

Clinical Competency Guidelines for Pulmonary Rehabilitation Professionals

POSITION STATEMENT OF THE AMERICAN ASSOCIATION OF CARDIOVASCULAR AND PULMONARY REHABILITATION

Eileen G. Collins, PhD, RN; Gerene Bauldoff, PhD, RN; Brian Carlin, MD; Rebecca Crouch, PT, DPT; Charles F. Emery, PhD; Chris Garvey, FNP, MSN, MPA; Lana Hilling, RCP; Trina Limberg, BS, RRT; Richard ZuWallack, MD; Linda Nici, MD

The American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) recognizes that interdisciplinary health care professionals providing pulmonary rehabilitation services need to have certain core competencies. This statement updates the previous clinical competency guidelines for pulmonary rehabilitation professionals, and it complements the AACVPR's *Guidelines for Pulmonary Rehabilitation Programs*. These competencies provide a common core of 13 professional and clinical competencies inclusive of multiple academic and clinical disciplines. The core competencies include patient assessment and management; dyspnea assessment and management; oxygen assessment, management, and titration; collaborative self-management; adherence; medication and therapeutics; non-chronic obstructive pulmonary diseases; exercise testing; exercise training; psychosocial management; tobacco cessation; emergency responses for patient and program personnel; and universal standard precautions.

K E Y W O R D S

competence
pulmonary rehabilitation

Author Affiliations: Edward Hines, Jr. VA Hospital and University of Illinois, Chicago, Illinois (Dr Collins); Ohio State University, Columbus, Ohio (Drs Bauldoff and Emery); Allegheny Hospital, Pittsburgh, Pennsylvania (Dr Carlin), Duke University, Durham, North Carolina (Dr Crouch); Seton Medical Center, Daly City, California (Ms Garvey); John Muir Health, Concord, California (Ms Hilling); University of California at San Diego, California (Ms. Limberg); St. Francis Hospital Medical Center, Hartford, Connecticut (Dr ZuWallack); and Providence VA Medical Center and Brown University, Providence, Rhode Island (Dr Nici).

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Correspondence: Eileen G. Collins, PhD, RN, Research and Development (151), Edward Hines, Jr. VA Hospital, Hines, IL 60141 (ecollins@uic.edu).

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Pulmonary rehabilitation (PR) is an effective intervention for improving quality of life, decreasing dyspnea, and increasing exercise tolerance in patients with chronic respiratory diseases.¹ Pulmonary rehabilitation is defined as “a comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies which include, but are not limited to, exercise training, education and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behaviors.”² Pulmonary rehabilitation is administered by an interdisciplinary team focused on improving functional status, reducing dyspnea, and improving quality of life for patients with chronic respiratory disorders. To deliver a quality program, health care providers of PR services must be competent in understanding and meeting the patient’s needs and goals. The purpose of this article is to outline those competencies recommended for personnel providing PR services. This article both reviews and updates the *2007 Clinical Competency Guidelines for Pulmonary Rehabilitation Professionals*³ and complements the American Association of Cardiovascular and Pulmonary Rehabilitation’s *Guidelines for Pulmonary Rehabilitation Programs*.⁴

Competency development for any discipline or program involves describing the knowledge and skills needed to provide the services.⁵ Professional

competence involves clinical skills and reasoning, scientific knowledge, and communication skills to benefit the individuals being served.⁶ In 2003, the Institute of Medicine issued a report, *Health Professions Education: A Bridge to Quality*.⁷ This report emphasized the need to change the education of health care professionals to improve the quality of health care in the United States. Five core competencies were presented in the report for the education of health professionals to meet the dynamic needs of the health care system. These competencies are patient-centered care, interdisciplinary teams, evidence-based practice, quality improvement, and informatics.⁷ They have been recognized by others⁸ and are part of the clinical competencies delineated for *Core Competencies for Cardiac Rehabilitation/Secondary Prevention Professionals: 2010 Update*.⁹ These core competencies (Table 1) are important for all health care professionals working in PR and serve as the essential elements upon which additional competencies build.

CORE COMPETENCIES FOR PULMONARY REHABILITATION PROFESSIONALS

The PR competencies outlined in 2007 included assessment, intervention and outcome evaluation, and followup. They focused on pathophysiology and

Table 1 • Core Competencies for Health Care Professionals^{7,9}

Competency	Essential Elements
Provide patient-centered care	<ul style="list-style-type: none"> • Identify, respect, and incorporate patient differences, values, preferences, and expressed needs • Relieve pain and suffering • Coordinate continuous care • Listen to, clearly inform, communicate with, and educate patients • Share decision making and management • Advocate disease prevention, wellness, and promotion of healthy lifestyle, including a focus on population health
Work in interdisciplinary teams	<ul style="list-style-type: none"> • Cooperate, collaborate, communicate, and integrate care in teams to ensure that care is continuous and reliable
Employ evidence-based practice	<ul style="list-style-type: none"> • Integrate best research and clinical practice guidelines with clinical expertise and patient values • Participate in learning and research activities to the extent feasible
Apply quality improvement	<ul style="list-style-type: none"> • Identify errors and hazards in care • Understand and implement basic safety design principles • Understand and measure quality of care in terms of structure, process, and outcomes in relation to patient and community needs • Design and evaluate interventions to change processes and systems of care to improve quality
Use informatics	<ul style="list-style-type: none"> • Communicate and manage information/knowledge to mitigate error and support decision making using information technology

TABLE 2 • Specific Competencies for Pulmonary Rehabilitation

Competency	Knowledge	Skill/Ability
Patient assessment and management	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Pulmonary anatomy, physiology, and pathophysiology • Pulmonary disease risk factors • Pulmonary assessments, diagnostic tests, and procedures including pulmonary function testing, multidimensional staging of COPD (ie, BODE index) • Common comorbidities • Exacerbation risks <p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Individual patient's needs, expectations of treatment, and cultural framework • Patient readiness to initiate behavior change 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Obtain a medical history, review medical records (including comorbidities), laboratory/radiologic data, pulmonary function data, smoking history, and data from questionnaires • A focused symptom history centering on dyspnea—its severity, what brings it on, what relieves it • Physical examination, including vital signs and respiratory and cardiac systems • Critical appraisal of pulmonary function testing, arterial blood gas findings, and other pertinent laboratory/radiologic data • Document patient preferences and goals <p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Develop an ITP, in conjunction with the patient, with development of reasonable, important, and measurable patient goals • Interactively communicate and counsel the patient/family on the treatment plan through shared decision making • Document and communicate ITP and progress reports to the referring health care provider and other members of the interdisciplinary team • Quantify patient outcomes through pre- and postprogram assessment of preestablished outcomes • Modify therapy goals when clinical findings warrant change
Demonstrate an understanding of:	<ul style="list-style-type: none"> • The recommendation that pulmonary rehabilitation should be considered for all patients with chronic respiratory disease who have persistent symptoms, limited activity, and/or are unable to adjust to illness despite otherwise optimal medical management • Current reimbursement criteria for pulmonary rehabilitation • Impact of conditions or processes that might be considered contraindications to pulmonary rehabilitation such as severe bone and joint conditions, unstable cardiac conditions, and significant cognitive impairment • Exercise and treatment protocols should be appropriate across the age, size, and physical development spectrum 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Identification and application of inclusion and exclusion criteria in current pulmonary rehabilitation guidelines • Communicate potential inclusion/exclusion criteria issues with the medical director of the program and/or referring physician • Review reimbursement criteria for pulmonary rehabilitation including specific third-party payers, and be able to convey this information to the patient • Use of age-appropriate teaching and treatment protocols

(continues)

TABLE 2 • Specific Competencies for Pulmonary Rehabilitation (Continued)

Competency	Knowledge	Skill/Ability
<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Tailoring rehabilitation interventions to meet the needs of the specific patient with regard to the underlying respiratory disease, physical limitations, and comorbidities • Common comorbidities that limit or otherwise influence physical activity, symptom management, and quality of life, which may include metabolic disorders, musculoskeletal conditions, cardiovascular conditions, neuromuscular conditions, psychiatric and mood disorders, or other conditions • Smoking cessation assessment • Nutrition assessment 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Assessment of patients with obstructive, restrictive, and vascular lung disease, lung transplant, and other surgical lung interventions • Accurately classify individuals with obstructive lung disease using spirometric data • Identify limitations to exercise in the individual patient (including respiratory, symptomatic, musculoskeletal, cardiovascular, and psychological) • Take appropriate actions to reduce fall risk in patients at risk for falls (eg, patients with musculoskeletal or neurological issues or pulmonary hypertension) • Take appropriate actions to intervene with high-flow oxygen in patients who are at risk for exercise-induced hypoxia (eg, patients with ILD) • Effectively communicate with the medical director and other health care providers on impediments and potential risks to the patient 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Assessment of dyspnea through the appropriate use of a valid and reliable instrument • Assessment of dyspnea onset/progress during exercise using the modified Borg scale • Critically appraise the patient experience of subjective dyspnea using the common descriptors of dyspnea quality
<p>Dyspnea assessment and management</p>	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Domains of dyspnea measurement (eg, sensory-perceptual experience, affective distress, symptom impact, or burden) • Measurement tools (eg, Modified Medical Research Council Dyspnea Scale, modified Borg, University of California San Diego Shortness of Breath Questionnaire, Baseline Dyspnea Index/Transition Dyspnea Index, Chronic Respiratory Disease Questionnaire Dyspnea domain) • Common descriptors of dyspnea quality (eg, work/effort, tightness, and air hunger/unsatisfied inspiration) 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Instruct the patient through demonstration of effective breathing strategies (eg, pursed lip breathing, prolonged expiration, and diaphragmatic breathing) • Facilitate patient mastery of techniques during exercise
<p>Demonstrate an understanding of:</p>	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Breathing strategies • Pharmacological/psychological treatment of dyspnea • Dyspnea treatment options that include: <ul style="list-style-type: none"> • Pulmonary rehabilitation • Supplemental oxygen • Pharmacologic therapy (eg, bronchodilators and opioids) • Nonpharmacologic approaches (eg, breathing retraining, pursed lip breathing, cool air movement on face, and noninvasive ventilation) • Cognitive behavioral therapy 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Instruct the patient through demonstration of effective breathing strategies (eg, pursed lip breathing, prolonged expiration, and diaphragmatic breathing) • Facilitate patient mastery of techniques during exercise

(continues)

TABLE 2 • Specific Competencies for Pulmonary Rehabilitation (Continued)

Competency	Knowledge	Skill/Ability
<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Causes and physiologic mechanisms of dyspnea in patients with lung disease: neurophysiologic mechanisms, cerebral processing of dyspnea, ventilatory constraints, pulmonary gas exchange abnormalities, peripheral muscle dysfunction, cardiac dysfunction, or any combination of the above. <p>Oxygen assessment, management, and titration</p>	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Limitations and uses of pulse oximetry <p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Arterial blood gas interpretation • Exercise and activity-induced hypoxemia <p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Criteria for prescribing LTOT • Stationary and portable oxygen storage and delivery equipment • Oxygen interface devices <p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Oxygen therapy patient education 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Assessment and patient instruction of the pathogenesis of dyspnea for the individual on the basis of the known physiologic mechanisms and pathophysiologic impact of the specific disease process <p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Pulse oximetry • Use appropriate sensor placement to provide stable readings • Communicate potential need for alternate testing (ie, ABC) when unable to obtain accurate readings or if more thorough information is required (ie, presence of hypercapnia) <p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Develop a long-term oxygen therapy prescription • Apply oxygen therapy flow to achieve SpO₂ above 88%–90% or per physician recommendation • Titrate flow settings and modify delivery devices when needed as exercise modality changes and intensity increases or decreases
<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Criteria for prescribing LTOT • Stationary and portable oxygen storage and delivery equipment • Oxygen interface devices <p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Oxygen therapy patient education 	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Criteria for prescribing LTOT • Stationary and portable oxygen storage and delivery equipment • Oxygen interface devices <p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Oxygen therapy patient education 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Perform oxygen assessments • Seek recommendations for sleep oxygen prescription (from the referring physician) • Collaborate with the health provider and vendor to select the optimal oxygen delivery system to support adequate oxygenation and lessen the overall impact on patient's personal freedom and quality of life • Assess delivery systems to confirm adequate oxygen prescription with home activity and exercise <p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Provide the patient with a written oxygen prescription and training for oxygen use with daily activities and exercise • When appropriate, instruct patients in self-monitoring oximetry use • Promote patient understanding of the use, benefits, and risk of oxygen therapy • Emotionally support the patient with implementing lifestyle-altering therapy

(continues)

TABLE 2 • Specific Competencies for Pulmonary Rehabilitation (Continued)

Competency	Knowledge	Skill/Ability
Collaborative self-management	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Behavior change • Self-efficacy • COPD exacerbation • The importance of regular exercise and activity and potential barriers to regular exercise and activity • Medication adherence including inhaler technique • End-of-life discussions and advanced directives including palliative and hospice care 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Practice techniques to promote self-efficacy and health behavior change (ie, increasing patient knowledge, goal setting, problem solving, and shared decision making) • Practice strategies aimed at the prevention, early recognition, and treatment of the COPD exacerbation (ie, the action plan) • Address motivational issues • Stress the need to promote physical activity in the home and community settings • Adjust teaching to accommodate individual needs and limitations
Adherence	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Exercise/physical activity, tobacco cessation • Nutrition counseling • Medication and oxygen use • Tobacco cessation 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Identify impairments to learning • Emphasize why exercise is important, barriers to exercise, and how to overcome them • Reinforce medication/oxygen regimens and practice inhaler technique • Tobacco cessation counseling and provide resources • Weight-loss strategies • Weight-gain strategies
Medication/therapeutics	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • The types of medications used for treatment of patients with COPD/other airway diseases including beta-agonists (short- and long-acting), anticholinergics (short- and long-acting), corticosteroids (eg, oral and inhaled), phosphodiesterase 4 inhibitors, antibiotics, and combination therapy(ies) • The types of medications used for the treatment of patients with other chronic lung diseases (eg, interstitial lung disease, vascular lung disease, and posttransplantation) including anti-inflammatory agents, immunosuppressive agents, and pulmonary artery vasodilators • Indications/contraindications/side effects of each medication type • The various types of secretion clearance techniques available (eg, postural drainage, chest physiotherapy, coughing, and mechanical device use), and indications/contraindications/side effects of various techniques 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Demonstrate the correct use of devices used for medication delivery (eg, aerosol, metered dose inhalers, and dry powder inhalers), secretion clearance techniques (eg, postural drainage, chest physiotherapy, controlled cough technique, and ambulatory and stationary mechanical device use), and breathing techniques (eg, pursed lip breathing and diaphragmatic breathing)

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TABLE 2 • Specific Competencies for Pulmonary Rehabilitation (Continued)

Competency	Knowledge	Skill/Ability
Diseases not related to COPD	<ul style="list-style-type: none"> • Types of breathing techniques (eg, pursed lip breathing and diaphragmatic breathing) and indications/contraindications/side effects of these techniques • Energy conservation techniques • Demonstrate an understanding of the need for alterations/changes in the therapeutic plan <p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Asthma, airway hyperresponsiveness, and exercise-induced bronchospasm • Fear and anxiety associated with exercise • Importance of a preexercise warm-up and postexercise cool-down • Importance of peak flow monitoring • Cystic fibrosis/bronchiectasis • Importance of secretion clearance • Cross-infection of patients/infection control • Salt and fluid loss when sweating during exercise • Lung transplantation • Differences of pretransplant vs posttransplant PR • Different types of ILD including idiopathic pulmonary fibrosis, sarcoidosis, asbestosis, silicosis, pneumoconiosis, pneumonitis, drug-induced lung disease, connective tissue disease, hypersensitivity pneumonitis, ARDS, and bronchiolitis obliterans • Pulmonary hypertension • Anatomical and physiologic basis for symptoms resulting from pulmonary hypertension • Importance of stopping exercise if the patient becomes symptomatic • Rationale for avoiding isometric exercise and heavy weight lifting, Valsalva maneuver in surgical pulmonary patient • Lung cancer treatment (surgery, chemotherapy, radiation therapy) 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Premedication, warm-up before exercise • Good hand washing • Maintains at least 3-ft (1-m) distance between patients when exercising^{1,3} • NaCl and fluid replacement • Secretion clearance techniques including controlled cough, postural drainage, percussion, vibration, vibration vest and positive end-expiratory devices, flutter and oscillatory airway devices to facilitate airway clearance, respiratory muscle training devices and techniques, and bronchodilators • Administer appropriate levels of supplemental oxygen • Energy conservation • Administer appropriate levels of supplemental oxygen to maintain SpO₂ ≥ 90% • Instruct patients with pulmonary hypertension to avoid Valsalva maneuver with activity and exercise

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TABLE 2 • Specific Competencies for Pulmonary Rehabilitation (Continued)

Competency	Knowledge	Skill/Ability
Exercise testing	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Use of field testing (6MWT, shuttle walk) as outcome measure • Importance of using standardized, consistent course/protocol and encouragement • Published protocol guidelines • Cardiopulmonary exercise testing • Application of exercise testing results into exercise prescription 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Complete 6MWT using American Thoracic Society criteria¹⁴ • Complete shuttle walk using published standards • Complete symptom-limited cardiopulmonary exercise testing on selected patients as appropriate • Appropriately monitor heart rate, blood pressure, perceived exertion, dyspnea, and SpO₂ • Develop exercise prescription on the basis of exercise testing results when appropriate
Exercise training	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Normal and abnormal physiologic responses to exercise¹⁰ • Specific pathophysiologic factors limiting exercise tolerance in pulmonary disease¹ • Physiologic basis of exercise training with pulmonary disease¹⁵ • Exercise prescription on the basis of testing, comorbidities, and pulmonary disease-specific principles • Safety and precautions of exercise training • Function and activities of daily living • Monitoring tools and oxygen administration with exercise training¹⁵ 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Recognition of signs and symptoms of exercise intolerance • Identify exercise limitations of specific comorbidities, including systemic and pulmonary hypertension, diabetes, congestive heart failure, obesity, osteoporosis, and musculoskeletal abnormalities • Develop an individualized and effective exercise prescription including endurance, strengthening, and flexibility components^{16,17} (use interval training when appropriate) • Accurately interpret and incorporate ongoing data into exercise prescription as individual responses change • Appropriately modify exercise plan for patients with pain • Take appropriate actions to modify exercise plan for patients with potential limitations resulting from patient parameters such as precautions on the basis of blood gas • Utilize results of functional tests for balance and gait assistance to ensure ambulation safety⁴
Psychosocial management	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Influence of pulmonary disease processes on emotional functioning, especially depression and anxiety • Influence of pulmonary disease on social relationships (including family and friends) and quality of life • Influence of pulmonary disease and emotional distress on cognitive functioning, especially memory and problem-solving skills • Influence of socioeconomic factors (ie, work status, income level, educational attainment, and access to health care) on patient functioning 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Proficient use of monitoring tools and interpretation of data during exercise training • Screen for psychological symptom burden (especially depression and anxiety), substance abuse, and poor quality of life • Assessment of cognitive capacity for adequate participation in the rehabilitation program and adherence to medical recommendations • Individual and group education/therapy to address stress management and effective coping strategies • Referral to institutional/community resources to address psychosocial distress or cognitive concerns that are not otherwise addressed

(continues)

TABLE 2 • Specific Competencies for Pulmonary Rehabilitation (Continued)

Competency	Knowledge	Skill/Ability
Tobacco cessation	<ul style="list-style-type: none"> • Influence of psychosocial factors on adherence to health behaviors (ie, smoking, diet, and exercise) • Pharmacologic agents that are commonly used to treat psychological distress • Available institutional/community resources (eg, psychologist, social worker, and clergy) to address psychosocial needs • Long-term planning needs of some patients, including advance directives, palliative care, and hospice information 	<ul style="list-style-type: none"> • Referral to the mental health specialist should screening suggests significant psychiatric disease • Measure and report outcomes of psychosocial functioning at the conclusion of the program
Emergency responses for patients and program personnel	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Psychological and physiologic behaviors of tobacco addiction^{9,18} • Effects of smoking on chronic respiratory disease • Established guidelines for treating tobacco use and tobacco prevention/cessation objectives • Effects of secondhand smoke as a risk factor for chronic respiratory disease • Influence of behavior change strategies on smoking cessation • Available institutional/community resources (eg, psychologist, social worker, and community smoking cessation programs) to support smoking cessation • Effects, risks, and benefits of pharmacologic agents used to aid in tobacco cessation 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Behavioral interventions to promote tobacco cessation and long-term tobacco-free adherence • Measure and report outcomes of tobacco cessation at the conclusion of the pulmonary rehabilitation program
Emergency responses for patients and program personnel	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • How to identify and treat life-threatening situations or urgent/adverse and untoward events. • Appropriate emergency responses to changing signs and symptoms 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Be familiar with the medical emergency policies and procedures on how to treat patients from onset of symptoms until resolution of emergency • All staff should be BLS certified • Use AED, bag-valve-mask, and oxygen correctly • Appropriate emergency procedures in response to changing signs and symptoms such as chest pain • Describe, for emergency personnel, the location of the incident, how to get there and exits or room numbers • Identify the location of all emergency equipment and supplies • Participate in mock emergency in-service/practice

(continues)

TABLE 2 • Specific Competencies for Pulmonary Rehabilitation (Continued)

Competency	Knowledge	Skill/Ability
Competency	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Urgent/adverse events or untoward events • Changes in perceived dyspnea at rest or with exercise • Participant comments/complaints <p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Unexpected events, falls • Sprains and fractures • Abrasions • Peripheral neuropathy • Muscle weakness • Poor balance • Lack of or inappropriate use of ambulatory assistive device • Possible neck/head injury 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Have the patient stop activity and assume a comfortable breathing position • Lung auscultation and obtain RR • Encourage the patient to use pursed lip breathing and panic control techniques • Have the patient use fast-acting bronchodilator medication • Administer oxygen if required • Monitor heart rate, blood pressure, and dyspnea rating • Terminate patient exercise when appropriate • Assess symptoms after terminating exercise and resting <p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Use fall prevention including standard screening tools with admission, train the patient in fall prevention techniques and strategies to enhance balance • Practice fall prevention by close monitoring of high-risk patients (eg, 1:1 monitoring with treadmill walking and use of seated exercises to promote safety) • Recognize the need for assistive ambulatory devices to improve safety • Refer to the appropriate provider for specific balance and/or fall prevention therapy • Assess why fall occurred (ie, equipment malfunction or participant accident when getting on or off equipment) • Evaluate seriousness of events and then act accordingly
Universal standard precautions	<p>Demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Importance of hand washing and universal precautions • Appropriate actions to prevent spread of methicillin-resistant <i>Staphylococcus aureus</i>, <i>Clostridium difficile</i> • Appropriate precautions for patients with varicella zoster (shingles) • Importance of staff immunizations for influenza and varicella zoster • Special precautions taken for patients in the rehabilitation setting with cystic fibrosis (ie, antibiotic-resistant <i>Pseudomonas cepacia</i>) • Signs and symptoms of tuberculosis and appropriate actions for evaluation and isolation 	<p>Ability to perform the following:</p> <ul style="list-style-type: none"> • Demonstrate proper hand washing technique • Wipe down (or instructs patients to wipe down) exercise equipment before use • Take appropriate actions with varicella zoster, instructing patients that lesions should be covered and patients should not attend rehabilitation until lesions have crusted over • Patients with cystic fibrosis should exercise >3 ft away from other patients and contain secretions¹³

Abbreviations: ABC, arterial blood gases; AED, automated external defibrillator; ARDS, adult respiratory distress syndrome; BLS, basic life support; BODE, body mass index, airflow obstruction, dyspnea, and exercise capacity; COPD, chronic obstructive pulmonary disease; ILD, interstitial lung disease; ITP, individual treatment plan; LTOT, long-term oxygen therapy; NaCl, sodium chloride; PR, pulmonary rehabilitation; RR, respiratory rate; SpO₂, pulse oximeter-measured oxygen saturation; 6MWT, 6-minute walk test.

comorbidity, professional communication, patient education and training, and exercise and psychosocial needs.³ The clinical competencies outlined within these current guidelines include (1) patient assessment and management; (2) dyspnea assessment and management; (3) oxygen assessment, management, and titration; (4) collaborative self-management; (5) adherence; (6) medication and therapeutics; (7) special consideration for non-chronic obstructive pulmonary disease diagnoses; (8) exercise testing; (9) exercise training; (10) psychosocial management; (11) tobacco cessation; (12) emergency responses for patients and program personnel; and (13) universal standard precautions. The authors recognize that there are areas of overlap in competencies as well as overlap in the knowledge, skills, and abilities listed under various competencies. For example, dyspnea assessment could be included under the patient assessment competency. However, because dyspnea assessment is so crucial to PR practice, it was decided to list it as a separate competency. It is important to acknowledge that not all PR professionals are likely to achieve all the competencies listed herein. Regulatory, educational preparation, and licensure limitations may limit services that any particular PR professional may provide. These competencies, however, provide an overarching and comprehensive knowledge framework of which PR health care professionals should be aware.

Table 2 outlines recommendations for specific core competencies for PR professionals. Compiling core competencies for PR professionals accomplishes four key objectives: (1) key knowledge and skills required by PR professionals are outlined for those working in the field; (2) key knowledge and skills needed for a future career in PR are outlined for academicians preparing future professionals; (3) baseline levels of knowledge components for licensure and certification are provided; and (4) these competencies are incorporated into the American Association of Cardiovascular and Pulmonary Rehabilitation program certification process.

PROGRAM ORGANIZATION

Although no specific competencies are associated with program organization, overall administrative competence is essential to a successful PR program. PR programs share essential features with variability found in available resources, program setting, structure, personnel, and age of the program. The optimal length of PR is unclear, yet longer programs have been associated with greater improvement and maintenance of benefits.²

Historically, PR has been underutilized, with barriers to enrollment including challenges to the patient's

schedule, travel, transportation, parking, cost and insurance coverage, lack of endorsement by health care providers, and lack of perceived benefit. Noncompletion of PR may be due to illness, comorbidities, travel and transportation issues, lack of perceived benefits, smoking, depressive symptoms, and lack of support. Contraindications to PR include any condition that could impact safe exercise or provision of PR.¹⁰ Pulmonary rehabilitation can be provided in inpatient and outpatient settings, whereas exercise training also can be provided in the individual's home with adequate resources in place.

Health care utilization and costs are reduced after PR, including hospital admissions, hospital days, and emergency room visits.¹¹ PR during or immediately after chronic obstructive pulmonary disease exacerbation reduces hospitalizations and possibly improves survival.¹² Challenges to providing PR include regulatory coverage of services, costs, and access. Patients impacted by limited access include those who are homebound or live in rural or remote areas. Technology may offer future options for satellite or alternatives to PR.

SUMMARY

We have developed a revised list of core competencies for PR professionals. No individual health care provider is likely to be proficient at everything on this list. In addition, smaller programs may not have the resources for competence in all areas. We propose the components in this document be used as goals for programs to strive for within the context of available resources.

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