

PRE-EXERCISE SCREENING

Guide to the Australian adult pre-exercise screening system



Professor Kevin Norton & Dr Lynda Norton

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CONTENTS

| | |
|--|----|
| Abbreviations | 1 |
| Foreword | 3 |
| Why screen pre-exercise? | 4 |
| The risk of injury or death? | 4 |
| Physical activity recommendations | 4 |
| Negligence and duty of care | 5 |
| Adult Pre-exercise Screening System overview | 7 |
| STAGE 1 OVERVIEW | 9 |
| STAGE 1: COMPULSORY QUESTIONS | 10 |
| STAGE 1: DECISION | 12 |
| STAGE 2 OVERVIEW | 13 |
| Risk factors: | |
| 1. Age and gender | 14 |
| 2. Family history of heart disease | 16 |
| 3. Smoking | 16 |
| 4. Physical activity patterns | 17 |
| 5. Body mass index | 18 |
| 6. High blood pressure | 20 |
| 7. High cholesterol | 22 |
| - Lipid definitions | 23 |
| 8. High blood sugar | 25 |
| Other medical / health concerns: | |
| 9. Hospital admission in the last 12 months? | 26 |
| 10. Current prescribed medications? | 26 |
| 11. Pregnant or recent childbirth? | 27 |
| 12. Muscle, bone, joint pain or soreness? | 27 |
| COMPLETION OF STAGE 2 | 28 |



| | |
|----------------------------|----|
| STAGE 3 OVERVIEW | 29 |
| STAGE 3 measurements | |
| 1. Body mass index | 31 |
| 2. Waist girth | 31 |
| 3. Blood pressure | 32 |
| MEASURING BLOOD PARAMETERS | |
| 4. Blood fats | 34 |
| 5. Blood glucose | 34 |
| COMPLETION OF STAGE 3 | 35 |
| Glossary of terms | 36 |
| Practice case studies | 38 |
| Notes | 50 |
| References | 52 |

ABBREVIATIONS

| | |
|--------------|---|
| AAS | Active Australia Survey |
| ABS | Australian Bureau of Statistics |
| ACSM | American College of Sports Medicine |
| AIHW | Australian Institute of Health and Welfare |
| APSS | Adult Pre-exercise Screening System |
| AusDiab | Australian Diabetes, Obesity and Lifestyle Study |
| BMI | Body mass index (weight in kilograms/ height in metres squared) |
| BP | Blood pressure |
| CDC | Centres for Disease Control and Prevention |
| CHD | Coronary heart disease |
| COPD | Chronic obstructive pulmonary disease |
| CV | Cardiovascular |
| CVD | Cardiovascular disease |
| DALY | Disability adjusted life year |
| DBP | Diastolic blood pressure |
| DDD | Defined daily dose (average daily dose of a drug used for its main intention) |
| DHAC | Commonwealth Department of Health and Aged Care |
| ESC | European Society of Cardiology |
| ESH | European Society of Hypertension |
| ESSA | Exercise and Sports Science Australia |
| FA | Fitness Australia |
| GP | General Practitioner |
| HDL | High density lipoproteins |
| JNC7 | Joint National Committee on Prevention, Evaluation and Treatment of High Blood Pressure |
| LDL | Low density lipoproteins |
| MET | Metabolic equivalents (this is a measure of the multiples of resting metabolic rate) |
| MI | Myocardial infarction |
| NCEP-ATP III | National Cholesterol Education program-Adult Treatment Panel III |
| NH&MRC | National Health & Medical Research Council |
| NHF | National Heart Foundation |
| NHS | National Health Survey |
| OECD | Organisation for Economic Co-operation and Development |
| PA | Physical Activity |
| PBS | Pharmaceutical Benefits Scheme |
| RPE | Rating of perceived exertion |
| RR | Relative risk |
| SBP | Systolic Blood Pressure |
| SMA | Sports Medicine Australia |
| VLDL | Very low density lipoproteins |
| WHO | World Health Organization |

FOREWORD

Pre-exercise screening is used to identify people who may have medical conditions which put them at a higher risk of an adverse event[#] during physical activity/exercise. It is a filter or 'safety net' to help determine if the potential benefits of exercise outweigh the risks for an individual.

In 2010 three national organisations - Exercise and Sport Science Australia (ESSA), Fitness Australia (FA) and Sports Medicine Australia (SMA) - came together to standardise the way pre-exercise screening was undertaken in the Australian health and fitness industry. Each organisation was represented by dedicated professionals committed to improving the way pre-exercise screening was performed and to help promote widespread use of a simple screening system.

Over the years a number of screening tools have been used in the fitness industry. Many had been designed 'in-house' while others were adopted from key international organisations such as the American College of Sports Medicine's risk stratification system or the Canadian PAR-Q (ACSM, 2010). The perception was that, while each had its strengths, none was ideal for practical use in the Australian industry. This led to the development of the 2005 SMA pre-exercise screening system*. This system was developed in conjunction with the Commonwealth Department of Health and Aged Care. Despite the 2005 screening system being recommended by these organisations it was not used widely in the industry because of the time and expertise required to administer the screening tool. It needed to be more functional in a range of settings. A system was required that was sensitive to help identify people at increased risk when they were beginning an exercise program yet was practical and easy to use. The system had to include the flexibility to be adopted as a relatively quick initial self-assessment in a way that was similar to the PAR-Q system but also include options for more detailed risk factor assessments like the ACSM system.

Consequently, the three Australian organisations developed the Adult Pre-exercise Screening System (APSS) and the core instrument of the system - the Tool (APSS Tool) that were released in 2011. This textbook can be used by exercise specialists and other health professionals to accompany the tool. It provides these people with an overview of the tool and how it can be best administered and

evaluated to make informed judgements about when to seek medical support for people new to exercise programs or who are significantly upgrading their physical activity patterns. The book also includes additional details that may be used to help make screening decisions, counsel clients and educate others in how to make best use of the screening system. It also has more details about individual risk factors and how exercise programs might be tailored to specific groups of people with chronic health conditions.

Major differences in the new Adult Pre-exercise Screening System include the fact Stage 1 can be self administered and evaluated. It is the only compulsory stage and contains seven basic questions. It was designed to be quick to administer even for people attending fitness centres and health clubs on a casual basis. Another important element of the new system is the transfer of greater responsibility to the exercise leader. There is greater flexibility in the system to encourage more people to begin physical activity at light-moderate intensity levels without the need for medical check-ups. This has often been perceived as a barrier to many people who may be confused and concerned about how dangerous beginning an exercise program might be for them.

The increased emphasis on exercise leadership and the capacity to make decisions in the safe interests of clients is critical to the success of the system. It also means exercise leaders need to understand all aspects of the pre-exercise screening system including interpretation. Equally, they must know how to prescribe exercise appropriate to their client's capabilities and health status. We want as many people in Australia as possible to lead active and healthy lives. This system can and should encourage more people to become active and hopefully enjoy the process with full confidence in the exercise leadership.

Appreciation is expressed to the members of the task force who undertook to develop the Adult Pre-exercise Screening System. Together we spent many hours across many months working our way through the challenges of developing a system that was practical and easy to administer, yet sensitive enough to make the process worthwhile. In particular the following people were instrumental in the successful completion of this project: Professor Jeff Coombes, Anita Hobson-Powell, Craig Knox, Nello Marino, Dr Robbie Parker, and Dr Andrew Williams.

[#] an adverse event refers to an unexpected event that occurs as a consequence of an exercise session, resulting in ill health, physical harm or death to an individual

* SMA Pre-exercise screening system 2005, <http://sma.org.au/wp-content/uploads/2009/05/new_pre_screening.pdf>

WHY SCREEN PRE-EXERCISE?

It is irrefutable that across the population the health benefits of physical activity outweigh the risks many fold. However, it is also recognised that for some individuals there may be an unacceptably high acute risk associated with starting a physical activity program or substantially increasing their level of activity.

While the overall risk of a cardiovascular or cerebrovascular event (for example, heart attack, stroke or sudden death) increases during physical activity in the acute phase, there is a protective effect over the longer term for those who regularly exercise. The main cause of these specific adverse events in adults is prior pathologies often related to atherosclerotic arterial disease. Regular physical activity reduces the build-up of fatty plaques that lead to atherosclerotic disease as well as increasing blood vessel compliance, capillary density and myocardial size and strength. There are other acute problems that may occur in some people who have other pathologies. These are typically related to the respiratory and metabolic systems but may occasionally involve other physiological systems. If health and fitness professionals can easily gather more information about the state of health or disease of a person, it might help to reduce the possibility of a problem occurring during exercise. There are no guarantees that an adverse event might or might not occur. However, this prior knowledge will assist in appropriate exercise prescription and can significantly reduce the probability of serious injury or life-threatening incidences.

THE RISK OF INJURY OR DEATH?

The transient risk of physical activity should be put into perspective. The probability of an adverse event of a significant nature is extremely low. For example, regular exercisers have a risk of dying during rest of about 1 in every 20 million hours compared to sedentary people who have a risk of dying at rest of 1 in every 5.5 million hours- about a 3.6 fold increase. However, this increased 'protection' for regular exercisers comes at a cost. During exercise, even those accustomed to exercising increase their risk of heart attack or sudden death. Moderate exercise increases the chance of dying (during the exercise) by about 4 fold, that is, to about 1 in every 5 million hours on average (for 'apparently healthy' or 'low risk' people). As the intensity of the activity increases

there is a progressively greater chance of suffering an adverse cardiovascular event. The most intense exercise increases the risk of adverse events to about 20 fold. Since humans are 'at rest' for a large part of the day (relative to undertaking vigorous exercise) then the long-term benefits for regular exercisers are clear - exercise, in general, protects people from such extreme adverse events.

Obviously, the risks of exercise are greater for those people who are known to have cardiovascular disease, or 'high risk' individuals. Overall, the risks of a major or fatal cardiovascular event occurring among various coronary heart disease (CHD) patients (that is, those known to have heart disease) attending rehabilitation programs is between about 1 per 117,000 hours of activity (for a major event such as a heart attack) to about 1 per 750,000 hours (for death).

The risk of these adverse events increases in an exponential fashion with increasing age, particularly for males above about 45 years and females above about 55 years - (see section on 'AGE and Gender' below), and with increasing exercise intensity. This is particularly important if the participant is unfit and unaccustomed to the exercise intensity - hence the need to progress slowly and with care. However, heart attack or sudden death rates are still relatively low even among these 'higher risk' groups.

PHYSICAL ACTIVITY RECOMMENDATIONS

All major professional sports medicine groups advise that it is safer (over the longer term) to become active than to remain sedentary. Providing the activity is progressive and not too intense early in the program the risks are extremely small for serious adverse effects. For example, the Australian Adult Pre-exercise Screening System was developed by the three leading exercise and sports medicine groups in the country. Together, they suggest people who are free from cardiovascular, metabolic or significant respiratory disease, and those without signs and/or symptoms of disease/injury (that is, low - moderate risk groups) can begin light-moderate-level physical activity programs without the need for a medical check up or clearance. The Australian National Heart Foundation (NHF) in a recent paper on physical activity for people with cardiovascular disease (CVD) stated that, providing the medical condition is stable, these patients can

also begin a light - moderate physical activity program without the need for a medical check-up. They included the following statements concerning patients with known CVD: "A detailed clinical assessment prior to recommending low to moderate physical activity is generally unwarranted and counterproductive" and, further, "it is not necessary that individuals starting a low to moderate progressive program of physical activity perform an exercise tolerance test".*

NEGLIGENCE AND DUTY OF CARE

In recent years there have been considerable changes to laws that govern the provision of recreation and sporting services. These laws differ among the states but the changes were, in part, designed to limit the ability of a plaintiff to sue for damages when injured while undertaking recreational or sporting activities that had significant 'physical exertion or physical risk'. These activities are typically described in the legislation as having 'an obvious' risk. Joining a gym and beginning an exercise program are considered part of the 'recreational or sporting activities'. Therefore, while changes to torts law (where people sue others for personal harm they suffer as a result of negligence by the other person) have, in theory, restricted the chance of successful litigation, there are still cases that show it is happening and exercise professionals and fitness centres are still successfully being sued for negligence in relation to services they offer. Negligence requires three elements to be satisfied: (1) a duty of care must be established between the plaintiff and defendant, (2) there must have been a breach of that duty by the defendant and (3) the damage (injury) must have been the result of the breach, or caused by the breach of duty. The following diagram outlines this process:

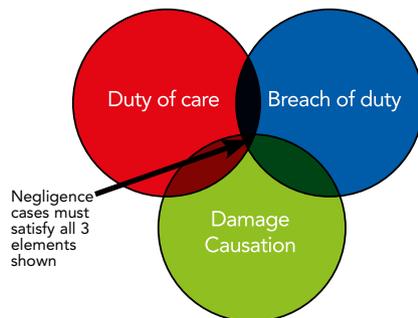


Figure 1. Elements in negligence

The important part here in relation to duty of care and negligence is that breach of duty is often assessed in relation to professional standards or recommended processes by the authority in a particular field - in this case by groups such as SMA, ESSA and FA. Since they are recommending pre-exercise screening is undertaken then this becomes significant in law cases where a person might be injured who hasn't been screened or has not been screened in a professional manner. While many fitness centres and individual providers ask their clients to sign waivers (which is a sensible practice) they may not always protect the provider. In summary, courts have generally held that you can't waive your right to provide a duty of care and contracts saying you waive the right for personal injury may not protect you in all circumstances.

In relation to risk warnings it is good practice to advise people of the potential risks when undertaking exercise. There can never be complete safety in recreational and sporting activities that involve significant physical exertion. However, the following examples for two states help to guide exercise providers about steps they should take to ensure adequate warnings are given. Make sure you are familiar with the relevant legislation in your own state or territory.

Section 5M of the *Civil Liability Act 2002 NSW* provides, in part, as follows:

(There is) No duty of care for recreational activity where there is a risk warning:

- (1) A person (the defendant) is not liable in negligence for harm suffered by another person (the plaintiff) as a result of the materialisation of an obvious risk of a dangerous recreational activity engaged in by the plaintiff.
- (3) For the purposes of subsection (1), a risk warning to a person in relation to a recreational activity is: a warning that is given in a manner that is reasonably likely to result in people being warned of the risk before engaging in the recreational activity. The defendant is not required to establish that the person received or understood the warning or was capable of receiving or understanding the warning.

In SA the legislation is similar:

Recreational Services (limitation of liability) Act 2002 (SA)

Definitions:

- Recreational services includes (commercial or non-commercial) participating in:
 - (a) a sporting activity or a similar leisure-time pursuit, or
 - (b) any other activity that involves a significant degree of physical exertion or physical risk, and
 - (c) is undertaken for the purposes of recreation, enjoyment or leisure (includes horse-riding, bungee jumping and other similar activities)
- Personal injury includes bodily injury and mental / nervous shock and death
- Duty of care - a duty to take care or to exercise skill (or both)

Modification of a duty may operate if:

- Companies register their recreational services and stipulate the codes (standards) of practice under which they will operate
- The person (consumer) can agree to services (contract) such that a duty of care is governed by the registered code
- If the consumer is injured the provider is liable only if he establishes that a failure to comply with the code caused or contributed to the injury.

Other states have similarly limited the ability of a plaintiff to sue where they have been injured as the result of the materialisation of an obvious risk of a dangerous recreational activity. This includes undertaking exercise programs as long as the provider warns them of the risk and complies with standards accepted within the industry - such as pre-exercise screening and appropriate exercise intensity prescription.

ADULT PRE-EXERCISE SCREENING SYSTEM OVERVIEW

The Adult Pre-exercise Screening System (APSS) consists of two parts - a compulsory part (Stage 1) and an optional part (Stages 2 and 3).

The compulsory part of the pre-exercise screening consists of general questions to determine if a person has any major or uncontrolled cardiovascular, metabolic and respiratory diseases, signs and symptoms of disease, or other medical issues that represent a substantial risk when beginning or upgrading their physical activity patterns. The option to undertake more detailed screening and testing in Stages 2 and 3 allows the tester to identify specific risk factors and other lifestyle behaviours that can assist in appropriate exercise prescription.

Figure 2 below shows that Stage 1 is the compulsory stage. It consists of a 7-item questionnaire that is self administered and self assessed. Individuals without any medical problems and who answer 'No' to all questions can begin an exercise program at

light-moderate intensity without further check-ups. Those people who answer 'Yes' to any question in Stage 1 may have potential problems that could be made worse by exercise. Therefore, these individuals are referred to a medical practitioner or other health professional. The other stages - Stage 2 and Stage 3 - are optional. These stages provide the tester/health professional an opportunity to gather information on a range of key risk factors. This information can then be used to tailor the exercise program, or possibly lead to a recommendation to seek further medical advice. This optional section involves a requirement for qualified health professionals administering the pre-exercise screening tool to use professional judgement on what constitutes an extreme risk factor value. Similarly, they should also judge whether a particular combination of risk factors is present that, together, might represent a high risker of an adverse event occurring during exercise. The information contained in this textbook will help fitness specialists and other health professionals to understand the nature of the risk when exercising. It will also assist and guide them in making judgements about the relative risks versus benefits of exercise and appropriate intensity of prescribed exercise.

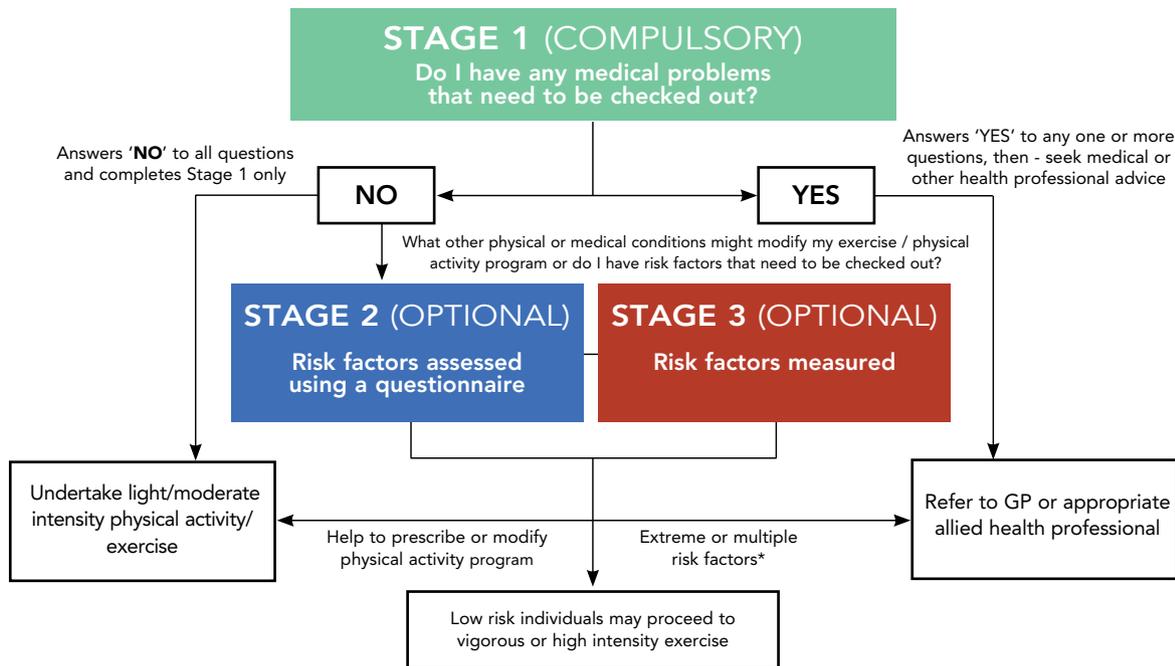


Figure 2. A schematic showing the general Adult Pre-exercise Screening System.

* Note: Qualified health professionals administering the pre-exercise screening tool should use professional judgement on what constitutes an extreme risk factor value.

ADULT PRE-EXERCISE SCREENING TOOL SCREENING OVERVIEW

STAGE 1 COMPULSORY QUESTIONS

This stage is self administered and self evaluated*

STAGE 1 AIM:

To identify individuals who may be at a **higher risk** of an adverse event during physical activity.

- If the individual answers YES to any of the 7 questions, they are advised to seek guidance from their GP or appropriate allied health professional prior to undertaking physical activity/exercise.
- If the individual answered NO to all of the 7 questions, and they have no other concerns about their health, they are advised that they may proceed to undertake light-moderate intensity physical activity/exercise.

What is meant by 'light-moderate intensity activity'? A table on 'Exercise Intensity Guidelines' (Fig. 4) has been included in this textbook on page 12.

STAGE 2 & 3 RISK FACTOR ASSESSMENT

These stages are administered by trained assessors

The information obtained through Stages 2 and 3 will indicate whether the individual is at **moderate or low risk**.

To stratify risk, record and use either:

- The total of risk factors from Stage 2
- or
- The total of risk factors from Stage 3 and questions 1 to 4 in Stage 2

The total number of risk factors can be recorded in the space provided.

If the individual has 2 or more risk factors, they are deemed to be moderate risk. If the individual has less than 2 risk factors they are deemed to be low risk. If there are extreme or multiple risk factors, the exercise professional should use judgement to decide whether further medical advice is required.

Individuals at moderate risk may participate in aerobic physical activity/exercise at a light or moderate intensity.

Individuals at low risk may participate in aerobic physical activity/exercise up to a vigorous or high intensity with appropriate progression and supervision.

* Self administered and self evaluated means that there is an option for clients to complete this questionnaire (stage 1) on-line or in hard copy but without necessarily having a health professional ask them the questions or assist in any other way. If the client has questions or concerns then they should be given the opportunity to seek assistance from the organisation offering the service before beginning exercise.

STAGE 1 (COMPULSORY)

AIM: to identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise.

This stage is self administered and self evaluated.

This screening tool can be administered to both regular and casual users of exercise services. Once completed, the form should be filed with the clients records for future reference.

STAGE 1 OVERVIEW

The 7 compulsory questions that form Stage 1 are shown in the tool on the over page. These questions cover major areas of cardiovascular, metabolic and respiratory diseases, and signs and symptoms of disease. There is a question on 'musculoskeletal problems' that could be made worse by undertaking physical activity. Finally, there is a question on 'other medical conditions' that could make it dangerous for a person to begin an exercise program.

The proforma makes it clear how to manage the responses. A person who answers 'No' to all questions can begin a physical activity program at light-moderate intensity. An individual who answers 'Yes' to any one or more needs additional attention before beginning a physical activity program. This follow-up is usually going to involve either a medical check or another health professional to determine the balance of risk versus benefit for that individual.

It is important to seek clarification of any 'Yes' responses before referring a person on. For example, almost everyone has joint aches and pains from time to time. This doesn't always mean exercise is contraindicated because it could be a minor ailment or a transient problem or muscle damage from an unfamiliar activity. Similarly, diabetics can benefit greatly from an appropriate exercise program so having diabetes may not always require a check up before starting a program. Also, everyone experiences a sensation of dizziness when they stand too quickly or change position suddenly. This is a natural part of a homeostatic response to maintain blood pressure. The screening system doesn't require these types of examples to be routinely referred to GP's or health professionals. Over time, experience will often help clarify these situations. In instances where the exercise professional has any doubts about the health status of their client, then the best advice is to seek further assistance from someone more experienced or from a medical practitioner.

ADULT PRE-EXERCISE SCREENING TOOL

This screening tool does not provide advice on a particular matter, nor does it substitute for advice from an appropriately qualified medical professional. No warranty of safety should result from its use. The screening system in no way guarantees against injury or death. No responsibility or liability whatsoever can be accepted by Exercise and Sports Science Australia, Fitness Australia or Sports Medicine Australia for any loss, damage or injury that may arise from any person acting on any statement or information contained in this tool.

Name: _____

Date of Birth: _____ Male Female Date: _____

STAGE 1 (COMPULSORY)

AIM: to identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise. This stage is self administered and self evaluated.

Please circle response

| | | |
|---|-----|----|
| 1. Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke? | Yes | No |
| 2. Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise? | Yes | No |
| 3. Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance? | Yes | No |
| 4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months? | Yes | No |
| 5. If you have diabetes (type I or type II) have you had trouble controlling your blood glucose in the last 3 months? | Yes | No |
| 6. Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise? | Yes | No |
| 7. Do you have any other medical condition(s) that may make it dangerous for you to participate in physical activity/exercise? | Yes | No |

IF YOU ANSWERED 'YES' to any of the 7 questions, please seek guidance from your GP or appropriate allied health professional prior to undertaking physical activity/exercise

IF YOU ANSWERED 'NO' to all of the 7 questions, and you have no other concerns about your health, you may proceed to undertake light-moderate intensity physical activity/exercise

I believe that to the best of my knowledge, all of the information I have supplied within this tool is correct.

Signature _____ Date _____

Figure 3. Stage 1 of the Adult Pre-exercise Screening Tool. The proforma shows the 7 questions and illustrates the management of people depending on their responses. Note also the space for the client to sign after completing the questionnaire.

STAGE 1 COMPULSORY QUESTIONS

1. Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke?

Examples include, but are not limited to:

| | | |
|-------------------------------|---|----------------------------|
| • Angina | • Cardiomyopathy | • Congenital Heart Disease |
| • Coronary Angioplasty | • Coronary Artery Bypass | • Heart Failure |
| • Heart Transplant | • Heart Valve Disease | • Heart Murmur |
| • Peripheral Vascular Disease | • Post Myocardial Infarction (heart attack) | • Stroke |

People who have had a heart attack or surgery such as a bypass operation will know this is part of their medical history and are likely to respond with a 'Yes' to this question. This doesn't immediately require them to seek medical clearance, it depends on the circumstances and time since the event. Some people report they have a heart murmur and have done so since they can recall. If it hasn't presented them any problems in usual daily tasks then it is unlikely to require medical clearance. On the other hand, people who report experiencing chest pain (angina) when walking up stairs or perhaps when mowing the lawn are a more significant concern. In this situation a medical check-up would be recommended. A guide is provided by the National Heart Foundation* who indicate that providing the medical condition is stable, 'these types of patients can begin a light - moderate physical activity program without the need for a medical check-up'. However, they add - 'a person's current level of activity, the severity of their cardiovascular condition, co-morbidities and personal preferences should determine the approach and rate of progress towards these goals' (of 30 minutes of moderate activity on most days of the week).

2. Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise?

Unexplained chest pains may be characterised by constriction, burning, knife-like pains and/or a dull ache. These symptoms are potentially related to an oxygen deficiency in areas of the heart muscle. It is usually related to arterial blockage due to

the presence of fatty plaques. If a person reports this problem a medical clearance should be recommended. These types of conditions are made worse by exercise because the increased work required by the heart muscle to pump blood around the body also requires more oxygen to be delivered to the heart muscle. If there is a partial blockage of a vessel then oxygen delivery is compromised and could develop into a heart attack.

3. Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance?

Examples of dizziness may include, but are not limited to light-headedness or the feeling of near fainting, loss of balance or other sensations such as floating or swimming. Although dizziness after exercise should not be ignored, this may occur even in healthy individuals. Be mindful that dizziness is sometimes reported by people who are simply saying that when they stand up suddenly they feel a transient light-headedness. This response to standing up is common and a normal response. However, if it is more than this type of situation, for example, if it occurs when seated or when walking then further checks are warranted.

4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months?

Medical attention refers to GP or hospital visit immediately following an asthma attack. It does not include the self administration of Ventolin, Becotide or any other inhalant. Asthma is relatively common in Australia, particularly in the winter months and pollen seasons. The AIHW (2011) estimates between 10-12% of Adults have asthma. Increased wheezing and asthma symptoms don't always mean a medical check-up is required. The question specifically refers to an asthma attack where immediate medical attention was required. This covers the more extreme examples where puffers and other medications have typically not been enough to prevent more significant problems associated with the asthma attack. These situations can be life-threatening and therefore we want the screening system to be able to identify potential problems with asthmatics who have a recent history of severe attacks.

5. If you have diabetes (type I or II) have you had trouble controlling your blood glucose in the last 3 months?

'Trouble controlling' usually refers to an inability to maintain a stable blood glucose level, this may also include the diabetic who sustains a hyperglycaemic (hyper) or hypoglycaemic (hypo) event. Hyperglycaemia is a condition that occurs when blood sugar (glucose) levels remain too high. Blood sugars vary from day to day, however the WHO state that consistently high blood glucose levels of >7 mmol/L over a number of days or a single measure of >15 mmol/L results in hyperglycaemia. While participating in exercise usually brings glucose levels down or holds it steady this may not always be the case.

Symptoms of hyperglycaemia include:

| | | |
|---------------------------|-----------------------|----------------------------------|
| • Anxiety | • Cold sweats | • Confusion |
| • Convulsions | • Difficulty speaking | • Dizziness/ light-headedness |
| • Double/blurry vision | • Irritability | • Lack of concentration |
| • Shaking or trembling | • Sleepiness | • Weakness |

Hypoglycaemia is a condition that occurs when blood glucose is too low. This occurs when your blood glucose level falls below about 3.5 mmol/L, although this can vary. Blood glucose at this level can be considered harmful. Exercise is more often related to lower levels of blood glucose so hypoglycaemia is more likely to occur in diabetics.

Symptoms of hypoglycaemia include:

| | | |
|------------|-------------|---------------------------|
| • Hunger | • Shakiness | • Nervousness/ anxiety |
| • Sweating | • Dizziness | • Confusion |

Sources: International Diabetes Institute (2004); Diabetes Australia (2011)

6. Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise?

Most people have experienced acute muscle aches and pains. Many also have chronic conditions that cause them to experience pain and / or limitations in their daily tasks. Arthritis is a good example of this type of chronic condition. Examples include, but are not limited to the conditions listed below:

| | | |
|--------------------------|---------------------|------------------------------|
| • Cerebral palsy | • Arthritis | • Bone fracture |
| • Chronic muscle fatigue | • Dislocations | • Joint replacement |
| • Multiple sclerosis | • Osteoarthritis | • Osteoporosis |
| • Muscular dystrophy | • Scoliosis | • Serious sprains or strains |
| • Parkinson's disease | • Spondylolisthesis | • Spondylolysis |

7. Do you have any other medical condition/s that may make it dangerous for you to participate in physical activity/exercise?

This final question of Stage 1 allows the person to indicate if they have any other concerns or medical problems not covered in the previous questions. Examples that might come up include, but are obviously not limited to:

| | | |
|------------------------------|----------------|---------------|
| • Acute injury | • Hypertension | • Hypotension |
| • Limiting back or foot pain | • Pregnancy | • Transplants |
| • Balance problems | • Cancer | • Epilepsy |

A similar version of the 'Exercise Intensity Guidelines' was published jointly by ESSA and FA in 2010 as part of a position statement on physical activity and exercise intensity terminology (Norton et al., 2010). The table is for reference purposes and to encourage consistency in terminology among exercise professionals. It contains information on the five levels of exercise intensity along with approximate heart rate levels, ratings of perceived exertion and other descriptors within each intensity category that may be useful when prescribing exercise and monitoring people being active.

STAGE 1 DECISION

If an individual answers YES to any of the 7 questions, they are advised to seek guidance from their GP or appropriate allied health professional prior to undertaking physical activity/exercise.

If an individuals answers NO to all of the 7 questions, and they have no other concerns about their health, they may proceed to undertake appropriate **light** or **moderate** intensity physical activity / exercise. At this stage the tester / participant may refer to the table of exercise intensity guidelines shown in figure 4.

If further information about the number and type of risk factors is required then the tester can proceed to Stages 2 and 3.

| EXERCISE INTENSITY GUIDELINES | | | |
|-------------------------------|---------------------|------------------------------------|--|
| INTENSITY CATEGORY | HEART RATE MEASURES | PERCEIVED EXERTION MEASURES | DESCRIPTIVE MEASURES |
| SEDENTARY | < 40% HRmax | Very, very light RPE# < 1 | • Activities that usually involve sitting or lying and that have little additional movement and a low energy requirement |
| LIGHT | 40 to <55% HRmax | Very light to light RPE# 1-2 | • An aerobic activity that does not cause a noticeable change in breathing rate • An intensity that can be sustained for at least 60 minutes |
| MODERATE | 55 to <70% HRmax | Moderate to somewhat hard RPE# 3-4 | • An aerobic activity that is able to be conducted whilst maintaining a conversation uninterrupted • An intensity that may last between 30 and 60 minutes |
| VIGOROUS | 70 to <90% HRmax | Hard RPE# 5-6 | • An aerobic activity in which a conversation generally cannot be maintained uninterrupted • An intensity that may last up to about 30 minutes |
| HIGH | ≥ 90% HRmax | Very hard RPE# ≥ 7 | • An intensity that generally cannot be sustained for longer than about 10 minutes |

= Borg's Rating of Perceived Exertion (RPE) scale, category scale 0-10

Figure 4. Exercise intensity guidelines (Norton et al., 2010).

STAGE 2 (OPTIONAL)

AIM: to identify those individuals with risk factors or other conditions to assist appropriate exercise prescription.

This stage is to be administered by a qualified exercise professional (Minimum Certificate III in Fitness with completion of screening and assessment units SISFFIT301A and SISFFIT307A (or equivalent or existing exercise/fitness qualifications).

STAGE 2 OVERVIEW

Stage 2 is an optional stage. This stage is about determining what sort of risk factors and how many risk factors a person has. This information is very valuable to help prescribe exercises tailored to the individual. Knowing a person has a specific combination of risk factors also enables the tester to establish a degree of confidence in how the person is likely to respond to physical activity and where there might potentially be problems. Like other screening systems a person is classified as a 'moderate' or 'low' risk based on the number of risk factors. If a person has 2 or more risk factors at Stage 2 or Stage 3 then they are classified as a 'moderate' risk. Less than 2 risk factors means they are at 'low' risk. However, the new screening system is also structured to total up a number of possible risk factors and to look specifically at individual risk factors. This allows the exercise professional the ability to make judgements about the relative risk a person may have when beginning an exercise program. For example, if a person has indicated they have an extreme risk factor such as very high blood

pressure or blood glucose values then the tester should always use professional judgement to decide if medical clearance is required before starting an exercise program.

We should try to encourage as many people as possible to have an active lifestyle. However, a small proportion will have conditions or risk factors that place them at an unacceptable level for adverse events during even light activities. Greater flexibility in the screening system brings greater responsibility on the part of the tester. Therefore, less experienced testers should always be more cautious and seek advice from more experienced exercise specialists when prescribing exercise for people new to physical activity programs.

STAGE 2 AIM

To identify individuals with risk factors or other conditions that are important to know when prescribing physical activities.

ADULT PRE-EXERCISE SCREENING TOOL

STAGE 2 (OPTIONAL)

Name: _____

Date of Birth: _____ Date: _____

AIM: To identify those individuals with risk factors or other conditions to assist with appropriate exercise prescription. This stage is to be administered by a qualified exercise professional.

| | | RISK FACTORS |
|--|--|---|
| 1. | Age _____ Gender _____ | ≥ 45yrs Males or ≥ 55yrs Females +1 risk factor |
| 2. | Family history of heart disease (eg: stroke, heart attack) Relative Age Relative Age <input type="checkbox"/> Father _____ <input type="checkbox"/> Mother _____ <input type="checkbox"/> Brother _____ <input type="checkbox"/> Sister _____ <input type="checkbox"/> Son _____ <input type="checkbox"/> Daughter _____ | If male < 55yrs = +1 risk factor If female < 65yrs = +1 risk factor Maximum of 1 risk factor for this question |
| 3. | Do you smoke cigarettes on a daily or weekly basis or have you quit smoking in the last 6 months? Yes No If currently smoking, how many per day or week? _____ | If yes, (smoke regularly or given up within the past 6 months) = +1 risk factor |
| 4. | Describe your current physical activity/exercise levels: Sedentary Light Moderate Vigorous <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Frequency _____ Duration _____ sessions per week minutes per week | If physical activity level < 150 min/ week = +1 risk factor If physical activity level ≥ 150 min/ week = -1 risk factor (vigorous physical activity/ exercise weighted x 2) |
| 5. | Please state your height (cm) _____ weight (kg) _____ | BMI = _____ BMI ≥ 30 kg/m ² = +1 risk factor |
| 6. | Have you been told that you have high blood pressure? Yes No | If yes, = +1 risk factor |
| 7. | Have you been told that you have high cholesterol? Yes No | If yes, = +1 risk factor |
| 8. | Have you been told that you have high blood sugar? Yes No | If yes, = +1 risk factor |
| Note: Refer over page for risk stratification. | | STAGE 2 Total Risk Factors = _____ |

| | | |
|-----|--|--|
| 9. | Have you spent time in hospital (including day admission) for any medical condition/illness/injury during the last 12 months? Yes No | If yes, provide details |
| 10. | Are you currently taking a prescribed medication(s) for any medical condition(s)? Yes No | If yes, what is the medical condition(s)? |
| 11. | Are you pregnant or have you given birth within the last 12 months? Yes No | If yes, provide details. I am _____ months pregnant or postnatal (circle). |
| 12. | Do you have any muscle, bone or joint pain or soreness that is made worse by particular types of activity? Yes No | If yes, provide details |

Figure 5. Stage 2 of the Adult Pre-exercise Screening Tool. The proforma shows the various questions related to key risk factors that can indicate a relative risk of an adverse event during exercise.

Specifically, STAGE 2 requires responses to 12 questions shown in figure 5 related to the following risk factors:

1. Age and Gender

Age is a well established risk factor for most diseases including heart disease, various cancers, stroke and metabolic disorders. If we live long enough we are guaranteed to develop some sort of pathology that will end our lives. The trend in life expectancy means we are living much longer now than at any time in recorded history. Figure 6 over page shows how life expectancy in Australia has increased over the past century. Importantly, the figure also shows that healthy life expectancy (also called disability-free years) has not kept pace with the increasing length of life. The net result is a widening gap when more and more people have chronic illness and other disabilities that we should be aware of. It is not a linear increase in risk of these diseases, rather it accelerates as we age. Figure 7 over page, for example, shows the rate of death in Australia, for all causes in the population increases rapidly from the age of about 70 onwards.

When we screen people before an exercise program it is a simple measure to ask them their age. Since age is related to the risk of having a disease and the risk of dying then this risk factor is important. More specifically, it gives us an idea about how likely it is they may have an adverse response to exercise, particularly vigorous or high-intensity exercise. In other words, this risk factor (like all risk factors) can help us determine the probability that an acute problem might occur if the physical activity is too intense or inappropriate for the age and disease state of the person. No-one is too old to begin an exercise program or to benefit from an exercise program. It is a matter of appropriate exercise prescription.

It is important to note that figure 7 shows the death rates for females are lower at every age compared to males and this is why the age cut-offs for the risk factors are different.

AGE AND GENDER
A risk factor is given if the person is male aged 45 or older, or female aged 55 or older

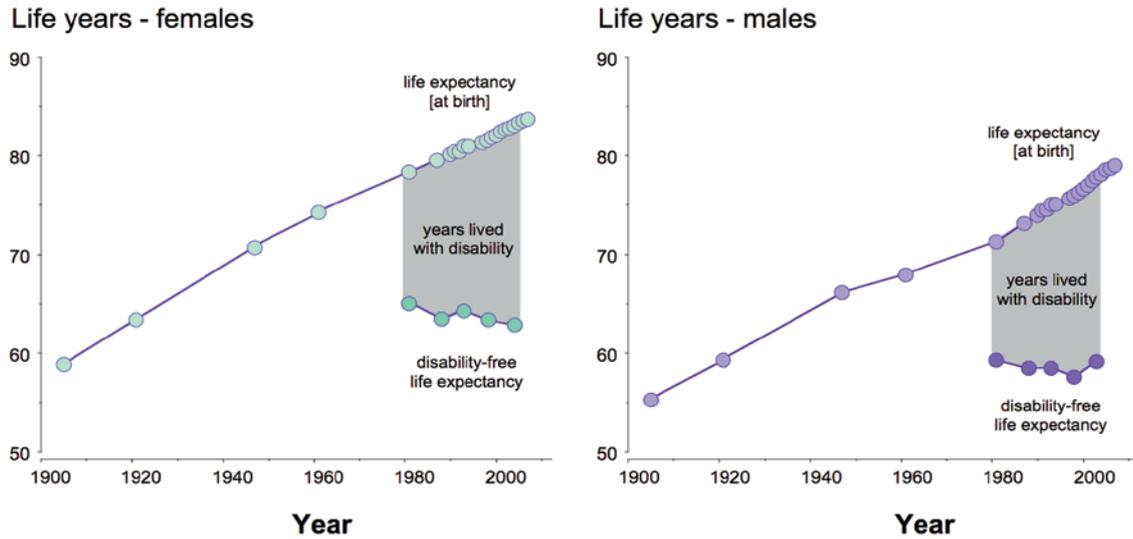


Figure 6. The trends in life expectancy at birth for Australian females (left) and males (right) across the last century. Also shown are the trends in disability-free life expectancy for females and males. The grey shaded area between the two trend lines reflects the years spent with disability (data were available only for the period shown). The figure has been generated using data from the Australian Bureau of Statistics Life Expectancy Tables (ABS, 2006) and the Australian Institute for Health and Welfare on disability free years (AIHW, 2006).

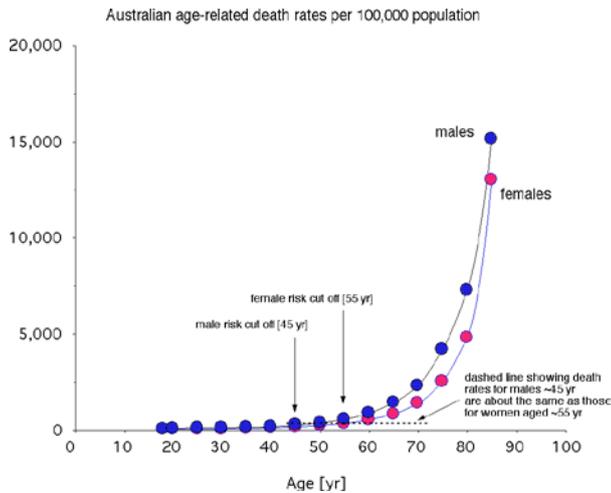


Figure 7. Death rates in Australia relative to age for males and females. The figure shows the acceleration in risk of dying (for all causes) up to 85+yr. The cut-offs chosen as risk factors for males (≥ 45 yr) and females (≥ 55 yr) are conservative at approximately 300 deaths per 100,000 population.

2. Family history of heart disease

A biological mother or father with a history of heart disease significantly raises an offspring's risk of also getting heart disease, regardless of ethnicity or country of birth.

The findings from the INTERHEART study in Canada (Chow et al., 2011) reinforces the need to include the question on family history of heart disease in the screening system. The study involved 12,000 patients from around the world who were being treated for their first heart attack between 1999 to 2003 as well as about 15,000 age- and sex-matched controls. About 18 percent of patients who had suffered a heart attack also had parents with a history of heart attack, compared to 12 percent of participants without heart disease. Overall, people with at least one parent with a history of heart disease were about 1.8 times more likely to get heart disease themselves (an 80% increase) compared to no parent with heart disease, even when factors such as the patient's age, sex, smoking, alcohol consumption, obesity level and region of residence were considered. Further, the risk was the same whether it was the father or mother who had the heart attack, and higher still if both parents were affected. Similarly, the risk was raised if the parent(s) had the heart attack before the age of 50. Overall, it is clear there is a strong genetic component of this risk for heart disease.

The bulk of evidence for family history as a risk factor comes from many studies and the current risk cut-offs are also consistent with the American College of Sports Medicine (2010).

First degree means a father, brother or son, or mother, sister or daughter. Heart disease at these relatively young ages is considered abnormal.

FAMILY HISTORY OF HEART DISEASE

A risk is given if a 1st degree family member has had a heart attack and was a male aged < 55 years or female < 65 years.

3. Smoking

About 1 in 5 Australian adults smoke. Although this is unacceptably high it is the lowest level since the 1950's when over 40% of all adults smoked. The current percentage of smokers means about 3 million people smoke on a daily basis. A further 3.6% (around 600,000 people) report smoking occasionally and so are also at risk of developing heart disease and other chronic conditions from smoking tobacco products. The most common of these is chronic obstructive pulmonary disease (COPD) such as emphysema.

Of all the preventable risk factors (things that people can change), tobacco smoking is responsible for the greatest burden on the health of Australians, accounting for 7.8% of the total burden of disease in 2003 (Begg et al., 2007). This means that about 7.8% of all premature death and disability is caused by people smoking.

Tobacco smoking is a major risk factor for the following conditions:

- Coronary heart disease
- Stroke
- Peripheral vascular disease
- Numerous cancers

In 2003, an estimated 15,511 people died in Australia as a result of tobacco smoking. Around 10% of deaths from cardiovascular disease are due to smoking tobacco.

A risk is also given if a person reports they have stopped smoking within the last 6 months (ACSM, 2010). This is because evidence shows the residual negative effects are still present up to at least 6 months post quitting. Some anatomical and physiological changes are irreversible. The question also asks how many cigarettes a person has per day. This information is informative because there is a strong association between the level of risk (for the diseases outlined above) and the amount of tobacco used per day.

SMOKING

A risk factor is assigned to smokers irrespective of how many cigarettes are smoked per day or if they have stopped smoking in the last 6 months

4. Physical activity patterns

There is now no doubt that lifestyle changes, especially diet and physical activity, can help to maintain quality of life and reduce the gap between disability-free years and life expectancy. Physical activity, a strong determinant of fitness, has also been shown to be among the most important risk factors for preventable disease and injury burden in Australia (Begg et al., 2007) as illustrated in figure 8.

The prevalence of inactivity as a risk factor is only one component of the relative impact on public health. The other component is the risk of disease associated with inactivity (commonly referred to as the relative risk or odds ratio for disease or illness). Together, these two factors can be expressed in terms of the percentage of the population potentially affected. When compared to other common risk factors for chronic disease such as smoking, hypertension, and dyslipidaemia, the prevalence of inactivity is the highest. Furthermore, the relative risk of disease associated with inactivity is also high. Therefore, the risk across the population directly attributable to inactivity is very significant (as shown in figure 8). The results shown in figure 9 also illustrate the significant impact that physical inactivity has on a range of specific diseases among the Australian population. The figure shows low PA contributes in significant ways to all the diseases shown. For example, inactivity accounts for an estimated 51% of all ischaemic heart disease (58% for males and 42% for females).

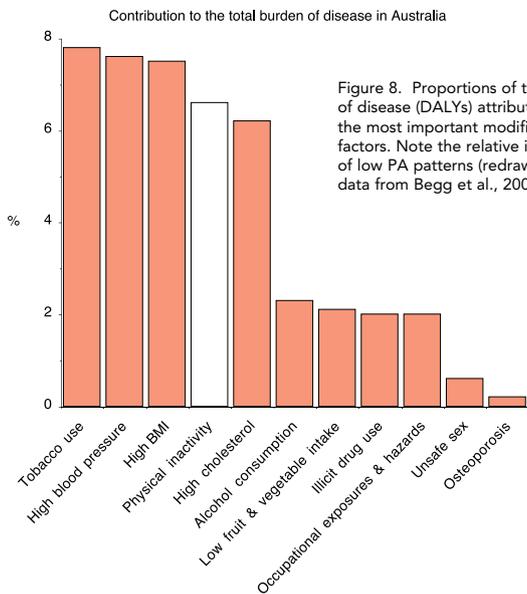


Figure 8. Proportions of the burden of disease (DALYs) attributable to the most important modifiable risk factors. Note the relative importance of low PA patterns (redrawn using data from Begg et al., 2007).

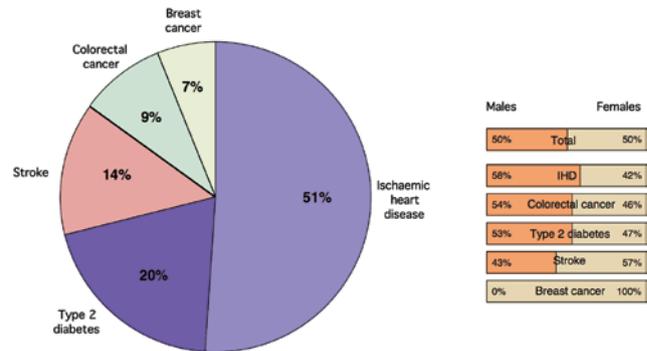


Figure 9. Proportions of the burden of disease (DALYs) attributable to physical inactivity by specific cause and proportions by sex, Australia, 2003 (redrawn from Begg et al., 2007 p 82).

The high risk of physical inactivity reinforces the need for inclusion of this risk factor in the screening system. It also highlights the importance of strategies to increase physical activity. For example, altering patterns of physical activity could potentially have a greater impact on population health than strategies to reduce smoking or hypertension. The screening tool allows a summary of current physical activity patterns to be described - both frequency and intensity of activities.

This is using the weighted method of the Active Australia Survey - where vigorous intensity activity is multiplied by 2 before summing all minutes of activity. This is to account for the greater health benefits of this higher intensity level when compared to 'moderate intensity' activity.

Recently there has been a growing interest in the effects of sedentary work (or long periods of sitting) on risk of chronic illness. It has been shown that even a few hours of inactivity can reduce insulin sensitivity on tissue membranes. Over time these consistent bouts of sedentary behaviour can lead to impaired glucose control and increase the risk of type 2 diabetes and metabolic syndrome. While there is no specific question in the pre-exercise screening tool on sedentary activity patterns this should be an area of focus for behavioural change interventions.

The term 'physical fitness' encompasses many aspects of physical work performance, the most important being cardiorespiratory fitness and musculoskeletal fitness. Directly measured cardiorespiratory fitness has been shown to be a strong predictor of all-cause and cardiovascular mortality and morbidity, stroke and diabetes, independent of the level of overweight, and many other risk factors and co-morbidities (Church et al., 2004; Katzmarzyk et al., 2004; Mora et al., 2007). This is also reinforced by Figure 10 showing increased mortality risk for the lower fitness groups at any given BMI level.

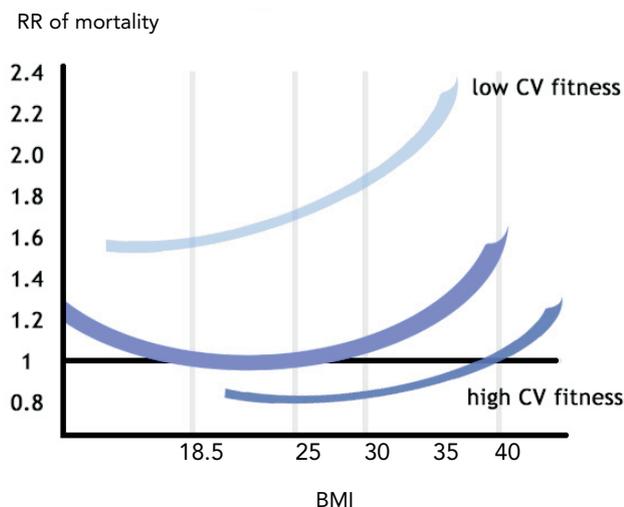


Figure 10. The generalised relative risk of mortality across a range of BMI levels and fitness categories is illustrated. Three lines are shown to illustrate the estimated change in relative risk as cardiovascular (CV) fitness changes among the populations studied. The curves are drawn as simple approximations of the lines of best fit through numerous published studies. The middle curve shows the overall pattern of increasing relative risk of all-cause mortality at both lower and higher BMI levels. These are shown relative to the 'normal' range of 18-25 BMI units. The top curve shows a higher relative risk with low CV fitness at any given BMI level. Conversely, the bottom curve shows mortality decreases at any given BMI if CV fitness level is high. These curves show that for any BMI level, the risk of mortality is increased in a person of low fitness and decreased in people with high fitness. The figure has been generated using many of the major longitudinal studies reported in systematic reviews (Flegal et al., 2005; McGee et al., 2005).

PHYSICAL ACTIVITY PATTERN

A risk factor is given if the person fails to meet
150 min/wk of weighted physical activity

5. Body mass index (BMI)

The most commonly used metric to describe the level of fatness among populations is body mass index (BMI). BMI is a weight-for-height measure that has been used throughout most of the world since the 1950's to estimate population trends in fatness. It has some limitations for individual assessment but it a useful indice for population trends. It is also easy for self-report data to be collected on this measure, hence its widespread use, despite the obvious limitations.

There are standard BMI cut-offs to categorise people in terms of their risk for type 2 diabetes and cardiovascular diseases. Two of the major international classification systems are shown in table 1. Basically, the risk of chronic disease and mortality goes up in an accelerated way as BMI goes from overweight to obese and beyond. The categories for overweight and obesity are useful to track trends in the proportion of the population within these categories. The WHO categories shown in the table have been adopted as the national standard in Australia. Many studies have found that overweight or obesity is associated with a wide range of elevated risk factors and an increase in death and disability rates. The most important of these are elevated rates of cardiovascular disease, diabetes and some forms of cancers (specifically breast and bowel) that occur as fatness levels increase among the population.

| BMI (kg/m ² range) | WHO classification | NHLBI terminology |
|-------------------------------|--------------------|-------------------|
| < 18.5 | Underweight | Underweight |
| 18.5 – 24.9 | Normal range | Normal |
| 25.0 – 29.9 | Preobese | Overweight |
| 30.0 – 34.9 | Obese class 1 | Obesity class 1 |
| 35.0 – 39.9 | Obese class 2 | Obesity class 2 |
| ≥ 40.0 | Obese class 3 | Obesity class 3 |

WHO indicates World Health Organisation
NHLBI indicates National Heart, Lung and Blood Institute

Table 1. Weight Classification by Body Mass Index (BMI).

There are several ways by which fatness increases the risk for developing disease. Probably the most important is an overall reduction in insulin sensitivity. Insulin is important to help glucose move out of the blood into cells. If this is restricted because of increasing fatness then glucose levels in the blood increase.

This leads to the pancreas producing more insulin to try to reduce blood glucose levels. Eventually insulin secretion is very high and its concentration in the blood is also elevated. High glucose levels also damage small blood vessels and nerves, especially in the eyes, kidneys and in the skin.

Increasing fatness raises circulating fat levels in the blood. This can cause more glucose, triglycerides and very low density lipoproteins to be secreted by the liver. Also, blood pressure can be raised because there is increased stress hormone release.

All of these various changes in the body as a person becomes overweight and then obese can contribute to the development and progression of heart disease and diabetes.

How common is high BMI as a risk factor?

Overweight and obesity rates have been going up in most countries around the world. The WHO has found acceleration in the proportion of the general population across almost all age categories who are classified as overweight or obese. The combination of reduced

manual labour and daily physical activity together with increased access and consumption of energy-dense foods are involved in this global problem. Figure 11 shows the results of a very important study that demonstrated large decreases in energy expended in occupational work. The amount of energy typically expended at work is much less now thanks to automation and electronic communication etc. compared to even a decade ago. We often try to increase the level of leisure-time energy expenditure (through exercise) but leisure time activity levels have been relatively stable over time so it is less likely this has contributed substantially to the rapid increases in obesity levels. However, it is an essential part of the solution.

It seems paradoxical that while overweight and obesity levels have gone up, we have also witnessed steady increases in life expectancy. For example, in Australia there are less heart disease and stroke episodes now than at any time in over the past four decades. However, at the same time the number of cases of diabetes has soared. There are now more than 1 million people in Australia with diabetes.

Energy expenditure [MET-hours / day]

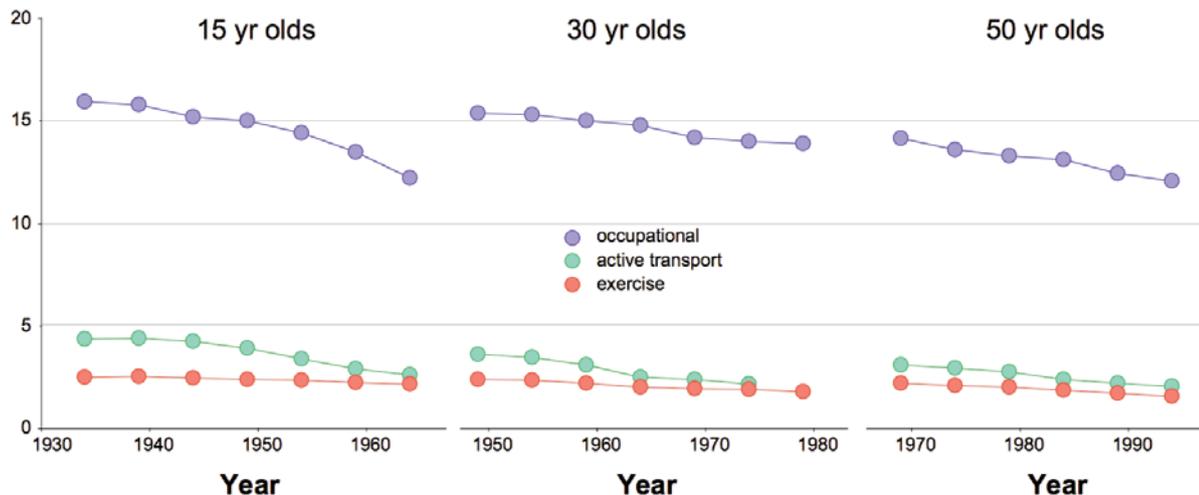


Figure 11. The declining energy expenditure for males assessed across about 60 years. The graph shows trends of specific daily activities by time period and age categories. It highlights the biggest decreases in daily energy use have come from (1) occupational activities, then (2) active transport and, finally, (3) exercise-related activity (redrawn from data in Norman et al., 2003).

The explanation partly lies in the fact that medical management of chronic disease has improved and many people are living longer periods of their life with chronic illness related to this important risk factor. Further, the management of obesity-related illnesses involve the growing reliance on medical interventions such as surgery and pharmacotherapy (see figure 12). The 1999-2000 the Australian Diabetes, Obesity and Lifestyle (AusDiab) Study involved about 50,000 Australians (aged 25 years and over). Based on these results it was estimated that over 2.6 million Australians (21% of the population) were obese (BMI > 30). This is more than double the rate observed in 1980. The same survey estimated that 7.5 million Australians (or 60%) were overweight (BMI > 25, including the obese group). Men (67%) were more likely to be overweight or obese than women (52%). The proportion of overweight or obese people increased across age groups and peaked at 55-74 years for men (74%) and 65-74 years for women (71%).

Community use of cardiovascular medications 1995-2005 [DDD/1,000/day]

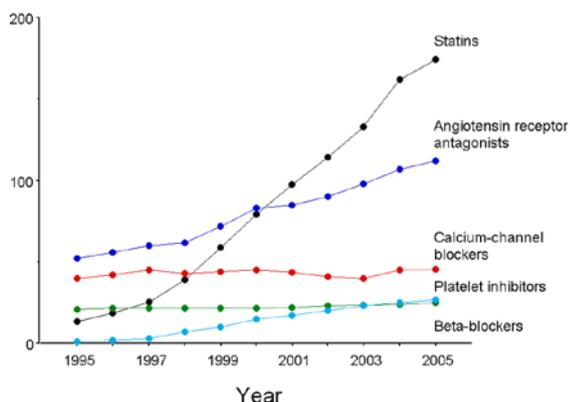


Figure 12. Trends in the use of medications for cardiovascular diseases. Note the rapid rise in the use of lipid lowering statins, platelet inhibitors for anti-coagulation and a range of anti-hypertensive medications. DDD is the defined daily dose per 1,000 population per day and is based on the assumed average dose per day of the drug used for its main indication (data from AIHW, 2004 and AIHW, 2008).

There are numerous studies that have investigated the link between levels of fatness and the relative risk of mortality, either all-cause or specific. There is still, however, debate about the precise interaction of the degree of over-fatness and the relative risk of premature death.

BODY MASS INDEX

A risk factor is assigned in either Stage 2 (self-report) or Stage 3 (measured) if the person has a BMI of 30 or greater

6. High blood pressure (hypertension)

Blood pressure (BP) measures are relatively easy to take and have therefore become part of routine checks in fitness centres. Despite the fact Stage 1 and Stage 2 do not require direct measurements of BP it is important that these measures are NOT discouraged. Monitoring BP is simple and informative and if health and fitness professionals have the expertise and time to conduct these measures then BP assessment can still be part of the pre-exercise screening.

Over the last two decades there have been large declines in the prevalence of high blood pressure in the Australian population. For men the prevalence has fallen steadily from 45% in 1980 to 14% in 2004-2005. The rate for women has also halved, from 29% in 1980 to 14% in 2004-2005 (AIHW, 2006). Similar trends have also been seen internationally. Aggressive treatments of severe and malignant hypertension from the 1970's led to declines in hypertension until the 1990's when blood pressure control rates remained unchanged and cardiovascular disease mortality rates appeared to climb slightly again.

Hypertension

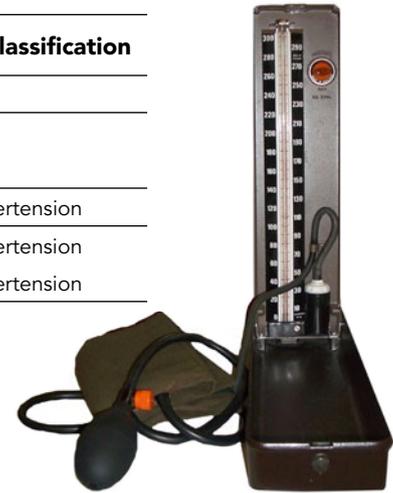
Ageing involves a progressive increase in resting blood pressure. This increase places additional strain on the heart and vessels. Hardening of the arteries is the major cause. Exercise training and a diet low in saturated fats can help prevent and even reverse the degree of hardening because it is known to keep blood vessels more compliant or elastic. The World Health Organisation states that systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg are risk factors for cardiovascular disease.

During exercise blood pressure is elevated quite a bit. In general, it goes up in proportion to the intensity of activity. This is why exercise intensity needs to gradually build over time and caution takes place early in an exercise program. Sudden increases can make a person feel nauseous. Extreme feats of weight lifting, for example, have been associated with very high blood pressure (> 300 mmHg SBP). This is not usually a problem for those who are younger and accustomed to weight training but can be potentially dangerous to others, especially the elderly and diseased. High intensity aerobic exercise can also raise SBP well in excess of 200 mmHg.

Blood pressure (mmHg)

| Systolic | Diastolic | NHF classification | JNC7 classification | ESC/ESH classification |
|-----------|-----------|---------------------------------|----------------------|------------------------|
| < 120 | < 80 | normal | normal | optimal |
| 120 - 129 | 80 - 84 | high normal | prehypertension | normal |
| 130 - 139 | 85 - 89 | | | high normal |
| 140 - 159 | 90 - 99 | grade 1 (mild) hypertension | stage 1 hypertension | grade 1 hypertension |
| 160 - 179 | 100 - 109 | grade 2 (moderate) hypertension | stage 2 hypertension | grade 2 hypertension |
| ≥ 180 | ≥ 110 | grade 3 (severe) hypertension | | grade 3 hypertension |

Table 2. Blood pressure classification using the North American JNC7 classification and the European categories. NHF: National Heart Foundation of Australia; JNC7: Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure; ESC/ESH: European Society of Cardiology and European Society of Hypertension.



Clinical studies have demonstrated that control of hypertension reduces total mortality, cardiovascular mortality, stroke and heart failure events. These studies have identified that a reduction of only 2 mmHg in average diastolic blood pressure in a population can result in clinically significant disease reduction. Several intervention studies have established that increasing physical activity patterns reduces blood pressure in hypertensive and normotensive adults, even without of weight loss. The average change in blood pressure across 54 separate studies in adults assigned to aerobic exercise showed a 3.8 mmHg reduction in systolic blood pressure and a 2.6 mmHg reduction in diastolic pressure compared with control subjects (Whelton et al., 2002). Blood pressure was significantly reduced even in trials in which overall weight loss was minimal. This suggests that exercise reduces blood pressure even when there were no changes in body weight. In another review of trials of weight loss and blood pressure it was found the effect on DBP was larger when body weight was reduced by physical activity compared with energy restriction, reinforcing the idea that physical activity reduces BP by mechanisms unrelated to weight loss (Neter et al., 2003). These reviews included a range of ages from 21-83 yr (median age 46.6 yr).

There are internationally accepted recommendations for beginning exercise and stopping exercise when blood pressure exceeds levels that are considered safe. These may differ slightly but the most common absolute contraindication for undertaking exercise under resting conditions is when SBP exceeds 200 mmHg or DBP exceeds 110 mmHg (ACSM, 2010). During exercise the absolute contraindications for most people (typical exceptions include athletes and individuals experienced in high-intensity training) are SBP >250 mmHg or DBP >110 mmHg (ACSM, 2010). Blood pressure responses during exercise are most often related to the intensity of exercise. This may mean the intensity of the prescribed exercise should be adjusted down to determine whether the blood pressure response during exercise can be controlled within safer levels.

HIGH BLOOD PRESSURE

A risk factor for high blood pressure is given in Stage 2 if the person answers 'Yes' they have been told they have high blood pressure OR if they are taking medication for high blood pressure. In Stage 3 a risk factor is given if the person has a resting systolic BP reading of ≥ 140 mmHg or resting diastolic BP reading of ≥ 90 mmHg (If both are greater they have a maximum of one risk factor for BP)

7. High cholesterol (hypercholesterolaemia)

NOTE: There are several lipids measured as part of Stage 3 of the screening system. In addition to the risk factor for total cholesterol, a risk factor is assigned if HDL is < 1 mmol/L or if triglycerides are > 1.7 mmol/L or if LDL is >3.4 mmol/L. A positive risk factor (good) is given if HDL is >1.55 mmol/L. However, it is important to recognise that the total number of risk factors possible for the lipid analyses is -1 to +1. For example, a person who has high total cholesterol AND high LDL will only receive +1 risk factor.

Blood lipids

Lipids are a diverse group of compounds that play an essential role in energy storage, cell membrane structure and as cellular messengers. They are composed mainly of triglycerides, cholesterol, phospholipids and proteins. Triglycerides, stored as adipose tissue, are the major energy form in humans while cholesterol is a major component of membrane lipids. Cholesterol is transported in the blood in association with lipoproteins and plays an essential role in the structure of cell membranes, steroid hormones and bile salts. The lipoproteins in the blood range in size from large chylomicrons, very low density lipoproteins (VLDL), intermediate density lipoproteins (IDL), low density lipoproteins (LDL), and smaller high density lipoproteins (HDL). Total cholesterol is a measure of all the sub-fractions of cholesterol in the blood.

LDL cholesterol, in excess, is deposited as fatty plaques on the walls of blood vessels and within the cellular structure of arteries resulting in atherosclerosis and arteriosclerosis. It is the concentration of LDL cholesterol that has been correlated with increased risk of cardiovascular disease. Conversely, HDL cholesterol has been shown to be consistently and strongly associated with cardiovascular risk reduction. HDL facilitate a process known as reverse cholesterol transport whereby cholesterol in peripheral tissues is taken up by HDL and ultimately returned to the liver for excretion in bile and faeces. HDL have also been shown to have antiatherogenic properties which protect the artery wall. They include stimulation of anti-inflammatory, anti-oxidant and anti-clotting activity.

Population studies and clinical trials have shown that serum total cholesterol levels are correlated to long-term risk of coronary heart disease and cardiovascular disease mortality over a broad range of cholesterol values. This relationship has been observed in many populations throughout the world, in men and women and across a range of ages although the strength of the relation is weaker with increasing age. It has also been shown that a 10% increase in total cholesterol (about 0.6mmol/L) was associated with a 27% increase in the incidence of coronary heart disease. A number of international guidelines have been developed, based on the relative risks of cardiovascular and cerebrovascular disease mortality associated with elevated cholesterol levels; these are shown in table 3 below.

| | NCEP - ATP III guideline | ESC guideline |
|-------------------|--------------------------|--|
| Total cholesterol | < 6.2 mmol/L [240 mg/dL] | < 5.0 mmol/L |
| LDL cholesterol | < 3.8 mmol/L [160 mg/dL] | < 3.0 mmol/L |
| HDL cholesterol | ≥ 1.0 mmol/L [40 mg/dL] | ≥ 1 mmol/L in males ≥ 1.2 mmol/L in females |
| Triglycerides | < 2.3 mmol/L | < 1.7 mmol/L |

NCEP - ATP III indicates National Cholesterol Education Program - Adult Treatment Panel III
ESC indicates European Society of Cardiology

Table 3. Examples of North American and European guidelines for lipid levels.

In Australia, guidelines by the Australian Heart Foundation indicate a risk factor for total cholesterol above 5.1 mmol/L while the American College of Sports Medicine and American Heart Association suggest a risk factor for total cholesterol above 5.2 mmol/L. This level has been adopted in the Adult Pre-exercise Screening System.

HIGH CHOLESTEROL

A risk factor is given in Stage 2 if the person answers 'Yes' they have been told they have high cholesterol OR if they are taking medication to lower cholesterol. In Stage 3 a risk factor is given if the person has a total cholesterol level of 5.2 mmol/L or greater

Lipid definitions

Lipids is another name for 'fats' in the blood. There are many types of lipids but the most important are:

Triglycerides - The most common type of blood fat. Triglycerides are used for energy as well as for tissue building. Excess dietary intake of carbohydrates, fats and oils, and proteins are all deposited in fat cells as triglycerides (aim for < triglycerides 1.7 mmol/L).

Cholesterol - This is a chemical substance that is a type of steroid. It is made in the body and also absorbed from food eaten. It is critical for health because it is used to produce many other steroid hormones and it also forms part of cell membranes.

HDL - High-density lipoprotein. HDL is the 'good' cholesterol. About 1/3 to 1/4 of all cholesterol is HDL. HDL removes cholesterol from plaques developing within blood vessels. HDL is made in the liver and the level increases with exercise training (aim for HDL > 1.55 mmol/L).

LDL - Low-density lipoprotein. LDL is the 'bad' cholesterol. LDL carries about 3/4 of the body's cholesterol. Excess LDLs are deposited in the walls of blood vessels forming fatty plaques. These can grow to eventually block blood flow or rupture causing serious health problems (aim for LDL < 3.4 mmol/L).

Total cholesterol is a combination of all the cholesterol in the blood. It is relatively easy to measure and is usually the first check on blood lipid profile. The total cholesterol level is important but the ratio of LDL to HDL is also informative (aim for total cholesterol <5.2 mmol/L).

Reducing blood lipids

What should I do to reduce my blood lipids?

- Try to control body weight by reducing fat intake and increasing physical activity. Physical activity also keeps HDL-cholesterol levels higher
- Eat less saturated fat because saturated fat raises LDL-cholesterol and triglyceride levels
- Eat more soluble fibre (eg, oats, barley, legumes, some fruits and vegetables) and soy products that can help lower cholesterol levels
- If high blood lipid levels persist your doctor may prescribe medication to help lower cholesterol levels.
- Remember, even if you are on medication to help lower your cholesterol level, it is still important to continue with healthy eating and physical activity.

Total cholesterol generally increases with age up to about the 60's. Average values then level off. At almost every age level (except women in their 20's and 30's and men in their 20's), more than 50% of the population have total cholesterol levels that place them above the **higher risk** threshold. This increasing pattern with age is shown in figure 13.

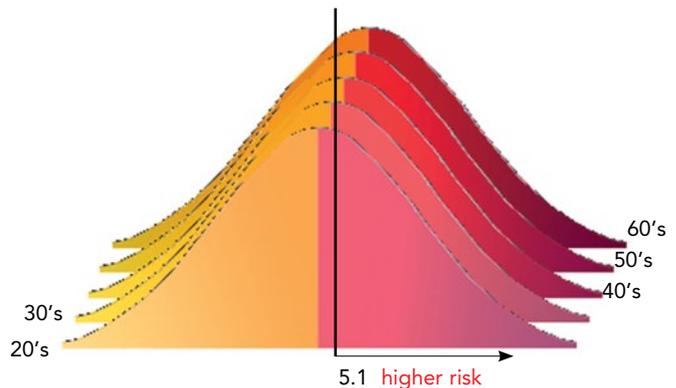


Figure 13. The population distributions of total cholesterol are represented in this figure. It shows the gradual trend upwards in the distribution with increasing age. The risk factor cut-off is 5.1 illustrating about half of all Australian adults have a risk factor.

Trends in cholesterol levels

Results of the 1999-2000 AusDiab Study showed high blood cholesterol (defined in the study as ≥ 5.5 mmol/L) was present in 52% of Australian adults. Average cholesterol levels for both men and women have remained fairly constant since 1980 when the first nationwide monitoring was conducted, as illustrated in figure 14, despite the rapidly accelerating use of medications (such as statins) to reduce blood cholesterol levels as shown in figure 12 on page 20.

In controlled trials of plasma cholesterol reduction using a number of different methods such as diet and medication it was estimated that, following five years of 'treatment', a difference in cholesterol concentration of 0.6 mmol/L was associated with a 25% to 27% reduction in mortality from coronary heart disease events and a 10% reduction in stroke.

Regular physical activity has been found to lower total cholesterol levels. The average improvement in lipids following increased physical activity has been shown to be a reduction of about 5% in LDL cholesterol, 4% in triglycerides and 1% in total cholesterol. There is also a typical increase in HDL cholesterol of between 4% and 18% (0.05 - 1.0 mmol/L) following regular exercise participation. These typical changes in lipid profiles have been estimated to reduce cardiovascular disease risk by between 5% in men and 8% in

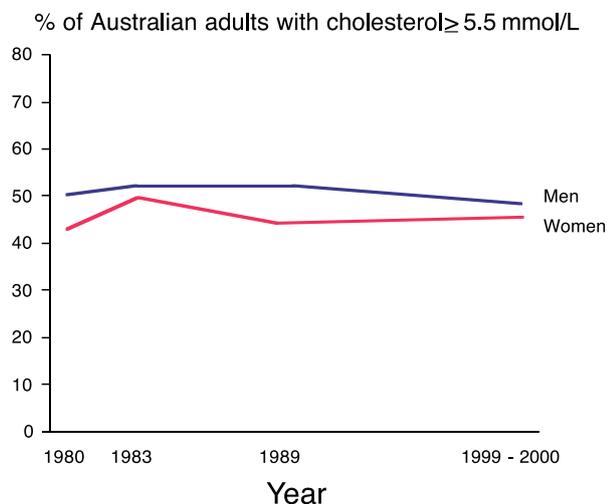
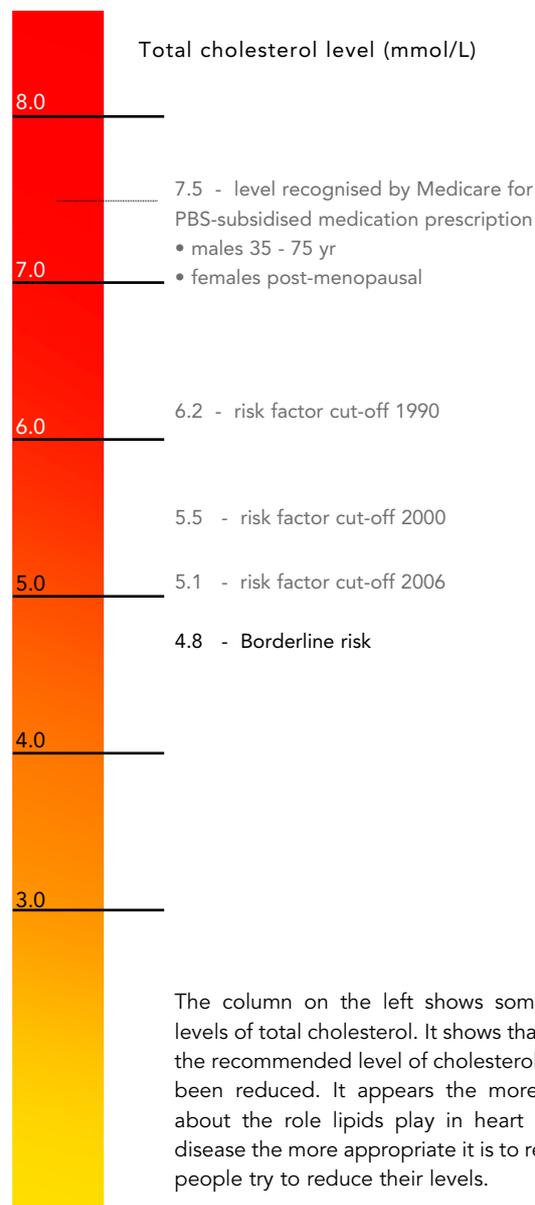


Figure 14. Proportion of adults (aged 25 - 64 years) with high blood cholesterol (≥ 5.5 mmol/L), 1980 to 1999-2000. Based on measured data, age-standardised to the 2001 Australian population measured in capital cities only (adapted from AIHW 2004).

women. However, the reductions found with exercise are still much less than the reductions found with medication intervention. Of course, there are numerous other health benefits of exercise other than just lowering cholesterol levels.



8. High blood sugar (hyperglycaemia)

Diabetics find it difficult to regulate their blood glucose levels. The World Health Organisation defines diabetics as those who cannot control their blood glucose levels below the range of 7.0 mmol/L after fasting (measured on two separate occasions). Pre-diabetic conditions are present when fasting glucose sits between 5.5 and 7.0 mmol/L. A normal level is ≤ 5.5 mmol/L after fasting.

A number of risk factors for developing diabetes have been documented and include obesity, ageing, lack of physical activity, and a familial disposition. They all appear to increase the risk of developing the disorder and the risk is amplified if there are more than one of these conditions present. Among individuals with diabetes, cardiovascular disease is the leading cause of morbidity and mortality (Ali & Maron, 2006), and adults with diabetes have a two- to fourfold higher risk of cardiovascular disease compared with those without diabetes (Wei et al., 2000). A major reason for the high rates of cardiovascular disease in diabetics is the coexistence of other risk factors such as abdominal obesity, hypertension and dyslipidaemia (Zimmet, 2003).

How common is type 2 diabetes?

Numerous reports from around the world have highlighted the increasing prevalence and incidence of diabetes. More than 5% of the global adult population have diabetes and another 8% have impaired glucose tolerance (Barr et al., 2006). From the baseline AusDiab study the overall rate of diabetes in Australia was 7.4% and an additional 16.4% had impaired glucose tolerance (Dunstan et al., 2002). Diabetes accounted for 5.8% of the overall disease burden in Australia in 2003 (AIHW 2006).

Questions 9 - 12 allow further information on the client that will help in the prescription of a tailored physical activity / exercise program to suit their current conditions and health status.

Why physical activity is important for diabetics

Many studies consistently show a significant reduction in the incidence of type 2 diabetes among physically active individuals compared with sedentary peers. In the Women's Health Study, Weinstein and colleagues (2004) showed that women (>45 years) who walked more than 120 minutes per week were 34% less likely to develop type 2 diabetes compared to women who did not walk regularly.

Similar results were found in the Nurses Health Study in the USA (Hu et al., 1999) where a progressive reduction in the relative risk of developing diabetes was found with increasing physical activity such that women undertaking regular, vigorous physical activity were 46% less likely to develop diabetes than women who were inactive. A Finnish study which followed 14,290 men and women over 12 years documented a 27% reduction in type 2 diabetes in those individuals who were physically active for 30 minutes/day or more (Hu G et al., 2004).

There is mounting evidence from clinical trials in Europe and the US that lifestyle changes to reduce weight and increase physical activity can prevent the progression from pre-diabetes to type 2 diabetes and reduce the risk of diabetes by 60% (NHMRC, 2001). For example, Tuomilehto and colleagues (2001) showed that incorporating increased physical activity and healthy eating could reduce or stop the progression of impaired glucose regulation to diabetes by 40-60% over a 3 to 6 year period. The role of physical activity in the risk reduction appears to be more significant than the weight loss (Blair & LaMonte, 2006). Physical activity has been shown to increase insulin sensitivity and improve glucose metabolism by up-regulation of the insulin-receptors and increased insulin and glucose delivery to muscle (Goodyear & Kahn, 1998). Improvements in mitochondrial function are induced by exercise training and this has been shown to be highly correlated with both insulin sensitivity and $VO_2\max$ (Zoll et al., 2002). In a systematic review of fourteen randomised controlled trials of exercise interventions for type 2 diabetes, it was found that glycaemic control was improved, insulin sensitivity increased and visceral adipose tissue was reduced in people with type 2 diabetes following exercise programs (Thomas et al., 2006).

Physical activity is the best method to help reduce the likelihood of developing type 2 diabetes. Exercise helps glucose move from the blood into the tissues, particularly muscles, to be used for fuel. People with higher glucose levels should incorporate exercise into their lifestyle to prevent long-term health problems associated with insulin resistance. The prevalence of diabetes is accelerating in a similar way to the obesity epidemic.

HIGH BLOOD SUGAR

A risk factor is given in Stage 2 if the person answers 'Yes' they have been told they have high blood sugar (or glucose) OR if they are taking medication to lower blood glucose. In Stage 3 a risk factor is given if the person has a fasting glucose level of 5.5 mmol/L or greater

OTHER MEDICAL / HEALTH CONCERNS

9. Hospital admission in the last 12 months?

The rationale for this question is the association between having been admitted to hospital in the last year and the general health status - even self assessed health status. A range of studies have shown positive relationships between the rates of illness and death and the number and length of hospital admissions in the previous 12 months. This includes morbidity and mortality for illnesses related to heart disease, lung disease (for example, COPD and asthma), dementia, hip fractures, infectious episodes and inflammatory bowel disease. The link between hospital admission and risk of further problems is also strengthened by studies showing admissions are correlated to 'poor health' status and, more importantly, negative health behaviours such as smoking rates, alcohol consumption (not measured directly in the screening process) and nutritional patterns.

10. Current prescribed medications?

The fact that the person is taking medication is an indication of a medically diagnosed problem. Discounting that some medications may be unrelated to medical illness or problems (for example, contraceptive pills), almost all other pharmaceutical prescriptions are taken to help with a medical condition or to alleviate the symptoms of an illness. Some degree of judgement is required here because it is relatively common for clients to list 'medications' that include contraceptive pills, vitamin supplements and other non-pharmaceutical tablets. It is not expected that fitness professionals will have an exhaustive understanding of medications and their use. However, using common language it is often important to know what medical conditions the drugs are prescribed for.

11. Pregnancy or recent childbirth?

During pregnancy and after recent childbirth are times to be more cautious with exercise. It is important for mothers to be active during and after pregnancy but the physiological changes taking place within the body mean there is an increased risk of complications to the mother and / or fetus during pregnancy. Generally this risk is small and appropriate exercise prescription will result in improved health to mother and baby. These benefits include assistance with weight loss, increased aerobic fitness, maintenance of bone density, improved cholesterol levels, social interaction and psychological well-being. Additional to these health benefits, exercise after giving birth can hasten recovery, assist with muscle strength and toning (SMA, 2009*). However, during pregnancy, the joints gradually loosen to prepare for birth. This may lead to an increased risk of injury. Those particularly affected are the pelvic joints. Activities involving jumping, frequent changes of direction and excessive stretching should be avoided as should jerky ballistic movements.

There are a number of reasons to stop exercise during pregnancy. These include vaginal bleeding, unusual shortness of breath, dizziness, headache, chest pain, calf pain or swelling, or unusual muscle weakness.

Monitoring exercise intensity in pregnant women is best achieved using a rating of perceived exertion (RPE) scale such as the Borg scale rather than heart rate per se.

12. Muscle, bone or joint pain or soreness?

Almost everyone has experienced some level of soreness following unaccustomed exercise or activity. This is a common physiological response and not really what this question is designed to identify. Soreness due to unaccustomed activity is not the same as pain in the joint, muscle or bone. Pain is more extreme and may represent an injury or serious inflammatory episode or even infection. If the 'yes' response is related to an acute problem then it is possible further medical guidance may be required. This is another example of where professional judgement is required and follow-up questions may be warranted. If the person has a condition such as arthritis or back problems then this is obviously important to know for exercise prescription.

* <http://sma.org.au/wp-content/uploads/2009/10/WIS-ExPreg.pdf>

COMPLETION OF STAGE 2

If the testers or client stops at the completion of Stage 2 then the following illustrates the summation of the risk factor scores.

The maximum number of possible risk factors at the end of Stage 2 is 8 - corresponding to questions 1-8 in the APSS Tool.

Stage 2 allows the person to be classified as either a 'moderate' or 'low' risk based on the number of risk factors. If a person has 2 or more risk factors at Stage 2 then they are classified as a 'moderate' risk. Less than 2 risk factors means they are at 'low' risk. However, the new screening system is also structured to total up a number of possible risk factors and to look specifically at individual risk factors. This allows the exercise professional to make judgements about an individual's overall level of risk when beginning an exercise program.

Sometimes a person may have a combination of risk factors whereby the tester may not be comfortable for the client to begin an exercise program without further medical clearance. In this case professional judgement may dictate that medical clearance is required before starting a program. In these rare instances the person would technically be classified as a 'high' risk until cleared of major problems.

A recent sample of over 550 adults (aged 18 - 65 yr) entering gym programs revealed the following distribution of risk factors at Stage 2 of the APSS tool (figure 15). Relatively few clients have zero risk factors and many have multiple risks. Regular exercise can help control and reduce these risk factors.

Stage 2 – Risk Stratification

At the completion of Stage 2, total all the risk factors from questions 1-8. If the client has **less than 2** risk factors, they are deemed to be low risk. If the client has **2 or more** risk factors, they are deemed to be moderate risk.

Low risk:

Individuals may participate in aerobic physical activity/exercise up to a vigorous or high intensity*

Moderate risk:

Individuals may participate in aerobic activity/exercise at a light or moderate intensity*

*Please refer to the table on Exercise Intensity Guidelines

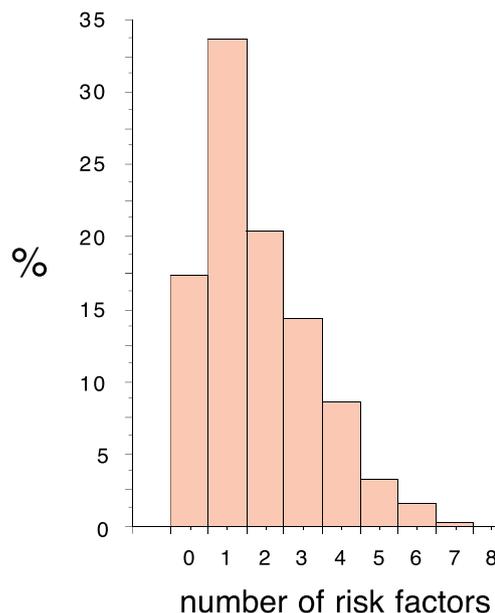


Figure 15. Proportion of adults (aged 18 - 64 years) versus number of risk factors at the end of Stage 2 in the APSS tool (Norton et al., 2007).

STAGE 3 (OPTIONAL)

AIM: to obtain pre-exercise baseline measurements of other recognised cardiovascular and metabolic risk factors.

This stage is to be **administered by a qualified exercise professional** (Measures 1, 2 & 3 – minimum qualification, Certificate III in Fitness; Measures 4 & 5 – minimum level, Exercise Physiologist).

Each question in Stage 3 includes a measurement protocol, current classification range and instructions for risk factor calculation.

STAGE 3 OVERVIEW

Stage 3 is another optional stage. This stage requires additional measurements to be taken so it is expected that the tester has additional skills and knowledge to be able to safely perform these tasks. Also, the tester requires a deeper understanding of measures such as blood lipids and what the various sub-fractions are, what dietary and lifestyle factors can influence these values and know the cut-offs / recommended levels for optimal health. More details of these variables and their association with health are outlined above in Stage 2. As a guideline the recommended qualifications for undertaking measures 1-3 in Stage 3 are a minimum of Certificate III in Fitness plus relevant skills in these measures. It is recommended that a minimal qualification of

Exercise Physiologist or equivalent, and skills in extracting and handling blood samples are present for those taking measures 4 and 5 in Stage 3.

The main difference between Stage 2 and Stage 3 is that Stage 2 obtains risk factor status based on questionnaire responses whereas Stage 3 requires them to be measured. In this way Stage 3 adds a level of accuracy over and above Stage 2 only.

STAGE 3 AIM

To obtain pre-exercise baseline measurements of other recognised cardiovascular and metabolic risk factors.

| STAGE 3 (OPTIONAL) | | |
|--|--|--------------|
| AIM: To obtain pre-exercise baseline measurements of other recognised cardiovascular and metabolic risk factors. This stage is to be administered by a qualified exercise professional. (Measures 1, 2 & 3 – minimum qualification, Certificate III in Fitness; Measures 4 and 5 minimum level, Exercise Physiologist*). | | |
| RESULTS | | RISK FACTORS |
| 1. BMI (kg/m ²) | BMI ≥ 30 kg/m ² = +1 risk factor | |
| 2. Waist girth (cm) | Waist > 94 cm for men and > 80 cm for women = +1 risk factor | |
| 3. Resting BP (mmHg) | SBP ≥ 140 mmHg or DBP ≥ 90 mmHg = +1 risk factor | |
| 4. Fasting lipid profile* | Total cholesterol ≥ 5.20 mmol/L = +1 risk factor | |
| Total cholesterol | HDL cholesterol > 1.55 mmol/L = -1 risk factor | |
| HDL | HDL cholesterol < 1.00 mmol/L = +1 risk factor | |
| Triglycerides | Triglycerides ≥ 1.70 mmol/L = +1 risk factor | |
| LDL | LDL cholesterol ≥ 3.40 mmol/L = +1 risk factor | |
| 5. Fasting blood glucose* | Fasting glucose ≥ 5.50 mmol = +1 risk factor | |
| STAGE 3 Total Risk Factors = | | |

| RISK STRATIFICATION | |
|---|---|
| Total stage 2 or Total stage 3 Plus stage 2 (Q1 - Q4) | <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto;"></div> <p>≥ 2 RISK FACTORS – MODERATE RISK CLIENTS Individuals at moderate risk may participate in aerobic physical activity/exercise at a light or moderate intensity (Refer to the exercise intensity table on page 2)</p> <p>< 2 RISK FACTORS – LOW RISK CLIENTS Individuals at low risk may participate in aerobic physical activity/exercise up to a vigorous or high intensity (Refer to the exercise intensity table on page 2)</p> |

Figure 16. Stage 3 of the Adult Pre-exercise Screening Tool. The proforma shows the 5 measured variables and illustrates the risk factor stratification and management of people depending on their cumulative risk factor score.

Specifically, Stage 3 requires measures of:

Anthropometry

- BMI (calculated BMI from weight/(height)²)
 - weight (kg)
 - height (cm)
- Waist girth (cm)

Blood pressure

- Resting blood pressure (mmHg)

Blood measures

- Blood fats
 - total cholesterol (mmol/L)
 - high-density lipoprotein (HDL, mmol/L)
 - triglycerides (mmol/L)
 - low-density lipoprotein (LDL, mmol/L)
- Fasting blood glucose (mmol/L)

Risk factors are assigned to each of the variables measured at this stage for a total of up to 9 risk factors in Stage 3 (waist girth is the only new variable measured at this stage). Weight and height do not carry a risk factor per se but BMI does. Also, HDL can be either a positive (good) risk factor (if > 1.55 mmol/L) or a negative (bad) risk factor (if < 1.00 mmol/L). In addition to these Stage 3 risk factors you will need to add any additional risk factors that carry forward from Stage 2. These are only risk factors associated with questions 1-4 because Stage 3 measurements of variables such as BMI and blood pressure etc supersede the Stage 2 responses based on questions alone. In other words, if any variables are measured at Stage 3 then use rather than the equivalent questionnaire responses from Stage 2 in order to calculate the total risk factor score.

STAGE 3 MEASUREMENTS

This section describes the standard techniques to be used when performing the anthropometry measurements.

1. Body mass index (BMI)

BMI (calculated as $\text{weight}/(\text{height})^2$) is used to determine if a risk factor is present. Use the Table provided (Table 1 page 18) to determine if a risk factor is given. The table is based on accepted international cut-offs for most populations. However, there are published tables that have been shown to be more specific for some Asian and Polynesian groups and possibly others. A BMI ≥ 30 is considered a cardiovascular risk factor.

Weight (kg)

Try to have the subject remove bulky clothes such as coats, boots and even shoes. Taking care in the first instance always give you greater confidence when these measures are repeated again at a later date. The scales should ideally read accurately to within $\pm 200\text{g}$. Most commercially available scales have this level of accuracy. You should also recognise that weight will fluctuate considerably across the day depending on things such as exercise, fluid / food intake and bathroom stops. Record the time of day when weight is measured so comparisons are more reliable. For many women there are also large fluctuations of several kilograms throughout the monthly hormonal cycle. These fluctuations can translate up to 1 BMI unit during a day or 2 BMI units or more across a monthly cycle, independent of any fat or lean tissue changes.

Height (cm)

An accurate measure of height is also important for accurate calculation of BMI. Stand-alone stadiometers are relatively inexpensive so these are recommended. Alternatively, a wall-mounted system is a little more robust but is typically more expensive. Measure after the person takes a deep breath in and stretches up to achieve peak height. Have them look forward in a horizontal plane when you take the measure. Height usually decreases throughout the day by about 1%. This means around 1 - 2 cm decrease during the day as our joints, predominantly in the spine, compress due to gravity.



Stadiometer

2. Waist girth (cm)

Waist girth measures are related to the risk factor of abdominal obesity. The recent 'Measure-up' campaign in Australia highlighted the increased risk of problems such as diabetes and heart disease when waist girth is elevated.

Waist girth is measured with a flexible tape measure. It is measured from the front so that the tape can be positioned at the obvious narrowing of the waist as shown in the figure. However, many people do not have an obvious narrowing so in these cases it should be taken at the level mid-way between the top of the Iliac crest (hip bone) and the lower (10th) rib. Instruct the person to stand with their feet slightly apart and to relax and breathe normally. Take the measure at the end of a regular breath out.



Waist girth measurement

A risk factor for waist girth is given if a male has a waist > 94 cm or a female has a waist girth $> 80\text{cm}$.

These are published by the World Health Organisation. They also state there is a 'greatly increased risk' (for chronic disease) if the waist girth is > 104 in males and > 88 cm in females.

3. Blood pressure measurement

The measurement technique for BP is a skill that is learnt over time and with practice. The following guidelines have been modified from the NHF (2010):

- The client should be seated and relaxed for several minutes prior to measuring BP.
- The selected arm should be free of constricting clothing so that the cuff can be wrapped around the upper arm without obstruction.
- Wrap the cuff snugly around the upper arm, with the centre of the cuff bladder positioned over the brachial artery and the lower border of the cuff about 2 cm above the bend of the elbow.
- Ensure that the cuff is at heart level by supporting the arm.
- The blood pressure cuff should be inflated which temporarily cuts off the blood supply to the arm. Palpate the radial pulse while inflating the cuff and note the pressure at which the radial pulse ceases to be palpable. Continue to inflate the cuff a further 30 mmHg above this pressure.
- Deflate the cuff at a rate of 2-3 mmHg/beat or less while palpating and note the pressure at which the radial pulse reappears.
- Fully deflate the cuff, wait approximately 30 seconds, then inflate the cuff to at least 30 mmHg above that at which the radial pulse reappeared.
- While deflating the cuff at a rate of 2-3 mmHg/beat or less, auscultate over the brachial artery in the antecubital fossa.
- Record the result for systolic and diastolic BP to the nearest 2 mmHg. For the systolic reading, record the level at which the beats (at least two consecutive beats) are heard, even if they then disappear transiently with progressive deflation (the 'auscultatory gap'). The first Korotkoff sound is the tapping sound first heard at the systolic pressure. Clear tapping, repetitive sounds for at least two consecutive beats is considered the systolic pressure. For the diastolic reading, use disappearance of sound (phase V Korotkoff). The fifth Korotkoff sound is a progressive diminished 'thumping' or muted thumping as the cuff pressure drops below the diastolic blood pressure. The disappearance of sound is considered the diastolic blood pressure.
- Wait 30 seconds before repeating the procedure in the same arm.
- Average the readings. If the first two readings differ by more than 10 mmHg systolic or 6 mmHg diastolic, or if initial readings are high, have the patient rest quietly for 5 minutes then take several readings until consecutive readings do not vary by greater than these amounts.

MEASURING BLOOD PARAMETERS

In Stage 3 of the screening process there is a requirement to take blood samples to measure a number of lipid sub-fraction concentrations and fasting blood glucose level. These techniques are relatively simple to perform and there are many types of portable analysers that give results within a minute or so - two examples are shown. It is important that appropriate training has been undertaken so that standard aseptic techniques are used when taking these point-of-care measures. This means using the following guidelines:

- The person giving the sample may need to run their hand under warm water and clench his/her fist several times to increase the circulation to the finger. If a person is anxious or cold then peripheral circulation will be reduced and blood sampling will be difficult.
- The tester should use an alcohol swab to clean the end of the finger to be pricked.
- Place the lancet on the fingertip - preferably the little or ring fingers - and press slightly off to the side.
- Dispose of the lancet in a sharps container.
- The tester may need to gently 'milk' the finger to encourage blood release. Note, however, values will be inaccurate if blood flow is low and too much force is used to obtain blood. This is because extracellular fluid will also be squeezed out with the blood.
- The goal is to fill a capillary tube with the appropriate volume for the analyser being used - typically 40µl for the lipid sample and 15µl for fasting glucose concentration. Adhere to the manufacturers guidelines for measuring the concentrations of the various blood parameters.
- It is especially important to be careful in regard to infection control. For this reason, wear gloves at all times, putting on a new pair for each new person. Ensure each new finger to be sampled is cleaned with an alcohol wipe. This will help reduce the possibility of micro-organisms moving from the skin into the blood.

Fasting blood samples are the preferred method to be used. Fasting is defined by the American Heart Association as no food, medication or liquid other than water for a period of 9-12 hours.



Reflotron analyser for blood analysis



Cardiocheck analyser for blood analysis

4. Blood fats

A small sample of blood taken from a finger prick can be analysed for a range of blood fats (lipids). Total cholesterol is the most common type of blood fat measured because of its association with heart disease. International standards point out that a total blood cholesterol ≥ 5.2 mmol/L is a risk factor for heart and blood vessel disease. Chronic exercise training, especially vigorous intensity training, has been shown to lower total cholesterol. Many test kits now allow reliable measures of sub-fractions of lipids such as triglycerides, LDL, and HDL. These measures can be much more informative about the relative ratios of the 'bad' cholesterol (LDL) versus the 'good' high-density lipoprotein. The machines are also able to give these results within a couple of minutes.

5. Blood glucose

A second blood sample may be used to measure the amount of glucose (simple sugar) in the blood. Glucose measurement needs to be taken while the client is in a 'fasting state'. This means refraining from eating for at least 9 hours before testing. Although clients can drink water they should be advised not to consume tea or coffee, even without sugar or milk, or any other type of drink. This is important so that accurate results can be obtained.

The body likes to regulate blood sugar between a narrow range. This is important because if it is too low then a person cannot survive (the brain and nerves, for example, use glucose as their major fuel source). On the other hand, if it is too high a person can also suffer tissue damage to nerves and blood vessels (over the longer term) and if it is really elevated this can lead to coma and death. Impaired glucose regulation is the test for diabetes and metabolic syndrome.

Type 2 diabetes is a metabolic disorder characterised by high blood glucose and associated insulin resistance. The pathological processes resulting in the development of diabetes involve a gradual progression from normoglycaemia to hyperglycaemia. This progression is characterised by abnormal insulin secretion and insulin resistance, resulting in impaired glucose uptake at the cellular level and excess glucose production by the liver. An intermediate stage of impaired glucose tolerance and impaired fasting glucose follows and, left untreated, this leads to the development of the hyperglycaemia, which typifies type 2 diabetes. Classification of diabetes is made when fasting plasma glucose levels are > 7.0 mmol/L on two separate occasions (WHO, 1999).

COMPLETION OF STAGE 3

If the tester completes Stage 3 then the following illustrates the summation of the risk factor scores.

The maximum number of possible risk factors at the end of Stage 3 is 9 - corresponding to questions 1-5 in Stage 3 of the APSS Tool plus any risk factors assigned for questions 1-4 in Stage 2 of the APSS Tool.

In total, a person's risk factor score will always be out of a possible total of 8 if they have completed STAGE 2 or out of 9 if they complete both STAGE 2 and STAGE 3.

Stage 3 – Risk Stratification

At the completion of Stage 3, total all the risk factors from Stage 3 and questions 1-4 in Stage 2. Record the risk factor total in the space provided on page 4 of the Screening Tool.

If the client has **less than 2** risk factors, they are deemed to be **low risk**.

If the client has **2 or more** risk factors, they are deemed to be **moderate risk**.

Low risk:

Individuals may participate in aerobic physical activity/exercise up to a vigorous or high intensity*

Moderate risk:

Individuals may participate in aerobic activity/exercise at a light or moderate intensity*

*Please refer to the table on Exercise Intensity Guidelines

GLOSSARY OF TERMS

Acute injury: Injury of short duration, rapid, and abbreviated in onset.

Angina: Chest pain due to an inadequate supply of oxygen to the heart muscle. The pain is typically severe and crushing, and it is characterised by a feeling of pressure and suffocation just behind the breastbone. Angina can accompany or be a precursor of a heart attack.

Arthritis: Inflammation of a joint. When joints are inflamed, they can develop stiffness, warmth, swelling, redness, and pain.

Bone fracture: A break in the bone. Although usually a result of trauma, a fracture can be the result of an acquired disease of bone, such as osteoporosis, or of abnormal formation of bone in a congenital disease of bone, such as osteogenesis imperfecta ("brittle bone disease").

Brachial artery: The artery that runs from the shoulder down to the elbow.

Cardiomyopathy: Disease of the heart muscle.

Cerebral palsy: An abnormality of motor function (the ability to move and control movements) that is acquired at an early age, usually less than 1 year, and is due to a brain lesion that is nonprogressive.

Chronic muscle fatigue: Also referred to as Chronic Fatigue Syndrome or Fibromyalgia. It is still not clear what the cause is and it is often difficult to diagnose. It typically involves many of the following symptoms: Fatigue not a result of exertion and is not relieved by rest, often continuing for months or longer. Unusual fatigue/weakness of longer than 24 hours following even moderate exercise. May also include symptoms more commonly associated with infectious episodes such as sore throat, fever or chills, painful lymph nodes, joint pain and headaches.

Congenital heart disease: A malformation of the heart, aorta, or other large blood vessels that is the most frequent form of major birth defect in newborns. Also known as congenital heart defect, congenital heart malformation, congenital cardiovascular disease, congenital cardiovascular defect, and congenital cardiovascular malformation.

Coronary angioplasty: A procedure in which a balloon-tipped catheter is used to enlarge a narrowing in a coronary artery caused by arteriosclerosis (hardening and thickening of the walls of the artery). Also known as percutaneous transluminal coronary angioplasty (PTCA).

Coronary artery bypass: A form of bypass surgery that can create new routes around narrowed and blocked arteries, permitting increased blood flow to deliver oxygen and nutrients to the heart muscles.

Epilepsy: When nerve cells in the brain fire electrical impulses at a rate up to four times higher than normal, a sort of electrical storm, called a seizure, occurs in the brain. Epilepsy is characterised by a pattern of repeated seizures.

Heart failure: Inability of the heart to keep up with the demands on it, with failure of the heart to pump blood with normal efficiency. When this occurs, the heart is unable to provide adequate blood flow to other organs, such as the brain, liver, and kidneys.

Heart transplant: An operation in which a diseased or malfunctioning heart is replaced with a healthy donor heart taken from a deceased person.

Heart valve disease: Can cause heart muscle weakness due to too much leaking of blood or cause heart muscle stiffness from a blocked valve.

Multiple sclerosis (MS): A disease that is characterised by loss of myelin (the coating of nerve fibres). In MS, loss of myelin usually affects white matter in the brain, but sometimes it extends into the gray matter. Symptoms of MS range from numbness to paralysis and blindness. People with MS experience attacks of symptoms that may last days, months, or longer. For many patients, the disease is progressive and leads to disablement, although some cases enter long, perhaps even permanent, remission.

Muscular dystrophy (MD): One of a group of genetic diseases characterised by progressive weakness and degeneration of the skeletal or voluntary muscles that control movement. The muscles of the heart and some other involuntary muscles are also affected in some forms of muscular dystrophy, and a few forms involve other organs as well.

Osteoarthritis: A type of arthritis caused by inflammation, breakdown, and eventual loss of the cartilage of the joints. Degenerative arthritis is the most common form of arthritis, usually affecting the hands, feet, spine, and large weight-bearing joints, such as the hips and knees.

Osteoporosis: Thinning of the bones, with reduction in bone mass, due to depletion of calcium and bone protein. Osteoporosis predisposes a person to fractures, which are often slow to heal and heal poorly. It is most common in older adults, particularly postmenopausal women, and in patients who take steroids or steroidal drugs.

Pacemaker insertion: An inserted device or system that sends electrical impulses to the heart in order to set the heart rhythm.

Parkinson's disease: A slowly progressive neurologic disease that is characterised by a fixed inexpressive face, tremor at rest, slowing of voluntary movements, gait with short accelerating steps, peculiar posture and muscle weakness, and low production of the neurotransmitter dopamine.

Peripheral vascular disease: Atherosclerosis (presence of fatty lipid deposits in the lining of an artery) of the arteries of the extremities. Peripheral vascular disease can lead to pain in the legs when walking that is relieved by resting.

Post myocardial infarction (heart attack): A sudden blockage of a coronary artery. Not infrequently, this leads to the death of part of the heart muscle due to its loss of blood supply. Typically, the loss of blood supply is caused by a complete blockage of a coronary artery by a blood clot. The interruption of blood flow is usually caused by arteriosclerosis, with narrowing of the coronary arteries, the culminating event being a thrombosis (clot). Death of the heart muscle often causes chest pain and electrical instability of the heart muscle tissue. Electrical instability of the heart may cause ventricular fibrillation (chaotic electrical disturbance), resulting in the inability of the heart to deliver oxygenated blood to the body. Permanent brain damage and death can result from heart attack unless oxygenated blood flow is restored within 5 minutes. Heart attack deaths can be avoided if a bystander starts CPR (cardiopulmonary resuscitation) within 5 minutes of the onset of ventricular fibrillation. When paramedics arrive, medications and/or electrical shock (cardioversion) to the heart can be administered to

convert ventricular fibrillation to a normal heart rhythm. Therefore, prompt CPR and rapid paramedic response can improve the survival chances after a heart attack. Also known as a myocardial infarction (MI). See also cardiac arrest.

Scoliosis: Lateral (sideways) curving of the spine. The degree of scoliosis may range from mild to severe.

Serious sprain: An injury to a ligament that results from overuse or trauma and prevents participation in physical activity/exercise.

Serious strain: An injury to a ligament, tendon, or muscle that results from overuse or trauma and prevents participation in physical activity/exercise.

Sphygmomanometer: Blood pressure cuff, an instrument for measuring blood pressure, particularly in arteries. Digital and manual models are available. The two basic types of manual sphygmomanometers are the mercury column and the gauge with a dial face. The manual sphygmomanometer in most frequent use today consists of a gauge attached to a rubber cuff that is wrapped around the upper arm and is inflated to constrict the arteries.

Spondylolisthesis: Forward movement of one vertebra in relationship to an adjacent vertebra.

Spondylolysis: The breaking down (dissolution) of a portion of a vertebra. Spondylolysis can be a cause of abnormal movement of the spine (spondylolisthesis) and lead to localised back pain.

Stroke: The sudden death of brain cells due to lack of oxygen, caused by blockage of blood flow or rupture of an artery to the brain. Sudden loss of speech, weakness, or paralysis of one side of the body can be symptoms.

Transplant: The grafting of a tissue from one place on the body to another. The transplanting of tissue can be from one part of a patient to another part as in the case of a skin graft using the patient's own skin, or from one patient to another patient as in the case of transplanting a donor kidney into a recipient.

Source:
WebMD. Webster's New World Medical Dictionary (3rd Edition).
Hoboken, NJ, U SA: Webster's New World, 2009. p 21.
<http://site.ebrary.com/lib/uqlib/Doc?id=10296815&ppg=33>
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PRACTICE CASE STUDY – #1

ADULT PRE-EXERCISE SCREENING TOOL

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Name: Margaret T. Jones
 Date of Birth: 12 June 1953 Male Female Date: 21 July 2011

STAGE 1 (COMPULSORY)

AIM: To identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise. This stage is self administered and self evaluated.

Please circle response

| | | |
|---|-----|--------------------------|
| 1. Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke? | Yes | <input type="radio"/> No |
| 2. Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise? | Yes | <input type="radio"/> No |
| 3. Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance? | Yes | <input type="radio"/> No |
| 4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months? | Yes | <input type="radio"/> No |
| 5. If you have diabetes (type I or type II) have you had trouble controlling your blood glucose in the last 3 months? | Yes | <input type="radio"/> No |
| 6. Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise? | Yes | <input type="radio"/> No |
| 7. Do you have any other medical condition(s) that may make it dangerous for you to participate in physical activity/exercise? | Yes | <input type="radio"/> No |

IF YOU ANSWERED 'YES' to any of the 7 questions, please seek guidance from your GP or appropriate allied health professional prior to undertaking physical activity/exercise

IF YOU ANSWERED 'NO' to all of the 7 questions, and you have no other concerns about your health, you may proceed to undertake light-moderate intensity physical activity/exercise

Stage 1 responses for client # 1

STAGE 2 (OPTIONAL)

Name: Margaret Jones
 Date of Birth: 12 June 1953 Date: 21 July 2011

AIM: To identify those individuals with risk factors or other conditions to assist with appropriate exercise prescription. This stage is to be administered by a qualified exercise professional.

| | | RISK FACTORS |
|---|---|---|
| 1. Age <u>58</u> Gender <u>female</u> | ≥ 45yrs Males or ≥ 55yrs Females +1 risk factor | |
| 2. Family history of heart disease (eg: stroke, heart attack) Relative Age Relative Age <input checked="" type="checkbox"/> Father <u>69</u> <input checked="" type="checkbox"/> Mother <u>62</u> <input type="checkbox"/> Brother <u> </u> <input type="checkbox"/> Sister <u> </u> <input type="checkbox"/> Son <u> </u> <input type="checkbox"/> Daughter <u> </u> | If male < 55yrs = +1 risk factor If female < 65yrs = +1 risk factor Maximum of 1 risk factor for this question | |
| 3. Do you smoke cigarettes on a daily or weekly basis or have you quit smoking in the last 6 months? Yes <input type="radio"/> No <input checked="" type="radio"/> If currently smoking, how many per day or week? <u> </u> | If yes, (smoke regularly or given up within the past 6 months) = +1 risk factor | |
| 4. Describe your current physical activity/exercise levels: Sedentary <input type="checkbox"/> Light <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Vigorous <input type="checkbox"/> Frequency (sessions per week) <u>2</u> Duration (minutes per week) <u>40</u> | If physical activity level < 150 min/ week = +1 risk factor If physical activity level ≥ 150 min/ week = -1 risk factor (vigorous physical activity/ exercise weighted x 2) | |
| 5. Please state your height (cm) <u>171</u> weight (kg) <u>66</u> | BMI = <u> </u> BMI ≥ 30 kg/m ² = +1 risk factor | |
| 6. Have you been told that you have high blood pressure? Yes <input checked="" type="radio"/> No <input type="radio"/> | If yes, = +1 risk factor | |
| 7. Have you been told that you have high cholesterol? Yes <input checked="" type="radio"/> No <input type="radio"/> | If yes, = +1 risk factor | |
| 8. Have you been told that you have high blood sugar? Yes <input checked="" type="radio"/> No <input type="radio"/> | If yes, = +1 risk factor | |
| Note: Refer over page for risk stratification. | | STAGE 2 Total Risk Factors = |

Stage 2 (questions 1-8) responses for client # 1

| | |
|---|--|
| 9. Have you spent time in hospital (including day admission) for any medical condition/illness/injury during the last 12 months? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details |
| 10. Are you currently taking a prescribed medication(s) for any medical conditions(s)? Yes <input checked="" type="radio"/> No <input type="radio"/> | If yes, what is the medical condition(s)? high blood pressure |
| 11. Are you pregnant or have you given birth within the last 12 months? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details. I am _____ months pregnant or postnatal (circle). |
| 12. Do you have any muscle, bone or joint pain or soreness that is made worse by particular types of activity? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details |

Stage 2 (questions 9-12) responses for client # 1

What decision did you make after Stage 1?

What decision did you make after Stage 2?

How many risk factors did Margaret have and what were they? Were any extreme?

What is your general recommendation for exercise prescription for Margaret? Are there any other issues / responses that you are concerned about?

PRACTICE CASE STUDY – #2

ADULT PRE-EXERCISE SCREENING TOOL

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Name: Donald Dengel
Date of Birth: 8 February 1948 Male Female Date: 21 July 2011

STAGE 1 (COMPULSORY)

AIM: to identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise. This stage is self administered and self evaluated.

Please circle response

| | | |
|---|-----|----|
| 1. Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke? | Yes | No |
| 2. Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise? | Yes | No |
| 3. Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance? | Yes | No |
| 4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months? | Yes | No |
| 5. If you have diabetes (type I or type II) have you had trouble controlling your blood glucose in the last 3 months? | Yes | No |
| 6. Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise? | Yes | No |
| 7. Do you have any other medical condition(s) that may make it dangerous for you to participate in physical activity/exercise? | Yes | No |

IF YOU ANSWERED 'YES' to any of the 7 questions, please seek guidance from your GP or appropriate allied health professional prior to undertaking physical activity/exercise

IF YOU ANSWERED 'NO' to all of the 7 questions, and you have no other concerns about your health, you may proceed to undertake light-moderate intensity physical activity/exercise

Stage 1 responses for client # 2

STAGE 2 (OPTIONAL)

Name: Donald Dengel
Date of Birth: 8 February 1948 Date: 21 July 2011

AIM: To identify those individuals with risk factors or other conditions to assist with appropriate exercise prescription. This stage is to be administered by a qualified exercise professional.

| | | RISK FACTORS |
|--|--|--------------|
| 1. Age <u>63</u> Gender <u>male</u> | ≥ 45 ys Males or ≥ 55 ys Females +1 risk factor | |
| 2. Family history of heart disease (eg: stroke, heart attack) Relative Age Relative Age <input type="checkbox"/> Father <input type="checkbox"/> Mother <input checked="" type="checkbox"/> Brother <u>59</u> <input type="checkbox"/> Sister <input type="checkbox"/> Son <input type="checkbox"/> Daughter | If male < 55yrs = +1 risk factor If female < 65yrs = +1 risk factor Maximum of 1 risk factor for this question | |
| 3. Do you smoke cigarettes on a daily or weekly basis or have you quit smoking in the last 6 months? <u>Yes</u> No If currently smoking, how many per day or week? _____ | If yes, (smoke regularly or given up within the past 6 months) = +1 risk factor | |
| 4. Describe your current physical activity/exercise levels: Sedentary <input checked="" type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Vigorous <input type="checkbox"/> Frequency sessions per week _____ Duration minutes per week _____ | If physical activity level < 150 min/week = +1 risk factor If physical activity level ≥ 150 min/week = -1 risk factor (vigorous physical activity/ exercise weighted x 2) | |
| 5. Please state your height (cm) <u>178</u> weight (kg) <u>86</u> | BMI = _____ BMI ≥ 30 kg/m ² = +1 risk factor | |
| 6. Have you been told that you have high blood pressure? <u>Yes</u> No | If yes, = +1 risk factor | |
| 7. Have you been told that you have high cholesterol? <u>Yes</u> No | If yes, = +1 risk factor | |
| 8. Have you been told that you have high blood sugar? <u>Yes</u> No | If yes, = +1 risk factor | |

Note: Refer over page for risk stratification. STAGE 2 Total Risk Factors =

Stage 2 (questions 1-8) responses for client # 2

| | |
|---|--|
| 9. Have you spent time in hospital (including day admission) for any medical condition/illness/injury during the last 12 months? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details |
| 10. Are you currently taking a prescribed medication(s) for any medical condition(s)? Yes <input checked="" type="radio"/> No <input type="radio"/> | If yes, what is the medical condition(s)? lipitor and betaloc |
| 11. Are you pregnant or have you given birth within the last 12 months? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details. I am _____ months pregnant or postnatal (circle). |
| 12. Do you have any muscle, bone or joint pain or soreness that is made worse by particular types of activity? Yes <input checked="" type="radio"/> No <input type="radio"/> | If yes, provide details knee arthritis |

Stage 2 (questions 9-12) responses for client # 2

What decision did you make after Stage 1?

What decision did you make after Stage 2?

How many risk factors did Donald have and what were they?
 Were any extreme?

What is your general recommendation for exercise prescription for Donald? Are there any other issues / responses that you are concerned about?

PRACTICE CASE STUDY – #3

ADULT PRE-EXERCISE SCREENING TOOL

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Name: Mary-anne Piltz
 Date of Birth: 2 March 1955 Male Female Date: 21 July 2011

STAGE 1 (COMPULSORY)

AIM: To identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise. This stage is self administered and self evaluated.

Please circle response

| | | |
|---|--------------------------------------|--------------------------|
| 1. Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke? | Yes | <input type="radio"/> No |
| 2. Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise? | Yes | <input type="radio"/> No |
| 3. Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months? | Yes | <input type="radio"/> No |
| 5. If you have diabetes (type I or type II) have you had trouble controlling your blood glucose in the last 3 months? | Yes | <input type="radio"/> No |
| 6. Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise? | Yes | <input type="radio"/> No |
| 7. Do you have any other medical condition(s) that may make it dangerous for you to participate in physical activity/exercise? | Yes | <input type="radio"/> No |

IF YOU ANSWERED 'YES' to any of the 7 questions, please seek guidance from your GP or appropriate allied health professional prior to undertaking physical activity/exercise

IF YOU ANSWERED 'NO' to all of the 7 questions, and you have no other concerns about your health, you may proceed to undertake light-moderate intensity physical activity/exercise

Stage 1 responses for client # 3

STAGE 2 (OPTIONAL)

Name: Mary-anne Piltz
 Date of Birth: 2 March 1955 Date: 21 July 2011

AIM: To identify those individuals with risk factors or other conditions to assist with appropriate exercise prescription. This stage is to be administered by a qualified exercise professional.

| | | RISK FACTORS |
|--|---|--------------|
| 1. Age <u>58</u> Gender <u>female</u> | ≥ 45 ys Males or ≥ 55 ys Females +1 risk factor | |
| 2. Family history of heart disease (eg: stroke, heart attack) Relative Age Relative Age <input type="checkbox"/> Father <u> </u> <input checked="" type="checkbox"/> Mother <u>73</u> <input type="checkbox"/> Brother <u> </u> <input type="checkbox"/> Sister <u> </u> <input type="checkbox"/> Son <u> </u> <input type="checkbox"/> Daughter <u> </u> | If male < 55yrs = +1 risk factor If female < 65yrs = +1 risk factor Maximum of 1 risk factor for this question | |
| 3. Do you smoke cigarettes on a daily or weekly basis or have you quit smoking in the last 6 months? Yes <input type="radio"/> No <input checked="" type="radio"/> If currently smoking, how many per day or week? <u> </u> | If yes, (smoke regularly or given up within the past 6 months) = +1 risk factor | |
| 4. Describe your current physical activity/exercise levels: Sedentary <input checked="" type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Vigorous <input type="checkbox"/> Frequency <u> </u> sessions per week Duration <u> </u> minutes per week | If physical activity level < 150 min/week = +1 risk factor If physical activity level ≥ 150 min/week = -1 risk factor (vigorous physical activity/ exercise weighted x 2) | |
| 5. Please state your height (cm) <u>154</u> weight (kg) <u>83</u> | BMI = <u> </u> BMI ≥ 30 kg/m ² = +1 risk factor | |
| 6. Have you been told that you have high blood pressure? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, = +1 risk factor | |
| 7. Have you been told that you have high cholesterol? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, = +1 risk factor | |
| 8. Have you been told that you have high blood sugar? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, = +1 risk factor | |

Note: Refer over page for risk stratification. STAGE 2 Total Risk Factors =

Stage 2 (questions 1-8) responses for client # 3

| | |
|---|---|
| <p>9. Have you spent time in hospital (including day admission) for any medical condition/illness/injury during the last 12 months? Yes <input type="radio"/> No <input checked="" type="radio"/></p> | <p>If yes, provide details</p> |
| <p>10. Are you currently taking a prescribed medication(s) for any medical condition(s)? Yes <input type="radio"/> No <input checked="" type="radio"/></p> | <p>If yes, what is the medical condition(s)? hormone replacement</p> |
| <p>11. Are you pregnant or have you given birth within the last 12 months? Yes <input type="radio"/> No <input checked="" type="radio"/></p> | <p>If yes, provide details. I am _____ months pregnant or postnatal (circle).</p> |
| <p>12. Do you have any muscle, bone or joint pain or soreness that is made worse by particular types of activity? Yes <input type="radio"/> No <input checked="" type="radio"/></p> | <p>If yes, provide details</p> |

Stage 2 (questions 9-12) responses for client # 3

What decision did you make after Stage 1?

What decision did you make after Stage 2?

How many risk factors did Mary-anne have and what were they? Were any extreme?

What is your general recommendation for exercise prescription for Mary-anne? Are there any other issues / responses that you are concerned about?

PRACTICE CASE STUDY – #4

ADULT PRE-EXERCISE SCREENING TOOL

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Name: Belinda Jayne
 Date of Birth: 5 February 1987 Male Female Date: 21 July 2011

STAGE 1 (COMPULSORY)

AIM: To identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise. This stage is self administered and self evaluated.

Please circle response

| | | |
|---|---------------------------|--------------------------|
| 1. Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke? | Yes | <input type="radio"/> No |
| 2. Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise? | Yes | <input type="radio"/> No |
| 3. Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance? | Yes | <input type="radio"/> No |
| 4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months? | Yes | <input type="radio"/> No |
| 5. If you have diabetes (type I or type II) have you had trouble controlling your blood glucose in the last 3 months? | Yes | <input type="radio"/> No |
| 6. Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise? | Yes | <input type="radio"/> No |
| 7. Do you have any other medical condition(s) that may make it dangerous for you to participate in physical activity/exercise? | <input type="radio"/> Yes | <input type="radio"/> No |

3 months pregnant

IF YOU ANSWERED 'YES' to any of the 7 questions, please seek guidance from your GP or appropriate allied health professional prior to undertaking physical activity/exercise

IF YOU ANSWERED 'NO' to all of the 7 questions, and you have no other concerns about your health, you may proceed to undertake light-moderate intensity physical activity/exercise

STAGE 2 (OPTIONAL)

Name: Belinda Jayne
 Date of Birth: 5 February 1987 Date: 21 July 2011

AIM: To identify those individuals with risk factors or other conditions to assist with appropriate exercise prescription. This stage is to be administered by a qualified exercise professional.

| | | RISK FACTORS | | | | | | | | | | | | | | | | |
|--|---|-------------------------------------|-------------------------------------|----------|---------------------------------|--------------------------|-------------------------------------|-------------------------------------|--|-------|---------------------------------|-------|------------------------------|-------|-----------------------------------|-------|--|--|
| 1. Age <u>24</u> Gender <u>female</u> | ≥ 45yrs Males or ≥ 55yrs Females + 1 risk factor | | | | | | | | | | | | | | | | | |
| 2. Family history of heart disease (eg: stroke, heart attack) <table style="width: 100%; border: none;"> <tr> <td style="border: none;">Relative</td> <td style="border: none;">Age</td> <td style="border: none;">Relative</td> <td style="border: none;">Age</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Father</td> <td style="border: none;">_____</td> <td style="border: none;"><input type="checkbox"/> Mother</td> <td style="border: none;">_____</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Brother</td> <td style="border: none;">_____</td> <td style="border: none;"><input type="checkbox"/> Sister</td> <td style="border: none;">_____</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Son</td> <td style="border: none;">_____</td> <td style="border: none;"><input type="checkbox"/> Daughter</td> <td style="border: none;">_____</td> </tr> </table> | Relative | Age | Relative | Age | <input type="checkbox"/> Father | _____ | <input type="checkbox"/> Mother | _____ | <input type="checkbox"/> Brother | _____ | <input type="checkbox"/> Sister | _____ | <input type="checkbox"/> Son | _____ | <input type="checkbox"/> Daughter | _____ | If male < 55yrs = +1 risk factor If female < 65yrs = +1 risk factor Maximum of 1 risk factor for this question | |
| Relative | Age | Relative | Age | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Father | _____ | <input type="checkbox"/> Mother | _____ | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Brother | _____ | <input type="checkbox"/> Sister | _____ | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Son | _____ | <input type="checkbox"/> Daughter | _____ | | | | | | | | | | | | | | | |
| 3. Do you smoke cigarettes on a daily or weekly basis or have you quit smoking in the last 6 months? Yes <input checked="" type="radio"/> No If currently smoking, how many per day or week? _____ | If yes, (smoke regularly or given up within the past 6 months) = +1 risk factor | | | | | | | | | | | | | | | | | |
| 4. Describe your current physical activity/exercise levels: <table style="width: 100%; border: none;"> <tr> <td style="border: none;">Sedentary</td> <td style="border: none;">Light</td> <td style="border: none;">Moderate</td> <td style="border: none;">Vigorous</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/></td> <td style="border: none;"><input type="checkbox"/></td> <td style="border: none;"><input checked="" type="checkbox"/></td> <td style="border: none;"><input checked="" type="checkbox"/></td> </tr> </table> Frequency sessions per week: _____ Duration minutes per week: _____ | Sedentary | Light | Moderate | Vigorous | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | If physical activity level < 150 min/ week = +1 risk factor If physical activity level ≥ 150 min/ week = -1 risk factor (vigorous physical activity/ exercise weighted x 2) | | | | | | | | | |
| Sedentary | Light | Moderate | Vigorous | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | | | | | | | | |
| 5. Please state your height (cm) <u>172</u> weight (kg) <u>58</u> | BMI = _____ BMI ≥ 30 kg/m ² = +1 risk factor | | | | | | | | | | | | | | | | | |
| 6. Have you been told that you have high blood pressure? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, = +1 risk factor | | | | | | | | | | | | | | | | | |
| 7. Have you been told that you have high cholesterol? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, = +1 risk factor | | | | | | | | | | | | | | | | | |
| 8. Have you been told that you have high blood sugar? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, = +1 risk factor | | | | | | | | | | | | | | | | | |

Note: Refer over page for risk stratification. STAGE 2 Total Risk Factors =

Stage 1 responses for client # 4

Stage 2 (questions 1-8) responses for client # 4

| | |
|---|---|
| 9. Have you spent time in hospital (including day admission) for any medical condition/illness/injury during the last 12 months? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details |
| 10. Are you currently taking a prescribed medication(s) for any medical conditions(s)? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, what is the medical condition(s)? |
| 11. Are you pregnant or have you given birth within the last 12 months? Yes <input checked="" type="radio"/> No <input type="radio"/> | If yes, provide details. I am <u>3 months</u> months <u>pregnant</u> or postnatal (circle). |
| 12. Do you have any muscle, bone or joint pain or soreness that is made worse by particular types of activity? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details |

Stage 2 (questions 9-12) responses for client # 4

What decision did you make after Stage 1?

What decision did you make after Stage 2?

How many risk factors did Belinda have and what were they?
 Were any extreme?

What is your general recommendation for exercise prescription for Belinda? Are there any other issues / responses that you are concerned about?

PRACTICE CASE STUDY – #5

ADULT PRE-EXERCISE SCREENING TOOL

This screening tool does not provide advice on a particular matter, nor does it substitute for advice from an appropriately qualified medical professional. No warranty of safety should result from its use. The screening system in no way guarantees against injury or death. No responsibility or liability whatsoever can be accepted by Exercise and Sports Science Australia, Fitness Australia or Sports Medicine Australia for any loss, damage or injury that may arise from any person acting on any statement or information contained in this tool.

Name: Jimmy Buckshot
 Date of Birth: 20 March 1941 Male Female Date: 21 July 2011

STAGE 1 (COMPULSORY)

AIM: to identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise. This stage is self administered and self evaluated.
 Please circle response

| | | |
|---|-----|-------------------------------------|
| 1. Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke? | Yes | No <input checked="" type="radio"/> |
| 2. Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise? | Yes | No <input checked="" type="radio"/> |
| 3. Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance? | Yes | No <input checked="" type="radio"/> |
| 4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months? | Yes | No <input checked="" type="radio"/> |
| 5. If you have diabetes (type I or type II) have you had trouble controlling your blood glucose in the last 3 months? | Yes | No <input checked="" type="radio"/> |
| 6. Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise? | Yes | No <input checked="" type="radio"/> |
| 7. Do you have any other medical condition(s) that may make it dangerous for you to participate in physical activity/exercise? | Yes | No <input checked="" type="radio"/> |

IF YOU ANSWERED 'YES' to any of the 7 questions, please seek guidance from your GP or appropriate allied health professional prior to undertaking physical activity/exercise

IF YOU ANSWERED 'NO' to all of the 7 questions, and you have no other concerns about your health, you may proceed to undertake light-moderate intensity physical activity/exercise

Stage 1 responses for client # 5

What decision did you make after Stage 1?

What decision would you make about progressing to Stage 2? Explain.

What is your general recommendation for Jimmy? Are there any other issues / responses that you are concerned about?

PRACTICE CASE STUDY – #6

ADULT PRE-EXERCISE SCREENING TOOL

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Name: Mike Delp
 Date of Birth: 7 December 1971 Male Female Date: 21 July 2011

STAGE 1 (COMPULSORY)

AIM: to identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise. This stage is self administered and self evaluated.

Please circle response

| | | |
|---|--------------------------------------|-------------------------------------|
| 1. Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke? | Yes | No <input checked="" type="radio"/> |
| 2. Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise? | Yes | No <input checked="" type="radio"/> |
| 3. Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance? | Yes | No <input checked="" type="radio"/> |
| 4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months? | Yes | No <input checked="" type="radio"/> |
| 5. If you have diabetes (type I or type II) have you had trouble controlling your blood glucose in the last 3 months? | <input checked="" type="radio"/> Yes | No |
| 6. Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise? | Yes | No <input checked="" type="radio"/> |
| 7. Do you have any other medical condition(s) that may make it dangerous for you to participate in physical activity/exercise? | Yes | No <input checked="" type="radio"/> |

IF YOU ANSWERED 'YES' to any of the 7 questions, please seek guidance from your GP or appropriate allied health professional prior to undertaking physical activity/exercise

IF YOU ANSWERED 'NO' to all of the 7 questions, and you have no other concerns about your health, you may proceed to undertake light-moderate intensity physical activity/exercise

What decision did you make after Stage 1?

What decision would you make about progressing to Stage 2? Explain.

What is your general recommendation for Mike? Are there any other issues / responses that you are concerned about?

Stage 1 responses for client # 6

PRACTICE CASE STUDY – #7

ADULT PRE-EXERCISE SCREENING TOOL

This screening tool does not provide advice on a particular matter, nor does it substitute for advice from an appropriately qualified medical professional. No warranty of safety should result from its use. The screening system in no way guarantees against injury or death. No responsibility or liability whatsoever can be accepted by Exercise and Sports Science Australia, Fitness Australia or Sports Medicine Australia for any loss, damage or injury that may arise from any person acting on any statement or information contained in this tool.

Name: Chester Ray
 Date of Birth: 22 November 1964 Male Female Date: 21 July 2011

STAGE 1 (COMPULSORY)

AIM: To identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise. This stage is self administered and self evaluated.

Please circle response

| | | |
|---|-----|----|
| 1. Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke? | Yes | No |
| 2. Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise? | Yes | No |
| 3. Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance? | Yes | No |
| 4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months? | Yes | No |
| 5. If you have diabetes (type I or type II) have you had trouble controlling your blood glucose in the last 3 months? | Yes | No |
| 6. Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise? | Yes | No |
| 7. Do you have any other medical condition(s) that may make it dangerous for you to participate in physical activity/exercise? | Yes | No |

IF YOU ANSWERED 'YES' to any of the 7 questions, please seek guidance from your GP or appropriate allied health professional prior to undertaking physical activity/exercise

IF YOU ANSWERED 'NO' to all of the 7 questions, and you have no other concerns about your health, you may proceed to undertake light-moderate intensity physical activity/exercise

STAGE 2 (OPTIONAL)

Name: Chester Ray
 Date of Birth: 22 November 1964 Date: 21 July 2011

AIM: To identify those individuals with risk factors or other conditions to assist with appropriate exercise prescription. This stage is to be administered by a qualified exercise professional.

| | | RISK FACTORS |
|---|---|---|
| 1. Age <u>46</u> | | |
| Gender <u>male</u> | ≥ 45yrs Males or ≥ 55yrs Females +1 risk factor | |
| 2. Family history of heart disease (eg: stroke, heart attack) | | If male < 55yrs = +1 risk factor If female < 65yrs = +1 risk factor Maximum of 1 risk factor for this question |
| <input type="checkbox"/> Father <input type="checkbox"/> Mother <input type="checkbox"/> Brother <input type="checkbox"/> Sister <input type="checkbox"/> Son <input type="checkbox"/> Daughter | | |
| 3. Do you smoke cigarettes on a daily or weekly basis or have you quit smoking in the last 6 months? Yes <u>No</u> | If yes, (smoke regularly or given up within the past 6 months) = +1 risk factor | |
| If currently smoking, how many per day or week? _____ | | |
| 4. Describe your current physical activity/exercise levels: | | If physical activity level < 150 min/week = +1 risk factor If physical activity level ≥ 150 min/week = -1 risk factor (vigorous physical activity/ exercise weighted x 2) |
| sedentary <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Vigorous <input checked="" type="checkbox"/> Frequency (sessions per week) _____ <u>4</u> <u>2</u> Duration (minutes per week) _____ <u>80</u> <u>40</u> | | |
| 5. Please state your height (cm) <u>181</u> weight (kg) <u>79</u> | | BMI = _____ BMI ≥ 30 kg/m ² = +1 risk factor |
| | | |
| 6. Have you been told that you have high blood pressure? Yes <u>No</u> | | If yes, = +1 risk factor |
| 7. Have you been told that you have high cholesterol? Yes <u>No</u> | | |
| 8. Have you been told that you have high blood sugar? Yes <u>No</u> | | If yes, = +1 risk factor |

Note: Refer over page for risk stratification. STAGE 2 Total Risk Factors =

Stage 1 responses for client # 7

Stage 2 (questions 1-8) responses for client # 7

| | |
|--|--|
| 9. Have you spent time in hospital (including day admission) for any medical condition/illness/injury during the last 12 months? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details |
| 10. Are you currently taking a prescribed medication(s) for any medical condition(s)? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, what is the medical condition(s)? |
| 11. Are you pregnant or have you given birth within the last 12 months? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details. I am _____ months pregnant or postnatal (circle). |
| 12. Do you have any muscle, bone or joint pain or soreness that is made worse by particular types of activity? Yes <input type="radio"/> No <input checked="" type="radio"/> | If yes, provide details |

Stage 2 (questions 9-12) responses for client # 7

What decision did you make after Stage 1?

What decision(s) did you make after Stages 2 and 3?

How many risk factors did Chet have and what were they? Were any extreme?

| STAGE 3 (OPTIONAL) | | |
|--|-----------------------------|--|
| AIM: To obtain pre-exercise baseline measurements of other recognised cardiovascular and metabolic risk factors. This stage is to be administered by a qualified exercise professional. (Measures 1, 2 & 3 – minimum qualification, Certificate III in Fitness; Measures 4 and 5 minimum level, Exercise Physiologist*). | | |
| | RESULTS | RISK FACTORS |
| 1. BMI (kg/m ²) | height 180.2 weight 80.6 | BMI ≥ 30 kg/m ² = +1 risk factor |
| 2. Waist girth (cm) | 88.4 | Waist > 94 cm for men and > 80 cm for women = +1 risk factor |
| 3. Resting BP (mmHg) | 148 / 90 | SBP ≥ 140 mmHg or DBP ≥ 90 mmHg = +1 risk factor |
| 4. Fasting lipid profile* | | Total cholesterol ≥ 5.20 mmol/L = +1 risk factor |
| Total cholesterol | 7.76 | HDL cholesterol > 1.55 mmol/L = -1 risk factor |
| HDL | 1.44 | HDL cholesterol < 1.00 mmol/L = +1 risk factor |
| Triglycerides | 2.12 | Triglycerides ≥ 1.70 mmol/L = +1 risk factor |
| LDL | 4.3 | LDL cholesterol ≥ 3.40 mmol/L = +1 risk factor |
| 5. Fasting blood glucose* | 5.1 | Fasting glucose ≥ 5.50 mmol = +1 risk factor |
| | | STAGE 3 Total Risk Factors = <input type="text"/> |
| RISK STRATIFICATION | | |
| Total stage 2 or Total stage 3 Plus stage 2 (Q1 - Q4) | | <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> ≥ 2 RISK FACTORS – MODERATE RISK CLIENTS Individuals at moderate risk may participate in aerobic physical activity/exercise at a light or moderate intensity (Refer to the exercise intensity table on page 2) </div> <div style="border: 1px solid black; padding: 5px;"> < 2 RISK FACTORS – LOW RISK CLIENTS Individuals at low risk may participate in aerobic physical activity/exercise up to a vigorous or high intensity (Refer to the exercise intensity table on page 2) </div> |

Stage 3 responses for client # 7

What is your general recommendation for exercise prescription for Chet? Are there any other issues / responses that you are concerned about?

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Pre-exercise risk identification and appropriate advice are vital components of any exercise service. Several pre-exercise screening systems have been used in the Australian setting however there is a need for a system that is capable of identifying risk while remaining practical and easy to use.

In 2010, three national organisations Fitness Australia, Exercise and Sports Science Australia (ESSA) and Sports Medicine Australia (SMA) came together to support the development of the Adult Pre-Exercise Screening System (APSS). The objective of new system is to offer a consistent high quality approach to pre-exercise screening, to enhance safety and help create improved health outcomes for clients.

Pre-Exercise Screening: Guide to the Australian Adult Pre-Exercise Screening System is the perfect accompaniment for exercise professionals and organisations using the new APSS. This comprehensive text provides an overview of the Adult Pre-Exercise Screening Tool and explains how the tool can be used to evaluate the need for medical support for those who are beginning an exercise program. Further information about individual risk factors and tailored programming for people with health conditions is also provided. This level of information will greatly assist decision making and the ability to counsel and educate the client.

In combination with the new APSS, this guide presents as an ideal learning and reference resource for all exercise and health professionals.

Professor Kevin Norton is a lecturer and leading researcher in Exercise Science in the School of Health Sciences at University of South Australia. As author of the Sports Medicine Australia Pre-Exercise Screening System (2005) and Chairman of the Development Committee for the APSS (2011), Professor Norton has made a significant contribution to the evolution of pre-exercise screening processes and risk factor assessment in Australia.

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