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# The Role of Clinical Exercise Physiologists with Exercise Testing

Exercise testing is a widely accepted procedure that has historically been used in cardiopulmonary settings for the last 40 years (1). The most common use of exercise testing has been to detect latent cardiovascular disease in asymptomatic people undergoing routine medical evaluation or to assess patients after a cardiac event (2). Typical modes for testing include an ergometer or treadmill with 12-lead electrocardiograph (ECG) monitoring. Over the years, the versatility and use of exercise testing has evolved to include assessment of healthy and older adults, children, recreational and elite athletes, and a variety of persons with chronic diseases and conditions (3). In addition to ECG monitoring, additional methods of measurement such as pulmonary gas exchange, pulmonary function, and strength or physical function assessments (e.g., grip strength and 6-minute walk test) have become more common in clinical testing and allow for a comprehensive overview of exercise capacity, disease thresholds, and current fitness level (3). Exercise testing is also indicated when quantifying physical work capacity for occupational medicine, injury risk in sport, determining medical clearance, monitoring symptoms (e.g., dyspnea or syncope), identifying ischemic threshold, or posttesting for treatment or training program effectiveness (1,2).

Due to the nature of clinical exercise testing, typically conducted on persons with chronic diseases or conditions, these tests must be administered by a qualified exercise professional (1). As recent as 2014, there has been debate on who are qualified exercise professionals and if it is safe to administer exercise testing without direct physician supervision (1). The most recent American Heart Association Scientific Statement, "Supervision of Exercise Testing by Non-physicians," provides insight on the most qualified exercise professionals able to administer safe and effective clinical exercise testing (1). In this scientific statement, nonphysician exercise professionals are defined as allied health professionals, including clinical exercise physiologists, physical therapists, nurses, nurse practitioners, and physician assistants (1). Myers et al. (1) references complication rates associated with >2.1 million exercise tests conducted by both physicians and allied health professionals between

1971 and 2012, demonstrating extremely low occurrence of mortality, morbidity, and other complications per 1,000 tests. The tests referenced by Myers et al. (1) were conducted with a combination of asymptomatic adults, athletes, and persons with chronic disease. Although ~75% of the exercise tests were supervised by a physician, no differences in safety or adverse events appeared when comparing physician-supervised exercise tests with allied health professional-supervised exercise tests (1). Even though overlap with academic training and experience exists between allied health professionals, clinical exercise physiologists are highly qualified exercise professionals trained to provide independent supervision of clinical exercise testing. With formal training, the clinical exercise physiologist has strong familiarity with the multiple exercise testing settings, including high acuity units in hospitals, variety of protocols, range of patient conditions who are managing acute and chronic disease, and proficiency with the skills and abilities required for test administration.

In a literature review by Warburton et al. (4), the safety and effectiveness of exercise tests conducted by qualified clinical exercise physiologists, with and without physician supervision, is supported. In that paper, they provide general recommendations for the formal training and preparation of the clinical exercise physiologist to work with clinical populations (4). In summary, these recommendations include (a) at minimum, completion of an undergraduate degree in exercise science and passage of a nationally recognized certification assessing entry level proficiencies; (b) training to deliver patient-centered care that is evidence-based and a part of a care team; (c) possession of discipline-specific core competencies (i.e., understanding different clinical populations); (d) completion of clinical rotations and internship hours; (e) direct assessment of clinical exercise testing skills and abilities which may require a specific number of tests (i.e., 50 tests); and (f) participation in continued professional education to maintain competencies (4). The above recommendations are aligned with recent work to advocate for advancement of clinical exercise physiologists being recognized as qualified health care providers (5). These recommendations also support the importance of academic

program accreditation by the Commission on Accreditation of Allied Health Education Programs in the United States and available certifications such as the American College of Sports Medicine Certified Clinical Exercise Physiologist (5) or American Association of Cardiovascular and Pulmonary Rehabilitation Certified Cardiac Rehabilitation Professional (6). This also aligns with the standards of practice and continuing professional education as regulated by Exercise & Sports Science Australia (7). It is also important to mention that the clinical exercise physiologist is one component of

the care team, and collaboration with physicians and other qualified allied health care professionals is critical for optimizing patient care that includes safe and effective exercise testing.

The role of the clinical exercise physiologist continues to build momentum in exercise testing and other clinical spaces. The professional field of clinical exercise physiology has made significant progress over the past several decades and shows promise for continual advancement as a profession.

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