

KIN 6056 Case Study: Jay Gaffigan

Instructions:

Please review the Jay Gaffigan *Case Study*.

Please provide your 1) preparticipation assessment (Is Mr. Gaffigan low-, moderate-, or high-risk?) 2) to include a list of all his risk factors (including the total number of risk factors), 3) any concerns you might have, and 4) special considerations you identify, 5) you complete assessment of Mr. Gaffigan's fitness status addressing all health-related fitness components.

Address all testing results and fill in all blanks, or missing data, such as percentile rankings and qualitative labels from the normative data.

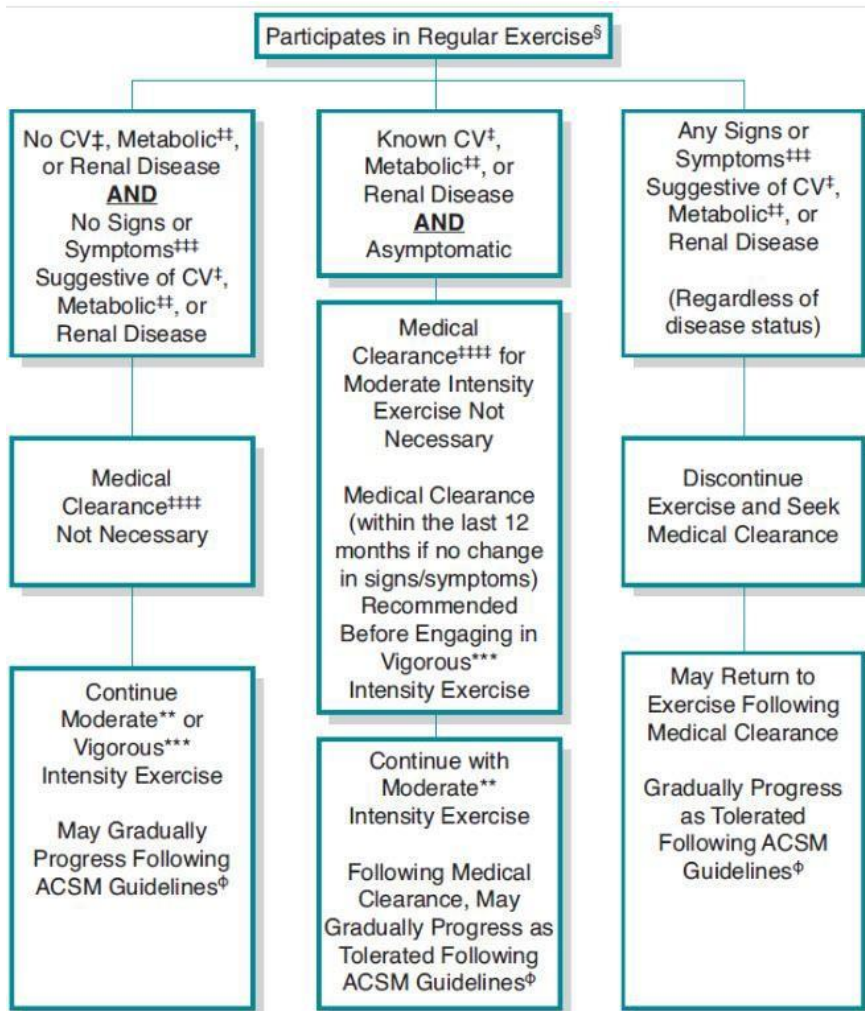
Please review the exhibits included (below) from the GETP 12, web (mortality/risk calculators, skinfold calculators, Balke protocol calculators) and the screening process from the GETP 9 in addition to your text, the assigned readings, and KIN 6056 lectures to draft a complete pre-participation assessment.

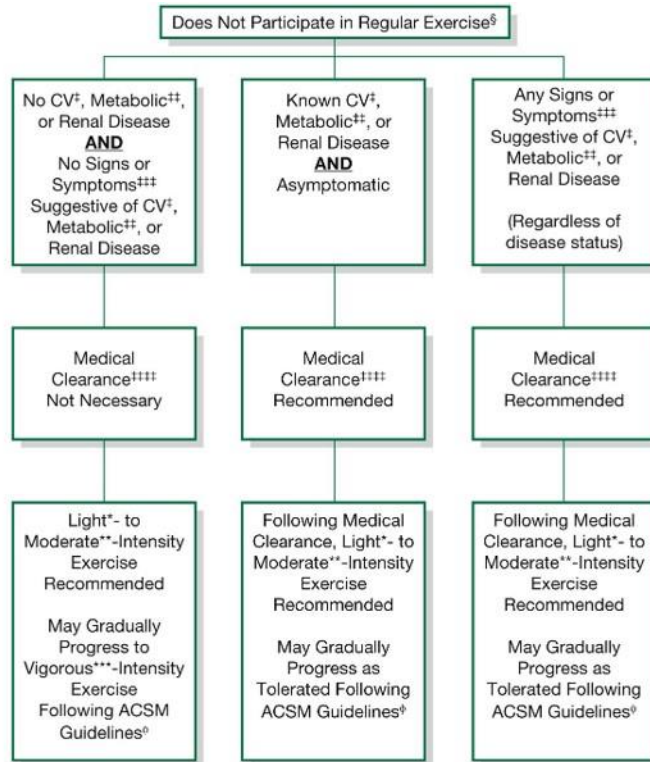
Some of the exhibits in this document are from earlier editions of the GETP and this document will be your only source. Examples would be the YMCA Bench Press Test for upper-body muscular endurance and the Partial Curl-up for abdominal muscular endurance.

Complete the fitness assessment on the Case Study 1 as well: Miley Serious.

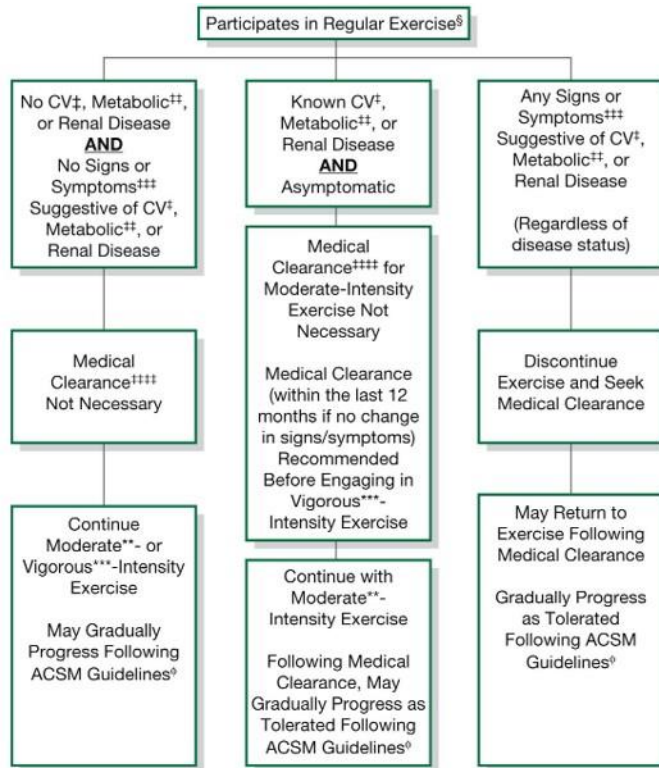
Subsequently, you will use your preparticipation assessment, along with your fitness assessment, and additional resources, to write an individualized, comprehensive exercise prescription aimed at improving all the health-related components of fitness, addressing Ms. Gaffigan's goals, Ms. Serious' goals, and any special considerations you identify. This will happen after the mid-term exam.

An incomplete list of exhibits from the GETP11 & 12 follows:

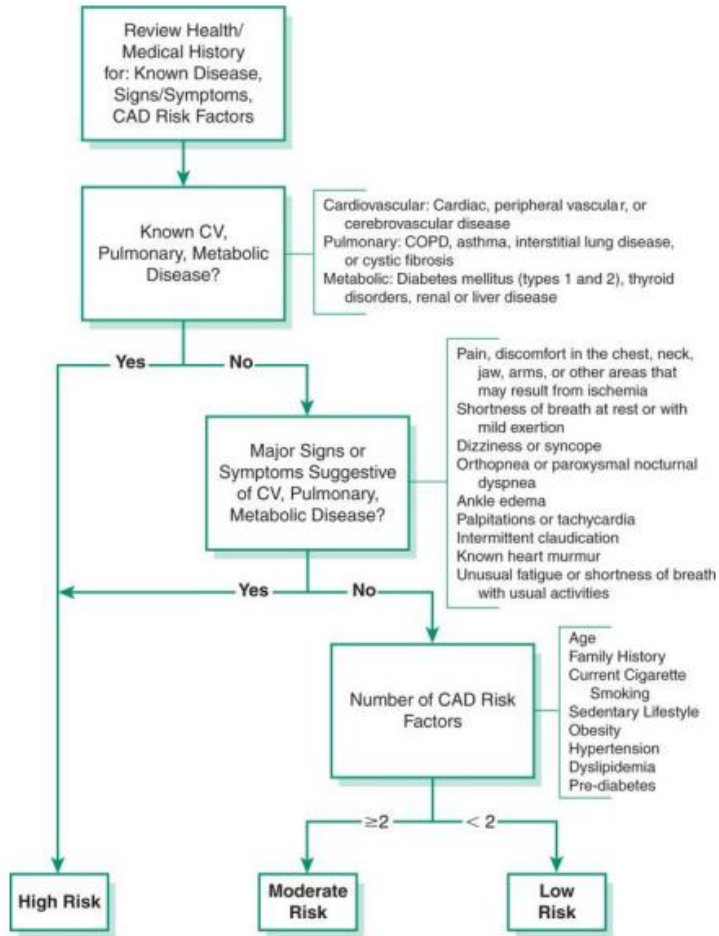


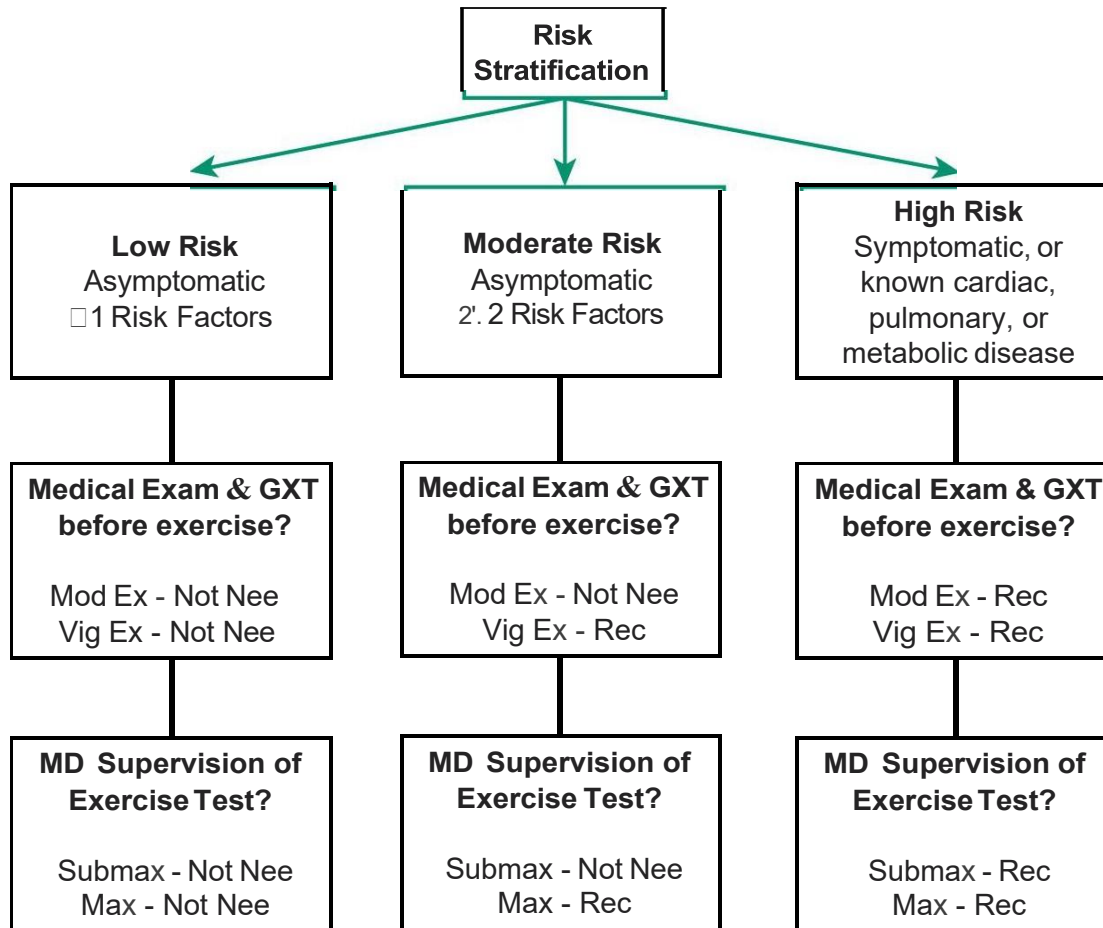


- [§]Exercise Participation Performing planned, structured physical activity at least 30 min at moderate intensity on at least 3 d · wk⁻¹ for at least the last 3 mo
- *Light-Intensity Exercise 30%–39% HRR or $\dot{V}O_2R$, 2–2.9 METs, RPE 9–11, an intensity that causes slight increases in HR and breathing
- **Moderate-Intensity Exercise 40%–59% HRR or $\dot{V}O_2R$, 3–5.9 METs, RPE 12–13, an intensity that causes noticeable increases in HR and breathing
- ***Vigorous-Intensity Exercise $\geq 60\%$ HRR or $\dot{V}O_2R$, ≥ 6 METs, RPE ≥ 14 , an intensity that causes substantial increases in HR and breathing
- [†]Cardiovascular (CV) Disease Cardiac, peripheral vascular, or cerebrovascular disease
- ^{‡‡}Metabolic Disease Type 1 and 2 diabetes mellitus
- ^{‡‡‡}Signs and Symptoms At rest or during activity. Includes pain, discomfort in the chest, neck, jaw, arms, or other areas that may result from ischemia; shortness of breath at rest or with mild exertion; dizziness or syncope; orthopnea or paroxysmal nocturnal dyspnea; ankle edema; palpitations or tachycardia; intermittent claudication; known heart murmur; unusual fatigue or shortness of breath with usual activities.
- ^{‡‡‡‡}Medical Clearance Approval from a health care professional to engage in exercise
- [§]ACSM Guidelines See the most current edition of ACSM's *Guidelines for Exercise Testing and Prescription*



- [§]Exercise Participation Performing planned, structured physical activity at least 30 min at moderate intensity on at least 3 d · wk⁻¹ for at least the last 3 mo
- ^{*}Light-Intensity Exercise 30%–39% HRR or $\dot{V}O_2R$, 2–2.9 METs, RPE 9–11, an intensity that causes slight increases in HR and breathing
- ^{**}Moderate-Intensity Exercise 40%–59% HRR or $\dot{V}O_2R$, 3–5.9 METs, RPE 12–13, an intensity that causes noticeable increases in HR and breathing
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- ^{‡‡‡‡}Medical Clearance Approval from a health care professional to engage in exercise
- [¶]ACSM Guidelines See the most current edition of *ACSM's Guidelines for Exercise Testing and Prescription*





Mod Ex: Moderate intensity exercise; 40-60% of $V_{\text{O}_2\text{max}}$; 3-6 METs; "an intensity well within the individual's capacity, one which can be comfortably sustained for a prolonged period of time (~45 minutes)"

Vig Ex: Vigorous intensity exercise; > 60% of $V_{\text{O}_2\text{max}}$; > 6 METs; "exercise intense enough to represent a substantial cardiorespiratory challenge"

Not Nee: Not Necessary; reflects the notion that a medical examination, exercise test, and physician supervision of exercise testing would not be essential in the preparticipation screening, however, they should not be viewed as inappropriate

Rec: Recommended; when MD supervision of exercise testing is "Recommended," the MD should be in close proximity and readily available should there be an emergent need

**TABLE 2.1. ACSM RISK STRATIFICATION CATEGORIES FOR
ATHEROSCLEROTIC CARDIOVASCULAR DISEASE**

Low risk	Asymptomatic men and women who have ≤ 1 CVD risk factor from Table 2.3
Moderate risk	Asymptomatic men and women who have ≥ 2 risk factors from Table 2.3
High risk	Individuals who have known cardiovascular, ^a pulmonary/ or metabolic ^b disease or one or more signs and symptoms listed in Table 2.2

ACSM, American College of Sports Medicine; CVD, cardiovascular disease.

^aCardiac, peripheral vascular, or cerebrovascular disease.

^bChronic obstructive pulmonary disease, asthma, interstitial lung disease, or cystic fibrosis.

^cDiabetes mellitus (type 1, type 2), thyroid disorders, renal, or liver disease.

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TABLE 2.2 • Cardiovascular Disease (CVD) Risk Factors and Defining Criteria

Positive Risk Factors	Defining Criteria
Age	Men ≥45 yr; women ≥55 yr (36)
Family history	Myocardial infarction, coronary revascularization, or sudden death before 55 yr in father or other male first-degree relative or before 65 yr in mother or other female first-degree relative (37)
Cigarette smoking	Current cigarette smoker or those who quit within the previous 6 mo or exposure to environmental tobacco smoke (37,38)
Physical inactivity	Not meeting the minimum threshold of 500-1,000 MET-min of moderate-to-vigorous physical activity or 75-150 min · wk ⁻¹ of moderate-to-vigorous intensity physical activity (23)
Body mass index/waist circumference	Body mass index ≥30 kg · m ⁻² or waist girth >102 cm (40 in) for men and >88 cm (35 in) for women (39)
Blood pressure	Systolic blood pressure ≥130 mm Hg and/or diastolic ≥80 mm Hg, based on an average of 2 readings obtained on 2 occasions, or on antihypertensive medication (40)
Lipids	Low-density lipoprotein cholesterol (LDL-C) ≥130 mg · dL ⁻¹ (3.37 mmol · L ⁻¹) or high-density lipoprotein cholesterol (HDL-C) <40 mg · dL ⁻¹ (1.04 mmol · L ⁻¹) in men and <50 mg · dL ⁻¹ (1.30 mmol · L ⁻¹) in women or non-HDL-C ≥160 (4.74 mmol · L ⁻¹) or on lipid-lowering medication. If total serum cholesterol is all that is available, use ≥200 mg · dL ⁻¹ (5.18 mmol · L ⁻¹) (41)
Blood glucose	Fasting plasma glucose ≥100 mg · dL ⁻¹ (5.5 mmol · L ⁻¹); or 2 h plasma glucose values in oral glucose tolerance test (OGTT) ≥140 mg · dL ⁻¹ (7.7 mmol · L ⁻¹); or HbA1c ≥6.5% (42)

TABLE 3.2 • Risk Criteria for Waist Circumference in Adults

Risk Category	Waist Circumference cm (in)	
	Women	Men
Very low	<70 cm (<27.5 in)	<80 cm (31.5 in)
Low	70-89 (27.5-35.0)	80-99 (31.5-39.0)
High	90-110 (35.5-43.0)	100-120 (39.5-47.0)
Very high	>110 (>43.5)	>120 (>47.0)

Reprinted with permission from (46).

Negative Risk Factors	Defining Criteria
HDL-C ⁰	>60 mg · dL ⁻¹ (1.55 mmol · L ⁻¹) (41)

⁰If the presence or absence of a CVD risk factor is not disclosed or is not available, that CVD risk factor should be counted as a risk factor.

⁰High HDL-C is considered a negative risk factor. For individuals having high HDL 60 mg · dL⁻¹ (7.55 mmol · L⁻¹), one positive risk factor is subtracted from the sum of positive risk factors

HbA1c, glycated hemoglobin; MET, metabolic equivalent; non-HDL-C, total cholesterol minus HDL-C

The waist-to-hip ratio (WHR) is the circumference of the waist divided by the circumference of the hips (see Box 3.3 for waist and buttocks/hips measures) and has traditionally been used as a simple method for assessing body fat distribution patterns and identifying individuals with higher amounts of abdominal fat or central adiposity (40). Health risk increases as WHR increases, and the standards for risk vary with age and sex. For example, for those younger than 60 yr of age, health risk is very high for men when WHR is >0.95 and for women when WHR is >0.86 for individuals aged 60-69 cutoff 0.95 for men and >0.90 for women for the same high risk classification as young adults (21).

TABLE J.5 • Percentages of Body Composition (Body Fat) by Age

%		Age (yr)					
		20-29	30-39	40-49	50-59	60-69	70-79
10	Very lean	11.4	11.0	11.7	13.8	13.8	13.7
15		14.1	13.8	15.2	16.1	17.0	16.4
20	Excellent	15.2	15.5	16.8	19.1	20.1	18.8
25		16.1	16.5	18.2	20.3	22.0	21.2
30	Good	16.8	17.5	19.5	22.3	23.2	22.6
35		17.7	18.0	20.5	23.5	24.5	23.7
40	Fair	18.6	19.2	21.6	24.7	25.5	24.5
45		19.2	20.1	22.6	25.7	26.0	25.4
50	Fair	20.0	21.0	23.6	26.7	27.5	26.3
55		20.7	22.1	24.6	27.4	28.3	27.1
60	Fair	21.8	22.9	25.5	28.3	29.2	27.8
65		22.6	23.7	26.4	29.2	30.1	28.6
70	Poor	23.5	24.8	27.4	30.0	30.8	30.0
75		24.4	25.8	28.3	30.7	31.5	30.9
80	Very poor	25.7	26.9	29.5	31.7	32.5	31.1
85		26.9	28.1	30.7	32.3	33.3	32.6
90	Very poor	28.6	29.6	31.9	33.8	34.4	33.6
95		30.9	31.4	33.4	34.9	35.4	35.0
100	Very poor	33.8	33.6	35.0	36.0	36.0	36.1
105		37.1	36.2	37.0	37.4	38.1	37.5
110	Very poor	38.4	39.0	39.0	39.8	40.3	40.0
115		39.4	39.0	39.0	39.8	40.3	40.0
n		1,342	4,376	6,312	4,400	1,576	325

Very lean, no less than 10-13% body fat is recommended for women.

Total n = 18,507

Adapted with permission from *Phys/CBI Fitness Assessment* and *Noons for Adults*, by J. Law and R. M.

The Cooper Institute, Dallas, Texas - 2013. For more information: <http://www.cooperinstitute.org>.

TABLE 4.1 • Pretest Likelihood of Ischemic Heart Disease^a

Age	Sex	Typical/ Definite Angina Pectoris	Atypical/ Probable Angina Pectoris	Nonanginal Chest Pain	Asymptomatic
30 to 39 yr	Men	Intermediate	Intermediate	Low	Very Low
	Women	Intermediate	Very Low	Very Low	Very Low
40 to 49 yr	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Low	Very Low	Very Low
50 to 59 yr	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Intermediate	Low	Very Low
60 to 69 yr	Men	High	Intermediate	Intermediate	Low
	Women	High	Intermediate	Intermediate	Low

^aNo data exist for patients who are <30 or >69 yr, but it can be assumed that prevalence of ischemic heart disease increases with age. In a few cases, patients with ages at the extremes of the decades listed may have probabilities slightly outside the high or low range. High indicates >90%; intermediate, 10%–90%; low, <10%; and very low, <5%.

Reprinted with permission from (5).

Use both mortality calculators to assess 10-year risk of mortality:

[Cleveland 10-year Mortality prognosis based on GXT](#)

[American College of Cardiology 10-year mortality calculator](#)

[Pre-test likelihood of CAD Calculator](#) (Diamond Forrester)

Contrast to GETP 9 Preparticipation screening process using the algorithms below.

Fitness Assessment (Please use your GETP if possible):

Table 3-13 Fitness Categories for the Push-up by Age and Sex

Category	AGE (yr)									
	20-29 y.o.		30-39 y.o.		40-49 y.o.		50-59 y.o.		60-69 y.o.	
	SEX: M	W	M	W	M	W	M	W	M	W
Excellent	≥36	≥30	≥30	≥27	≥25	≥24	≥21	≥21	≥18	≥17
Very Good	29-35	21-29	22-29	20-26	20-26	15-23	13-20	11-20	11-17	12-16
Good	22-28	15-20	17-21	13-19	13-19	11-14	10-12	7-10	8-10	5-11
Fair	17-21	10-14	12-16	8-12	10-12	5-10	7-9	2-6	5-7	2-4
Poor	≤16	≤9	≤11	≤7	≤9	≤4	≤6	≤1	≤4	≤1

Reprinted with permission from the Canadian Society for Exercise Physiology (141) in ACSM's GETP11 p100.

TABLE 3.1 • Classification of Disease Risk Based on Body Mass Index (BMI) and Waist Circumference			
Disease Risk ^a Relative to Normal Weight and Waist Circumference			
	BMI (kg · m ⁻²)	Men, ≤102 cm Women, ≤88 cm	Men, >102 cm Women, >88 cm
Underweight	<18.5	—	—
Normal	18.5–24.9	—	—
Overweight	25.0–29.9	Increased	High
Obesity, class			
I	30.0–34.9	High	Very high
II	35.0–39.9	Very high	Very high
III	≥40.0	Extremely high	Extremely high

^aDisease risk for Type 2 diabetes, hypertension, and cardiovascular disease.
Dashes (—) indicate that no additional risk at these levels of BMI was assigned. Increased waist circumference can also be a marker for increased risk even in individuals of normal weight.
Modified from (26).

TABLE 3.2 • Risk Criteria for Waist Circumference in Adults

Risk Category	Waist Circumference cm (in)	
	Women	Men
Very low	<70 cm (<27.5 in)	<80 cm (31.5 in)
Low	70-89 (27.5-35.0)	80-99 (31.5-39.0)
High	90-110 (35.5-43.0)	100-120 (39.5-47.0)
Very high	>110 (>43.5)	>120 (>47.0)

Reprinted with permission from (46).

The waist-to-hip ratio (WHR) is the circumference of the waist divided by the circumference of the hips (see Box 3.3 for waist and buttocks/hips measures) and has traditionally been used as a simple method for assessing body fat distribution patterns and identifying individuals with higher amounts of abdominal fat or central adiposity (40). Health risk increases as WHR increases, and the standards for risk vary with age and sex. For example, for those younger than 60 yr of age, health risk is *very high* for men when WHR is >0.95 and for women when WHR is >0.86 or in individuals aged 60-69, the WHR cutoff values are >1.03 for men and >0.90 for women for the same health risk classification as young adults (21).

TABLE J.4 • Fitness Categories for Body Composition for Men by Age

Age (yr)	Body Fat (%)					
	20-29	30-39	40-49	50-59	60-69	70-79
Very lean	4.2	7.3	9.5	11.1	12.0	13.6
	6.4	10.3	13.0	14.9	16.1	15.5
	7.9	12.5	15.0	17.0	18.1	17.5
Excellent	9.1	13.8	16.4	18.3	19.2	19.0
	10.5	14.9	17.5	19.4	20.2	20.2
	11.5	15.9	18.5	20.2	21.0	21.1
Good	12.6	16.8	19.3	21.0	21.7	21.6
	13.8	17.7	20.1	21.7	22.4	22.3
	14.8	18.4	20.8	22.3	23.0	22.9
Fair	15.5	19.2	21.4	23.0	23.6	23.6
	16.7	20.0	22.1	23.6	24.2	24.1
	17.5	20.7	22.6	24.2	24.9	24.5
Fair	18.8	21.8	23.5	24.9	25.8	25.2
	19.5	22.4	24.2	25.6	26.4	25.7
	20.7	23.2	24.9	26.3	27.0	26.3
Fair	22.1	24.1	25.7	27.1	27.9	27.1
	23.3	25.1	26.6	28.1	28.6	26.0
	25.1	26.4	27.7	29.2	29.8	29.3
Very poor	26.6	27.8	29.1	30.6	31.2	30.6
	29.3	30.2	31.2	32.7	33.5	32.9
	33.7	34.4	35.2	36.4	37.2	37.3
<i>n</i>	1,938	10,457	16,032	9,976	3,097	571

Very lean: no less than 11% body fat is recommended for men.

Total *n* = 42,071.

Adapted with permission from *Physical Activity Fitness Assessments and Norms for All Adults and Law Enforcement*.

The Cooper Institute, Dallas, Texas, 2013. For more information: <http://www.cooperinstitute.org>.

TABLE 3.5 • Fitness Categories for Body Composition (Body Fat) for Women by Age

Age (yr)	Age (yr)					
	20-29	30-39	40-49	50-59	60-69	70-79
99	11.4	11.0	11.7	13.8	13.8	13.7
95	14.1	13.8	15.2	16.9	17.7	16.4
90	15.2	15.8	16.8	19.1	20.1	18.8
85	16.1	16.5	18.2	20.8	22.0	21.2
80	16.8	17.5	19.5	22.3	23.2	22.6
75	17.7	18.3	20.5	23.5	24.5	23.7
70	18.6	19.2	21.6	24.7	25.5	24.5
65	19.2	20.1	22.6	25.7	26.6	25.4
60	20.0	21.0	23.6	26.6	27.5	26.3
55	20.7	22.0	24.6	27.4	28.3	27.1
50	21.8	22.9	25.8	28.3	29.2	27.8
45	22.6	23.7	26.4	29.2	30.1	28.6
40	23.5	24.8	27.4	30.0	30.8	30.0
35	24.4	25.8	28.3	30.7	31.5	30.9
30	25.7	26.9	29.8	31.7	32.5	31.6
25	26.9	28.1	30.7	32.8	33.3	32.6
20	28.6	29.6	31.9	33.8	34.4	33.6
15	30.9	31.4	33.4	34.9	35.4	35.0
10	33.8	33.6	35.0	36.0	36.6	36.1
5	36.6	36.2	37.0	37.4	38.1	37.5
	38.4	39.0	39.0	39.8	40.3	40.0
<i>n</i>	1,342	4,376	6,392	4,496	1,576	325

*Very lean, no less than 10-13% body fat is recommended for women.

Total *n* = 18,507

Adapted with permission from *Physical Fitness Assessment and Norms for Adults and Law Enforcement*.

The Cooper Institute, Dallas, Texas, 2013. For more information: <http://www.cooperinstitute.org>.

TABLE 3.8 • Treadmill-Induced Cardiorespiratory Fitness (VO_{2max}) by Age and Sex

		WOMEN				
		Age Group (yr)				
Percentile		20-29	30-39	40-49	50-59	60-69
95	Superior	56.0	45.8	41.7	35.9	29.4
90		51.3	41.4	38.4	32.0	27.0
85	Excellent	48.3	39.3	36.0	30.2	25.6
80		46.5	37.5	34.0	28.6	24.6
75		44.7	36.1	32.4	27.6	23.8
70	Good	43.2	34.6	31.1	26.8	23.1
65		41.6	33.5	30.0	26.0	22.0
60		40.6	32.2	28.7	25.2	21.2
55		38.9	31.2	27.7	24.4	20.5
50	Fair	37.6	30.2	26.7	23.4	20.0
45		35.9	29.3	25.9	22.7	19.6
40		34.6	28.2	24.9	21.8	18.9
35		33.6	27.4	24.1	21.2	18.4
30	Poor	32.0	26.4	23.3	20.6	17.9
25		30.5	25.3	22.1	19.9	17.2
20		28.6	24.1	21.3	19.1	16.5
15		26.2	22.5	20.0	18.3	15.6
10	Very Poor	23.9	20.9	18.8	17.3	14.6
5		21.7	19.0	17.0	16.0	13.4
		(n=410)	(n=608)	(n=843)	(n=805)	(n=408)

Percentiles from cardiorespiratory exercise testing on a treadmill with measured maximal volume of oxygen consumed per unit time (liters per minute) (ml · kg⁻¹ · min⁻¹). Data obtained from the Fitness Registry and the Importance of Exercise National Database (FRIEND) Registry for men and women who were considered free from known cardiovascular disease. Adapted with permission from (124).

TABLE 3.8 • Treasured-ness of Maximum Resting $\dot{V}O_{2max}$ by Age and Sex

$\dot{V}O_{2max}$ ($ml \cdot O_2 \cdot kg^{-1} \cdot min^{-1}$)

		MEN				
		Age Group (yr)				
Percentile		20-29	30-39	40-49	50-59	60-69
95	Superior	66.3	59.8	55.6	50.7	43.0
90		61.8	56.5	52.1	45.6	40.3
85	Excellent	59.3	54.2	49.3	43.2	38.2
80		57.1	51.6	46.7	41.2	36.1
75		55.2	49.2	45.0	39.7	34.5
70	Good	53.7	48.0	43.9	38.2	32.9
65		52.1	46.6	42.1	36.3	31.6
60		50.2	45.2	40.3	35.1	30.5
55		49.0	43.8	38.9	33.8	29.1
50	Fair	48.0	42.4	37.8	32.6	28.2
45		46.5	41.3	36.7	31.6	27.2
40		44.9	39.6	35.7	30.7	26.6
35		43.8	38.8	34.6	29.5	25.7
30	Poor	41.9	37.4	33.3	28.4	24.6
25		40.1	35.9	31.9	27.1	23.7
20		38.1	34.1	30.5	26.1	22.4
15		35.4	32.7	29.0	24.4	21.2
10	Very Poor	32.1	30.2	26.8	22.8	19.8
5		29.0	27.2	24.2	20.9	17.4

TABLE 1.9 • Cycle Ergometer-Based Cardiorespiratory Fitness Classifications ($\dot{V}O_{2max}$) by Age and Sex
(air/wed)

$\dot{V}O_{2max}$ ($ml\ O_2 \cdot kg^{-1} \cdot min^{-1}$)

		WOMEN				
		Age Group (yr)				
Percentile		20-29	30-39	40-49	50-59	60-69
95	Superior	45.2	33.2	29.3	25.0	22.0
90		42.6	30.0	26.2	22.6	20.5
85	Excellent	40.9	27.8	24.4	21.5	19.3
80		38.8	26.0	23.4	20.7	18.8
75		37.1	25.1	22.6	20.1	18.3
70		35.6	24.2	22.0	19.3	17.8
65	Good	34.6	23.3	21.4	18.9	17.3
60		33.6	22.5	20.7	18.2	16.7
55		32.4	22.1	22.0	17.7	16.3
50		31.0	21.6	19.4	17.3	16.0
45	Fair	29.8	21.0	18.8	17.0	15.7
40		28.1	20.1	18.4	16.6	15.4
35		26.6	19.5	17.9	16.2	15.1
30		25.6	18.8	17.1	15.7	14.7
25	Poor	23.2	17.9	16.5	15.3	14.4
20		21.6	17.0	15.8	14.9	14.0
15		20.4	16.3	15.4	14.4	13.5
10	Very Poor	19.3	15.2	14.6	13.7	13.0
5		17.1	14.4	13.5	12.8	12.2
		(n = 410)	(n = 608)	(n = 843)	(n = 805)	(n = 408)

Percentiles from cardiopulmonary exercise testing on a cycle ergometer with measured maximal volume of oxygen consumed per unit time ($\dot{V}O_{2max}$) ($ml\ O_2 \cdot kg^{-1} \cdot min^{-1}$).
 Data obtained from the Fitness Registry and the Importance of Exercise National Database (FRIEND) Registry for men and women who were considered free from known cardiovascular disease.
 Adapted with permission from (124).

VO_{max} (ml·0.2·kg⁻¹·min⁻¹)

MEN

Group (yr)

		20-29	30-39	40-49	50-59	60-69
95	Superior	58.S	44.7	41.Q	37.4	324
90		55.S	41.7	37.1	34.0	29.9
85		53.9	38.1	34.9	32.1	27.8
80		51.4	36.2	34.2	30.7	26.7
75		49.S	35.0	31.8	29.3	25.S
70		47.9	33.9	30.4	28.2	24.5
65	Good	46.0	31.8	29.3	27.1	24.0
60		44.S	31.1	28.6	26.3	23.2
55		43.1	30.7	28.0	25.7	229
50	Fair	41.9	30.1	27.1	24.8	224
45		40.2	29.4	26.2	24.2	21.9
40		38.3	28.1	25.4	23.6	21.4
35		37.6	27.S	24.9	23.0	21.0
30		36.2	26.9	24.0	226	20.2
25	Poor	34.7	26.2	229	221	19.7
20		33.2	25.4	222	21.5	19.0
15		31.8	23.9	21.6	20.8	18.4
10	Very Poor	29.S	21.8	20.6	20.4	17.3
5		25.S	19.3	18.9	18.1	15.3

TABLE 3.11 • Fitness CB (egom: sfa, UpperBodyStrength/2, Men/111 Women by Age

Bench Press Weight Ratio: weight pushed in lb / body weight in lb

		MEN					
		Age Group (yr)					
Percentile		<20	20-29	30-39	40-49	50-59	60+
99	Superior	>1.76	>1.63	>1.35	>1.20	>1.05	>0.94
95		1.76	1.63	1.35	1.20	1.05	0.94
90		1.46	1.45	1.24	1.10	0.97	0.84
85	Excellent	1.38	1.37	1.17	1.04	0.93	0.84
80		1.34	1.32	1.12	1.00	0.90	0.82
75		1.29	1.26	1.08	0.96	0.87	0.79
70	Good	1.24	1.22	1.04	0.93	0.84	<i>O.N</i>
65		1.23	1.18	1.01	0.90	0.81	0.74
60		1.19	1.14	0.98	0.88	0.79	<i>O.N</i>
55	Fair	1.16	1.10	0.96	0.86	<i>O.N</i>	0.70
50		1.13	1.06	0.93	0.84	0.75	0.68
45		1.10	1.03	0.90	0.82	0.73	0.67
40	Poor	1.06	0.99	0.88	0.80	0.71	0.66
35		1.01	0.96	0.86	0.78	0.70	0.65
30		0.96	0.93	0.83	0.76	0.68	0.63
25		0.93	0.90	0.81	0.74	0.66	0.60
20		0.89	0.88	0.78	<i>O.N</i>	0.63	0.57
15		0.86	0.84	0.75	0.69	0.60	0.56
10	Very Poor	0.81	0.80	0.71	0.65	0.57	0.53
5		0.76	<i>O.N</i>	0.65	0.59	0.53	0.49
		<0.76	<i>O.N</i>	<0.65	<0.59	<0.53	<0.49
<i>n</i>		60	425	1,909	2,090	1,279	343

Total n = 6,106

Table 3.11 • Fitness Categories for Body Strength for Nonmilitary by Age (a, n, o, d)

Bench Press Weight Ratio = weight pushed in lb ÷ body weight in lb

		WOMEN					
		Age Group (yr)					
Percentile		<20	20-29	30-39	40-49	50-59	60+
99	Superior	>0.88	>1.01	>0.82	>0.77	>0.68	>0.72
95		0.88	1.01	0.82	0.77	0.68	0.72
90		0.83	0.90	0.76	0.71	0.61	0.64
85	Excellent	0.81	0.83	0.72	0.66	0.57	0.59
80		0.77	0.80	0.70	0.62	0.55	0.54
75		0.76	0.77	0.65	0.60	0.53	0.53
70	Good	0.74	0.74	0.63	0.57	0.52	0.51
65		0.70	0.72	0.62	0.55	0.50	0.48
60		0.65	0.70	0.60	0.54	0.48	0.47
55	Fair	0.64	0.68	0.58	0.53	0.47	0.46
SD		0.63	0.65	0.57	0.52	0.46	0.45
45		0.60	0.63	0.55	0.51	0.45	0.44
40	Poor	0.58	0.59	0.53	0.50	0.44	0.43
35		0.57	0.58	0.52	0.48	0.43	0.41
30		0.56	0.56	0.51	0.47	0.42	0.40
25	Very Poor	0.55	0.53	0.49	0.45	0.41	0.3<1
20		0.53	0.51	0.47	0.43	0.3<1	0.38
15		0.52	0.50	0.45	0.42	0.38	0.36
10		0.50	0.48	0.42	0.38	0.37	0.33
5		0.41	0.44	0.39	0.35	0.31	0.26
		<0.41	<0.44	<0.39	<0.35	<0.31	<0.26
n		20	191	379	333	189	42

Total n = 1,154

One repetition maximum (1-RM) bench press, with bench press weight ratio = weight pushed in pounds per body weight in pounds. 1-RM was measured using a Universal Dynamic Variable Resistance (UDVR) machine.

Adapted with permission from *Physical Fitness Assessments and Norms for Adults and Law Enforcement*. The Cooper Institute, Dallas, Texas. 2013. For more information: <http://www.cooperinstitute.org>.

TABLE 12. Fitness Categories for Leg Strength by Age and Sex*

Leg Press Weight Ratio = weight lifted / body weight in lb

		MEN				
		Age Group (yr)				
Percentile		20-29	30-39	40-49	50-59	60+
90	Well above average	227	207	192	180	173
80	Above average	213	193	182	171	162
70		205	185	174	164	156
60	Average	1.97	1.77	1.68	1.58	1.49
50		1.91	1.71	1.62	1.52	1.43
40	Below average	1.83	1.65	1.57	1.46	1.38
30		1.74	1.59	1.51	1.39	1.30
20	Well below average	1.63	1.52	1.44	1.32	1.25
10		1.51	1.43	1.35	1.22	1.16

		WOMEN				
		Age Group (yr)				
Percentile		20-29	30-39	40-49	50-59	60+
90	Well above average	1.82	1.61	1.48	1.37	1.32
80	Above average	1.68	1.47	1.37	1.25	1.18
70		1.58	1.39	1.29	1.17	1.13
60	Average	1.50	1.33	1.23	1.10	1.04
50		1.44	1.27	1.18	1.05	0.99
40	Below average	1.37	1.21	1.13	0.99	0.93
30		1.27	1.15	1.08	0.95	0.88
20	Well below average	1.22	1.09	1.02	0.88	0.85
10		1.14	1.00	0.94	0.78	0.72

*One repetition maximum (1-RM) leg press weight ratio = weight pushed per body weight.
 1-RM was measured using a Universal Dynamic Variable Resistance (DVR) machine.
 Study population for the data set was predominantly white and college educated.
 Adapted from Institute of Aerobics Research, Dallas, 1994.

	Age(yr):					
	9-19		20-44		45-9	
	M	F	M	F	M	F
Hip extension	18(17-20)	21 (19-22)	17(16-19)	18(17-19)	14(13-15)	17(16-18)
Hip flexion	135 (133-137)	135 (133-137)	130 (129-132)	134 (133-135)	127 (126-129)	131 (129-132)
Knee flexion	142 (140-144)	142 (141-144)	138 (137-139)	142 (141-143)	133 (132-134)	138 (137-139)
Knee extension	2(1-3)	2(2-3)	1(1-1)	2(1-2)	1(0-1)	1(1-2)
Ankle dorsiflexion	16(15-18)	17(16-19)	13(12-14)	14(13-15)	12(11-13)	12(11-13)
Ankle plantar flexion	53(51-55)	57(55-60)	55(53-56)	62(61-64)	49(48-51)	57(55-58)
Shoulder flexion	171 (169-173)	172 (170-174)	169 (167-170)	172 (171-173)	164 (162-166)	168 (167-170)
Elbow flexion	148 (147-150)	150 (149-151)	145 (144-146)	150 (149-151)	144 (142-145)	148 (147-149)
Elbow extension	5(4-7)	6(5-8)	1(0-2)	5(4-6)	-1(-2-0)	4(3-5)
Elbow pronation	80(79-82)	81(80-83)	76(76-78)	82(81-83)	75(75-79)	81(80-82)
Elbow supination	88(86-90)	90(88-92)	85(84-86)	91(89-92)	82(81-84)	87(86-88)

M, men; W, women.

Data are means(95% confidence interval).

Adapted with permission from (151).

TABLE 4.15. ATNESS CATEGORIE5 BY AGE GROUPS FOR TRUNK FORWARD FLEXION USING A SIT-AND-REACH BOX (,cm)"

CATEGORY	AGE									
	20-29		30-39		41)-49		50-59		60-69	
SEX	M	F	M	F	M	F	M	F	M	F
Excellent	40	41	38	41	35	38	35	39	33	35
Very good	39	40	37	40	34	37	34	38	32	34
	34	37	33	36	29	34	28	33	25	31
Good	33	36	32	35	28	33	27	32	24	30
	30	33	28	32	24	30	24	30	20	27
Fair	29	32	27	31	23	29	23	29	19	26
	25	28	23	27	18	25	16	25	15	23
Needs improvement	24	27	22	26	17	24	15	24	14	22

M, male; F, female

Note: These norms are based on data from a sit-and-reach box in which the zero point is 26 cm. Who? usiri, g., box in the zero point is set at H (m, 1A.d.; u-acc 3 011 & om ea(1111atu i11 tlm table.

Source: C., 11, zdof, . fir. otim: & /Jfistyf6 1: CSEJ>-1-1.ruWJ & Fitlesl leff"!: 3rd ed., 2000. LJ; ed witl P"rmioaic" fom lho G,,; d:iar, Sc-ci,,r; f'w E.erti,, Phric:ciY

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TABLE 4.16. PERCENTILES BY AGE GROUPS AND SEX FOR YMCA SIT-AND-REACH TEST (INCHES)

PERCENTILE	AGE											
	18-25		26-35		36-45		46-55		56-65		>65	
SEX	M	F	M	F	M	F	M	F	M	F	M	F
90	22	24	21	23	21	22	19	21	17	20	17	20
80	20	22	19	21	19	21	17	20	15	19	15	18
70	19	21	17	20	17	19	15	18	13	17	13	17
60	18	20	17	20	16	18	14	17	13	16	12	17
50	17	19	15	19	15	15	13	16	11	15	10	15
40	15	18	14	17	13	16	11	14	9	14	9	14
30	14	17	13	16	13	15	11	14	9	13	8	13
20	13	16	11	15	11	14	11	14	7	12	7	11
10	11	14	9	13	7	11	6	10	8	9	4	9

M, male; F, female

Note: Following norms are based on data from a sit-and-reach box in which the zero point is 26 cm. Who? usiri, g., box in the zero point is set at H (m, 1A.d.; u-acc 3 011 & om ea(1111atu i11 tlm table.

Source: C., 11, zdof, . fir. otim: & /Jfistyf6 1: CSEJ>-1-1.ruWJ & Fitlesl leff"!: 3rd ed., 2000. LJ; ed witl P"rmioaic" fom lho G,,; d:iar, Sc-ci,,r; f'w E.erti,, Phric:ciY

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BOX 4.6

Push-up and Curl-up (Crunch) Test Procedures for Measurement of Muscular Endurance

CURL-UP (CRUNCH)

1. The individual assumes a supine position on a mat with the knees at 90 degrees. The arms are at the side, palms facing down with the middle fingers touching a piece of masking tape. A second piece of masking tape is placed 10 cm apart.⁴ Shoes remain on during the test.
2. A metronome is set to 50 beats·min⁻¹ and the individual does slow, controlled curl-ups to lift the shoulder blades off the mat (trunk makes a 30-degree angle with the mat) in time with the metronome at a rate of 25 per minute. The test is done for 1 minute. The low back should be flattened before curling up.
3. Individual performs as many curl-ups as possible without pausing, to a maximum of 25.^{1,2}

¹Alternatives include (a) having the hands held across the chest, with the head activating a counter when the trunk reaches a 30-degree position (17) and placing the hands on the thighs and curling up until the hands reach the knee caps (18). Elevation of the trunk to 30 degrees is the important aspect of the movement.

²An alternative includes doing as many curl-ups as possible in 1 minute.

From Canadian Society for Exercise Physiology. *Canadian Physical Activity, Fitness & Lifestyle Approach: CSEP Health & Fitness Program's Appraisal & Counseling Strategy*, 3rd ed. Ottawa (ON): Canadian Society for Exercise Physiology; 2003, with permission.

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TABLE 4.12. FITNESS CATEGORIES BY AGE GROUPS AND SEX FOR PARTIAL CURL-UP

CATEGORY	AGE									
	20-29		30-39		40-49		50-59		60-69	
	M	F	M	F	M	F	M	F	M	F
Excellent	25	25	25	25	25	25	25	25	25	25
Very good	24	24	24	24	24	24	24	24	24	24
	21	18	18	19	18	19	17	17	16	17
Good	20	17	17	18	17	18	16	16	15	16
	16	15	15	10	13	11	11	10	11	8
Fair	15	13	14	9	12	10	10	9	10	7
	11	5	11	6	6	4	8	6	6	3
Needs improvement	10	4	10	5	5	3	7	5	5	2

M, male; F, female

Source: Canadian Physical Activity, Fitness & Lifestyle Approach; CSEP Health & Fitness Program's Appraisal & Counseling Strategy, 3rd ed. ©2003, Updated with permission from the Canadian Society for Exercise Physiology.

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TABLE 4.13. YMCA BENCH PRESS TEST: TOTAL LIFTS

CATEGORY	ACE											
	18-25		26-35		36-45		46-55		56-65		>65	
SEX	M	F	M	F	M	F	M	F	M	F	M	F
Excellent	64	66	61	62	55	57	47	50	41	42	36	30
	44	42	41	40	36	33	28	29	24	24	20	18
Good	41	38	37	34	32	30	25	24	21	21	16	16
	34	30	30	29	26	26	21	20	17	17	12	12
Above average	33	28	29	28	25	24	20	18	14	14	10	10
	29	25	26	24	22	21	16	14	12	12	9	8
Average	28	22	24	22	21	20	14	13	11	10	8	7
	24	20	21	18	18	16	12	10	9	8	7	5
Below average	22	18	20	17	17	14	11	9	8	6	6	4
	20	16	17	14	14	12	9	7	5	5	4	3
Poor	17	13	16	13	12	10	8	6	4	4	3	2
	13	9	12	9	9	6	5	2	2	2	2	0
Very poor	<10	6	9	6	6	4	2					0

M, male. F, female.

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