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| <b>Title</b> | <b>Demonstrate knowledge of the purpose, pitfalls and use of exercise testing</b> |                |          |
| <b>Level</b> | <b>3</b>  | <b>Credits</b> | <b>4</b> |

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| <b>Purpose</b> | People credited with this unit standard are able to: explain the purpose of exercise testing; explain the impact of reliability and validity on the value of exercise testing for exercise participants; and describe the protocols and procedures of specific exercise tests. |
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| <b>Classification</b> | Fitness > Fitness Assessment and Individual Fitness Instruction |
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| <b>Available grade</b> | Achieved |
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### Guidance Information

- 1 Fitness assessment information on New Zealand norms for anthropometric data and on skinfold sites and measurement techniques is presented in two booklets available from the Life in New Zealand (LINZ) Activity and Health Research Unit, University of Otago, PO Box 56, Dunedin. They are:
  - a Wilson, NC, Russell, DG, and Wilson BD. (1993). *Body Composition of New Zealanders*. Dunedin: LINZ Activity & Health Research Unit, University of Otago.
  - b Wilson, NC, Russell, DG, and Wilson, BD. (1993). *Size and Shape of New Zealanders*. Dunedin: LINZ Activity & Health Research Unit, University of Otago.
 Further information is available in the standards issued by the International Society for the Advancement of Kinanthropometry (ISAK); *ISAK International Standards for Anthropometric Assessment*, 2001, available through the ISAK website: [www.isakonline.com](http://www.isakonline.com).
- 2 Exercise participants' needs can be social, psychological or physical in origin. However, within this unit standard needs are not grouped in this way but rather the various needs that an exercise participant may have are directly identified.
- 3 Recommended resources include:
  - a Handcock, Phil J. (1994). *Techniques of Fitness Assessment: The living manual*. Auckland: Fitness Concepts.
  - b Handcock, Phil J, and Knight, Brenda. (1994). *Field Testing Manual for Sports*. Wellington. NZ Sport Science and Technology Board and Coaching NZ.
  - c Howley, ET, and Franks, BD. (2003). *Health Fitness Instructor's Handbook* (4th ed). Champaign, IL: Human Kinetic.
  - d Skinner, James S (ed). (2005). *Exercise Testing and Exercise Prescription for Special Cases: Theoretical basis and clinical application* (3rd ed). Philadelphia, PA: Lippincott Williams & Wilkins.

- e American College of Sports Medicine. (2005). *ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription* (5th ed). Philadelphia, PA: Lippincott Williams & Wilkins.
  - f Norton, K, and Olds, T (eds). (1996). *Anthropometrica: A textbook of body measurement for sports and health courses*. Sydney: University of NSW Press.
- 4 *Psychometric properties* refer to the characteristics a particular measurement has when it is used to assess an identified parameter, and include validity (the truth of a measure), reliability (the ability of the measure to produce reliable results on different occasions), specificity (the appropriateness of the measure to the factor that is being assessed), and sensitivity (the degree to which the measure can detect change in the factor being assessed).

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## Outcomes and performance criteria

### Outcome 1

Explain the purpose of exercise testing.

#### Performance criteria

- 1.1 Explanation describes how an exercise participant's needs can be met through the use of exercise testing.
- Range accountability; urgency; motivation; accurate feedback on progress against the exercise plan; detection of ineffective training modalities/variables; focusing of client on desirable training; justification of exercise progression in line with improvement of fitness variables; need for change in exercise type, intensity, duration, frequency or variety; achievement of stated goals; safety.
- 1.2 Explanation identifies and compares exercise tests that can be used to measure exercise variables for the client.
- Range must include but is not limited to two tests each for – cardiovascular fitness, body composition, blood pressure; comparison must include but is not limited to – suitability for various client types and activity types, cost, accessibility, psychometric properties of measures/measurement tools (validity, reliability, sensitivity, specificity).

### Outcome 2

Explain the impact of reliability and validity on the value of exercise testing for exercise participants.

#### Performance criteria

- 2.1 Types of errors that can occur in exercise testing are explained.
- Range random error, standard error of measurement.

- 2.2 The psychometric property of validity is explained using examples.
- 2.3 The psychometric property of reliability is explained using examples.
- Range intra- and inter-rater reliability.
- 2.4 Methods to improve the validity of testing for exercise participants are explained.
- Range testing must include but is not limited to – submaximal predictive aerobic fitness test, body fat minimum three site caliper test; examples of these tests must include at least one of – Åstrand-Rhyming Step Test, Harvard Step Test, Åstrand-Rhyming Cycle Ergometer Test, PWC170 Test, Rockport 1 Mile Walk Test, Cooper 12-minute Run Test, Multistage Fitness Test (beep test); methods to improve validity must include but are not limited to – test selection to match participant and variable to be assessed.
- 2.5 Methods to improve the reliability of testing for exercise participants are explained.
- Range testing must include but is not limited to – submaximal predictive aerobic fitness test, blood pressure measurement, body fat three site calliper test, girth measurements, height and weight; methods to improve reliability must include but are not limited to – equipment calibration and condition, adherence to testing protocol, accuracy of assessor, pre-test conditions of participant, control of testing environment, exercise participant physical/psychological state.
- 2.6 The impact of poor validity and reliability on exercise testing results is explained in relation to exercise participant motivation and programme design.
- Range over reported improvements that mislead (false-positives); demotivating results that show no improvement (false-negatives); exercise participant frustration, disengagement and disbelief in the value of testing due to fixation on results; change in exercise prescription erroneously on the basis of incorrect results; intra and inter-rater reliability.

### Outcome 3

Describe the protocols of specific exercise tests and their associated procedures.

- Range must include but not limited to one test each for – submaximal predictive aerobic fitness; blood pressure measurement; body fat (minimum three site calliper test); height, weight and girth measures of waist, hip and thigh; examples of tests that can be used are – Åstrand-Rhyming Step Test, Harvard Step Test, Åstrand-Rhyming Cycle Ergometer Test, PWC170 Test, Rockport 1 Mile Walk Test, Cooper 12-minute Run Test, Multistage Fitness Test (Beep Test).

**Performance criteria**

- 3.1 Description of the test protocol establishes what the test is measuring.
- 3.2 Description of the test protocol identifies equipment requirements and the procedures for calibration of that equipment.
- 3.3 Description of the test protocol establishes any presumptions made and identifies (where applicable) sample population characteristics used for normative data.
- 3.4 Description of the test protocol establishes the pre-test conditions required for optimal accuracy and reliability.
- 3.5 Description of the test protocol details test requirements and contraindications.
- Range conditions for cessation of test, pre-test screening/contraindications, possible hazards/risks and strategies to minimise or eliminate these.
- 3.6 Description of the test protocol establishes the testing conditions and procedures required to achieve accuracy and reliability during the test.
- 3.7 Description of the test protocol establishes what data will be produced.

**This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.**

**Status information and last date for assessment for superseded versions**

| Process      | Version | Date             | Last Date for Assessment |
|--------------|---------|------------------|--------------------------|
| Registration | 1       | 20 April 2006    | 31 December 2020         |
| Review       | 2       | 23 November 2017 | 31 December 2020         |

**Consent and Moderation Requirements (CMR) reference**

0099

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.