

Chapter 1

Cardiorespiratory Impairment

INTRODUCTION

Cardiorespiratory impairment results from conditions that affect the function of the heart or lungs. The procedures described in this chapter are to be applied in assessing most conditions of the heart and lungs, and will usually also be appropriate for conditions affecting the function of the thorax or diaphragm, lesions of the nerves that supply the muscles of respiration, and conditions such as anaemia. The principal exception is any condition which is predominantly intermittent in nature and which would be better assessed by applying Chapter 15 (Intermittent Impairment).

Different procedures (described in Chapter 2) are to be applied to assess hypertension and non-cardiac vascular conditions (such as aortic aneurysm and varicose veins).

In general, cardiorespiratory impairment is to be measured by reference to exercise tolerance. Exercise tolerance is quantified in terms of METs (see pages 26–27). However, if a respiratory component is present, measurements of lung function, such as *forced expiratory volume in one second* (FEV1), *forced vital capacity* (FVC), and *maximal expiratory flow* (MEF_{25–75}) are to be used in addition to exercise tolerance. FEV1 and FVC are to be measured by spirometry. For the purposes of assessment in accordance with this *Guide*, the terms “MEF_{25–75}” and “FEF_{25–75}” (*forced expiratory flow between 25% and 75% of the vital capacity*) are to be taken as equivalent.

The conversion of loss of exercise tolerance and measurements of lung function into an impairment rating is set out in Table 1.2 and Table 1.3.

Certain cardiorespiratory conditions cannot be rated by applying exercise tolerance. These include:

- ◆ conditions that do not decrease exercise tolerance;
- ◆ conditions that do not produce symptoms; and
- ◆ intermittent conditions.

“Exercise tolerance” refers to a person’s ability to exercise from a cardiorespiratory point of view rather than to a person’s total ability to exercise. For example, a veteran who has osteoarthritis of both knees may be greatly limited in walking but may still be able to swim a considerable distance. Such a veteran would still have good exercise tolerance from a cardiorespiratory point of view, though total ability to exercise would be reduced.

A veteran whose ability to exercise has been significantly reduced by other conditions (such as musculoskeletal conditions or being grossly overweight), or who no longer has cardiac or respiratory symptoms on exercise, cannot always be given an appropriate impairment rating for reduced exercise tolerance. However, the need to apply Chapter 19 (Partially Contributing Impairment) should always be considered before disregarding exercise tolerance figures.

Calculation of the impairment rating for accepted cardiorespiratory conditions

Follow the steps below to determine the impairment rating for cardiorespiratory conditions:

(Each step is elaborated in the following pages.)

STEP 1	Establish what cardiorespiratory conditions are present.	Page 19
STEP 2	Assess the information that is available and decide whether it is reliable and sufficient.	Page 19
STEP 3	Determine the impairment rating based on effort tolerance.	Page 21
STEP 4	<i>(Omit this step if no respiratory disease is present.)</i> Determine the impairment rating based on measurements of lung function.	Page 25
STEP 5	Determine the total accepted cardiorespiratory functional impairment rating.	Page 32
STEP 6	Consider the effects of cardiac failure (if any).	Page 36
STEP 7	Moderate the total cardiorespiratory functional impairment rating to allow for effects of any non-accepted conditions.	Page 37
STEP 8	Determine whether any ratings from the relevant Other Impairment tables apply (Tables 1.7, 1.8, 1.9, 1.10).	Page 37

Step 1: Establish what cardiorespiratory conditions are present.

For the purpose of assessing cardiorespiratory impairment, both the *accepted* and the *non-accepted* conditions are taken into account. Both will affect the way in which cardiorespiratory functional impairment is calculated. (Their combined effect is taken into account in the application of Table 1.5 in Step 5.)

Any non-accepted conditions are to be subsequently allowed for by applying Chapter 19 (Partially Contributing Impairment) — see Step 7.

When considering the question: ‘What cardiorespiratory conditions are present in this veteran?’, it is not appropriate to rely simply on a list of accepted conditions. Both previously claimed but rejected cardiorespiratory conditions and unclaimed cardiorespiratory conditions may also be present.

Step 2: Assess the information that is available and decide whether it is reliable and sufficient.

To make a reliable cardiorespiratory assessment, there should be an adequate medical history of the veteran’s cardiorespiratory conditions. In addition, there should be information relating to the veteran’s effort tolerance and, if any respiratory disease is present, there should also be one or more sets of spirometry or other physiological measurements of respiratory function. The criteria by which the evaluation of the information is to be made are set out below.

Medical history

An adequate history of the veteran’s illness and a description of the current symptoms and details of the current treatment should be available.

The history should be reviewed at the start of the cardiorespiratory assessment procedure to establish whether any major cardiorespiratory event (for example a myocardial infarction or bypass surgery) has occurred within the period of assessment.

An examination of the history will indicate whether any Other Impairment ratings (from Tables 1.7, 1.8, 1.9, 1.10) are applicable. For example, in the case of ischaemic heart disease, the history will reveal whether the veteran has had any myocardial infarctions, whether coronary bypass surgery has been performed and the outcome of any such surgery. In other cases, for example when respiratory disease is present, the current treatment will reveal whether any Other Impairment rating for cardiorespiratory conditions is applicable.

In long-standing respiratory conditions, there will often be a disease complex present that is more extensive than that implied by the original diagnostic label. For example, asthma may lead to chronic obstructive respiratory disease and chronic bronchitis may lead to small airways disease. Such extensions of the disease process are to be

assessed as part and parcel of the original condition unless there is clear reason why they should not be — for example, they have been determined to be non-accepted conditions.

Effort tolerance

Effort tolerance information should always be obtained except if the veteran has a condition that renders the collection of reliable effort tolerance information impracticable.

Examples of conditions that may render the collection of reliable effort tolerance information impracticable include:

- ◆ hemiparesis following a stroke;
- ◆ quadriplegia or hemiplegia;
- ◆ severe arthritis of the lower limbs; and
- ◆ certain mental conditions such as dementia (in which the veteran's ability to cooperate or provide useful information may be restricted).

The date of the effort tolerance information used must be appropriate to the period of assessment: the effort tolerance information should be *not more than six months older* than the relevant time in the assessment period to which the information is to be applied.

Measurements of lung function

Spirometry should always be obtained if any condition affecting the function of the lungs is present unless it is not practicable or appropriate to perform spirometry because:

- ◆ the veteran is very old or frail and cannot reasonably attend a clinic where spirometry can be performed; or
- ◆ the veteran lives in a remote locality and cannot reasonably attend a clinic where spirometry can be performed; or
- ◆ the veteran's impairment from other accepted conditions is of such a degree that it would result in a combined impairment rating of at least 68 points.

The date of the spirometry used must be appropriate to the period of assessment: the spirometry should be *not more than six months older* than the relevant time in the assessment period to which the information is to be applied.

The nature of the spirometry should be appropriate: the nature of the spirometric readings should be *consistent with the known conditions affecting the veteran* and should also be consistent with such other information (eg, old spirometry) as is available or can reasonably be obtained. There should be no unexplained inconsistencies between the various reports.

If the nature of the spirometry cannot be reconciled with other relevant information, the spirometry may need to be repeated or the veteran referred to a respiratory physician for clarification of the situation.

If a veteran has emphysema, as evidenced by diminished carbon monoxide diffusing capacity, and diagnosed by a specialist respiratory physician, assessment can be made on the basis of effort tolerance alone.

Step 3: Determine the impairment rating based on effort tolerance.

To determine the impairment rating based on effort tolerance follow the substeps below.

(Each step is elaborated in the following pages.)

Substep 3A	Determine the symptomatic activity level by applying Table 1.1 — Activity Levels (with energy expenditure in METs).	Page 21
Substep 3B	Convert that symptomatic activity level into an impairment rating. This step involves consulting either Table 1.2 — Loss of Cardiorespiratory Function: Exercise Tolerance (Males); or Table 1.3 — Loss of Cardiorespiratory Function: Exercise Tolerance (Females).	Page 25

After both substeps have been completed, a single rating will have been obtained. This rating is known as the impairment rating for effort tolerance.

If symptoms do not occur, a rating for the condition may be found in Table 1.6 (Cardiac Failure) if applicable, or in the relevant Other Impairment table.

Substep 3A: Determine the symptomatic activity level.

The **symptomatic activity level** is the exercise level (measured in METs) at which symptoms occur. One MET represents the energy expenditure associated with the consumption of 3.5 mL oxygen per kilogram of body weight per minute. Table 1.1 lists various activities grouped according to their energy expenditure in METs.

The symptomatic activity level is the level at which the activities from within any one METs category consistently give rise to symptoms of the accepted cardiorespiratory condition, such as angina, dyspnoea, palpitations, or fatigue. The symptomatic activity level may be determined by reference to a report specifically provided for the purpose as well as by reference to clinical notes and by comparison of the information with the activities listed in Table 1.1. (The symptomatic activity level may be determined by reference to activities other than those contained in Table 1.1 if the energy expenditure (in METs) of those activities is available in the medical or scientific literature.)

In determining the symptomatic activity level, greater reliance is to be placed on activities that involve steady, as opposed to sporadic, expenditure of energy. Such activities are more reliable as indicators of exercise tolerance. Less reliance is to be placed on activities that can be completed in less than a few minutes, as symptoms may take longer than this to occur.

Responses of the type 'I cannot do such and such' or 'I do not do so and so' are not useful in assessing the symptomatic activity level. What must be established is that level of exercise that the veteran is able to do but which results in angina, breathlessness, or some other cardiorespiratory symptom.

Symptoms that occur while an activity is performed are not necessarily a result of the energy expenditure occasioned by the activity. Many specific activities can be performed in a way which would mean that they were no longer examples of the METs level in which they are placed in Table 1.1. For example, while driving a car sedately is an example of 2–3 METs, driving a car in a Grand Prix is not.

Estimations of exercise tolerance above the 6-7 METs level should only be made using exercise tests. The following activities are listed for information only.

7–8 METs

- ◆ Very heavy exercise
- ◆ Jogging (8 km/h).
- ◆ Horseback riding (galloping).
- ◆ Carrying heavy objects (30 kg) on level ground.
- ◆ Sawing hardwood with hand tools.

8–9 METs

- ◆ Running (9 km/h).
- ◆ Skiing (cross-country).

- ◆ Chopping hardwood.
- ◆ Callisthenics.
- ◆ Squash (non competitive).

10+ METs

- ◆ Running quickly (10 km/h).
- ◆ Cycling quickly (25 km/h).
- ◆ Carrying loads (10 kg) up a gradient.
- ◆ Football (any code).

Alternate procedures for establishing the symptomatic activity level

1. The symptomatic activity level may be determined by exercise tests. These tests include:
 - ◆ use of treadmills; or
 - ◆ cycles; or
 - ◆ rowing machines.

Because of their greater objectivity, the results of exercise tests (when available) are to be used in preference to the method of calculating exercise tolerance as described above. Moreover, exercise tests must always be used to make an estimate of exercise tolerance above 6–7 METs.

2. If certain levels of activity have been prohibited by the treating doctor, because of the adverse effect the prohibited activity is likely to have on the veteran's health as a result of the accepted condition, then the level of exercise that has been prohibited may be regarded as the symptomatic activity level.

**SCALE
1.1**



**CARDIORESPIRATORY IMPAIRMENT: ACTIVITY LEVELS
(with energy expenditure in METs)**

1–2 METs	<p>Energy expended at rest or minimal activity</p> <ul style="list-style-type: none"> • Lying down. • Sitting and drinking tea. • Using sewing machine (electric). • Sitting down. • Sitting and talking on telephone. • Travelling in car as passenger. • Standing. • Sitting and knitting. • Playing cards. • Strolling (slowly). • Light sweeping. • Clerical work (desk work only).
2–3 METs	<p>Energy expended in dressing, washing and performing light household duties</p> <ul style="list-style-type: none"> • Light household duties. • Walking slowly (3.5 km/h). • Playing piano, violin, or organ. • Typing. • Cooking or preparing meals. • Playing billiards. • Clerical work which involves moving around. • Setting table. • Driving power boat. • Washing dishes. • Playing golf (with power buggy). • Bench assembly work (seated). • Dressing, showering. • Horseback riding at walk. • Using self-propelled mower. • Light tidying, dusting. • Lawn bowls. • Polishing silver. • Driving car.
3–4 METs	<p>Energy expended in walking at an average pace</p> <ul style="list-style-type: none"> • Walking at average walking pace (5 km/h). • Golf (pulling buggy). • Machine assembly. • Cleaning car (excludes vigorous polishing). • Minor car repairs. • Tidying house. • Welding. • Cleaning windows. • Table tennis.

(continued next page)

**Ratings derived
from METs are age
adjusted**

**SCALE
1.1 (cont'd)**



**CARDIORESPIRATORY IMPAIRMENT: ACTIVITY LEVELS
(with energy expenditure in METs) continued**

- Pushing light power mower over flat suburban lawn at slow steady pace.
 - Vacuuming.
 - Sedate cycling (10 km/h).
 - Shifting chairs.
 - Light gardening (weeding and water).
 - Hanging out washing.
 - Making bed.
- 4–5 METs Moderate activity: encompasses more strenuous daily activities with the exclusion of manual labour and vigorous exercise
- Mopping floors.
 - Golf (carrying bag).
 - Light carpentry (eg chiselling, hammering).
 - Scrubbing floors.
 - Ballroom dancing.
 - Beating carpets.
 - Tennis doubles (social, non-competitive).
 - Stocking shelves with light objects.
 - Polishing furniture.
 - Wallpapering.
 - Shopping and carrying groceries (10 kg).
 - Gentle swimming.
 - Painting outside of house.
 - Hoeing (soft soil).
 - Stacking firewood.
- 5–6 METs Heavy exercise: manual labour or vigorous sports
- Walking 6.5 km/h (sustained brisk walk, discomfort in talking at the same time).
 - Walking slowly but steadily up stairs.
 - Carpentry (eg sawing and planing with hand tools).
 - Swimming laps (non-competitive).
 - Pushing a full wheelbarrow (20 kg).
 - Shovelling dirt (12 throws a minute).
 - Digging in garden.
- 6–7 METs
- Badminton (competitive).
 - Tennis (singles, non-competitive).
 - Water skiing.
 - Loading truck with bricks.
 - Using a pick and shovel to dig trenches.

The activities listed under each heading are examples. There will be other activities that have the same METs expenditure and hence can be used for reference if their METs level is known.

**Ratings derived
from METs are age
adjusted**

Substep 3B: Convert the symptomatic activity level into an impairment rating.

The symptomatic activity level is used, in conjunction with the veteran's age, height, and sex, to obtain an impairment rating.

In the case of a male, Table 1.2 is to be applied.

In the case of a female, Table 1.3 is to be applied.

For the purposes of Tables 1.2 and 1.3, a veteran's age is taken to be his or her age in whole years at the date of the report relating to the exercise tolerance (unless the report is of a retrospective type and clearly refers to some earlier period, in which case the veteran's age is taken to be his or her age in whole years at the relevant time).

Step 4: (Omit this step if no respiratory disease is present.) Determine the impairment rating based on measurements of lung function.

FEV₁, FVC, and MEF₂₅₋₇₅ are the usual physiological measurements of lung function. Determinations of FEV₁, FVC, and MEF₂₅₋₇₅ should be conducted by an experienced operator without specific administration of a bronchodilator. The best set of results should be selected, that is, the set of results which indicates the greatest degree of health and, consequently, the lowest degree of impairment.

If both pre-bronchodilator and post-bronchodilator results are available the pre-bronchodilator results are to be applied in determining the impairment rating based on measurements of lung function.

To determine the impairment rating based on measurements of lung function, follow the substeps below.

Substep 4A

Obtain the measured FEV₁, FVC, and MEF₂₅₋₇₅ from the data.

Substep 4B

Work out the predicted FEV₁, FVC, and MEF₂₅₋₇₅ for a person of the same age, height, and gender. This can be done either by applying the nomograms Figure 1a (for males) or Figure 1b (for females) or by applying the formula relating to each nomogram.

Substep 4C

Express the measured FEV₁ as a percentage of the predicted FEV₁, and Express the measured FVC as a percentage of the predicted FVC, and Express the measured MEF₂₅₋₇₅ (if appropriate) as a percentage of the predicted MEF₂₅₋₇₅.

These conversions are performed by applying the formula:

$$\text{Measured value as \% of predicted value} = \frac{\text{Actual value} \times 100}{\text{Predicted value}}$$

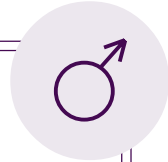
Substep 4D

Determine an impairment rating from a physiological measurement by using the percentage obtained in substep 4C in conjunction with Table 1.4. Separate impairment ratings can be obtained from each physiological measurement (that is, from the FEV₁, FVC, and MEF₂₅₋₇₅).

Substep 4E

The final impairment rating is the highest (or equal highest) of the ratings obtained in substep 4D.

**Functional Loss
Table 1.2**



**LOSS OF CARDIORESPIRATORY FUNCTION:
EXERCISE TOLERANCE**

		(Males)																
Age	Symptomatic Activity Level (METs*)	Age	Symptomatic Activity Level (METs*)									Age	Symptomatic Activity Level (METs*)					
less than	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	10+	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	10+
25	90	80	70	60	50	40	30	20	10	55	80	70	55	40	25	15	10	
25	90	80	70	60	50	40	30	20	10	56	80	70	54	39	24	15	9	
26	90	80	70	60	50	40	30	20	10	57	80	69	53	38	23	14	8	
27	89	80	70	59	48	38	28	19	10	58	80	69	52	37	22	14	7	
28	89	80	70	59	47	37	27	19	10	59	80	68	51	36	21	13	6	
29	88	80	70	58	46	36	26	18	10	60	80	68	50	35	20	13	5	
30	88	80	70	58	45	35	25	18	10	61	80	67	49	34	19	12	4	
31	87	80	70	57	44	34	24	17	10	62	80	67	48	33	18	12	3	
32	87	80	70	57	43	33	23	17	10	63	80	66	47	32	17	11	2	
33	86	80	70	56	42	32	22	16	10	64	80	66	46	31	16	11		
34	86	80	70	56	41	31	21	16	10	65	80	65	45	30	15	10		
35	85	80	70	55	40	30	20	15	10	66	80	64	44	29	15	9		
36	85	80	70	55	39	29	20	15	9	67	79	63	43	28	14	8		
37	85	79	69	54	38	28	19	14	8	68	79	62	42	27	14	7		
38	85	79	69	54	37	27	19	14	7	69	78	61	41	26	13	6		
39	85	78	68	53	36	26	18	13	6	70	78	60	40	25	13	5		
40	85	78	68	53	35	25	18	13	5	71	77	59	39	24	12	4		
41	85	77	67	52	34	24	17	12	4	72	77	58	38	23	12	3		
42	85	77	67	52	33	23	17	12	3	73	76	57	37	22	11	2		
43	85	76	66	51	32	22	16	11	2	74	76	56	36	21	11	1		
44	85	76	66	51	31	21	16	11		75	75	55	35	20	10			
45	85	75	65	50	30	20	15	10		76	75	55	35	19	9			
46	85	75	64	49	30	20	15	9		77	75	54	34	18	8			
47	84	74	63	48	29	19	14	8		78	75	54	34	17	7			
48	84	74	62	47	29	19	14	7		79	75	53	33	16	6			
49	83	73	61	46	28	18	13	6		80	75	53	33	15	5			
50	83	73	60	45	28	18	13	5		81	75	52	32	14	4			
51	82	72	59	44	27	17	12	4		82	75	52	32	13	3			
52	82	72	58	43	27	17	12	3		83	75	51	31	12	2			
53	81	71	57	42	26	16	11	2		84	75	51	31	11	1			
54	81	71	56	41	26	16	11			85	75	50	30	10				
									above	85	75	50	30	10				

**One MET represents the energy expenditure associated with the consumption of 3.5 mL oxygen/kg body weight/min.*

Ratings derived from METs are age adjusted

**Functional Loss
Table 1.3**



**LOSS OF CARDIORESPIRATORY FUNCTION:
EXERCISE TOLERANCE**

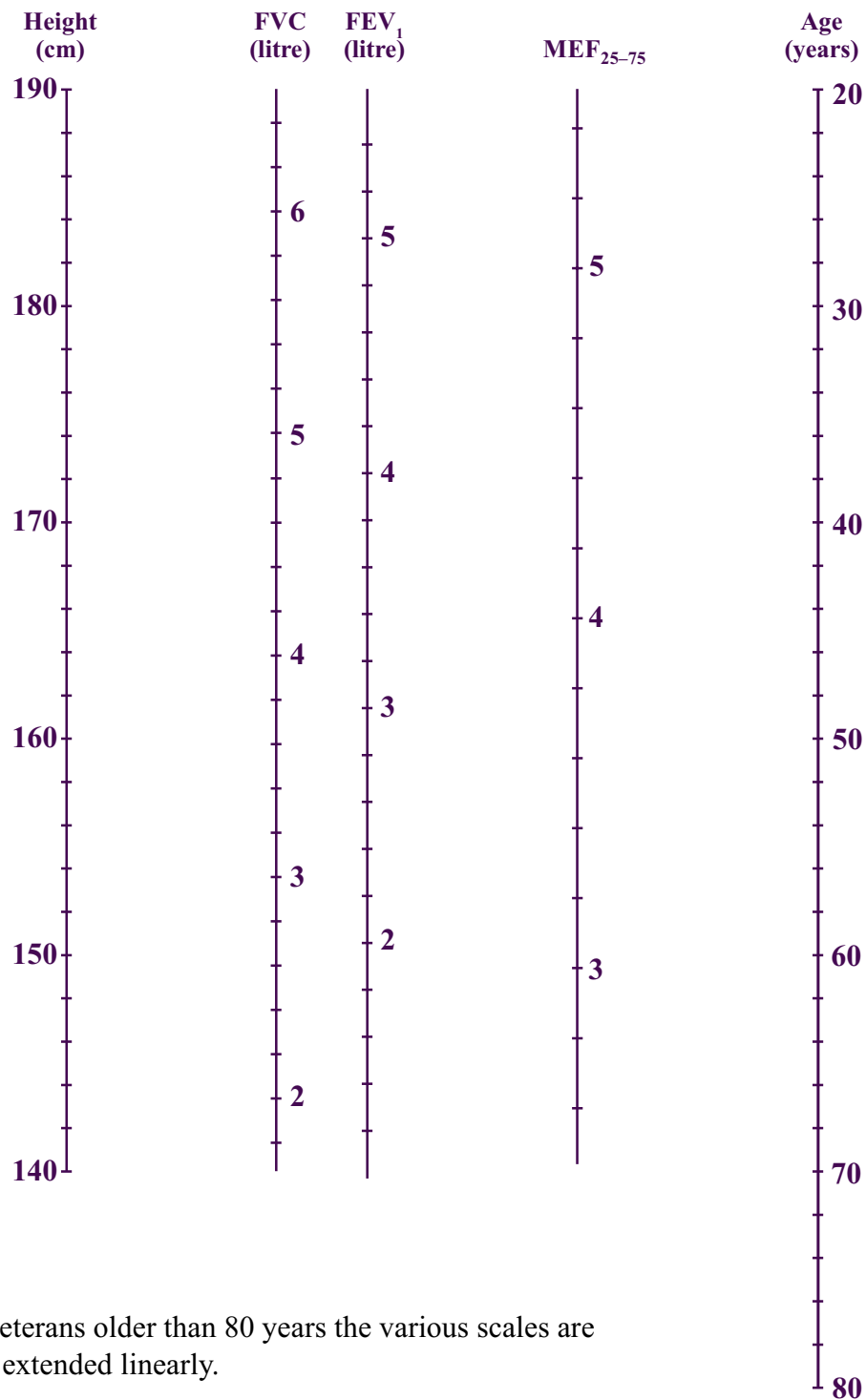
(Females)

Age	Symptomatic Activity Level (METs*)										Age	Symptomatic Activity Level (METs*)									
less than	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	10+		1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	10+		
25	90	80	70	55	40	30	20	15	10	55	80	65	50	30	20	15	10				
25	90	80	70	55	40	30	20	15	10	56	80	65	49	29	20	15	9				
26	90	80	69	54	40	30	20	15	10	57	80	64	48	28	19	14	8				
27	89	79	68	53	39	29	20	15	10	58	80	64	47	27	19	14	7				
28	89	79	67	52	39	29	20	15	10	59	80	63	46	26	18	13	6				
29	88	78	66	51	38	28	20	15	10	60	80	63	45	25	18	13	5				
30	88	78	65	50	38	28	20	15	10	61	80	62	44	24	17	12	4				
31	87	77	64	49	37	27	20	15	10	62	80	62	43	23	17	12	3				
32	87	77	63	48	37	27	20	15	10	63	80	61	42	22	16	11	2				
33	86	76	62	47	36	26	20	15	10	64	80	61	41	21	16	11					
34	86	76	61	46	36	26	20	15	10	65	80	60	40	20	15	10					
35	85	75	60	45	35	25	20	15	10	66	80	59	39	20	15	9					
36	85	75	60	45	34	25	20	15	9	67	79	58	38	19	14	8					
37	85	75	60	44	33	24	19	14	8	68	79	57	37	19	14	7					
38	85	75	60	44	32	24	19	14	7	69	78	56	36	18	13	6					
39	85	75	60	43	31	23	18	13	6	70	78	55	35	18	13	5					
40	85	75	60	43	30	23	18	13	5	71	77	54	34	17	12	4					
41	85	75	60	42	29	22	17	12	4	72	77	53	33	17	12	3					
42	85	75	60	42	28	22	17	12	3	73	76	52	32	16	11	2					
43	85	75	60	41	27	21	16	11	2	74	76	51	31	16	11	1					
44	85	75	60	41	26	21	16	11		75	75	50	30	15	10						
45	85	75	60	40	25	20	15	10		76	75	49	29	15	9						
46	85	74	59	39	25	20	15	9		77	75	48	28	14	8						
47	84	73	58	38	24	19	14	8		78	75	47	27	14	7						
48	84	72	57	37	24	19	14	7		79	75	46	26	13	6						
49	83	71	56	36	23	18	13	6		80	75	45	25	13	5						
50	83	70	55	35	23	18	13	5		81	75	44	24	12	4						
51	82	69	54	34	22	17	12	4		82	75	43	23	12	3						
52	82	68	53	33	22	17	12	3		83	75	42	22	11	2						
53	81	67	52	32	21	16	11	2		84	75	41	21	11	1						
54	81	66	51	31	21	16	11			85	75	40	20	10							
									above	85	75	40	20	10							

**One MET represents the energy expenditure associated with the consumption of 3.5mL oxygen/kg body weight/min.*

Ratings derived from METs are age adjusted

FIGURE 1a — PREDICTION NOMOGRAM: MALE (BTPS)



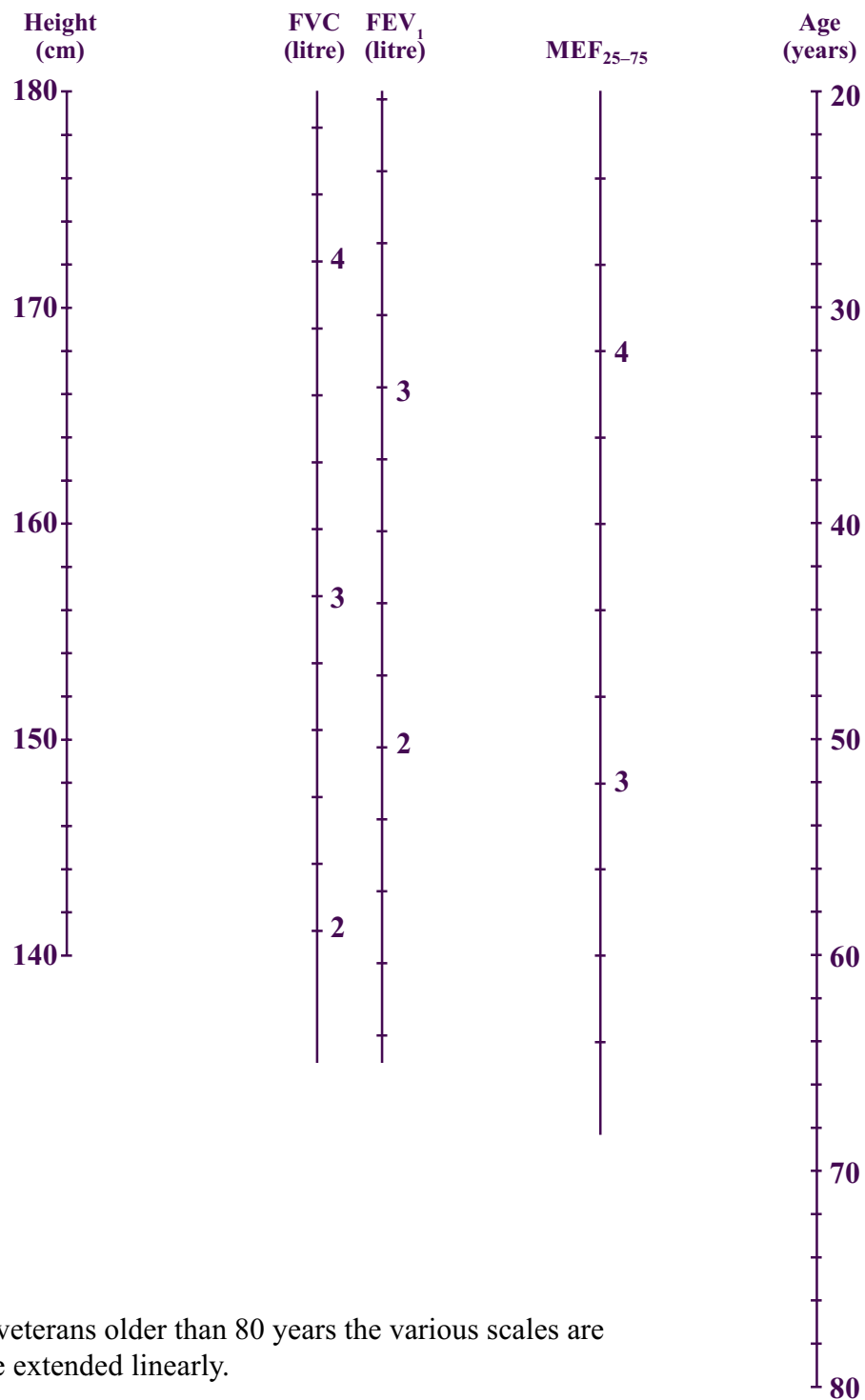
For veterans older than 80 years the various scales are to be extended linearly.

This nomogram corresponds to the formulas:

$$\text{FEV}_1 = 0.0553 \times \text{Height} - 0.036 \times \text{Age} - 4.182$$

$$\text{FVC} = 0.0713 \times \text{Height} - 0.0265 \times \text{Age} - 6.463$$

$$\text{MEF}_{25-75} = 2.683 + 0.0195 \times \text{Height} - 0.043 \times \text{Age}$$

FIGURE 1b — PREDICTION NOMOGRAM: FEMALE (BTPS)

For veterans older than 80 years the various scales are to be extended linearly.

This nomogram corresponds to the formulas:

$$\begin{aligned} \text{FEV}_1 &= 0.0347 \times \text{Height} - 0.0252 \times \text{Age} - 1.929 \\ \text{FVC} &= 0.04315 \times \text{Height} - 0.02185 \times \text{Age} - 2.83 \\ \text{MEF}_{25-75} &= 2.918 + 0.0125 \times \text{Height} - 0.034 \times \text{Age} \end{aligned}$$

Functional Loss
Table 1.4

**LOSS OF CARDIORESPIRATORY FUNCTION:
 PHYSIOLOGICAL MEASUREMENTS**

Impairment Rating	FEV1 as a percentage of predicted	FVC as a percentage of predicted	MEF₂₅₋₇₅ as a percentage of predicted
NIL	85	85	85
TWO		84	
SIX	84		84
SEVEN		83	
EIGHT	83		83
TEN	82		82
ELEVEN	81	82	81
TWELVE			
THIRTEEN	80		80
FOURTEEN	79	81	79
FIFTEEN			
SIXTEEN	78	80	78
SEVENTEEN	77		77
EIGHTEEN	76	79	76
NINETEEN			
TWENTY	75	78	75
TWENTY-ONE	74		74
TWENTY-TWO	73	77	73
TWENTY-THREE	72		72
TWENTY-FOUR	71	76	71
TWENTY-FIVE			
TWENTY-SIX	70	75	70
TWENTY-SEVEN	69	74	69
TWENTY-EIGHT	68		68
TWENTY-NINE	67	73	67
THIRTY	66	72	66
THIRTY-ONE	65	71	65
THIRTY-TWO	64		64
THIRTY-THREE	63	70	63
THIRTY-FOUR	62	69	62
THIRTY-FIVE	61	68	61
THIRTY-SIX	60	67	60
THIRTY-SEVEN	59		59

Ratings derived
from this table are
age adjusted

(continued next page)

Functional Loss
Table 1.4
(cont'd)



**LOSS OF CARDIORESPIRATORY FUNCTION:
 PHYSIOLOGICAL MEASUREMENTS (continued)**

Impairment Rating	FEV1 as a percentage of predicted	FVC as a percentage of predicted	MEF₂₅₋₇₅ as a percentage of predicted
THIRTY-NINE	57	65	57
FORTY		64	
FORTY-ONE	56	63	56
FORTY-THREE	54	61	54
FORTY-FOUR	53	60	53
FORTY-FIVE	52		52
FORTY-SEVEN	50	58	50
FORTY-EIGHT	49	57	49
FORTY-NINE	48	56	48
FIFTY-ONE	46	54	46
FIFTY-TWO	45	53	45
FIFTY-THREE	44	52	44
FIFTY-FIVE	42	50	42
FIFTY-SIX	41	49	41
FIFTY-SEVEN	40		40
FIFTY-NINE	38	47	38
SIXTY	37	46	37
SIXTY-ONE	36	45	36
SIXTY-THREE	34	43	34
SIXTY-FOUR	33	42	33
SIXTY-FIVE	32	41	32
SIXTY-SEVEN	30	39	30
SIXTY-EIGHT	29	38	29
SIXTY-NINE	28	37	28

Ratings derived
 from this table are
 age adjusted

Whenever the measured parameter is less than 85% of the predicted, Table 1.4 corresponds to the following formulas:

$$\text{Impairment rating based on FEV1} = 98 - \% \text{ FEV1} + \frac{50}{(\% \text{ FEV1} - 90)}$$

$$\text{Impairment rating based on FVC} = 108 - \% \text{ FVC} + \frac{100}{(\% \text{ FVC} - 88.5)}$$

$$\text{Impairment rating based on MEF}_{25-75} = 98 - \% \text{ MEF} + \frac{50}{(\% \text{ MEF} - 90)}$$

When the measured parameter is 85% or more of the predicted, then the impairment rating is defined as NIL

“%FEV1” means measured FEV1 expressed as a percentage of predicted FEV1.

“%FVC” means measured FVC expressed as a percentage of predicted FVC.

“%MEF” means measured MEF₂₅₋₇₅ expressed as a percentage of predicted MEF₂₅₋₇₅.

In each case the percentage is to be rounded to the nearest integer before the formula is applied.

If these formulas are applied the resulting impairment rating is always to be rounded to the nearest integer.

Step 5: Calculate the total accepted cardiorespiratory functional impairment rating.

At this stage there will usually be an impairment rating derived from effort tolerance information and there may also be an impairment rating derived from measurements of lung function. These must be combined into a single cardiorespiratory functional impairment rating. The method by which that is to be done is set out in Table 1.5.

For the purposes of Table 1.5, the following abbreviations have been used:

Abbreviation	Meaning
“FI”	means cardiorespiratory functional impairment rating.
“No FI”	means a cardiorespiratory functional impairment rating cannot be calculated from either effort tolerance information or measurements of lung function.
“METs”	means the cardiorespiratory functional impairment rating is to be taken as the impairment rating derived from METs alone.

“Spirometry” means the cardiorespiratory functional impairment rating is to be taken as the impairment rating derived from measurements of respiratory function.

“average of METs and Spirometry” means the average rating derived from METs alone and the cardiorespiratory functional impairment rating derived from measurements of respiratory function alone — using the ordinary formula for averaging two quantities or by use of the nomogram in Figure 1c. In either case, the result is to be rounded to the nearest integer.

**Procedural
Table 1.5**



CARDIORESPIRATORY FUNCTIONAL IMPAIRMENT

		Respiratory disease present		No respiratory disease
		Spirometry obtainable	Spirometry not obtainable	
Cardiac disease present	METs data obtainable	FI = higher of METs and Spirometry	FI = METs	FI = METs
	METs data not obtainable	FI = Spirometry	No FI	No FI
No cardiac disease	METs data obtainable	FI = average of METs and Spirometry	FI = METs	
	METs data not obtainable	FI = Spirometry	No FI	

In applying this table, both accepted and non-accepted conditions are to be taken into account.

No age adjustment permitted for this table

From Table 1.5 it will be seen that:

- ◆ if cardiac conditions exist in the absence of respiratory disease, cardiorespiratory functional impairment should be measured by effort tolerance alone;
- ◆ if respiratory conditions exist in the absence of cardiac disease, the cardiorespiratory functional impairment rating is the rounded average of (i) impairment as measured by effort tolerance, and (ii) impairment as measured by spirometry;
- ◆ if both cardiac and respiratory conditions co-exist, the cardiorespiratory functional impairment rating is the greater of (i) the impairment rating as measured by effort tolerance, and (ii) the impairment rating as measured by spirometry.

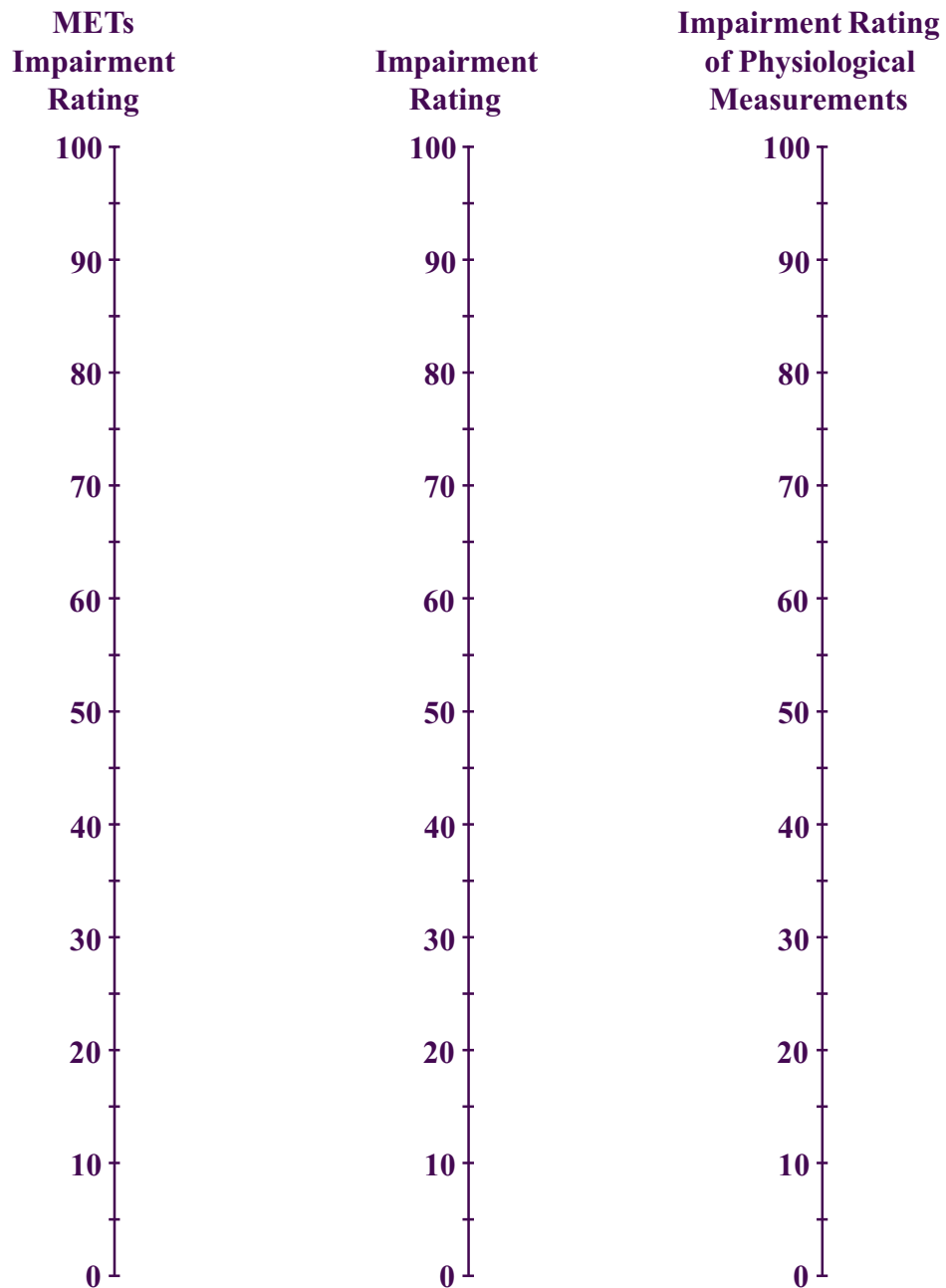
In applying these rules, both accepted and non-accepted cardiac and respiratory conditions are to be taken into account.

Only one rating for effort tolerance is to be given irrespective of the number of conditions that contribute to the relevant impairment.

Only one rating is to be given for physiological measurements of lung function irrespective of the number of conditions that contribute to the relevant impairment.

This single “total cardiorespiratory functional impairment” is due to the combined effect of all cardiorespiratory conditions whether accepted or not.

**FIGURE 1c — LOSS OF RESPIRATORY FUNCTION
RESPIRATORY NOMOGRAM**



This nomogram is to be used in accordance with the instructions in Step 5 and the procedural Table 1.5.

Results from this nomogram are to be rounded to the nearest five points. 2.5 is to be rounded up to 5 and 7.5 is to be rounded up to 10.

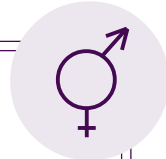
This nomogram corresponds to the formula:

$$\text{Impairment Rating} = \frac{\text{METs Impairment Rating} + \text{Impairment Rating of Physiological Measurement}}{2}$$

Step 6: Consider the effects of cardiac failure (if any).

For the purposes of assessment under this *Guide*, cardiac failure is considered to be a surrogate measure of cardiorespiratory impairment. When cardiac failure is present, the impairment rating calculated using effort tolerance will usually exceed any possible impairment rating from Table 1.6. Table 1.6 is of particular importance in assessing a veteran who is unable to be rated using effort tolerance because of significant conditions such as hemiplegia.

**Functional Loss
Table 1.6**



CARDIAC FAILURE

Impairment

Rating ventricular cardiac failure **Criteria** rated

NIL	No cardiac failure; that is, neither symptoms nor X-ray evidence of cardiac failure.
TEN	<ul style="list-style-type: none"> No symptoms, but X-ray evidence of early cardiac failure. Evidence of right ventricular failure.
FIFTEEN	L by ejection fraction of between 40% and 60% and persisting despite therapy.
TWENTY	Left or biventricular cardiac failure demonstrated on X-ray or by ejection fraction of less than or equal to 40% and persisting despite therapy.

Only one rating is to be selected from this table for any condition or combination of conditions. If more than one criterion applies, that which gives the higher or highest rating is to be chosen.

**No age adjustment
permitted for
this table**

A rating from Table 1.6 is to be compared with the total cardiorespiratory functional impairment rating (obtained in Step 5) and the higher of the two is to be chosen.

Step 7: Moderate the total cardiorespiratory functional impairment rating to allow for effects of any non-accepted conditions.

Partially contributing impairment

If non-accepted conditions contribute to the impairment, Chapter 19 (Partially Contributing Impairment) is to be applied to determine impairment from the accepted conditions.

If cardiac conditions exist in the absence of respiratory disease: if there is more than one cardiac condition present (for example ischaemic heart disease and a valvular heart disease) and some are accepted and some are not accepted, then the total cardiorespiratory functional impairment rating must be moderated by applying Chapter 19 to determine the impairment due to the accepted condition.

If a respiratory condition exists in the absence of cardiac disease, the symptomatic activity level will generally be the exercise level (in METs) at which dyspnoea occurs. If there is more than one respiratory condition present and at least one is accepted and at least one is not accepted, then the total cardiorespiratory functional impairment rating must be moderated by applying Chapter 19 to determine the impairment due to the accepted condition or conditions.

If cardiac and respiratory conditions co-exist, and at least one is accepted and at least one is not accepted, it is necessary to determine the total cardiorespiratory functional impairment rating (as set out in the previous steps), and then to moderate that rating by applying Chapter 19 to determine the impairment due to the accepted condition.

The result that is then derived is the “total accepted cardiorespiratory functional impairment rating”.

Step 8: Determine whether any ratings from the cardiorespiratory Other Impairment tables apply.

Cardiorespiratory Other Impairment tables

Once the total accepted cardiorespiratory functional impairment rating has been determined, it must be compared with the relevant cardiorespiratory Other Impairment tables. For assessment purposes, four categories of cardiorespiratory condition are recognised. These categories are:

- ◆ ischaemic heart disease;
- ◆ valvular heart disease;
- ◆ miscellaneous heart disease; and
- ◆ lower respiratory tract conditions.

There are four cardiorespiratory Other Impairment tables — corresponding to each of the above categories. These tables are:

- Table 1.7 — Cardiorespiratory Impairment: Ischaemic;
- Table 1.8 — Cardiorespiratory Impairment: Valvular;
- Table 1.9 — Cardiorespiratory Impairment: Miscellaneous; and
- Table 1.10 — Cardiorespiratory Impairment: Respiratory.

Only one rating is to be selected from each of these cardiorespiratory Other Impairment tables (Tables 1.7, 1.8, 1.9, and 1.10) for any condition or combination of conditions.

If accepted conditions belonging to more than one of the four categories of cardiorespiratory disease above are present, then the relative contribution of their effect on the total accepted cardiorespiratory functional impairment must be estimated by applying Chapter 20 (Apportionment). The rating for each condition will be the higher of the cardiorespiratory functional impairment rating attributed to it and its cardiorespiratory Other Impairment rating.

The cardiorespiratory worksheet (at page 42) should also be consulted.

**Other
Impairment
Table 1.7**



**CARDIORESPIRATORY IMPAIRMENT:
ISCHAEMIC HEART DISEASE**

Impairment Ratings	Criteria
NIL	No history of symptoms but evidence of transient ischaemia on exercise ECG testing.
TEN	<ul style="list-style-type: none"> • Coronary artery disease, characterised by typical history of angina pectoris. • Coronary artery disease, characterised by history of uncomplicated myocardial infarct, with no subsequent evidence of cardiac failure and infrequent or no angina. • Coronary artery disease with single disease (disease other than left main coronary) demonstrated on angiogram. • Coronary artery disease with successful coronary artery surgery, followed by no angina or only infrequent angina but no further infarcts or cardiac failure.
FIFTEEN	Coronary artery disease (not successfully corrected) demonstrated on angiogram.
TWENTY	<ul style="list-style-type: none"> • Coronary artery disease characterised by a history of myocardial infarct followed, immediately or after a lapse of time, by continuing angina or further infarcts. • Coronary artery disease characterised by left main coronary artery disease (not successfully corrected) demonstrated on angiogram. • Coronary artery disease with successful coronary artery surgery, followed, after a lapse of time, by frequent angina or further infarcts or cardiac failure.

Only one rating is to be selected from this table for any condition or combination of conditions. If more than one criterion applies, that which gives the higher or highest rating is to be chosen.

**No age adjustment
permitted for
this table**

Other Impairment Table 1.8



CARDIORESPIRATORY IMPAIRMENT: VALVULAR HEART DISEASE

Impairment Ratings	Criteria
NIL	<ul style="list-style-type: none"> Mitral valve prolapse with no or minimal symptoms. Aortic sclerosis with no or minimal symptoms.
FIVE	Diagnosed valvular heart disease (other than mitral valve prolapse or aortic sclerosis) with no symptoms and no X-ray evidence of cardiac failure.
TEN	Valvular heart disease with successful valve replacement, not requiring anticoagulant medication, with no subsequent symptoms or evidence of cardiac failure.
FIFTEEN	Valvular heart disease with successful valve replacement, requiring anticoagulant medication, with no subsequent symptoms or evidence of cardiac failure.

Only one rating is to be selected from this table for any condition or combination of conditions. If more than one criterion applies, that which gives the higher or highest rating is to be chosen.

No age adjustment permitted for this table

Other Impairment Table 1.9



CARDIORESPIRATORY IMPAIRMENT: MISCELLANEOUS

Impairment Ratings	Criteria
NIL	Flow murmurs.
TWO	Chronic asymptomatic arrhythmia, eg atrial fibrillation, atrial or ventricular ectopic beats.
FIVE	Need for a permanent pacemaker.

Only one rating is to be selected from this table for any condition or combination of conditions. If more than one criterion applies, that which gives the higher or highest rating is to be chosen.

No age adjustment permitted for this table

Arrhythmias are usually to be rated by applying Chapter 15 (Intermittent Impairment) unless they cause a permanent restriction of exercise tolerance, in which case they are to be assessed by their effect on effort tolerance.

**Other
Impairment
Table 1.10**



**CARDIORESPIRATORY IMPAIRMENT:
LOWER RESPIRATORY TRACT**

Impairment Ratings	Criteria
NIL	Asymptomatic pleural plaques.
TWO	<ul style="list-style-type: none"> • Recurrent lower respiratory infections (at least 6 per year). • Intermittent use of bronchodilator medication.
FIVE	<ul style="list-style-type: none"> • Daily use of inhaled steroids required. • Regular, daily use of bronchodilator medication. • Chronic cough, with production of at least 50 mL sputum/day.
TEN	<ul style="list-style-type: none"> • Regular, daily use of bronchodilator medication required in addition to daily inhaled steroids. • Chronic cough, with production of at least 100 mL sputum/day.
TWENTY	Repeated courses (at least several courses per year) or permanent use of oral steroids required.

Only one rating is to be selected from this table for any condition or combination of conditions. If more than one criterion applies, that which gives the higher or highest rating is to be chosen.

**No age adjustment
permitted for
this table**

Peripheral Vascular Conditions

Tables 1.2 and 1.3 are to be applied to assess those conditions that affect exercise tolerance from a cardiorespiratory point of view. Peripheral vascular conditions typically cause loss of function of the lower limbs only and therefore are to be assessed under lower limb impairment (using Chapter 3).

Atherosclerosis frequently causes both a cardiorespiratory condition and a peripheral vascular condition. In such cases, if both types of conditions are accepted conditions, then both conditions are to be rated using the appropriate assessment procedure.

The rating of asthma depends on the clinical circumstances. If asthma has caused chronic airways obstruction the method of assessment described in this chapter is to be applied. If there is little fixed obstruction and a large reversible component, the rating is to be based on the occurrence of attacks using the method of intermittent impairment (Chapter 15). Asthma can also be rated, if there is minimal loss of function, from Table 1.10.



Cardiorespiratory Worksheet

File No:

Veteran's given names:

Veteran's surname:

Condition(s) accepted for assessment

Veteran's height:

Veteran's D.o.B.:

Gender:

METs Assessment

Date of report:

Age:

Limiting symptoms =

METs level =

Lung Function Assessment

Date of test:

Age:

	FEV1	FVC	MEF 25-75
Actual			
Predicted			
(Act/Pred) × 100			
Impairment (Table 1.4)			

METs impairment rating: **A**

Physiological impairment rating (use highest assessment value): **B**

Find the accepted functional impairment from values A and B by using Table 1.5.

Please note that *Partially Contributing Impairment (Chapter 19)* may need to be used in calculating the accepted functional impairment.

Was Chapter 19 used? Yes No Accepted functional impairment **C**

Category	D Relative contribution to functional impairment (as ratio)	E Functional impairment for each category (by apportionment)	F Applicable Other Impairment rating	G Final rating for category (greater of E and F)
Ischaemic				
Valvular				
Other cardiac				
Respiratory				

The ratings in column G are not to be rounded or combined at this stage. They are all to be carried forward to be combined in the final combining of all ratings.

Signature	Name (Please print)	Date / /
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