical thinking and communication skills to discuss their position on the care of patients during rounds and to advocate for the best approach to respiratory care for the specific patient are essential.[23] Interaction with the ICU patient care team requires an in-depth working knowledge of evidence-based medicine.[15] The large number of randomized controlled trials in respiratory critical care requires the graduate to have the ability to critically review the literature and to critique the statistical methodology used to evaluate study results.[13]

In addition to a working knowledge of classic invasive mechanical ventilation, the graduate therapist must possess the ability to differentiate between the indications for invasive and noninvasive ventilation and high-frequency oscillation. They must also recognize the indications for rescue therapies such as extracorporeal membrane oxygenation. The therapist should be relied upon as an expert source of information on when and how these techniques should be applied.[18]

Essential to the care of critically ill patients is a broad knowledge of the various approaches to monitoring. This includes laboratory, radiograph, computed tomography, and magnetic resonance imaging data, and bedside monitoring data (Tables 2 and 5).[1] The graduate therapist must be proficient in the monitoring of hemodynamics and must be able to evaluate pressure, flow, and volume waveforms to determine how the mechanical ventilator should be adjusted, and have the ability to recommend alternate modes

Table 11. Competency Area VII: Therapeutics - Application to Respiratory Care Practice*

Descriptor	Definition
E. Bronchial Hygiene Therapy	Apply knowledge, understanding, and troubleshooting skills to bronchial hygiene therapy for adult, pediatric, and neonatal patients. 1. Positioning for bronchial drainage 2. Chest percussion: manual and mechanical percussor 3. Vibratory continuous positive airway pressure (CPAP) 4. Expiratory positive airway pressure (EPAP) devices 5. External chest-wall-vibration devices 6. Assist physician in therapeutic bronchoscopy 7. Intrapulmonary percussive ventilation (IPV) 8. Cough-assist device (insufflator-exsufflator)
F. Airway Management	Apply knowledge, understanding, and troubleshooting skills to airway management for adult, pediatric, and neonatal patients. 1. Head-tilt chin-lift airway-opening maneuver 2. Oropharyngeal airway 3. Nasopharyngeal airway 4. Face mask and bag-valve-mask 5. Care of oral and nasal endotracheal tubes 6. Competency in advising discontinuance or change to alternative airway based on assessment/protocols 7. Care of tracheostomy tube (competency in advising decannulation or change to alternative airway based on assessment/protocols) 8. Care of tracheostomy "button" or valve 9. Assist physician in placing surgical or percutaneous tracheostomy tube. 10. Suction via artificial airway, operate suction system, select suction catheter.
G. Mechanical Ventilation	Apply knowledge, understanding, and troubleshooting skills to mechanical ventilation for adult, pediatric, and neonatal patients. 1. Incorporate the mechanical ventilation principles listed in critical care (see Table 7 VIB) 2. CPAP devices 3. Bi-level positive airway pressure (BiPAP) devices 4. Noninvasive-ventilation interfaces: nasal mask, nasal pillows, oro-nasal mask, full-face mask, helmet

* Upon entry into the workforce, a graduate respiratory therapist must possess all of these competencies.

of ventilation to improve patient-ventilator synchrony. The graduate therapist should be conversant in new monitoring technology.

In the ICU, a working knowledge of pharmacology is required: specifically, an understanding of drugs that affect the patient's interaction with the mechanical ventilator, and agents used to treat cardiovascular dysfunction. A highly proficient knowledge of drugs that affect the respiratory system is critical. A graduate therapist must be able to modify respiratory care based on integration of data from the patient, the ventilator, hemodynamic monitors, laboratory reports, and radiographs. Competency to practice respiratory therapy in 2015 and beyond will continue to be certified by credentialing and licensure boards to protect the public.

Credentialing of Respiratory Therapists to Certify Competency

Graduate RTs are currently required to take 3 examinations to become a registered RT (RRT).[25] First they must pass the CRT examination and be recognized as a Certified Respiratory Therapist. This examination is also used by most states as the state licensure examination. Upon successful completion of the CRT examination, graduate therapists are expected to take the RRT examination. The RRT examination is taken in 2 parts: a written multiple-choice examination, followed by a clinical simulation examination. Specialty credentialing is also currently available in pulmonary function technology, neonatal/pediatric respiratory care, and sleep-disorders testing and therapeutic intervention (see Table 14).[26]

While most graduates of respiratory therapy programs take the CRT examination, a smaller percentage take the RRT examination. As of 2008, 115,583 individuals have received the RRT credential, and 94,638 therapists hold the CRT credential (all RRTs also hold the CRT credential). The current 2-tier credentialing system and state laws that require successful completion of only the CRT examination for licensure offer insufficient incentives to graduating RTs to demonstrate competency in areas tested by the RRT examinations. In 2003, the AARC, the Commis-

Table 12. Competencies on Which General Agreement Was Reached by the Second Conference Attendees*

Competency Area†	Questions (n = 73)	Respondents (n, %)	Likert-Scale Scores (n, %)‡					Median	Min	Max	Total Score§
			Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree				
I. Diagnostics											
A. Pulmonary function technology‖	3	28 (76)	47 (56)	21 (25)	9 (11)	7 (8)	0 (0)	5	2	5	84
B. Sleep‖	3	28 (76)	30 (36)	43 (51)	5 (6)	6 (7)	1 (1)	4	1	5	84
C. Invasive procedures‖	5	28 (76)	100 (71)	27 (19)	9 (6)	3 (2)	1 (1)	5	1	5	140
II. Disease Management											
A. Chronic	3	28 (76)	64 (76)	18 (21)	1 (1)	1 (1)	0 (0)	5	2	5	84
B. Acute	3	28 (76)	41 (76)	10 (18)	5 (9)	0 (0)	0 (0)	5	3	5	84
III. Evidence-Based Medicine and Respiratory Care Protocols											
A. Evidence-based medicine	3	28 (76)	46 (55)	24 (29)	7 (8)	5 (6)	2 (2)	5	1	5	84
B. Respiratory care protocols	2	28 (76)	39 (70)	13 (23)	4 (7)	0 (0)	0 (0)	5	3	5	56
IV. Patient Assessment											
A. Patient assessment	3	28 (76)	68 (81)	11 (13)	5 (6)	0 (0)	0 (0)	5	3	5	84
B. Diagnostic data‖	4	27 (73)	74 (68)	21 (19)	8 (7)	5 (5)	0 (0)	5	2	5	108
C. Physical examination	4	27 (73)	104 (96)	4 (4)	0 (0)	0 (0)	0 (0)	5	4	5	108
V. Leadership											
A. Team member	1	28 (76)	24 (86)	3 (11)	1 (4)	0 (0)	0 (0)	5	3	5	28
B. Healthcare regulatory system	1	28 (76)	15 (54)	11 (39)	1 (4)	1 (4)	0 (0)	5	2	5	28
C. Written and verbal communication	1	28 (76)	26 (93)	2 (7)	0 (0)	0 (0)	0 (0)	5	4	5	28
D. Healthcare finance	1	28 (76)	16 (57)	8 (29)	3 (11)	1 (4)	0 (0)	5	2	5	28
E. Team leader	1	28 (76)	19 (68)	4 (14)	3 (11)	1 (4)	1 (0)	5	1	5	28
VI. Emergency and Critical Care											
A. Emergency care	7	27 (73)	139 (74)	37 (20)	9 (5)	4 (2)	0 (0)	5	2	5	189
B. Critical care	13	26 (70)	252 (75)	61 (18)	17 (5)	8 (2)	0 (0)	5	2	5	338
VII. Therapeutics											
A. Assessment of need for therapy	1	28 (76)	18 (64)	10 (36)	0 (0)	0 (0)	0 (0)	5	4	5	28
B. Assessment prior to therapy	6	28 (76)	128 (76)	37 (22)	3 (2)	0 (0)	0 (0)	5	3	5	168
C. Administration of therapy	5	28 (76)	121 (86)	19 (14)	0 (0)	0 (0)	0 (0)	5	4	5	140
D. Evaluation of therapy	5	28 (76)	116 (83)	18 (13)	1 (1)	5 (4)	0 (0)	5	2	5	140

* General agreement was defined as approval of > 80% of respondents to the second conference survey.
† See Tables 2–11 for definitions of competency areas.
‡ Likert scale: 5 = strongly agree, 4 =agree, 3 = undecided, 2 = disagree, 1 = strongly disagree. Likert category is the total for all questions in that competency area.
§ Total score = number of respondents × number of questions in that competency area.
‖ Includes one definition on which limited agreement was reached (see Table 13).

sion on Accreditation of Respiratory Care (CoARC), and the National Board for Respiratory Care (NBRC) recognized the RRT credential as the "standard of excellence" for RTs. At the request of the AARC and CoARC, the NBRC approved a policy on January 1, 2005, that requires graduates of registry-eligible programs to complete the CRT and RRT examinations within 3 years of graduation.[25] Accreditation of RT education programs is also fundamentally important to assure that graduate RTs are ready to enter the RT workforce.

Respiratory Therapy Accreditation to Assure Graduate Respiratory Therapist Competency

The respiratory therapy education system has relied on accreditation to validate the quality of programs. Graduation from an accredited program is a requirement for licensure in many states, and is required to take certification and registry examinations. CoARC's mission is to promote quality respiratory therapy education through its accreditation services. CoARC indicates that accreditation provides consumer protection, advances and enhances the profession, and protects against compromise of education quality. Effective November 2009, CoARC separated from the Commission for Accreditation of Allied Health Education Programs to become a freestanding accrediting organization for respiratory therapy programs.[27] The sponsoring and participating organizations (Table 18) have agreed to continue their supporting roles of CoARC.

CoARC accreditation standards focus on outcomes such as student pass rates on credentialing examinations, rate of postgraduate employment, employer satisfaction with grad-

Table 13. Competencies on Which Limited Agreement Was Reached by the Second Conference Attendees*

Competency Area†	Respondents (*n*, %)	Likert-Scale Scores (*n*, %)‡					Median	Min	Max
		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree			
I. Diagnostics									
A. Pulmonary function technology									
3. Evaluate and interpret the results of a cardiopulmonary exercise study.	28 (76)	7 (25)	11 (40)	5 (18)	5 (18)	0 (0)	4	2	5
B. Sleep									
3. Evaluate sleep study results to determine possible therapies	28 (76)	5 (18)	15 (54)	2 (7)	5 (18)	1 (4)	4	1	5
C. Invasive Procedures									
5. Describe indications and contraindications for open lung biopsy, mediastinoscopy, and transthoracic needle biopsy, and recognize abnormal results.	28 (76)	7 (25)	10 (36)	7 (25)	3 (11)	1 (4)	4	1	5
IV. Patient Assessment									
B. Diagnostic data									
4. Review and interpret imaging studies, including radiograph, computed tomogram, ventilation/perfusion scan, and magnetic resonance imaging scan, as derived from reports, and, where possible, direct inspection of studies.	27 (73)	11 (41)	7 (26)	4 (15)	5 (18)	0 (0)	4	2	5

* Limited agreement was defined as approval of $> 61\%$ and $< 72\%$ of respondents to the second conference survey.
† See Tables 2–11 for definitions of competency areas.
‡ Likert scale: 5 = strongly agree, 4 =agree, 3 = undecided, 2 = disagree, 1 = strongly disagree. Likert category is the total for all questions in that competency area.

Table 14. Specialty Areas Identified in Small Group Sessions

Specialty Area	Credential	Certification Board
Neonatal-Pediatric Specialist	RRT-NPS, CRT-NPS	NBRC
Certified/Registered Pulmonary Function Technologist	CPFT, RPFT	NBRC
Sleep Disorders Specialist	RRT-SDS, CRT-SDS	NBRC
Adult Critical Care Specialist (Likely available in the 4th quarter of 2011)	(Not determined)	NBRC
Registered Polysomnographic Technologist	RPSGT	BRPT
Asthma Educator (Certified)	AE-C	AAE
ECMO Specialist	Institutional Guidelines	ELSO
Certified Cardiographic Technician	CCT	CCI
Registered Cardiovascular Invasive Specialist	RCIS	CCI
Registered Cardiac Sonographer	RCS	CCI
Certified Clinical Exercise Specialist	CCES	ACSM
Certified Hyperbaric Technologist	CHT	NBDHMT

NBRC = National Board for Respiratory Care
BRPT = Board of Registered Polysomnographic Technologists
AAE = Association of Asthma Educators
ELSO = Extracorporeal Life Support Organization
CCI = Cardiovascular Credentialing International
ACSM = American College of Sports Medicine
NBDHMT = National Board of Diving and Hyperbaric Medicine Technology
ECMO = Extracorporeal Membrane Oxygenation

uates, and student satisfaction with the program.[27] These are important measures. However, changes in the health-care system may impose additional demands on education programs for RTs (see Tables 2–11). Drivers of these

Table 15. Impact of Economy on 568 Hospitals: Dealing With the Poor Economy[9]

Strategy	Selected This Option (%)
Cut administrative costs	59
Reduce staff	53
Reduce services	27
Divest assets	12
Consider merger	8

changes include: the cost of healthcare; changing demographics of the population; technology advances; consumerism in healthcare; and shifts in the disease burden. As noted in the report to U.S. Secretary of Education (2005-2009) Margaret Spellings, "A Test of Leadership: Charting the Future of United States Higher Education," the country desires "a higher-education system that gives Americans the workplace skills they need to adapt to a rapidly changing economy."[28] A clear vision of the transition from graduate RT to practicing registered RT to expertise in a respiratory care specialty area is needed for the profession to adapt to a rapidly changing economy.

The Transition From Graduate Therapist to Specialty Practice

General agreement was reached by those attending the conference that the terms "entry-level" and "advanced-level" do not sufficiently describe the competencies needed by the respiratory therapy profession. "Graduate therapist" was strongly supported as the descriptor that should be used to describe new RT graduates from education programs in 2015 and beyond. CoARC has announced that starting in 2010 they will accredit only RT programs whose students are eligible for the NBRC RRT examinations.[27] The assumption is that quality programs graduate students who will be successful in obtaining the RRT credential shortly after graduation. A "graduate therapist" was defined as a person who has graduated from a CoARC-accredited program but has not passed the RRT examinations. The transition into the workforce can best be described as moving from graduate therapist to registered RT to obtaining competence in one or more specialty areas of practice (see Table 14). An experienced RT can practice without specialty credentials in any area of respiratory care. However, market forces drive consumers to seek credentialed specialists. The importance of documenting competence and quality of care by administering national board specialty certification examinations has been in place since 1917, when the American Board for Ophthalmic Examination was incorporated.[29] The concept of more experienced RRTs working in specialized areas such as neonatology and pediatrics, pulmonary function technology, and extracorporeal life support dates back to the introduction of the NBRC Certified Pulmonary Function Technologist (CPFT) examination in 1984, the Registered Pulmonary Function Technologist (RPFT) examination in 1987, the

Table 16. Critical Thinking Skills

Prioritizing
Arrange scheduled work to treat the most critical or unstable patients first.
Adjust to unexpected circumstances.
Make rapid adjustments to the work schedule.
Respond quickly to a changing situation.
Solve problems while completing other tasks.
Anticipating
Think ahead to avoid problems.
Recognize the early signs of a changing situation.
Continually assess situations.
Foresee adverse outcomes.
Restock supplies prior to depletion.
Troubleshooting
Locate and correct technical problems.
Find lost equipment.
Teach staff to troubleshoot equipment.
Communicating
Gather and give information: verbal, non-verbal, and written.
Establish working relationships with others.
Modify communication dependent on the practitioner and the situation.
Deliver the appropriate message with clarity, professionalism, and good timing.
Speak with appropriate intonation, facial expression, and body language.
Negotiating
Negotiate a change in behavior.
Mandate a needed change in behavior when negotiation is inappropriate.
Use managers and supervisors appropriately to counsel staff on changes in behavior.
Present a suggestion in the form of a question.
Avoid negotiating to a breaking point.
Negotiate with veracity for emergency situations worked outside of medical orders.
Decision Making
Reach a judgment or conclusion.
Make a decisions during grand rounds or when using protocols.
Ask questions and share information before making a decision.
Rely on common sense, gut feelings, intuition.
Make decisions based on experience.
Use trial and error when no evidence is available.
Reflecting
Reflect on work, patients, decisions, profession.
See multiple perspectives.
Accept that there is no solution at times.
Develop coping mechanisms.
Find greater compassion for patients
Develop a broader context of healthcare: costs, services, reform, restructuring.

Table 17. Critical Thinking Domains

Technology
Malfunctions
Shortages
Recommending appropriate equipment
Modifying for novel care
Patients
Rare diseases
Neonatal delivery and transport
Emergencies
Assessments
Modification of therapy
Unexpected responses to therapy
Problems
Multiple patients demanding time
Mistakes
Responding to questions
Clinicians
Communicating with nurses, physicians, and others
Medical orders do not coincide with care plan
Conflicting requests
Unclear orders
Decision making
Making recommendations
Multi-tasking

Table 18. Sponsors and Representatives of the Commission for Accreditation of Respiratory Care

Organizations	Representatives (*n*)
American Association for Respiratory Care*	6
American Society of Anesthesiologists*	2
American College of Chest Physicians*	2
American Thoracic Society*	2
American Society of Allied Health Professions†	1
National Network of Health-Career Programs in Two-Year Colleges†	1
At-large members	2
Public members	1
Immediate past commission chair	1
Total	18

* Sponsors
† Organization invited to send a representative.

Neonatal and Pediatric Specialist (NPS) examination in 1991, the Sleep Disorders Specialist (SDS) examination in 2008, and the future Adult Critical Care examination scheduled for 2011. The NBRC reports that as of 2008 they have certified 13,311 RTs in pulmonary function technology and 10,440 RTs in neonatology and pediatrics.[25] The NBRC uses a 5-step process to develop a new specialty examination: (1) Viability study with a favorable conclusion; (2) National personnel survey to determine if a sufficiently large population of potentially credentialed practitioners exists; (3) National job analysis study; (4) Development of test specifications and multiple, parallel forms of the specialty examination; and (5) Validation of the new specialty examination to ensure statistical evidence exists between practitioners' examination scores and the tasks assessed on the examination.[26]

Summary

The role and responsibilities of the RT workforce will change substantially in the near future, in response to major changes in the United States healthcare system. The second AARC conference has reached general agreement on the competencies needed by graduate therapists entering the RT workforce in 2015. The next conference, to be held in 2010, will determine how the education system, program accreditation, and licensure will need to change to prepare for the competencies required of the RT workforce in the future and how this can be accomplished with minimal impact on the workforce.

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Appendix 1 Attendees at the Second Conference on the Future of Respiratory Care

Ade Adesanya MD, Society of Critical Care Medicine
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Sherry L Barnhart RRT-NPS FAARC, National Board for Respiratory Care
Will D Beachey PhD RRT FAARC, Committee on Accreditation of Respiratory Care
Hugh W Bonner PhD, Association of Schools of Allied Health Professions
Kent Christopher MD, AARC Board of Medical Advisors
William Croft MS RRT-NPS, North Carolina Board for Respiratory Care
William H Dubbs RRT MHA MEd FAARC, AARC Staff
Edna Fiore, Emphysema Foundation for Our Right to Survive
Sondra Flemming MSc RN, National Network of Health Career Programs in Two-Year Colleges
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Kathy J Rye EdD RRT FAARC, Committee on Accreditation of Respiratory Care
David C Shelledy PhD RRT FAARC, Association of Schools of Allied Health Professions
Thomas J Smalling PhD RRT RPFT RPSGT FAARC, Committee on Accreditation of Respiratory Care
Charles B Spearman MSEd RRT FAARC, California Board for Respiratory Care

Gary A Smith FAARC, National Board for Respiratory Care
Alvin V Thomas MD, American College of Chest Physicians
Mark W Thomas MS RPh, American Society of Health System Pharmacists
David L Vines MSHS RRT FAARC, Rush University
John W Walsh, COPD and Alpha-1 Foundation
John R Walton MBA RRT FAARC, Resurrection Health Care
Jeffrey J Ward MEd RRT FAARC, AARC Education Section Chair
Robert L Williams PhD, University of Georgia

Appendix 2 Organizations Invited to the Second Conference on the Future of Respiratory Care

Allergy and Asthma Network - Mothers of Asthmatics
Alpha-1 Foundation
American Academy of Family Physicians
American Academy of Pediatrics
American Association for Cardiovascular and Pulmonary Rehabilitation
American Association for Homecare
American Association for Homes and Service for the Aging
American Association for Respiratory Care
American Association of Community Colleges
American Association of Critical Care Nurses
American College of Allergy and Immunology
American College of Chest Physicians
American College of Physicians
American Health Care Association
American Hospital Association
American Lung Association
American Respiratory Care Foundation
American Sleep Apnea Association
American Society of Anesthesiologists
American Society of Health System Pharmacists
American Thoracic Society
Association of Asthma Educators
Asthma and Allergy Foundation of America
Blue Cross
California Board for Respiratory Care
California Health Care Foundation
California Quality Collaborative
Catholic Health Association of the United States
Center for Disease Control
Center for the Health Professions
Centers for Medicare and Medicaid Services
Commission on Accreditation of Allied Health Education Programs
Committee on Accreditation of Respiratory Care
COPD Foundation
COPD-ALERT
Department of Defense Health Affairs
Dallas-Fort Worth Business Group on Healthcare
Disease Management Association of America
Emphysema Foundation for Our Right to Survive
Federation of American Hospitals
Genetic Alliance
Healthcare Financial Management Association
Leapfrog
Medical Group Management Association
National Board for Respiratory Care
National Association for Home Care and Hospice
National Association for Long Term Hospitals and Acute Long Term Hospital Association
National Association for Medical Direction of Respiratory Care
National Heart Lung and Blood Institute
National Home Oxygen Patients Association
National Network of Health Career Programs in Two-Year Colleges
New York State Board of Respiratory Therapy
North Carolina Board for Respiratory Care
Ohio Board for Respiratory Care
Pulmonary Fibrosis Foundation
Robert Wood Johnson Foundation
Society of Critical Care Medicine
Society of Hospital Medicine
Texas Department of State Health Services - Respiratory Therapy Program
Association of Schools of Allied Health Professions
The Joint Commission
US Department of Health and Human Services
US Department of Health and Human Services/Health Resources and Services Administration
United States Office of Personnel Management
United Health Care
United States Public Health Service
Veterans Administration

Appendix 3 Task Force on the Future of Respiratory Care

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