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ELDER CARE

A Resource for Interprofessional Providers

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Pulmonary Rehabilitation

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Pulmonary rehabilitation (PR) is an evidence-based, comprehensive intervention for patients with lung disease who have decreased functional status. PR programs are individualized to improve functional status, decrease symptoms of dyspnea and fatigue, improve quality of life, and assist patients in managing their lung condition. PR has been shown to lower health care costs by reversing or stabilizing the systemic effects of chronic lung disease.

PR involves a multidisciplinary group of physicians, nurses, physical therapists, and respiratory therapists. A psychologist, nutritionist, occupational therapist, and others may also be involved.

PR is complementary to the care provided by the patients' clinician, so coordination of care is important. Patients are encouraged to be active partners in the management of their chronic lung disease. Clinicians should be familiar with the PR program to which they are referring their patients to facilitate communication and maximize benefits to the patient.

Who is a Candidate for Pulmonary Rehabilitation?

While many clinicians think only of severe COPD as a condition that benefits from PR, a patient who is symptomatic from *any* lung disease should be considered a candidate for PR (Table 1). In some cases, however, the availability of PR will depend on the skills of the team, third-party reimbursement, and the ability of the program to offer rehabilitation for those with severe lung disease and fragile health.

Poor candidates for PR are those in whom exercise is contraindicated, such as patients with unstable cardiac disease (Table 2). Patient with conditions that interfere with learning, such as cognitive disorders and psychiatric illness, are also poor candidates. Patients who smoke can benefit from PR, but insurers may require evidence that the patient is making an attempt to stop smoking.

Patients referred for PR are expected to have been maximally evaluated and treated for their underlying lung disease by their primary care clinician. Those with COPD, for example, should have a post-bronchodilator spirometry to establish the presence and degree of airway obstruction. This information guides the PR staff in setting exercise goals. The PR program coordinator and medical director also assess candidates to assure that patients can exercise safely and that their underlying condition is stable at the time of entry into the program.

Table 1. Examples of Lung Conditions for Which Pulmonary Rehabilitation Should be Considered

- Amyotrophic lateral sclerosis
- Bronchiectasis
- Bronchiolitis obliterans
- Chronic obstructive pulmonary disease (COPD)
- Chronic/persistent asthma
- Interstitial lung disease
- Lung cancer
- Obesity-related respiratory disease
- Parkinson's disease
- Pre and post lung transplantation
- Pre and post lung volume-reduction surgery
- Pre and post thoracic and abdominal surgery
- Primary pulmonary hypertension
- Sarcoidosis
- Ventilator dependency

Table 2. Patients with Conditions Such as These are Not Candidates for Pulmonary Rehabilitation

- Severe aortic stenosis
- Unstable angina or recent myocardial infarction
- Acute pulmonary embolus or pulmonary infarction
- Acute myocarditis or pericarditis
- Uncontrolled heart failure
- Suspected or known dissecting aneurysm
- Uncontrolled arrhythmias
- Neuromuscular, musculoskeletal, or rheumatic disorders that are worsened by exercise
- Cognitive or psychiatric disorders

TIPS FOR TREATING PULMONARY REHABILITATION

- Consider a referral to pulmonary rehabilitation for any patient with any lung disease, not just COPD, who is symptomatic with dyspnea and/or decreased functional status.
- Prior to referral, be sure the patient's lung disease has been fully evaluated and maximally treated, and that the patient is sufficiently stable to undertake a graded exercise program.
- Provide patients with information about pulmonary rehabilitation. Such information is available from the American Thoracic Society (see resource list).

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What Happens in a Pulmonary Rehabilitation Program?

PR programs can vary from 4 to 12 weeks in length and include both formal and informal exercise, and self-care and pulmonary education sessions. Supervised exercise typically takes place 3 to 5 times per week, with each session lasting 2 to 3 hours.

Because skeletal muscle dysfunction is prevalent in patients with COPD and other lung diseases, a combination of strength and endurance training is used to reverse deconditioning. Baseline exercise testing with a walk test (e.g., six minute walk distance [6MWD]) or incremental maximal exercise tests (IMET), is used to both evaluate the patient's ability to exercise as well as to serve as baseline for comparison to assess the outcome of PR.

The exercise capacity of patients with lung disease is limited by ventilatory capacity, not by heart rate, so target heart rate is not used as a guide to increase exercise as it is in cardiac patients. Rather, the exercise level is increased incrementally based on the patient's perceived intensity of exertion (Borg rating scale). The goal is to eventually reach 60 to 80% of peak work rate if a baseline IMET was performed, or other goals established based on initial 6MWD.

Exercise consists of upper and lower extremity strength and endurance training (Table 3). Resistance exercises build upper and lower extremity strength. Resistance is gradually increased and strength is built over the course of the program. Thirty minutes of continuous endurance exercise is a goal, though patients who are debilitated may require different goals that include shorter duration with frequent rest breaks, or interval training.

Program staff also modify duration and degree of resistance depending on a patient's exercise tolerance, oxygen desaturation, or changes in heart rate or blood pressure.

Education The educational program includes: anatomy and physiology of the lung, how to use inhalers, and self-care (Table 4). "Teaching moments" occur often throughout the program, such as reinforcing proper inhaler technique.

Table 3: Upper and Lower Extremity Training Devices

Training	Upper Extremity	Lower Extremity
Strength	• hand weights • arm lifts with and without weights • elastic resistance	• ankle weights • machine weights • elastic resistance
Endurance	• arm ergometer • dowel lifts • rowing	• treadmill (motorized) • stationary bicycle • walking; walking track • stair climbing

Table 4: Example of Educational Topics in a Pulmonary Rehabilitation Program

- Normal pulmonary anatomy and physiology
- Pathophysiology of chronic lung disease
- Description of medical tests (lung function tests, oximetry, arterial blood gases)
- Breathing strategies (pursed-lip breathing, secretion clearance, paced breathing techniques, energy conservation)
- Medications (bronchodilators, steroids, oxygen), inhaler technique, spacer/chamber, cleaning equipment, proper use of antibiotics, expectorants and cough suppressants
- Oxygen delivery systems (concentrators, liquid, compressed gas, pulse devices), oxygen-conserving devices
- Exercise and maintaining physical activities, home exercise
- General nutrition guidelines
- Early recognition and treatment of exacerbations (signs and symptoms of a respiratory infection, when to call your health care provider, self-management strategies for increased symptoms and, action plan)
- Prevention (importance of vaccination, avoidance of irritants, secondhand smoke)
- Travel (availability of supplemental oxygen)
- Coping with chronic lung disease (sexuality, depression and anxiety, stress management, relaxation techniques)
- End-of-life planning

References and Resources

American College of Sports Medicine, 2000, *ACSM's guidelines for exercise testing and prescription,* 6th ed. Philadelphia, PA: Lippincott, Williams, and Wilkins.

American Thoracic Society—Patient Education Information about Pulmonary Rehabilitation. http://patients.thoracic.org/materials/index.php.

The Pulmonary Education and Research Foundation (PERF). http://www.perf2ndwind.org/

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