Agenda Item 10
AARC's Taskforce on Competencies for Entry into Respiratory Therapy
INFORMATION

Executive Summary

In 2015, the Taskforce on Competencies for Entry into Respiratory Therapy Practice was charged with using data from the 2015 and Beyond conferences, and later sub-groups, to determine the competencies needed by respiratory care practitioners who are entering into respiratory care professional practice. Members of the taskforce included representatives from the American Association for Respiratory Care (AARC), Commission on Accreditation for Respiratory Care, and National Board for Respiratory Care, along with liaisons from the three entities that were non-voting members. The taskforce reported an analysis and evaluation of all competencies and when these competencies should be acquired, either before or after entry into professional practice, as determined by the taskforce. The AARC Board of Directors approved this report in October 2016.

Method of analysis included a review of 202 competencies with all taskforce members providing their professional opinion as to when a competency should be acquired. When differences of opinion were found, discussions via conference call led to consensus. Results show that of the 202 competencies reviewed, 153 competencies should be developed before entry to respiratory care professional practice and 49 competencies should be attained after entry into respiratory care professional practice. See the full document for specifics regarding the competencies.

The report finds that new graduates of respiratory therapy educational programs have many competencies needed prior to entry into professional practice. Another finding is that practicing respiratory therapists must continue their development post-graduation to attain additional competencies. One limitation of this report may be that not all competencies needed for current respiratory therapy practice are captured with this analysis. Nonetheless, failure to obtain these competencies directs the profession to identify that, to meet the demands of delivering patient care safely in critical care areas and for disease management, patients will not be receiving the respiratory care that they expect and deserve.

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Competency	Acquired before entry or after entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
Area I: Collection of Diagnostic Information	
A. Pulmonary Function Technology	
1. Perform basic spirometry, including adequate coaching, recognition of improperly performed maneuvers, corrective actions, and interpretation of test results.	before
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.	after
B. Sleep	
1. Compare and evaluate the indications and contraindications for sleep studies.	before
2. Explain results in relation to types of respiratory sleep disorders.	before
C. Invasive Diagnostic Procedures	
1. Identify and distinguish the indications, contraindications, and general hazards, complications in preparation, performance, and post care of bronchoscopic procedures.	after
2. Describe the role of a respiratory therapist in diagnostic bronchoscopy procedures.	after
3. Monitor and evaluate the patient's clinical condition with pulse oximetry, electrocardiogram, exhaled gas analysis, and other related diagnostic devices.	after
4. Perform arterial and venous sampling for blood analysis.	before
Area II: Disease Management	
A. Management of Chronic Diseases	
1. Understand the etiology, anatomy, pathophysiology, diagnosis, and treatment of cardiopulmonary diseases (e.g., asthma, chronic obstructive pulmonary disease) and comorbidities.	before
2. Communicate and educate to empower and engage patients.	before
3. Develop, administer, and re-evaluate patient care plans to	
a. establish specific desired goals and objectives.	before
b. assess level of patient understanding.	before
c. anticipate the effects of pharmacologic agents on organ systems within scope of respiratory care.	before
d. identify the patient/caregiver's need for psychosocial, emotional, physical, or spiritual support.	after
e. educate about nutrition, exercise, wellness.	before

Competency	Acquired before entry or after entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
f. assess and modify the environment.	before
g. conduct monitoring and follow-up evaluation.	after
h. develop action plans.	before
i. apply evidence-based medicine, protocols, and clinical practice guidelines.	before
j. monitor adherence through patient collaboration and empowerment, including proper and effective device and medication utilization.	before
k. implement and integrate appropriate patient-education materials and tools.	after
l. utilize appropriate diagnostic and monitoring tools.	before
m. document and monitor outcomes (economic, quality, safety, patient satisfaction).	after
n. communicate, collaborate, and coordinate with physicians, nurses, and other clinicians.	after
o. assess, implement, and enable patient resources support system (family, services, equipment, personnel).	after
p. ensure financial/economic support of plan/program and related documentation.	after
q. educate on dyspnea management and energy conservation.	after
B. Management of Acute Diseases	
1. Develop, administer, evaluate, and modify respiratory care plans in the acute-care setting, using evidence-based medicine, protocols, and clinical practice guidelines.	before
2. Communicate and educate to empower and engage patients.	before
3. Develop, administer, and re-evaluate patient care plans to	
a. establish specific desired goals and objectives.	before
b. evaluate the patient.	before
c. anticipate the effects of pharmacologic agents on organ systems within scope of respiratory care.	before
d. identify the patient/caregiver's need for psychosocial, emotional, physical, or spiritual support.	after
e. educate about nutrition, exercise, wellness.	before
f. assess and modify the environment.	before
g. conduct monitoring and follow-up evaluation.	after
h. develop action plans.	before
i. apply evidence-based medicine, protocols, and clinical practice guidelines.	before
j. monitor adherence through patient collaboration and empowerment, including proper and effective device and medication utilization.	before

Competency	Acquired before entry or after entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
k. implement and integrate appropriate patient-education materials and tools.	after
l. utilize appropriate diagnostic and monitoring tools.	before
m. document and monitor outcomes (economic, quality, safety, patient satisfaction).	after
n. communicate, collaborate, and coordinate with physicians, nurses, and other clinicians.	after
o. assess, implement, and enable patient resources support system (family, services, equipment, personnel).	after
p. ensure financial/economic support of plan/program and related documentation.	after
q. educate on dyspnea management and energy conservation.	after
Area III: Evidence-Based Medicine and Respiratory Care Protocols	
A. Evidence-Based Medicine	
1. Retrieve credible sources of evidence.	after
2. Critique published research	after
3. Explain the meaning of general statistical tests.	after
4. Apply evidence-based medicine to clinical practice.	after
B. Respiratory Care Protocols	
1. Explain the use of evidence-based medicine in the development and application of hospital- based respiratory care protocols.	before
2. Evaluate and treat patients in a variety of settings, using the appropriate respiratory care protocols.	before
Area IV: Patient Assessment	
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.	before
2. Obtain medical, surgical, and family history.	before
3. Obtain social, behavioral, and occupational history, and other historical information incident to the purpose of the current complaint.	after
B. Diagnostic Data	
1. Review and interpret pulmonary function studies (spirometry) and pulse oximetry.	before
2. Review and interpret lung volumes and diffusion studies.	before
3. Review and interpret arterial blood gases, electrolytes, complete blood cell count, and related laboratory tests.	before

Competency	Acquired before entry or after entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
C. Physical Examination	
1. Inspect the chest and extremities to detect deformation, cyanosis, edema, clubbing, and other anomalies.	before
2. Measure vital signs (blood pressure, heart rate, respiratory rate).	before
3. Evaluate patient breathing effort, ventilatory pattern, and use of accessory muscles.	before
4. Measure and document oxygen saturation with oximetry under all appropriate conditions (with or without oxygen at rest and during sleep, ambulation, and exercise).	before
Area V: Leadership	
A. Team Member	
1. Collaborate as a healthcare team member as it relates to planning, decision making and other team functions.	before
B. Healthcare Regulatory Systems	
1. Identify regulatory requirements that impact the healthcare system.	after
C. Written and Verbal Communication	
1. Demonstrate effective written and verbal communication with various members of the healthcare team, patients, families, and others (cultural competence and literacy).	before
D. Healthcare Finance	
1. Demonstrate basic knowledge of healthcare and financial reimbursement systems and the need to reduce the cost of delivering respiratory care.	before
E. Team Leader	
1. Identify the roles of a team leader.	after
Area VI: Emergency and Critical Care	
A. Emergency Care	
1. Perform basic life support (BLS), advanced cardiovascular life support (ACLS) according to American Heart Association (AHA) guidelines.	before
2. Perform pediatric advanced life support (PALS) according to American Heart Association (AHA) guidelines and neonatal resuscitation program (NRP) according to the American Academy of Pediatrics.	after
3. Maintain knowledge and skills necessary to retain certification as per associated guidelines as stated above.	after
4. Perform endotracheal intubation.	after
5. Perform as a member of the rapid response team (medical emergency team).	before

Competency	Acquired before entry or after entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
6. 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.	after
7. Provide intra-hospital transport of critically and chronically ill patients.	before
8. Provide cardiopulmonary life support and airway control during transport.	after
9. Apply knowledge of emergency pharmacology.	before
10. Demonstrate ability to recommend use of pharmacotherapy.	before
B. Critical Care	
1. Apply to practice knowledge and analysis of invasive and noninvasive mechanical ventilators.	after
2. Apply to practice all ventilation modes currently available on invasive and noninvasive mechanical ventilators, and as adjuncts to the operation of modes.	before
3. Interpret ventilator data and hemodynamic monitoring data.	before
4. Manage monitoring system.	before
5. Manage airway devices.	before
6. Make treatment recommendations based on waveform graphics, pulmonary mechanics, and imaging studies.	before
7. Apply knowledge, and analysis of use of therapeutic medical gases.	before
8. Identify indications for circulatory gas exchange devices.	after
9. Collaborate with other professionals in care management built upon evidence-based medicine and clinical protocols.	before
10. Deliver therapeutic interventions based on evidence-based medicine and clinical protocols.	before
Area VII: Assessment of Therapeutics	
A. Assessment of Need for Therapy – Assesses the need for therapies in all patient settings.	
1. Medical gas therapy	before
2. Humidity therapy	before
3. Aerosol therapy	before
4. Lung expansion therapy	before
5. Airway clearance therapy	before
6. Airway management	before
7. Mechanical ventilation	before
B. Assessment Prior to Therapy	

Competency	Acquired <u>before</u> entry or <u>after</u> entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
1. Review order and/or implement protocol.	before
2. Review patient history, laboratory results, and imaging data.	before
3. Determine indications/contraindications for therapy.	before
4. Interview and conduct physical examination of patient.	before
5. Determine appropriateness of order.	before
6. Determine need for physician intervention.	before
C. Administration of Therapy	
1. Select and assemble equipment.	before
2. Apply and administer therapy.	before
3. Monitor patient's response to therapy.	before
4. Instruct patient on proper technique.	before
5. Recognize and rectify equipment malfunction (troubleshooting).	before
6. Follow Standard Precautions for infection control.	before
D. Evaluation of Therapy	
1. Recognize complications and respond to adverse effects.	before
2. Recommend therapy modifications.	before
3. Assess therapy effectiveness.	before
4. Document therapy.	before
Area VIII: Application of Therapeutics to Respiratory Care Practice	
A. Medical Gas Therapy – Apply knowledge, understanding, and troubleshooting skills to gas delivery systems in all patient settings	
1. Evaluate compressed gas cylinders.	before
2. Evaluate regulators and flow meters.	before
3. Evaluate liquid-oxygen systems (stationary and portable).	before
4. Evaluate oxygen concentrators (stationary and portable).	before
5. Evaluate oxygen conserving devices.	before
6. Evaluate high-flow air-entrainment systems.	before
7. Evaluate oxygen and air-flow-meter mixing systems.	before
8. Evaluate air/oxygen blenders.	before
9. Evaluate hyperbaric oxygen systems.	before
10. Evaluate sub-ambient oxygen delivery systems (neonatal only).	before

Competency	Acquired before entry or after entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
11. Evaluate nasal cannulas.	before
12. Evaluate high-flow nasal cannulas.	before
13. Evaluate non-reservoir masks.	before
14. Evaluate reservoir masks.	before
15. Evaluate air-entrainment masks.	before
16. Evaluate hood/head-enclosures (neonatal only).	before
17. Evaluate transtracheal oxygen therapy.	before
18. Evaluate nitric oxide therapy.	before
19. Evaluate helium/oxygen therapy.	before
B. Humidity Therapy – Apply knowledge, understanding, and troubleshooting skills to humidity therapy systems in all patient settings.	
1. Evaluate unheated passive humidifiers.	before
2. Evaluate active and passive heat-and-moisture exchangers (HMEs).	before
3. Evaluate heated humidifiers for medical gas delivery systems via mask, tracheal catheter, and artificial airways.	before
C. Aerosol Therapy – Apply knowledge, understanding, and troubleshooting skills to aerosol systems in all patient settings.	
1. Evaluate non-medicated, large-volume nebulizers, heated and unheated.	before
2. Evaluate for delivery of medication.	
a. small-volume nebulizers, including ultrasonic and porous/mesh	before
b. intermittent	before
c. breath-actuated	before
d. nebulizers for bronchial challenge testing	before
3. Evaluate nebulizers for continuous nebulization.	before
4. Evaluate pressurized metered-dose inhalers.	before
5. Evaluate dry-powder inhalers.	before
6. Evaluate competency in pharmacology nomenclature, physiologic action, adverse effects, and doses.	before
a. adrenergics	before
b. anticholinergics, cholinergics	before
c. decongestants	before

Competency	Acquired before entry or after entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
d. mucolytics	before
e. pulmonary vasodilators	before
f. antimicrobials	before
7. Evaluate peak expiratory flow meters and inspiratory flow meters.	before
8. Calculation and modification of drug dosing.	before
D. Therapy – Apply knowledge, understanding, and troubleshooting skills to lung expansion equipment in all patient settings.	
1. Evaluate incentive spirometers (flow-based and volume-based).	before
2. Evaluate continuous positive airway pressure (CPAP) devices.	before
3. Evaluate expiratory positive airway pressure (EPAP) devices.	before
4. Evaluate bi-level positive-pressure breathing.	before
5. Evaluate positive expiratory therapy (PEP).	before
6. Evaluate oscillatory positive expiratory therapy (OPEP).	before
7. Evaluate intermittent positive-breathing devices.	before
8. Evaluate bag-value-mask devices.	before
E. Airway Clearance Therapy	
1. Evaluate proper positioning for bronchial drainage.	before
2. Evaluate chest percussion: manual and mechanical percussors.	before
3. Evaluate positive airway pressure adjuncts (vibratory and non-vibratory PEP).	before
4. Evaluate expiratory positive airway pressure (EPAP) devices.	before
5. Evaluate external chest-wall-vibration devices.	before
6. Describe the role of a respiratory therapist in therapeutic bronchoscopy.	after
7. Evaluate high frequency positive pressures devices.	after
8. Autogenic drainage.	after
9. Cough-assist device (insufflator-exsufflator).	before
F. Airway Management- Apply knowledge, understanding and troubleshooting skills using airway management in all patient settings.	
1. Perform the head-tilt chin-lift airway-opening maneuver.	before
2. Perform the jaw lift without head extension maneuver.	before
3. Evaluate the use for an oropharyngeal airway.	before
4. Evaluate the use for a nasopharyngeal airway.	before

Competency	Acquired **before** entry or **after** entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
5. Evaluate the use of a bag-valve-mask resuscitator.	before
6. Evaluate the use of a laryngeal mask airway (LMA).	before
7. Evaluate the need and use of oral and nasal endotracheal tubes.	before
8. Evaluate the need and use of a tracheostomy tube.	before
9. Evaluate the need and use of a tracheostomy "button" or valve.	before
10. Evaluate and advise for the discontinuance or change to alternative airway based on assessment/protocols.	after
11. Evaluate the need and use of tracheostomy tubes (competency in advising decannulation or change to alternative airway based on assessment/protocols).	before
12. Evaluate the need and use of tracheostomy "button" or valve	before
13. Assist physician in placing surgical or percutaneous tracheostomy tube.	before
14. Suction via artificial airway, operate suction system, select suction catheter.	before
G. Mechanical Ventilation	
1. Incorporate the mechanical ventilation principles listed in critical care.	before
2. Evaluate the need and use of CPAP devices.	before
3. Evaluate the need and use of bi-level positive airway pressure devices.	before
4. Evaluate the need and use of noninvasive-ventilation interfaces: nasal mask, nasal pillows, oro-nasal mask, full-face mask, and helmet.	before
IX. Post-Acute Care	
A. Patient Assessment	
1. Assess physical-vital signs, functional capacity.	before
2. Assess cognitive-level of comprehension, reading level, language barriers.	after
3. Evaluate social support system-recognition of anxiety, depression, signs of abuse and the knowledge of and ability to access community resources.	after
B. Environmental Assessment	
1. Evaluate the home environment for appropriateness of prescribed therapy and identify risk factors.	before
2. Educate on oxygen safety to include, but not limited to the presence of fire extinguishers, smoke detectors, smoking cessation, evacuation routes, open flames.	before
3. Educate on fall safety to include clutter, proper floor surfaces, and adequate lighting.	after
4. Medication error identification.	after
5. Educate on infection prevention by disinfecting home medical equipment.	before

Competency	Acquired <u>before</u> entry or <u>after</u> entry according to the AARC Taskforce on Competencies for Entry into Respiratory Care Professional Practice
6. Identify and discuss electrical safety (e.g., use of power cords/strips, fuses).	after
7. Identify and discuss structural barriers (e.g., lack of running water, weak floors, and stairs).	after
C. Therapeutic	
1. Evaluate limitations that exist with equipment used in the post-acute care setting.	after
2. Recommend care plan modifications by recognizing additional needs that exist (e.g., bathroom safety, wheelchairs, electric beds, portable supplemental oxygen delivery systems).	after
D. Unique Equipment and Monitoring Software	
1. Initiate patient monitoring equipment and understand interpretation of data (e.g., infant apnea monitors, pulse oximetry, $ETC0_2$).	before
2. Apply to practice ventilation modes currently available on ventilators used in the post-acute care setting, invasively and non-invasively.	before
3. Interpret data available on post-acute care ventilators as well as CPAP/Bi-level devices.	before
4. Integrate compliance data monitoring respiratory devices remotely.	after
E. Health Policy	
1. Adhere to regulatory requirements (e.g., FDA, Hazmat).	after
2. Demonstrate knowledge of reimbursement criteria and/or cost allocation for respiratory equipment and supplies based on payer criteria.	after

Approved - August 19, 2016

SUPPORT FOR TRANSITIONING FROM ASSOCIATE TO BACCALAUREATE DEGREES IN RESPIRATORY THERAPY

American Association for Respiratory Care

Growth in Necessary Competencies

Competencies[1]

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

Expectations

- Critical Care: 93.7% of hospitals expect RTs to participate on rapid response teams[2] but only 65% of AS RT programs teach this skill[3]
- Integrating Evidence-Based Medicine: 42% of AS RT programs teach this skill[3]

Increasingly complex clinical skills plus *growth in non-task oriented attributes*[4]

Government Recognition

Regulatory Requirements

- CLIA
  - Laboratory analysis must be under the direction and responsibility of a laboratory director and technical consultant who possess at least a baccalaureate degree[5]

U.S. Public Health Service

- Bachelor-trained RTs eligible to become commissioned officers in the Therapist Category (effective Sept 2007)[6]
- Respiratory care not recognized as a "profession" by CMS because majority of therapists do not have a bachelor degree

Growth in Diversity of Care Sites

- Clinical resources needed to provide experiences during clinical education to prepare graduates for the workforce[7]
- 25% of RTs work outside of the acute care environment[8]
  - High growth potential

Primary employment venues[8]

Employment venue	2009	2014
Acute care	75%	74.5%
DME	6.3%	5.5%
Long-term acute care	4.4%	7.6%
Education	12.5%	6.7%
Industry	1.2%	1.0%
Outpatient	6%	4.1%
Physician office	Not surveyed	2.1%
Temporary (agency)	0.9%	0.9%

Increased Demand for Non-Clinical Skills

- Communication
  - Interprofessionalism teamwork and collaboration
- Deductive Reasoning/Critical Thinking
  - Positive association between strong educational science background and critical thinking ability[9]
- Leadership
  - Not currently taught by majority of AS RT programs[3]
- Health Policy
  - AS graduates less likely to learn how reimbursement affects care[3]
- Education
  - Patient education (tobacco cessation, disease self-management)
  - Clinical education (precepting new employees, students)
  - Formal RT education (didactic, laboratory)

Cost-Effective Employee Orientation

- AS-prepared RT graduates perceived as less prepared[10]
  - Average time for orientation: 4-5 full-time weeks of employment[2]
  - New BS graduates: 6.6 weeks; New AS graduates: 7.1 weeks[7]
- Lack of time in AS program for certifications (ACLS, PALS, NRP)[11]
  - 53% of RTs hold PALS credential[8]
  - 53% of RTs hold NRP credential[8]
  - 77% of RTs hold ACLS credential[8]

Preparing Next Generation Leaders

The Problem

- Current leaders retiring
  - Almost 50% of RT educational program directors to retire by 2024[12]
- Majority of workforce AS-prepared RT
  - Underqualified for advancement in career
  - 3rd most common reason for not accepting more students was unavailability of faculty[12]
  - Reduction in RT enrollment due to lack of faculty

Bachelor Degree would:

- Provide solid foundation for career advancement
  - Expanded general education
  - Expanded RT-related content
- Foster leadership
- Prepare for graduate programs in management, education

Challenges on AS/AAS Programs

- Limited time to deliver curriculum
- Inability to extend curriculum time
- More difficult to address desired non-clinical skills
  - Credit limits imposed on many community colleges[2]
  - AS program less likely to teach students how to critically review research and statistical analysis[3]
  - AS program less likely to teach students how to apply evidence-based medicine to clinical practice[3]
- Less ability to add pre-requisite courses to enhance success in respiratory therapy courses
- If graduates do not pursue a baccalaureate degree, reduced marketability and autonomy when compared to other allied health professionals

Earning a BS: Benefits to the Graduate

- Potentially more prepared to join the workforce[11]
- Potential increase in salary
  - Each increase in academic degree associated with $3,071 increase in annual compensation[8]
- Increased opportunities for promotions
- Increased opportunities for employment
  - Many job postings include “BS preferred”
  - Non-traditional positions may include requirement for higher degree (e.g. disease manager, case manager, clinical specialist, etc.)
- Preparation for potential admission to graduate school
- Recognition as a professional

References

1. Barnes TA, Gale DD, Kacmarek RM, Kageler WV. Competencies needed by graduate respiratory therapists in 2015 and beyond. Respir Care 2010;55(5):601-616.
2. AARC Human Resource Survey of Acute Care Hospital Employers. 2014.
3. Barnes TA, Kacmarek RM, Durbin CG. Survey of respiratory therapy education program directors in the United States. Respir Care 2011;56(12):1906-1915.
4. Beachey W. Baccalaureate entry-level education in respiratory care. Respir Care Educ Annu 2012;21:1-4.
5. Davis MD, Walsh BK, Sittig SE, Restrepo RD. AARC clinical practice guideline: blood gas analysis and hemoximetry: 2013. Respir Care 2013;58(10):1694-1703.
6. Hanley ME, Bogdan GM. Mechanical ventilation in mass casualty scenarios. Augmenting staff: Project XTREME. Respir Care 2008;53(2):176-188.
7. Kacmarek RM, Barnes TA, Durbin CG. Survey of directors of respiratory therapy departments regarding the future education and credentialing of respiratory care students and staff. Respir Care 2012;57(5):710-720.
8. AARC Human Resource Survey Report. 2014.
9. Wettstein RB, Wilkins RL, Gardner DD, Restrepo RD. Critical-thinking ability in respiratory care students and its correlation with age, educational background, and performance on national board examinations. Respir Care 2011;56(3):284-289.
10. Walsh BK, Gentile MA, Grenier BM. Orienting new respiratory therapists into the neonatal/pediatric environment: a survey of educators and managers. Respir Care 2011;56(8):1122-1129.
11. Strickland SL. Does neonatal education get a failing grade? Respir Care Educ Annu 2004;13:29-26.
12. AARC Human Resource Survey of Education Programs. 2014.