NZ Register of Exercise Professionals

# New Zealand Pre-Screening Guide


SKILLS ACTIVE AOTEAROA

Version 1 - November 2014

Recognised by Skills Active and endorsed by Exercise Association of NZ

Exercise Association of New Zealand
Representing the Exercise & Fitness Industry

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# Part A.1 USING THIS PRE-SCREEN

Many current pre-screen models tend to be exclusively focused on risk stratification alone. Unfortunately, these singularly-focused formats fail to provide Registered Exercise Professionals with all the necessary information required to formulate a safe and effective exercise programme. The New Zealand Register of Exercise Professionals Pre-Screen brings together four key sections to provide a template for complete exercise pre-screening. The Pre-Screen process is to ensure the safety of your client, and to determine key information to inform customised exercise prescription.

## THE PROCESS:

The intention is that this pre-screen form is used in a one-to-one interview style setting, so the form is essentially a template on which to compile answers given, for the most part verbally, by clients. At your discretion you may ask the client to complete certain sections independently, such as circling areas of injury on the figures in section 2, or perhaps ticking relevant boxes in checklists such as medical conditions. Such an approach can be more time efficient and avoid an 'interrogation interview' feel to proceedings, but each Registered Exercise Professional will use the Pre-Screen in a way fitting to their setting and their client. Although the risk stratification (called Important Medical Information) is the very first section, you may choose to alter the order of the pre-screen process. For example, many Registered Exercise Professionals would prefer to start with developing a rapport and ascertaining training goals prior to 'launching' into an investigation on medical issues. However, it should be recognised that the pre-screen process could also inform goal setting. For example, if during screening it is determined that an individual has problems with glycemic control, improved glycemic control may be established as a training goal.

One of the skills needed for an effective Pre-Screen is the ability to follow through on a client's responses. For example, if they have a knee injury, which knee is it? How did they do it? How long ago was that? Did they see a doctor or physio? What did they suggest? What activities cause their knee pain? What makes the knee feel good?….. Simply ticking the box does not constitute sufficient information. Be an exercise detective! It is important that you are sure that you understand exactly your client's situation. The client should feel that you are taking an interest in them and will therefore be able to design a programme that is specific to them. Really get to the specifics of their goals and what they want to achieve. Sometimes as a Registered Exercise Professional you will have to dispel myths or help modify unrealistic goals as part of the Pre-Screen process.

Complete the process by summing up all the important points. Give your client the last say by asking something like "is that a fair summary of your health profile and the things that you want to achieve from your training programme?"

This gives the client the chance to correct any misconceptions that you may have and to add anything that they have just remembered.

What if you are not sure if exercising is safe for your client?

It is appropriate to ask the client to return to their allied health professional to ask for clearance to exercise. However it is important that you don't give the client the impression that you are 'fobbing them off' or putting them in the too hard basket. Make another appointment time within the week so that they realise that you are keen to help but would prefer to consult with an appropriate professional prior to commencing the structured programme.

Keep in mind that privacy regulations prevent Registered Exercise Professionals seeking direct information from a GP unless the client has first given permission. Please use the Health Professional Referral Letter which is in Part F of this guide. This provides approval to speak with another health professional, and provides clear questions which require an answer so that you can provide the best programme.

- Do first make your client feel comfortable with the prescreen process. Explain why you are collecting this information and what will be done with it.
- Do break the Pre-Screen into sub topics. Some topics may be best asked verbally eg training goals, while others may be answered quicker in writing eg the client ticking boxes for their injuries.
- Don't talk to your client if you have asked them to fill out a section of the form – it's hard for them to concentrate on two things at once.
- Do look for non-verbal responses eg does the client hesitate while deciding on an answer?
- Do follow up all "yes" responses to medical or injury questions ("Which leg? How did you do it? When? Did you get treatment? What did the doctor suggest? Do you still get pain? During what activities?)
- Don't presume anything. Let the client tell you.

In summary, the imperative to ascertain key information prior to ensuing programme writing is reflected in the general order of proceedings:

1. **Identify key risk factors**
2. **Identify other key medical / physical condition information**
3. **Determine information that informs programme design**
4. **Fitness assessment results (at your discretion) that may influence programming**

   **(Called programme information in the Pre-Screening Form)**

## Section 1: Important Health Information (also known as Risk Stratification)

Clearly it is important to identify key risk factors prior to compiling a new structured exercise programme. The risk stratification section is based on an internationally accepted model for assigning 'risk factor points' to either currently diagnosed conditions (for example, high blood pressure) or from correctly conducted assessment (such as lipid profile testing) results. The total points assigned then define risk. There are also 'red flag' scenarios whereby known cardiovascular, pulmonary, and/or metabolic diseases (or signs and symptoms of these diseases) will automatically signal the need for a cautious approach to exercise commencement, which needs to take place under the consultation of a medical professional. Some current international models use so-called 'negative risk factors' whereby a positive factor is cancelled out when a negative risk factor is also present. For example, if one point is assigned owing to high blood pressure but HDL cholesterol (an example of a 'negative risk factor') is in a good range, the total points would be considered 0. We have chosen not to use such a model because it potentially places the Registered Exercise Professional in a scenario where they may misguide a client by inadvertently negating a serious positive risk factor that needs medical attention.

Currently known or measured by you?

Many clients will come to you knowing about existing conditions. Many will also provide you with tests results from medical professionals such as GP's, particularly if they have been referred to you. In some cases, you may be in a position to do a quick and easy screening test for some of the measures within your own facility. Fitness instructors, for example, often assess blood pressure. Height, weight, and waist circumference (done properly) are also quick and easy screening measures. You may also have access to some devices that need only a droplet of blood from a finger prick for lipid testing, blood glucose, or perhaps HbA1c. We have included the option of using such results within the pre-screen. Follow strict and correct procedures if you are using devices that extract blood in any way. You may also choose to recommend that a client purchases a self-referred test from a laboratory such as Labtests. Many common tests are fairly inexpensive and, in such facilities, are conducted by trained professionals in laboratory settings. You can actually walk in off the street and request blood testing for many different measures. Results are typically emailed directly to the client (often within a day) so there is no breach if they choose to share them with you. The client can then choose to consult their GP if either recommended by you, or they perceive the need to pursue medical advice. Or, GP's may refer patients to testing at no extra cost (most common health measures by blood test are funded if requested by a GP).

Be very mindful of your scope of practice as a Registered Exercise Professional. You do not diagnose, only screen. If someone presents with an abnormal result your follow-up would be to refer to a medical professional for clarification. Don't tell them they have a condition, such as high cholesterol, only that the result you acquired or observed, today, is outside the medically recommended range. No more. We believe that such screening can only serve to improve awareness of underlying metabolic disease and increase client safety. It may be that your client was not aware of a poor lipid profile or abnormal glucose control, in which case you may well have done them and their GP a good service. Discretion should be applied to results. For example, if a basic blood glucose test is performed and an abnormal result is noted, don't alarm the client, just suggest a follow-up. Consider that in conjunction with other risk factors.

**Screening tests are for screening, not diagnosing.**

## Section 2: Other important conditions

This section is self-explanatory. No Registered Exercise Professional would design an exercise programme without first gaining an understanding of the status of the client regarding the conditions within this section.

## Section 3: Programming information

A key point of difference with the New Zealand REPs Pre-Screen is that rather than focus on Section 1 Important Medical Information alone, it also incorporates relevant information to ensure the design of a safe and effective exercise programme. Clearly, goals, exercise history, and availability are all critical to accomplishing this endeavor. Accordingly, we have designed a comprehensive pre-screen form that consists of these important features for your use.

## Section 4: Monitoring Progression

At your discretion you may also choose to conduct a range of assessments, appropriate to your client and your setting. Ideally, results from the assessments also inform design of your exercise programme. We have chosen some key components of fitness and common measures. Add your own as you see fit. They may also be a useful tool to use in goal setting.

## The order of the Pre-Screen form usage

Although the risk stratification (section 1 titled "Important Health Information") is the very first section, you may choose to alter the order of the pre-screen process. In summary, the imperative is to ascertain key information prior to ensuing programme writing is reflected in the general order of proceedings:

1. **Identify key risk factors**
2. **Identify other key medical / physical condition information**
3. **Determine information that informs programme design**
4. **Fitness assessment results (programming information) that may influence programming**

The intention is that the Pre-Screen form is used in a one-to-one interview style setting, so the form is essentially a template on which to compile answers given by clients. You may ask the client to complete certain sections independently, such as circling areas of injury on the figures in section 2 of the pre-screen form.

## Part A.2

# Pre-Exercise Screening Form

NZ Register of Exercise Professionals

APPROVED AND RECOMMENDED BY THE NZ REGISTER OF EXERCISE PROFESSIONALS (REPs). To be used in conjunction with the REPs New Zealand Pre-Screening Guide and associated risk stratification best practice. For use exclusively for REPs Registered Exercise Professionals only.

| Name: | Age: |
|---|---|
| Medical Provider(s) Name and Contact: | |

## SECTION 1 : IMPORTANT MEDICAL INFORMATION

| | YES | NO |
|---|---|---|
| **CARDIOVASCULAR AND PULMONARY CONDITIONS*:**<br>Diagnosed heart condition or stroke, or unreasonable leg or chest pain during exercise?<br>Blood pressure over 200/110mm/Hg (measured at time of this pre-screen)?<br>Diagnosed pulmonary disease?<br>(Exercise Professional - see note 1 below)<br>IF YOU TICK YES TO THIS QUESTION PROCEED ONLY UNDER MEDICAL GUIDANCE | | |

IF YOU TICK YES TO 2 OR MORE OF THE FOLLOWING QUESTIONS, THEN PROCEED WITH CAUTION UNDER GUIDANCE

| | | YES | NO |
|---|---|---|---|
| | **FAMILY HISTORY:**<br>Father or brother under 55 years with a history of heart disease or stroke?<br>Mother or sister under 65 years with a history of heart disease or stroke? | | |
| | **AGE:**<br>Male over 45 years?<br>Female over 55 years? | | |
| | **BLOOD PRESSURE:**<br>Over 140mm/Hg systolic or 90mm/Hg diastolic. Or, on blood pressure medication? | | |
| | **ASTHMA:**<br>Attack that required medical attention last 12 months? | | |
| | **SMOKING:**<br>Currently or quit within previous 6 months? | | |
| | **GENERAL ACTIVITY LEVEL:**<br>Currently sedentary? | | |
| | **BODY COMPOSITION (INDICATIVE):**<br>BMI ≥ 30 kg/m2 or Waist (cm) ÷ Height (cm) ratio above 0.6? | | |
| | **BONE AND JOINT:**<br>Known bone or joint problem that could be aggravated by exercise? | | |
| | **OTHER:**<br>Any other condition that may increase risk of adverse reaction to exercise? | | |
| OPTIONAL | **LIPIDS:**<br>Identified blood lipids outside recommended range<br>(Exercise professional see note 2 below): | | |
| OPTIONAL | **GLYCEMIC CONTROL:**<br>Diagnosed Type 1 or 2 diabetes<br>(Exercise Professional - see note 3 below) | | |

### NOTES FOR EXERCISE PROFESSIONAL

**1) Cardiovascular / pulmonary disorder**
Angina
Shortness of breath with mild exertion or during sleep (Dyspnea)
Dizziness during exercise (Syncope)
Ankle swelling (Edema)
Heart murmur
Unpleasant, rapid beating of heart (Palpitations / Tachycardia)
Intermittent claudication (Cramping/pain in legs unexplained)
Pulmonary disorder such as COPD, cystic fibrosis, emphysema, other

**2)) Dyslipidemia. Known result or measured at time of pre-screen:**
LDL ≥ 3.37 mmol/L
Total ≥ 5.18 mmol/L
HDL < 1.04 mmol/L
Triglycerides (TG) ≥ 1.7 mmol/L
TG/HDL ratio ≥ 4.0

**3) Glycemic control. Known result or measured at time of pre-screen:**
Glucose ≥ 5.5 mmol/L over several readings
HbA1c ≥ 40 mmol/mol

## SECTION 2 : OTHER IMPORTANT CONDITIONS

**MUSCULOSKELETAL**

Any pain or major injury to:
*(Please tick any which apply)*

- ○ Feet / Ankles
- ○ Calf / Shin
- ○ Knees
- ○ Hamstrings
- ○ Hips / Groin
- ○ Lower Back / Abs
- ○ Upper back / Ribs
- ○ Neck / Shoulders
- ○ Arm / Elbow
- ○ Wrists / Hands

○ **PREGNANT**
now or in last 12 months

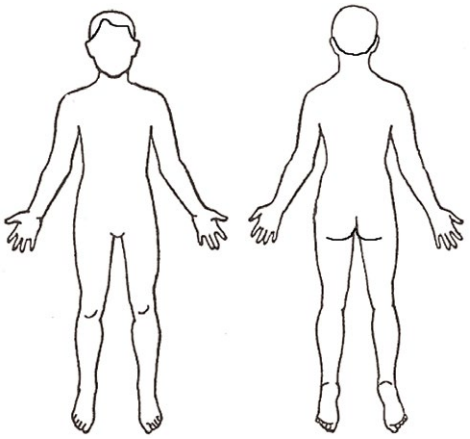
○ **EPILEPSY**

○ **ARTHRITIS**

**MEDICATIONS:**

- ○ Beta blockers
- ○ ACE inhibitors
- ○ Diuretic
- ○ Statin
- ○ Oral hypoglycemic
- ○ Other

Please circle any area that may be adversely affected by exercise:



NOTES: _____

_____

_____

Thank you for taking the time to answer the questions above. Your answers will help your REPs Registered Exercise Professional determine the best approach to help you reach your exercise goals.

**Informed Consent**

I acknowledge that that information provided above regarding my health and personal information is, to the best of my knowledge, correct. I will inform my exercise professional immediately if there are any changes in my health status.

I understand that participating in physical activity and exercise can carry a risk, and I accept all responsibility for that risk.

I understand that due care will be undertaken by my REPs Registered Exercise Professional at all times.

NAME: _____

SIGNATURE: _____

DATE: _____ / _____ / _____

## SECTION 3 : PROGRAMMING INFORMATION

| EXERCISE GOALS | |
|---|---|
| ○ Strength | NOTES |
| ○ Muscle mass increase | |
| ○ Lose bodyfat | |
| ○ Gain aerobic fitness | |
| ○ Flexibility | |
| ○ General health | |
| ○ General energy | |
| ○ Sport specific (speed etc) | |

| EXERCISE HISTORY | |
|---|---|
| CURRENT OR VERY RECENT: | NOTES |
| ○ Resistance/weight training | |
| ○ Structured aerobic exercise | |
| ○ Group exercise | |
| ○ Regular sport or recreation | |
| ○ General activity | |
| ○ Other | |
| ○ Prior exercise facility membership(s)? Reason for stopping? | |

**AVAILABILITY**

List preferred timeslots (if any) and preferred maximum duration:

| | MON | TUE | WED | THU | FRI | SAT | SUN |
|---|---|---|---|---|---|---|---|
| MORNING | | | | | | | |
| LUNCH | | | | | | | |
| AFTERNOON | | | | | | | |
| EVENING | | | | | | | |

**EXERCISE PREFERENCES**

What type of exercise(s) enjoyed previously?

What type of exercise(s) disliked previously?

## SECTION 4 : MONITORING PROGRESSION

| | RESULT | GOALS | | |
|---|---|---|---|---|
| | | By: | By: | By: |
| **MOVEMENT COMPETENCY** | | | | |
| Squat both legs | | | | |
| Squat single leg | | | | |
| Deadlift | | | | |
| Lunge | | | | |
| Row | | | | |
| Press | | | | |
| **STRENGTH** | | | | |
| Exercise 1: | | | | |
| Estimated 1 RM | | | | |
| Reps completed | | | | |
| Load used | | | | |
| Exercise 2: | | | | |
| Estimated 1 RM | | | | |
| Reps completed | | | | |
| Load used | | | | |
| **BODY COMPOSITION** | | | | |
| Weight | | | | |
| Height | | | | |
| Waist | | | | |
| BMI | | | | |
| Waist / Height Ratio | | | | |
| Estimated % fat | | | | |
| Estimated % LMM | | | | |
| Sum ____ skinfolds | | | | |
| Girths: | | | | |
| **AEROBIC** | | | | |
| Blood pressure Systolic/Diastolic | | | | |
| Estimated VO2 max | | | | |
| HR steady state | | | | |
| Workload | | | | |
| **FLEXIBILITY** | | | | |
| | | | | |
| Other | | | | |
| | | | | |

| **PROPOSED SCHEDULE:** | | | | | Based on availability, assessment results and goals: | | |
|---|---|---|---|---|---|---|---|
| | MON | TUE | WED | THU | FRI | SAT | SUN |
| MORNING | | | | | | | |
| LUNCH | | | | | | | |
| AFTERNOON | | | | | | | |
| EVENING | | | | | | | |

# Part A.3 PRE-SCREEN AND EXERCISE

## Is the pre-screen and risk stratification procedure a barrier to starting exercise?

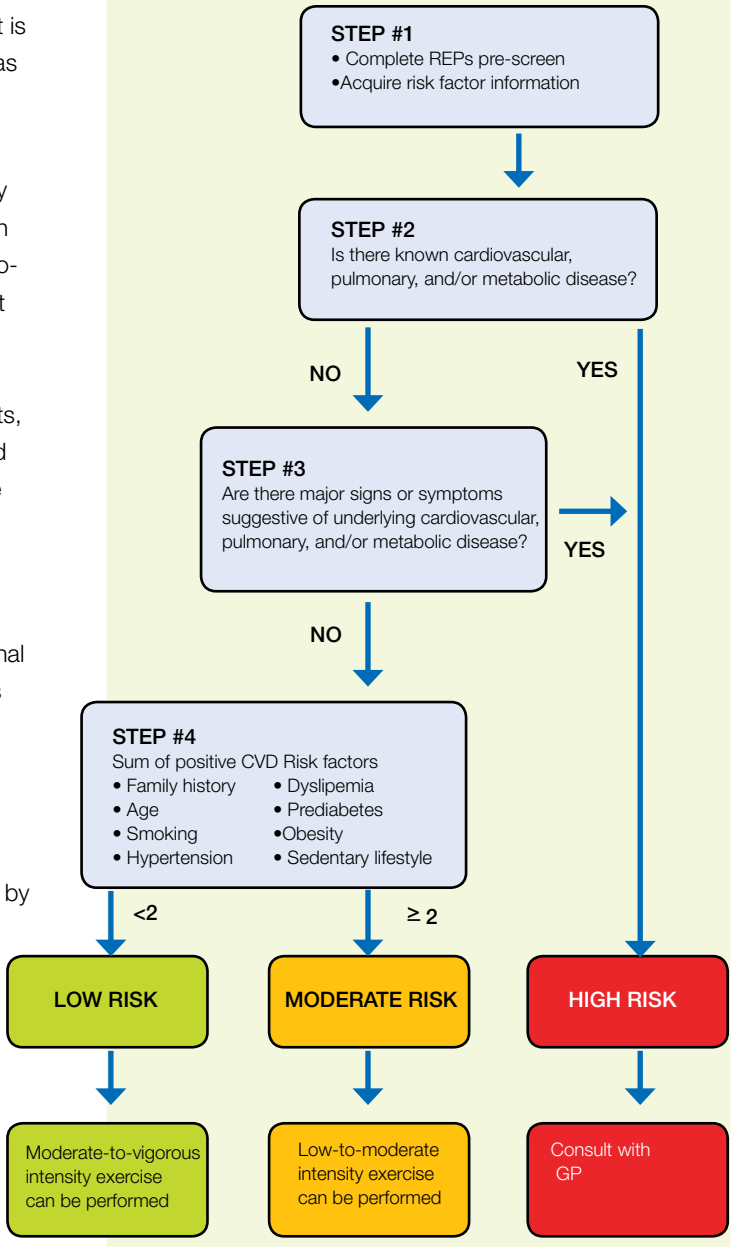
No. The most important purpose of the risk stratification procedure is to identify those individuals who may benefit from first consulting with a GP prior to initiating exercise. It is critical to highlight that this step should not be perceived as a barrier to an individual starting an exercise programme.

Research is quite clear that for most individuals the benefits of low-to-moderate intensity exercise substantially outweighs any risks. In fact, there is even greater risk of an individual remaining sedentary compared to starting low-to-moderate intensity exercise. However, for a small segment (i.e. the high risk) of the population, the risk of exercise-related events such as a heart attack or sudden death, is substantial when performing unaccustomed exercise bouts, in particular vigorous intensity exercise. It is recommended that high risk individuals consult with their GPs in advance of proceeding with an exercise programme. It may be determined that these individuals would be better suited exercising in a medically supervised programme.

You should use the REPs Pre-Screening Health Professional Referral Letter in Part F of this guide when referring clients on to other health professionals. This referral letter will ensure you obtain the relevant information and guidance from the other health professional to develop a safe and effective exercise programme.

A risk stratification flow chart presented right can be used by Registered Exercise Professionals to guide them through the risk stratification procedures.

**Risk stratification flow chart.**



# Section A.4 EXERCISE HABITS AND EXERCISE-RELATED COMPLICATIONS

## What client exercise habits place them at increased risk for an adverse exercise-related event?

Over the first few weeks of working with your client it is important to take note of their exercise habits. Do they have a tendency to increase their resistance training weights markedly without first consulting with you? Or, do they exercise vigorously on the treadmill and stop suddenly without cooling down?

These and other unhealthy exercise practices increase the risk of your client experiencing an adverse exercise-related event. Registered Exercise Professionals should correct clients in a firm but professional manner as soon as possible.
This will ensure a more safe and effective exercise programme. In turn, this will promote a greater likelihood of lifetime physical activity.

**Exercise Training Habits**

- **disregard for appropriate warm-up & cool-down**
- **consistently exceeds prescribed training HR**
- **(intensity violator)**
- **consistently exceed prescribed training weights**
- **(intensity violator)**
- **disregard correct exercise form/technique**

# Part B Case studies

## If this scenario arises how should I proceed?

In this section we review common scenarios Registered Exercise Professionals will encounter during the pre-screen process. Five separate case studies are presented. For each case study Registered Exercise Professionals should first carefully review the client profile.

**REGISTERED EXERCISE PROFESSIONALS should then perform the following:**

- **Identify the risk factors present**
- **Risk stratify the client**
- **Provide a recommended and suitable course-of-action**

# Case Study #1 - SAMPLE PRE-SCREEN FORMS

## Pre-Exercise Screening Form

REPs — NZ Register of Exercise Professionals

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| | |
|---|---|
| Name: Client Profile 1 Example | Age: 37 |
| Medical Provider(s) Name and Contact: Dr Smith, ABC Medical Centre 37 | |

### SECTION 1 : IMPORTANT MEDICAL INFORMATION

| | YES | NO |
|---|---|---|
| **CARDIOVASCULAR AND PULMONARY CONDITIONS*:** Diagnosed heart condition or stroke, or unreasonable leg or chest pain during exercise? Blood pressure over 200/110mm/Hg (measured at time of this pre-screen)? Diagnosed pulmonary disease? (Exercise Professional - see note 1 below) IF YOU TICK YES TO THIS QUESTION PROCEED ONLY UNDER MEDICAL GUIDANCE | | ✔ |

IF YOU TICK YES TO 2 OR MORE OF THE FOLLOWING QUESTIONS, THEN PROCEED WITH CAUTION UNDER GUIDANCE

| | | YES | NO |
|---|---|---|---|
| | **FAMILY HISTORY:** Father or brother under 55 years with a history of heart disease or stroke? Mother or sister under 65 years with a history of heart disease or stroke? | | ✔ |
| | **AGE:** Male over 45 years? Female over 55 years? | | ✔ |
| | **BLOOD PRESSURE:** Over 140mm/Hg systolic or 90mm/Hg diastolic. Or, on blood pressure medication? | | ✔ |
| | **ASTHMA:** Attack that required medical attention last 12 months? | | ✔ |
| | **SMOKING:** Currently or quit within previous 6 months? | | ✔ |
| | **GENERAL ACTIVITY LEVEL:** Currently sedentary? | ✔ | |
| | **BODY COMPOSITION (INDICATIVE):** BMI ≥ 30 kg/m2 or Waist (cm) ÷ Height (cm) ratio above 0.6? | | ✔ |
| | **BONE AND JOINT:** Known bone of joint problem that could be aggravated by exercise? | | ✔ |
| | **OTHER:** Any other condition that may increase risk of adverse reaction to exercise? | | ✔ |
| OPTIONAL | **LIPIDS:** Identified blood lipids outside recommended range (Exercise professional see note 2 below): | | ✔ |
| OPTIONAL | **GLYCEMIC CONTROL:** Diagnosed Type 1 or 2 diabetes (Exercise Professional - see note 3 below) | | ✔ |

**NOTES FOR EXERCISE PROFESSIONAL**

**1) Cardiovascular / pulmonary disorder**
Angina
Shortness of breath with mild exertion or during sleep (Dyspnea)
Dizziness during exercise (Syncope)
Ankle swelling (Edema)
Heart murmur
Unpleasant, rapid beating of heart (Palpitations / Tachycardia)
Intermittent claudication (Cramping/pain in legs unexplained)
Pulmonary disorder such as COPD, cystic fibrosis, emphysema, other

**2) Dyslipidemia. Known result or measured at time of pre-screen:**
LDL ≥ 3.37 mmol/L
Total ≥ 5.18 mmol/L
HDL < 1.04 mmol/L
Triglycerides (TG) ≥ 1.7 mmol/L
TG/HDL ratio ≥ 4.0

**3) Glycemic control. Known result or measured at time of pre-screen:**
Glucose ≥ 5.5 mmol/L over several readings
HbA1c ≥ 40 mmol/mol



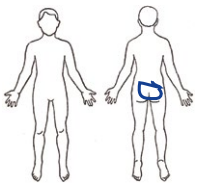
### SECTION 2 : OTHER IMPORTANT CONDITIONS

**MUSCULOSKELETAL**

Any pain or major injury to:
*(Please tick any which apply)*

- ○ Feet / Ankles
- ○ Calf / Shin
- ○ Knees
- ○ Hamstrings
- ○ Hips / Groin
- ✔ Lower Back / Abs
- ○ Upper back / Ribs
- ○ Neck / Shoulders
- ○ Arm / Elbow
- ○ Wrists / Hands

Please circle any area that may be adversely affected by exercise:



- ○ **PREGNANT** now or in last 12 months
- ○ **EPILEPSY**
- ○ **ARTHRITIS**

**MEDICATIONS:**

- ○ Beta blockers
- ○ ACE inhibitors
- ○ Diuretic
- ○ Statin
- ○ Oral hypoglycemic
- ○ Other

NOTES: Previous lower back pain (apparently lumbar spine and some sacro-illiac joint by client general description) at times when gardening and lifting for an extended period. Not currently sore. Not treated or diagnosed.

Thank you for taking the time to answer the questions above. Your answers will help your REPs Registered Exercise Professional determine the best approach to help you reach your exercise goals.

**Informed Consent**

I acknowledge that that information provided above regarding my health and personal information is, to the best of my knowledge, correct. I will inform my exercise professional immediately if there are any changes in my health status.

I understand that participating in physical activity and exercise can carry a risk, and I accept all responsibility for that risk.

I understand that due care will be undertaken by my REPs Registered Exercise Professional at all times.

NAME: Client Profile

SIGNATURE: C Profile

DATE: 1 / 9 / 14



### SECTION 3 : PROGRAMMING INFORMATION

| EXERCISE GOALS | NOTES |
|---|---|
| ✔ Strength | Enjoys some gardening notices lifting capacity diminished |
| ○ Muscle mass increase | |
| ✔ Lose bodyfat | Abdominal |
| ✔ Gain aerobic fitness | |
| ○ Flexibility | |
| ✔ General health | |
| ✔ General energy | Often feels lethargic |
| ○ Sport specific (speed etc) | |

| EXERCISE HISTORY | NOTES |
|---|---|
| CURRENT OR VERY RECENT: | |
| ○ Resistance/weight training | |
| ✔ Structured aerobic exercise | Previous gym 2 yrs ago, bike |
| ○ Group exercise | |
| ○ Regular sport or recreation | |
| ✔ General activity | Occasional gardening |
| ○ Other | |
| ✔ Prior exercise facility membership(s)? Reason for stopping? | Y 2 yrs ago for 6 mths, at local fitness centre. Got bored, lacked motivation, winter |

**AVAILABILITY**

List preferred timeslots (if any) and preferred maximum duration:

| | MON | TUE | WED | THU | FRI | SAT | SUN |
|---|---|---|---|---|---|---|---|
| MORNING | | | | | | | |
| LUNCH | | | | | | | |
| AFTERNOON | | | | | | | |
| EVENING | 45 min | | 45 min | | | 45 min | 45 min |

**EXERCISE PREFERENCES**

What type of exercise(s) enjoyed previously?

Enjoyed biking on stationary bike in gym for a "few weeks" then got bored and did not seek new programme, membership dropped off. Several years ago played some social touch. Otherwise don't know but has heard weights are good for you and some friends have recommended it.

What type of exercise(s) disliked previously?

Don't really know apart from some boredom with same cardio session repetitively.



### SECTION 4 : MONITORING PROGRESSION

| | RESULT | GOALS By: | By: | By: |
|---|---|---|---|---|
| **MOVEMENT COMPETENCY** | | | | |
| Squat both legs | OK, some lumbar flexion and thoracic extension | | | |
| Squat single leg | Poor hip hitch L noted | | | |
| Deadlift | Poor heels up and lumbar flexion | | | |
| Lunge | L knee medial deviation w hip lateral deviation | | | |
| Row | Pretty good, some shoulder elevation | | | |
| Press | Fine | | | |
| **STRENGTH** | | | | |
| Exercise 1: | | | | |
| Estimated 1 RM | | | | |
| Reps completed | | | | |
| Load used | | | | |
| Exercise 2: | | | | |
| Estimated 1 RM | | | | |
| Reps completed | | | | |
| Load used | | | | |
| **BODY COMPOSITION** | | | | |
| Weight | 85kg | 84kg, 4 wks | | |
| Height | 175m | | | |
| Waist | 84cm | 83cm, 4 wks | | |
| BMI | 27.7 | | | |
| Waist / Height Ratio | 0.48 | | | |
| Estimated % fat | | | | |
| Estimated % LMM | | | | |
| Sum ____ skinfolds | | | | |
| Girths: | Chest: Upper arm flexed: Glutes: | | | |
| **AEROBIC** | | | | |
| Blood pressure Systolic/Diastolic | 126/72 | | | |
| Estimated VO2 max | | | | |
| HR steady state | 143 BPM | 135, 4 wks | | |
| Workload | 6.2kmh, 10% incl | | | |
| **FLEXIBILITY** | | | | |
| | | | | |
| Other | | | | |
| | | | | |

**PROPOSED SCHEDULE:** Based on availability, assessment results and goals:

| | MON | TUE | WED | THU | FRI | SAT | SUN |
|---|---|---|---|---|---|---|---|
| MORNING | | | | | | | |
| LUNCH | | | | | | | |
| AFTERNOON | | | | | | | |
| EVENING | Wts upper/ aerobic combo | | Wts upper/ aerobic combo | | | Wts upper/ aerobic combo | |

## Case Study #1

A sedentary and non-smoking 37-yr old male comes to your facility hoping to start a moderate-intensity exercise programme. Part of the baseline assessments at your facility includes submaximal cardiorespiratory and muscular fitness testing. His health history questionnaire indicates he has no personal or family history of heart disease. You obtain a waist-to-height ratio and BP at your facility whilst sending him off to a test centre for blood work. Below are the measures obtained:

TC = 5.09 mmol/L

LDL = 3.03 mmol/L

HDL = 0.92 mmol/L

TG = 4.39 mmol/L

waist-to-height ratio = 0.48

BP = 126/72 mmHg

FBG = 7.26 mmol/L

### Worksheet:

Risk factor(s) present:

- ✔ Sedentary
- ✔ Dyslipidaemia (TG/HDL ratio ≥ 4.0)
- ✔ Impaired fasting blood glucose (elevated FBG) - technically above the threshold for diabetes (a metabolic disease)

Risk stratification:

- ✔ 2 points. Moderate, possibly high risk given FBG test but only on this one occasion. Needs follow-up to confirm result.

Recommended course-of-action:

- ✔ Proceed with caution and the client should be referred to GP for exam given the metabolic profile. In particular, the FBG value is suggestive of possible diabetes - a known metabolic disease

## Case Study #2

An active and non-smoking 57-yr old female has entered your facility and would like to begin exercising more vigorously, including high intensity resistance training circuit classes. The only testing consists of height and weight. Her pre-screen paperwork reflects no personal or family history of heart disease. A copy of her most recent physical reveals the following information:

TC = 4.53 mmol/L

LDL = 2.87 mmol/L

HDL = 1.34 mmol/L

waist-to-height ratio = 0.42

BP = 126/74 mmHg

HbA1c = 32 mmol/mol

### Worksheet:

Risk factor(s) present:

Risk stratification:

Recommended course-of-action:

## Case Study #3

A sedentary and non-smoking female (46yrs) comes to your facility to start a moderate-intensity aerobics class. Her health history questionnaire indicates she has no personal history of heart; however, she reports some shortness of breath the last several months when climbing stairs. Additionally, her pre-screen reflects that both her father and mother died of heart attacks in their mid-forties. A copy of her most recent physical reveals the following information:

TC = 4.68 mmol/L BMI = 22.1 kg/m2

LDL = 2.53 mmol/L BP = 146/94 mmHg

HDL = 1.45 mmol/L HbA1c = 24 mmol/mol

### Worksheet:

Risk factor(s) present:

Risk stratification:

Recommended course-of-action:

## Case Study #4

A sedentary, non-smoking male (42yrs) comes to your facility to start an exercise programme. His pre-screen indicates he has no personal or family history of heart disease. You obtain the following assessment values at your facility during the pre-screen process:

Lipid profile:

TC = 5.38 mmol/L

LDL = 3.47 mmol/L

HDL = 1.42 mmol/L

TG = 1.30 mmol/L

BMI = 33.2 kg/m2

BP = 128/76 mmHg

FBG = 5.35 mmol/L

### Worksheet:

Risk factor(s) present:

Risk stratification:

Recommended course-of-action:

## MODEL RESPONSES for Each Client Case Study

| **Case Study #1** | |
|---|---|
| Risk factor(s) and/or,<br>Signs & Symptoms and/or;<br>Disease(s) present: | ✔ Sedentary<br>✔ Dyslipidaemia (TG/HDL ratio ≥ 4.0)<br>✔ Impaired fasting blood glucose (elevated FBG) –<br>technically above the threshold for diabetes (a metabolic disease) |
| Risk stratification | ✔ High risk |
| Recommended course-of-action | ✔ Proceed with caution and the client should be referred to GP for exam given the metabolic profile. In particular, the FBG value is suggestive of possible diabetes – a known metabolic disease. |
| **Case Study #2** | |
| Risk factor(s) and/or,<br>Signs & Symptoms and/or;<br>Disease(s) present: | ✔ Age (female ≥ 55 yr) |
| Risk stratification | ✔ Low risk |
| Recommended course-of-action | ✔ The client should be safe to progress with vigorous-intensity exercise. The only risk factor present is age. All other measures fall within normal ranges. |
| **Case Study #3** | |
| Risk factor(s) and/or,<br>Signs & Symptoms and/or;<br>Disease(s) present: | ✔ Sedentary<br>✔ Hypertension (SBP ≥140 and/or DBP ≥ 90 mmHG)<br>✔ Family history of heart disease<br>Shortness of breath with exertion |
| Risk stratification | ✔ High risk |
| Recommended course-of-action | ✔ The client should be referred to GP for exam. The individual has 3 risk factors, including a strong family history; and reports shortness of breath with exertion – this is a sign & symptom of underlying cardiovascular or pulmonary disease. |
| **Case Study #4** | |
| Risk factor(s) and/or,<br>Signs & Symptoms and/or;<br>Disease(s) present: | ✔ Sedentary<br>✔ Dyslipidaemia (elevated total cholesterol and LDL cholesterol)<br>✔ Obesity (BMI ≥ 30 kg/m2) |
| Risk stratification | ✔ Moderate risk |
| Recommended course-of-action | ✔ The client can proceed with moderate-intensity exercise. If client wishes to participate in vigorous-intensity exercise it may be prudent to refer the individual to a GP prior. |

# Section C.1 PURPOSE OF THE PRE-SCREEN

## Why is pre-screening performed?

Exercise training will be relatively safe for the majority of clients, even those with multiple chronic conditions, provided that appropriate assessment and screening is performed prior to beginning the programme (23). The likelihood of an adverse event, although not entirely preventable, can be markedly reduced with baseline assessments, risk stratification, and patient education (1).

It is likely individuals with multiple chronic conditions will be stratified into a high-risk category and therefore require GP clearance and consent to participate in an exercise programme. Importantly, clients and Registered Exercise Professionals alike should inquire with their medical team about any specific limitations to be aware of when designing the exercise programme. The pre-screen process will also help identify central problems that can prove useful in designing the exercise programme and recognising limitations. For example, a hypertensive individual taking a medication may require a careful cool down after each and every exercise session or they may become lightheaded.

## What are the main goals of the pre-screening procedure?

Prior to designing and implementing an exercise programme, it is essential for Registered Exercise Professionals to acquire as much information as possible about the client. Accomplishing each of the following goals will increase the likelihood of a safe and effective exercise programme:

- **Identify goals of the exercise programme**
- **Identify those at increased risk for either disease and/or event based on the presence of risk factors**
- **Identify persons with significant existing disease**
- **Identify individuals with other special needs**

# Section C.2 ESTABLISHING PROGRAMME GOALS

## How can Registered Exercise Professionals best assist clients prioritise goals?

An initial and considerable challenge facing Registered Exercise Professionals at the beginning of a partnership with a new client is to assist them in successfully prioritizing the goals for the exercise programme. Simply put – what should the primary objectives of an exercise programme be for most clients? Undoubtedly every client will have different outcomes in mind when desiring to become more active, however; because CVD has been the most pressing health problem in New Zealand for the last 50 years it is logical that most adults engage in exercise programmes aimed at reducing the risk of CVD development and CVD mortality. To accomplish this goal it is paramount to understand how those risk factors that contribute to the process of CVD development and mortality are positively modified with exercise training.

## What are the major CVD risk factors that can be positively modified with exercise?

Major risk factors for CVD include low levels of cardiorespiratory fitness, dyslipidemia (for example, elevated low density lipoprotein – LDL cholesterol and low high density lipoprotein – HDL cholesterol), hypertension, Type 2 diabetes mellitus (T2DM), and obesity (5). Registered Exercise Professionals should make every effort to acquire baseline measurements of all these parameters for each client. Subsequently, the obtained values can be evaluated for whether or not any of the risk factor numbers place the client in an elevated risk category. If so, positive changes to those specific risk factors should be a primary exercise programme outcome. REGISTERED EXERCISE PROFESSIONALS should also understand how much improvement is expected for each parameter and how long it will take.

**• Cardiorespiratory fitness**

Cardiorespiratory fitness has been coined the ultimate health outcome (13), and for good reason; it has been shown that low cardiorespiratory fitness accounts for more deaths in both men and women than any other CVD risk factor (5). The good news is that low cardiorespiratory fitness is exceptionally modifiable. In fact, improvements in fitness will likely be more pronounced when compared to other risk factors! Research has reported that following three months of aerobic training the typical improvement in cardiorespiratory fitness can be expected to be between 10-30%. These changes pay big dividends in terms of long term health as the literature suggests a 15% reduction in mortality for a 10% improvement in cardiorespiratory fitness (11).

**• Hypertension**

Next to low cardiorespiratory fitness hypertension has been implicated in the second highest number of overall deaths amongst American adults according to one study (5). Research has shown an inverse relationship between exercise and blood pressure levels. Accordingly, it is to be expected that engaging in a regular exercise programme will confer benefits in terms of blood pressure reduction. If truth be told, no other health outcome, compared to blood pressure, benefits nearly as quickly from performing exercise. A single, acute bout of moderate intensity exercise can lower systolic blood pressure by 5-7 mmHg for up to a remarkable 22 hours following the completion of the exercise session (3). Interestingly, the chronic benefits from exercise training in terms of blood pressure reduction are less pronounced with the literature reporting a decrease of 3mmHg and 2 mmHg in systolic and diastolic blood pressure, respectively after anywhere between one to six months of aerobic training (12). Although these changes appear rather unassuming, it has been demonstrated that blood pressure decreases of as little as 2 mmHg are associated with a 6% decrease in stroke mortality and a 4% decrease in coronary artery disease (7).

**• Obesity**

The number one goal for many clients initiating an exercise programme is to lose weight. Given both the widespread prevalence of obesity and the fact that excessive fat mass is associated with a myriad of unhealthy conditions this is an admirable target. Regrettably, clients frequently establish weight loss goals which are incongruent with what the scientific literature suggests are likely to occur with exercise training. Comprehensive reviews, focused on the topic of weight loss and exercise, report weight reductions of approximately 0.5 to 1.4 kg with 4 months of training (22). Yet, for the Registered Exercise Professional, it is of absolute importance that they clarify to their clients that these relatively modest changes bestow important overall health benefits. A number of studies have linked substantial improvements to various chronic disease risk factors, including low cardiorespiratory fitness, insulin resistance, and low HDL cholesterol, with weights loss reductions of only 2 to 3% (9).

**• Type 2 Diabetes**

T2DM is currently an epidemic that is projected to worsen; it has been estimated that 300,000 New Zealanders have T2DM (26). Heart disease death rates are two to four times higher in those with T2DM compared to those without the metabolic condition (14). The hallmark benefits of regular exercise in those with T2DM include increased insulin sensitivity, decreased HbA1C, and reduced insulin requirements. Chronic aerobic training over two to 12 months has been reported to decrease HbA1C levels by 0.6% (8). This reduction is clinical significant for T2DM clientele and has been linked with a 22% reduction in microvascular complications and 8% reduction in rate of myocardial infarctions. In nondiabetics regular exercise also provides important benefits in terms of maintaining normal insulin sensitivity and blood glucose control. For example, it has been reported that two months of aerobic exercise training reduces fasting blood glucose levels by 0.15 mmol/L (15).

**• Dyslipidemia**

Dyslipidemia refers to abnormalities in the blood lipid and lipoprotein profile of which elevations in total cholesterol, LDL cholesterol, and triglycerides, along with low HDL cholesterol, are characteristic features. These parameters may be modified with regular exercise. Three months of aerobic training has been linked to increases in HDL cholesterol of 0.05 – 0.2 mmol/L (10). Likewise, regular exercise over similar time periods results in LDL cholesterol reductions between 3-10% (17, 30). Total cholesterol and triglycerides can also be attenuated following several months of regular exercise; typical decreases in total cholesterol are 4-20% while triglycerides are lowered by 0.13 – 1.0 mmol/L (10). These positive modifications to the lipid profile yield important overall health benefits. It has been estimated that for every 0.02 mmol/L increase in HDL cholesterol, the risk of a CHD event is reduced by 2 to 3% (27). Moreover, it has been purported that for every 1% decrease in LDL cholesterol there is a corresponding 1% reduced risk for significant heart disease events (24). Similarly, each 1% reduction in total cholesterol levels has been associated with a 2% decrease in CVD rate (25). Research has indicated that the above-mentioned modifications are most likely to be seen in HDL and triglycerides, while the adaptations in total cholesterol and LDL cholesterol are not as universal.

## The expected change, timeline, and meaningfulness for key health outcomes

| Health outcome | Expected change | Timeline | Meaningfulness |
|---|---|---|---|
| Cardiorespiratory fitness | 10-30% | 3 months | 10% VO2max = 15% risk of mortality |
| Systolic blood pressure | 3 mmHg | 1-6 months | 2mmHg SBP = 6% stroke mortality and 4% CHD |
| Diastolic blood pressure | 2 mmHg | 1-6 months | No data available |
| Weight loss | 0.5-1.4kg | 4 months | 2-3% weight = improvements in other risk factors |
| Fasting blood glucose | 0.33 mmol/L | 2 months | No data available |
| HbA1c | 0.6% | 2 - 12 months | 0.6% HbA1c = 22% microvascular complications and 8% reduced rate of MI |
| Total cholesterol | 4-20% | 3-6 months | 1% TC = 2% CVD rates |
| LDL cholesterol | 3-10% | 3 - 6 months | 1% LDL = 1% risk of CHD event |
| HDL cholesterol | 0.05-0.2 mmol/L | 3 -6 months | 0.02 mmol/L HDL = 2-3% risk of CHD event |
| Triglycerides | 0.05-0.4 mmol/L | 3-6 months | No data available |

**It is paramount that Registered Exercise Professionals assist their clients with establishing attainable goals. Understanding the expected change in key health outcomes and the expected timeframe to achieve these adaptations will result in the most realistic and triumphant result.**

# Section C.3 RISK FACTORS AND SIGNS/SYMPTOMS OF DISEASE

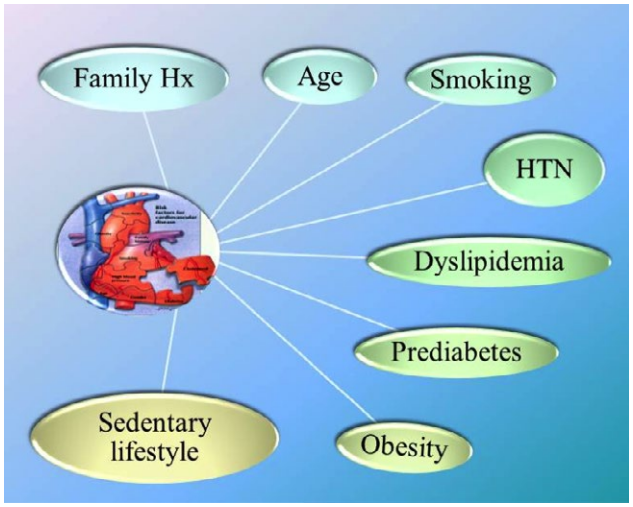
## How can clients at increased risk for either disease and/or event be identified?

Clients with positive risk factors for cardiovascular disease are at increased risk for ultimately developing cardiovascular disease and/or experiencing an exercise-related cardiac event. Positive risk factors are elements that contribute towards disease profession. Similarly, clients with known signs and/or symptoms of cardiovascular, pulmonary, and/or metabolic disease are at increased risk of an exercise-related cardiac event or other complication.

i. Positive risk factors for cardiovascular disease are

ii. Common signs and symptoms of cardiovascular, pulmonary, and metabolic disease. These individuals will require medical referral and clearance before commencing exercise.

### Positive Risk Factors for Cardiovascular Disease





### Common signs and symptoms of Cardiovascular, Pulmonary, and Metabolic Disease.

- Pain or discomfort in chest, arm, neck, jaw (ischemia)
- SOB at rest or w/ mild exertion
- Dizziness or syncope
- Orthopnea or paroxysmal nocturnal dyspnea
- Ankle edema
- Palpitations or tachycardia
- Intermittent claudication
- Known heart murmur
- Unusual fatigue or SOB with usual activities

# Section C.4 CRITERIA FOR CARDIOVASCULAR DISEASE RISK FACTORS

## What are the defining criteria for the positive cardiovascular disease risk factors?

The presence of positive cardiovascular disease risk factors (listed below) provides a framework for risk stratifying clients. The overall number of positive risk factors should be totalled. In the event there is no available information for a specific positive cardiovascular disease risk factor it has been recommended elsewhere (1) to assume the worst case scenario and count the risk factor.

### Defining criteria for positive cardiovascular disease risk factors.

| | |
|---|---|
| Family history | • MI, coronary revascularization, or sudden death:<br>✔ before 55 yr in father or 1o male relative<br>✔ before 65 yr in mother or 1o female relative |
| Age | ✔ Men ≥ 45yr<br>✔ Women ≥ 55yr |
| Smoking | • Current smoker or quit within previous 6 months |
| Hypertension | • BP ≥ 140 mmHg SBP and/or ≥ 90 mmHg DBP<br>✔ on 2 occasions<br>✔ or on antihypertensive medication |
| Dyslipidemia | • HDL < 1.04 mmol/L (40 mg/dL) or<br>• LDL ≥ 3.37 mmol/L (130 mg/dL) or<br>• Triglycerides (TG) ≥ 1.7 mmol/L or<br>• TG/HDL ratio ≥ 4.0 or<br>• On lipid lowering meds<br>• TC ≥ 5.18 mmol/L (200 mg/dL ) *only use if all that is available |
| Prediabetes | • Fasting BG ≥ 5.50 mmol/L (100 mg/dL) on 2 occasions<br>• HbA1c ≥ 40 mmol/mol |
| Obesity | • BMI ≥ of 30 kg/m2<br>✔ waist >102 cm for men, >88 cm for women<br>✔ waist-to-height ratio: ≥0.60 |
| Sedentary lifestyle | • no regular exercise programme<br>✔ do not meet minimal PA recommendations<br>✔ < 30 min mod-intensity; < 3 days/wk; < 3 months |

# Section C.5 RISK STRATIFICATION

## How can healthy history and risk factor information be used to risk stratify clients?

Upon obtaining a completed REPs pre-screen and measures of positive cardiovascular disease risk factors Registered Exercise Professionals are in a position to risk stratify new clients into one of 3 classifications:

- Low risk
- Moderate risk
- High risk

The criteria for each of these classifications is as follows:

**Low risk** - individuals who are asymptomatic with no diagnosed disease and have no more than one major CVD risk factor

**Moderate risk** - Individuals who are asymptomatic with no diagnosed disease and have two or more major CVD risk factors

**High risk** - Those with known cardiovascular, pulmonary, or metabolic disease or have one or more signs/symptoms suggestive of cardiovascular or pulmonary disease

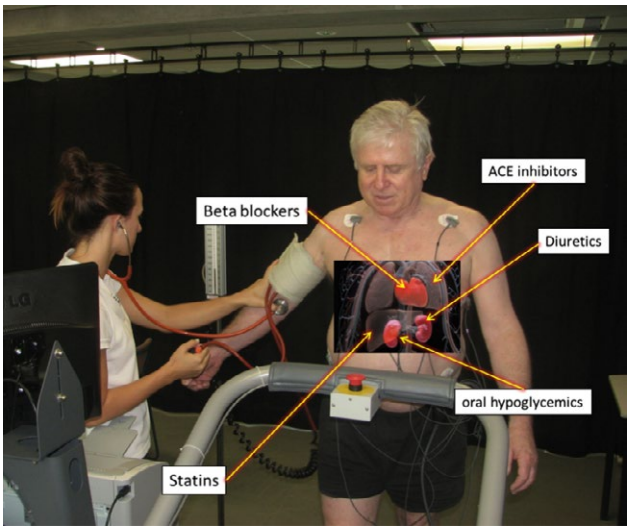
# Section D EXERCISE-MEDICATION INTERACTIONS

## My client is taking medication – what do I need to know?

**Opening**

Thousands of New Zealanders currently take prescribed medications in an effort to manage various chronic diseases. It is paramount for Registered Exercise Professionals to gain a better understanding of the effects these common medications can have on the exercise response. This next section will provide a basic understanding of 5 common medications clients may be taking, how they affect exercise, and modifications required to the exercise programme.

### The location of the targeted effect of common medications.




## Common medication #1: Beta blockers

**Mechanism of action:**

Beta blockers are commonly prescribed medications for hypertension and heart disease. Beta blockers function by preventing the binding of epinephrine to receptors in the heart. This results in both decreased resting and exercise HR and BP values. Commonly prescribed beta blockers include atenolol and metoprolol.

**Interaction between medication and exercise response:**

The therapeutic effect provided by beta blockers also means an altered physiological response to exercise. Beta blocker treatment blunts the usual increases in HR and BP corresponding to higher exercise intensities/workloads. Beta blockers can also cause glucose intolerance in diabetics by masking the symptoms of hypoglycemia.

**Modifications required in the exercise programme:**

The fact that beta blockers reduce the HR response to exercise means traditional methods for establishing target HR (e.g., peak HR method or HR reserve method) are likely to be invalid. The most important modification required of the exercise programme for individuals taking a beta blocker is use of an alternative method for setting target intensity. The RPE scale is an excellent option. Registered Exercise Professionals should also strongly encourage diabetic patients whom are also prescribed beta blockers to regularly check blood glucose values with their glucometers prior to exercise to ensure levels are in a safe range.

## Common medication #2: ACE inhibitors

**Mechanism of action:**

An ACE inhibitor is a medication primarily used for the treatment of hypertension. Common ACE inhibitors include captopril, enalapril, and lisinopril. ACE inhibitors reduce the activity of the complex renin-angiotensin-aldosterone system. Simply put, ACE inhibitors block the conversion of angiotensin I to angiotensin II primarily in the lungs. The molecule angiotensin II is a potent vasoconstrictor of blood vessels. Therefore, reduced production of this molecule results in relaxation of the blood vessels and lower blood pressure values.

**Interaction between medication and exercise response:**

Individuals on ACE inhibitor medication have both lower resting and exercise blood pressure values. However, it is the interaction between ACE inhibitors and the postexercise blood pressure response that requires added attention from Registered Exercise Professionals. An acute beneficial response to exercise is a phenomenon known as postexercise hypotension whereby systolic blood pressure values can be reduced by 10-20 mmHg for up to 9 hours after the conclusion of exercise. The concern for individuals taking ACE inhibitors is that the combination of the reduction in blood pressure from the medication coupled with the natural-occurring postexercise hypotension can result in excessive reductions in blood pressure. This can lead to untoward events such dizziness and in rarer instances syncope (i.e., temporary loss of consciousness).

**Modifications required in the exercise programme:**

Registered Exercise Professionals should strongly encourage a gradual cool down of 5-10 minutes of light aerobic activity that will assist the body to return to homeostasis and prevent excessive reductions in blood pressure.

## Common medication #3: Diuretics

**Mechanism of action:**

Diuretics are another class of medications commonly used for the treatment of hypertension. One of the most common types of diuretics is HCTZ. Diuretics act on the kidney and lead to increased urine output. An up-regulation in urine excretion in turn leads to a lower plasma volume thereby lowering blood pressure.

**Interaction between medication and exercise response:**

In a similar manner to ACE inhibitors individuals on diuretics will have both lower resting and exercise blood pressure values. And, in a related manner, a principle concern for individuals taking ACE inhibitors is that the combination of the reduction in blood pressure from the diuretics coupled with the natural-occurring postexercise hypotension can result in excessive reductions in blood pressure.

**Modifications required in the exercise programme:**

Clients on diuretics should be encouraged to perform a gradual cool down after all exercise sessions. Additionally, Registered Exercise Professionals should encourage clients taking a diuretic to perform a daily weight check. This measure will ensure that the prescribed dosage of diuretic is continuing to have its efficacious physiological benefits. A sudden change in weight of a few kilograms can help alert clients that something may be amiss and that communication with their GP could be warranted.

## Common medication #4: statins

**Mechanism of action:**

Statins are the most common medication prescribed for high cholesterol. Statins function by inhibiting a key enzyme involved in the production of cholesterol in the liver. Common statins include lipitor, zocor, and pravachol.

**Interaction between medication and exercise response:**

Caution is advised when exercise is performed by individuals taking statins. Although not common there are occasional instances where statins are associated with exertional rhabdomyolysis. Rhabdomyolysis is a condition in which damaged muscle disuse breaks down and releases cellular content (e.g., protein myoglobin) into the blood. These products can be harmful to the kidney. The incidence of exertional rhabdomyolysis is higher in de-conditioned individuals performing high-intensity exercise, most notably resistance training and eccentric exercises. The condition is also likely to be worsened if the high-intensity exercise is also performed in hot and/or humid environments.

**Modifications required in the exercise programme:**

There are several preventative measures Registered Exercise Professionals can practice to avoid exertional rhabdomyolysis:

1. All exercise programming (aerobic and resistance training) should begin at low-intensity and progress gradually.
2. Registered Exercise Professionals should be vigilant to the signs and symptoms of exertional rhabdomyolysis. These may include muscle stiffness and/or pain, fatigue, and dark coloured urine.
3. Clients should always be encouraged to remain hydrated and exercise at cooler ties of the day (if outside).

## Common medication #5: oral hypoglycemics

**Mechanism of action:**

Oral hypoglycemics are a class of medications commonly prescribed for individuals with T2DM. There are three major groups of oral hypoglycemics used to control blood glucose: 1) ß-Cell stimulants for insulin release, 2) drugs to improve insulin sensitivity, and 3) drugs that decrease intestinal absorption of carbohydrates. ß-Cell stimulants function by inciting insulin release from the pancreas. These medications are taken with meals and help alleviate excessive increases in post-meal blood glucose levels. The latter two oral hypoglycemic categories have little effect on the exercise response. A few common ß-Cell stimulants include glipizide and glyburide.

**Interaction between medication and exercise response:**

The transport of glucose from the blood into the muscle cell is facilitated by the transporter protein GLUT-4. These transporter proteins respond to two signals – insulin and exercise. Because of the insulin stimulation from ß-Cell stimulants, when combined with exercise, there is increased potential for hypoglycemia (i.e., low blood glucose).

**Modifications required in the exercise programme:**

The most important modification to the exercise programme for those clients' prescribed oral hypoglycemics is frequent monitoring of blood glucose values. It should be noted that it is not the responsibility of the exercise professional to check blood glucose values. Rather, the client should bring their own glucometer and glucose strips which should have been prescribed by a physician or endocrinologist.

**Key take home message**

**The combination of an aging New Zealand population along with the widespread prevalence of various chronic diseases heightens the chances that the next client coming to you for exercise guidance will also be taking a prescribed medication. This section highlighted how common medications influence the exercise response. Key modifications required of the exercise programme to accommodate interactions between medications and the exercise responses were also identified.**

# Section E THE PRE-SCREEN TO EXERCISE PROGRAMME TRANSITION

## Will more of my clients be healthy or persons with multiple chronic diseases?

In 2011/2012 just over half (54%) of New Zealanders met national physical activity recommendations (31). Older New Zealanders are currently both the least physically active and the most rapidly growing of any age group. Physical inactivity is associated with numerous unhealthy conditions, including obesity, hypertension, T2DM, and CVD (4). Moreover, the presence of specific chronic conditions can lead to an even greater propensity of comorbidities. For instance, almost all clients with diabetes have at least one other chronic condition and nearly half have 3 or more comorbidities (32). The prevalence of common chronic and clinical populations is displayed in the table below. Collectively these factors make it increasingly likely that Registered Exercise Professionals will be interacting with clientele other than apparently healthy adults. Although there are exercise programming guidelines for older adult and various chronic-diseased populations, these recommendations exclusively address each group separately. This is unfortunate because rarely does a client possess only one chronic condition; rather it is much more likely that they will have multiple conditions (co-morbidities). This section will explain critical measures that can be taken to successfully break down complex cases into simple ones and ultimately lead to safer and more effective exercise programme outcomes.

**Prevalence of common chronic and clinical populations.**

| Condition | Prevalence |
|---|---|
| Arthritis | 15% of adults (15 and older) |
| Asthma | 11% of adults |
| Cardiac heart disease | 200,000 adults |
| Hypertension | 31% of adults |
| Chronic Pain | 16% of adults |
| Metabolic Syndrome | 13-67% (40-79) |
| Obesity | 28% of adults |
| Type 2 Diabetes | 5% of adults |

*modified from references (29, 31)

## How can exercise programming for complex clients be made more manageable?

Presently, both the New Zealand Heart Foundation (26) and Ministry of Health (31) list sedentary lifestyle as a controllable risk factor for many chronic health conditions. Accordingly, exercise is a common therapeutic intervention strategy for clients with comorbidities. Next, the complex scenario of designing an exercise programme for persons with multiple chronic conditions is broken down into four simple and manageable steps.

### Step #1

To fully appreciate the arduous task of working with individuals with multiple chronic conditions, it is paramount to recognise that the presence of these comorbidities may serve as competing demands on client's self-management resources, thus reducing the time and energy an individual has remaining to devote to each and every condition (6). Accordingly, these individuals will require additional guidance and resources to ensure that other conditions are managed effectively. An individual with a severe and symptomatic condition, such as heart failure, will likely have considerable difficulty managing other conditions (e.g., T2DM). In these circumstances, a severe limitation should not preclude the exercise professional from designing a routine that targets each individual condition (18).

The exercise professional may need to be creative in modifying the routine to sufficiently accommodate limiting factors, yet ensure thresholds for frequency, intensity, and time are also met to elicit positive training effects. Individuals with multiple comorbidities may possess conditions (e.g., low back pain, lupus, osteoarthritis, fibromyalgia) that fluctuate significantly from day-to-day in terms of severity. Exercise professionals must be prepared to accommodate an ever-changing chronic condition landscape with these types of clients and constantly adjust the session to best serve the client on any given day. Clients with comorbidities will require a high degree of monitoring to ensure proper adherence of the established exercise regimen and to determine that the physiological responses to each session are normal. Exercise professionals should be knowledgeable of, and able to educate clients on, the potential signs that would warrant the termination of exercise.

The last point to understand concerning exercise programme design for clients with multiple conditions is vital. Although exercise can be applied as powerful therapeutic intervention, there are certainly reasonable limitations to its overall effectiveness with each condition. There is powerful evidence for a favourable relationship between exercise volume and numerous conditions, including risk of coronary artery disease mortality, obesity, dyslipidemia, Type 2 diabetes, and colon cancer (1, 20, 28). On the other hand, conditions such chronic obstructive pulmonary disease, Alzheimer's disease, and chronic low back pain, just to list a few, may not see a marked improvement as a result of the exercise (19).

### Step #2

A critical shortcoming to our overall current healthcare model for the management of chronic conditions is that the treatment has historically been approached in a singular fashion. For example, an Endocrinologist might provide recommendations for a diabetic, while a Rheumatologist can provide guidance to an arthritic patient; yet it would be rare for either medical professional to make note of the concurrent chronic condition when devising a therapeutic intervention. In fact, it has been noted that patients infrequently receive guidance from medical professionals on prioritizing and managing multiple chronic conditions (18). It is important to recognize that this philosophy also extends to current exercise guidelines for chronic conditions. As is summarized in Table 1, the exercise prescription guidelines for common chronic conditions are presented in a separate and uniform manner (1). Given the strong likelihood that your client will possess multiple chronic conditions, exercise professionals must be prepared to meet the challenge of developing a suitable comprehensive exercise programme that addresses each of the client's chronic conditions.

A requisite task is to initially create two separate lists, which prioritise the chronic conditions of a client in terms of 1) long-term mortality risk and 2) symptom limiting. The chronic condition topping the list in terms of mortality risk should ideally be the primary focus of the exercise programme. For example, an individual with heart disease, osteoporosis, and arthritis should be most concerned about management of the heart disease. Epidemiological data clearly shows an individual is more likely to die from heart disease compared to the two other chronic conditions (21). Yet a primary focus on the management of the heart disease in this instance should not be misinterpreted to mean a singular and exclusive focus on only that condition. The exercise programme similarly needs to also be formulated with the aim of positively modifying each of the other two conditions. Concurrent to designing an exercise programme based upon the 'long-term mortality risk' list, is also the requirement for adjusting parameters of the training routine in accordance with the 'symptom limiting' list. As previously mentioned, there will undoubtedly be occasions where an individual's unstable condition (e.g., arthritis) dictates that the exercise session or programme revolves around the limiting symptom(s). For instance, although specific weekly energy expenditure volume and exercise intensity

thresholds must be surpassed to positively modify coronary heart disease (1), these limits may be unattainable amid an arthritic flair-up. In view of these circumstances, the exercise professional may elect to amend the routine in various manners, including decreasing the exercise volume and/or intensity, altering the exercise modality from land- to water-based, or rescheduling the exercise session to another day when the symptoms are less restrictive.

**How important is it to improve muscular fitness?**

A balanced and comprehensive exercise programme should not consist of aerobic training exclusively, but also resistance training exercises. Importantly, over the past 10 years there has been a wealth of research highlighting the various health benefits of regular resistance training to improve muscular fitness, including enhanced functional capacity, positive cardiometabolic profile, lowered risk of cardiac events, and reduced risk of mortality from all causes (2). The fact that resistance training can positively modify body composition (i.e., improved muscle mass and reduced fat mass) makes it an important strategy for the prevention and treatment of metabolic syndrome. Further, regular resistance training helps preserves bone mass as individual's age, thus reducing the risk of one developing osteoporosis later in life. Moreover, it is well recognised that one of the most important factors involved with good balance is optimal muscle strength. As such, regular resistance training that improves and/or maintains muscle strength will help preserve balance, especially as one ages. This in turn will play an important role in reducing the risk of falls. Overall, there is strong scientific evidence to support the numerous health benefits of a structured and progressive resistance training programme.

## Step #3

In general, the exercise prescription for individuals with comorbidities can follow the FITT framework. The table below summarizes the basic evidence-based guidelines for common clinical populations. This resource can assist with establishing the basic parameters of the exercise prescription around the various conditions of an individual.

Let's consider an individual who has arthritis, dyslipidemia, hypertension, and T2DM. As highlighted in the previous section there are different strategies to establishing the overall exercise programme. One guideline to employ when designing the programme is to follow the specific exercise prescription for the chronic condition that poses the greatest risk of mortality for the individual. In this instance, Type 2 diabetes is generally considered to increase the risk for heart disease and all-cause mortality (33) more so than the other conditions. Concomitantly, the other chronic conditions and specific limiting symptoms must also be carefully considered when formulating the programme. In this instance, the frequency and time parameters of the exercise prescription for each condition is comparable. Yet, there are some marked differences in the exercise intensity recommendations between conditions. While both moderate (64% to <77% HRmax) and vigorous (77% to <90% HRmax) exercise intensity are recommended in obesity and T2DM populations, as can be noted from Table 5.2, vigorous intensity exercise is not recommended for either hypertensive or arthritic populations. Therefore, it would be prudent for the exercise professional to adopt the exercise prescription for T2DM in this scenario, provided the exercise intensity was restricted to a moderate category.

An alternative strategy is to use the exercise prescription guidelines for a single chronic condition that proves to be the most limiting of the multiple conditions for each client. In particular this approach is warranted when the client is symptomatic or the condition is not stable. Arthritis is characterized by periodic episodes of acute inflammation. Pain and discomfort are common throughout these flares, and without sufficient caution, exercise can actually exacerbate the symptoms (1). Under these circumstances it would be ill-advised to pursue the exercise prescription guidelines for T2DM despite it topping our greatest risk for mortality list. On the contrary, an exercise prescription resembling the guidelines for arthritis recommended would be more suitable.

### The exercise prescription for common chronic and clinical populations

| Condition | Frequency | Intensity | Time |
|---|---|---|---|
| Arthritis | 3-5 days/wk | 64% to <77% HRmax | 20-30 min/day |
| Cardiac disease | 4-7 days/wk | 64% to <90% HRmax | 20-60 min/day |
| Hypertension | ≥ 5 days/wk | 64% to <77% HRmax | 30-60 min/day |
| Metabolic Syndrome | 5 days/wk | 64% to <77% HRmax | 50-60 min/day |
| Obesity | ≥ 5 days/wk | 64% to <90% HRmax | 30-60 min/day |
| Type 2 Diabetes | 3-7 days/wk | 64% to <90% HRmax | 20-60 min/day |

* Modified from References (1, 16)

## Step #4

The final step in all evidence-based practice programmes is the review of performance. Exercise professionals should regularly review the first 4 steps (Scenario, Understand, Prioritize, Exercise Programme Design) and seek ways to improve in the future. Given the aforementioned complexity of exercise programme design for individuals with multiple chronic conditions, frequently reviewing all aspects of the programme is mandatory. It is absolutely paramount for the exercise professional to comprehend and fully appreciate the unstable nature of most chronic conditions (18, 28). Quite simply put – the aims of your exercise programme are unpredictable and moving targets. You will be required to revise your mortality risk and symptom-limiting lists multiple times. Likewise, the occasions where you will need to modify the exercise routine to accommodate the sudden worsening of a symptom-limiting condition will be of irregular frequency and duration.

The review process also provides exercise professionals with the opportunity to provide clients with valuable feedback on the effectiveness of the programme. Understanding the typical improvement (if any) for each chronic condition that can be expected through an exercise intervention, along with the time course to achieve this modification, will help the exercise professional provide meaningful feedback to clients. Remember an improvement for all chronic conditions is not always a feasible expectation (19). There will be scenarios where simply maintaining functional capacity or stabilizing the disease process can, and should, be viewed as a successful outcome.

The considerable challenge of designing exercise programs for clients with comorbidities requires a simplified approach for Registered Exercise Professionals. This section conveyed 4 basic steps to follow with each client to accomplish the explicit goal of a safer and more effective exercise programme outcome. It is important to note that the primary focus of this section was to outline the procedures required to assist Registered Exercise Professionals with breaking down complex cases into more simple and manageable tasks. Additionally, it centred on special considerations needing attention when interacting with and providing exercise programming for clients with multiple chronic diseases. The intent of this section was not to be exhaustive in its scope of addressing each and every chronic condition the Registered Exercise Professionals will encounter in their career. Listed below the Registered Exercise Professional will find a brief list of excellent resources concerning the pathophysiology and exercise guidelines for dozens of chronic conditions. It is highly recommended that these resources are utilised by Registered Exercise Professionals when implementing the steps outlined in this section with future clients.

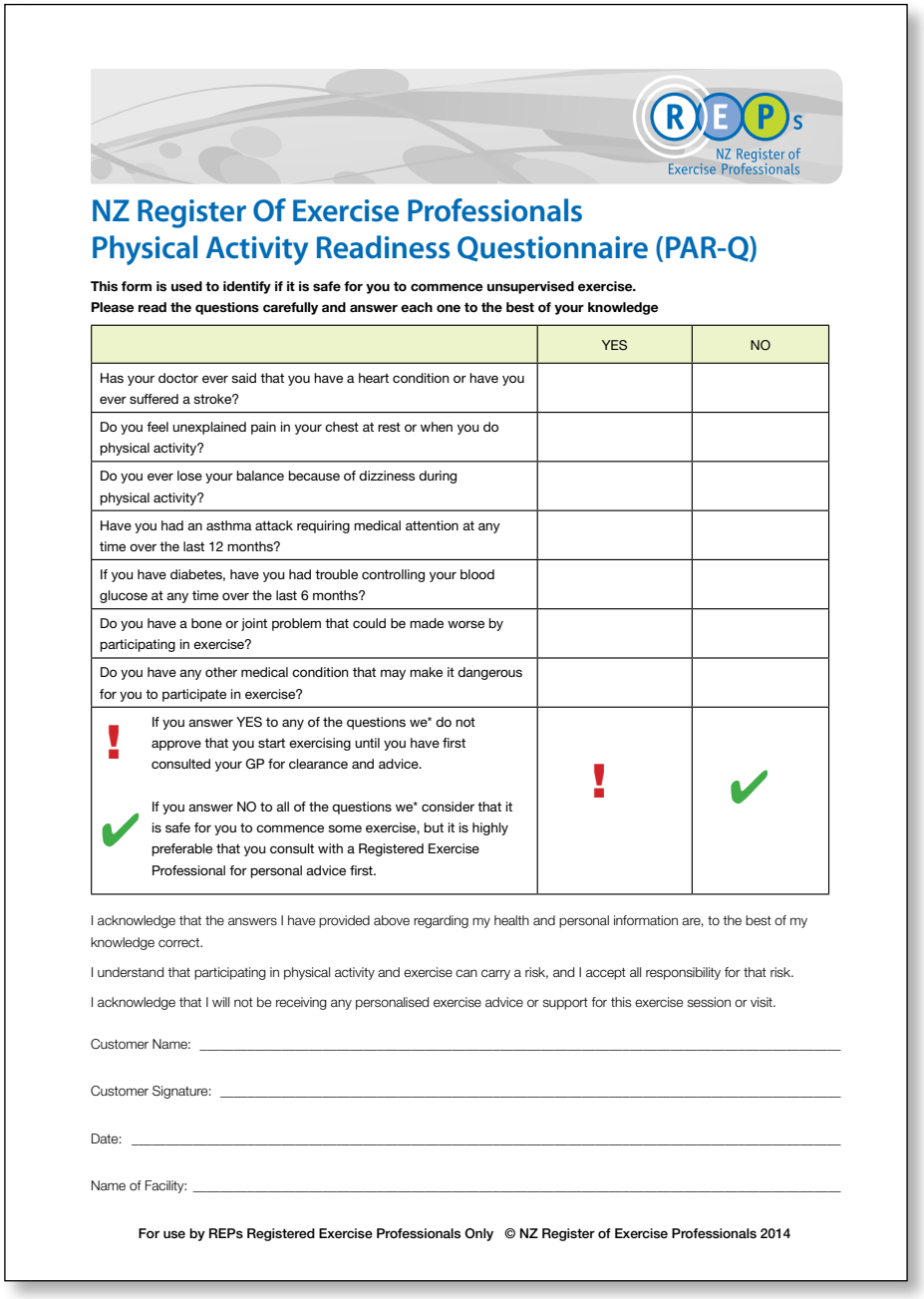
# Part F
# REPs Physical Activity Readiness Questionnaire (PAR-Q)

The REPs PAR-Q form is **NOT INTENDED** as an alternative to the main REPs Pre-Screening form, as it does not provide the detail needed to develop personalised exercise assessment and prescription.

The PAR-Q is designed for quick, easy, and independent completion by the facility user.

It is specifically and exclusively intended for the following situations:

- **Unsupervised exercise facilities** for users to sign prior to entry
- **Casual visitors** to an exercise facility who will otherwise receive no further individual attention from a Registered Exercise Professional. For example, a facility receptionist could request that a non-member visitor complete and sign the PAR-Q prior to facility use.



NZ Register of Exercise Professionals

## NZ Register Of Exercise Professionals
## Physical Activity Readiness Questionnaire (PAR-Q)

**This form is used to identify if it is safe for you to commence unsupervised exercise.**
**Please read the questions carefully and answer each one to the best of your knowledge**

| | YES | NO |
|---|---|---|
| Has your doctor ever said that you have a heart condition or have you ever suffered a stroke? | | |
| Do you feel unexplained pain in your chest at rest or when you do physical activity? | | |
| Do you ever lose your balance because of dizziness during physical activity? | | |
| Have you had an asthma attack requiring medical attention at any time over the last 12 months? | | |
| If you have diabetes, have you had trouble controlling your blood glucose at any time over the last 6 months? | | |
| Do you have a bone or joint problem that could be made worse by participating in exercise? | | |
| Do you have any other medical condition that may make it dangerous for you to participate in exercise? | | |
| ! If you answer YES to any of the questions we* do not approve that you start exercising until you have first consulted your GP for clearance and advice.<br>✔ If you answer NO to all of the questions we* consider that it is safe for you to commence some exercise, but it is highly preferable that you consult with a Registered Exercise Professional for personal advice first. | ! | ✔ |

I acknowledge that the answers I have provided above regarding my health and personal information are, to the best of my knowledge correct.

I understand that participating in physical activity and exercise can carry a risk, and I accept all responsibility for that risk.

I acknowledge that I will not be receiving any personalised exercise advice or support for this exercise session or visit.

Customer Name: _____

Customer Signature: _____

Date: _____

Name of Facility: _____

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## Part G

# Pre-Screening Health Professional Referral Letter

NZ Register of Exercise Professionals

To _____ Date: / /

_____

_____

_____

Dear _____

**Re: Client Name:** _____

**Client Address:** _____

**Client DOB:** _____

Your client/patient has met with me with the goal of _____

I am a Registered Exercise Professional with the New Zealand Register of Exercise Professionals (REPs). Before commencing a programme of exercise for your client/patient, I have carried out the REPs exercise pre-screening process. Information gathered during the screening process included the following:

| | | | |
|---|---|---|---|
| **Current Physical Activity Level** | **Sessions / week** | | **Notes:** *(Exercise Professional: Include details of any: Signs or Symptoms, Risk Factors, Known Conditions of medical issues identified in pre-screen results).* |
| | **Minutes / week** | | |
| | **Intensity (low/mod/high/ vig)** | | |
| **Resting HR** | | | |
| **Resting BP** | | | |
| **Weight** | | | |
| **BMI** | | | |
| **Waist Circ** | | | |

Exercise professional to attach a copy of the REPs Pre-screening form, and any details of other practitioners treating the client.

In response to your client/patients pre exercise screening results, I request your guidance in relation to the following condition(s) to enable and ensure the delivery of a safe and effective exercise programme:

Based on your client/patients goals, it is intended to have them commence an exercise programme consisting of the following:

*Describe the intended program focus in brief (1-2 sentences) – e.g. strength / cardio based programme group vs 1:1*

Please indicate any recommendations you may have in relation to their exercise programme, including specific activities they cannot or should not be undertaking at this time, or other relevant notes.

| Practitioner to include any notes for the exercise professional here: |
|---|
| |

I will keep you informed of progress and any major changes in his/her condition. To acknowledge you have received this referral, please complete this section:

| | | | | |
|---|---|---|---|---|
| **Date:** | | **Status of Referral:**<br>**please describe action required in notes* | **Complete** | **Incomplete*** |
| **Practitioner Name:** | | **Contact person for follow up:**<br>***please provide new contact details in notes* | **As above** | **New contact**** |
| **Practitioner Title:** | | **Notes:** | | |
| **Practitioner Signature:** | | | | |

*Please include in notes any instructions you may have regarding follow up or progress reporting.*

I welcome any advice you feel necessary and can be contacted by phone _____

or by email _____ _____ anytime.

| | | | |
|---|---|---|---|
| **Client Consent:** | I give my permission for my exercise professional to communicate with the referring Practitioner and/or my GP regarding my health status and my progress relating to my exercise programme. | | |
| **Client Name:** | | | |
| **Client Signature:** | | **Date:** | |

Yours sincerely

Name: _____

**This letter is for use by REPs Registered Exercise Professionals Only © NZ Register of Exercise Professionals 2014**

# Part H
# Resources for the Exercise Professional designing exercise programmes for Clients with Comorbidities

## Will more of my clients be healthy or persons with multiple chronic diseases?

- ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities, 3rd Ed
- ACSM's Guidelines for Exercise Testing and Prescription, 9th Ed
- ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription, 6th Ed

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## List of Abbreviations

| | |
|---|---|
| ACE | Angiotensin converting enzyme |
| BMI | Body mass index |
| BP | Blood pressure |
| COPD | Chronic obstructive pulmonary disease |
| CHD | Coronary heart disease |
| CVD | Cardiovascular disease |
| DBP | Diastolic blood pressure |
| F | Female |
| FBG | Fasting blood glucose |
| FITT | Frequency, Intensity, Time, Type |
| GP | General practitioner |
| HbA1C | Hemoglobin A1C |
| HCTZ | Hydrochlorothiazide |
| HDL | High density lipoprotein |
| HR | Heart rate |
| HRmax | Maximal heart rate |
| LDL | Low density lipoprotein |
| LMM | Lean muscle mass |
| M | Male |
| NZ | New Zealand |
| NZ REPs | New Zealand Register of Exercise Professionals |
| REP | Registered Exercise Professional |
| RPE | Rating of perceived exertion |
| SBP | Systolic blood pressure |
| SOB | Shortness of breath |
| TG | Triglycerides |
| T2DM | Type 2 diabetes mellitus |
| VO2max | Maximal oxygen uptake |
| 1 RM | 1 repetition maximum |