

TABLE 1

Tests and batteries used to assess physical fitness in military and security corps. The studies are organized by chronological order.

Fitness component	Author	Sample (sex, age)	Corporation (country)	Physical fitness test	Variables
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness Body composition	(Pipes, 1977)	20 men 21-29 y	Fireman (Los Angeles, United States)	Incremental cycle ergometer test Rope climbing (sec) 40 yard dash (sec) 600 yard run (sec) Push-ups (n ^o /min) Sit-ups (n ^o /min) Leg-lifts (n ^o /min) 1RM bench press (lbs) 1 RM military press (lbs) 1 RM pull down (lbs) 1 RM Biceps curl (lbs) 1 RM leg press (lbs) Body composition	Body density, relative body fat, LBM, VE, VO _{2 max} , HR _{max} , SFS, SFB, SFT _h AC, SC, TC, FBC
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness	(Ash, Cates, & Virginia Dept of State, 1978)	Unclear	Police (Virginia, United States)	Physical Activities Inventory Scramble and Pursue Flexed Arm Hang Dynamic Flexibility Hand Grip Strength Maximum Oxygen Utilization Obstacle Course	
Cardiorespiratory fitness	(Ritter, Stone, & Willerson, 1979)	60 men 22 y	US army recruits (Oklahoma, United States)	Incremental treadmill test (Bruce protocol)	HR, blood pressure, serum myoglobin
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness	(Spitler, Jones, Hawkins, & Dudka, 1987)	3 women 9 men 32.4 y	Police (North Carolina, United States)	Medically-Oriented Health and Physical Fitness Test Body composition Skinfold (triceps, subscapular, suprailiac, abdominal, thigh) (mm) 12-lead Electrocardiogram (beat.min ⁻¹) Blood pressure (mm Hg), forced Vital	HR, BP, %BF, FFM, SFT, SFS, SFP, SFA, SFT _h , CRF, VO _{2 max}

capacity, forced expiratory Volume in 1 second and maximal Voluntary ventilation.
 Bruce treadmill stress test (ml/kg/min)
 Cybex II techniques for knee
 Shoulder flexion and extension (Watts, Newton Meters and % strength at 15 rep)

Standard Physical Fitness Test
 Cycle ergometer test (ml/kg/min)
 4. 8 km walk (ml/kg/min)
 12-minute walk-run test (ml/kg/min)
 45.7 m dash (sec)
 Sit and reach back flexion (cm)
 Grip strength dynamometer (kg)
 One repetition maximum bench press (kg)
 Push-up (maximum)
 Chin-ups (maximum)
 Sit-ups (1 min maximum)
 Dodging run (sec)
 Vertical jump (cm)

Police task-Oriented Test
 503 m run (min)
 Victim carry (sec)
 Window clim (sec)
 6 foot wall scale (sec)
 Long jump (m)
 40 foot culvert crawl (sec)
 Uneven balance beam walk (sec)
 146 m obstacle course (sec)

Cardiorespiratory fitness	(M. A. Williams et al., 1987)	171 men 38.5 y	Police officer (Not reported)	Incremental treadmill test (Bruce protocol)	HR, blood pressure, VO _{2 max}
Cardiorespiratory fitness Muscle skeletal fitness	(Burke, Kemery, Sauser, & Dyer, 1989)	259 men 19.7 y	U.S. Army infantry (Georgia, United States)	Physical Fitness Test Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) 3.2 km run (min and sec)	

Cardiorespiratory fitness	(Burger, Bertram, & Stewart, 1990)	18 men 20 y	Military volunteers (Not reported)	Incremental treadmill test 2,4 km run (sec)	W, H, $VO_{2\ max}$, MV, HR, MEC
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Conway & Cronan, 1992)	333 women 2,712 men 28.2 y	NAVY personnel (Not reported)	Physical Readiness Test 2.4 km run/walk test (min) sit-ups (n° /2 min) Body composition	%BF, LBM
Cardiorespiratory fitness Muscle skeletal fitness	(Hoad & Clay, 1992)	165 participants (Not reported)	British Army officers cadets (United Kingdom)	Army Personal Fitness Assessment (APFA) Strength (score): Press-up (n°) Sit-ups on an inclined board (n°) Pull-ups (n°) Arm dips on parallel bars (n°) Standing jump Endurance (score): 1.5 mile run	
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness	(Hoover, 1992)	Not reported	Police (Not reported)	Physical Agility Test Pus-ups (n°) Grip-total both hands (kg) Obstacle course (sec) 165 lb. drag (sec) 95 lb. carry (sec) 804 m run (min and sec)	Physical Fitness Norms 2.4 km run (time) Skins folds Sit and reach test Sit-up (n° /min) One repetition maximum bench press ratio score is weight pushed in pounds/body weight in pounds

Cardiorespiratory fitness Muscle skeletal fitness Body composition	(B. H. Jones, Bovee, Harris, & Cowan, 1993)	124 men 20.2 y 186 women 21.1 y	Army trainees (Not reported)	Army Physical Training Test 1 mile run (min) Sit-ups (n°/2 min) Push-ups (n°/2) Body composition	H, W, BMI, %BF, skinfold
Cardiorespiratory fitness	(Guezennec, Satabin, Legrand, & Bigard, 1994)	27 male	French especial operation soldiers (France)	Incremental exercise test on cycle-ergometer	VB, G, lactate, glycerol, β -OH butyrate, FFA, myoglobin concentration, testosterone, insulin, W
Cardiorespiratory fitness Body composition	(Gambera, Schneeman, & Davis, 1995)	12 women 20 men 32 y	U.S. Air Force (California, United States)	Cycle ergometric method of submaximal testing Body composition	BMI, Plasma Lipids, Lipoprotein levels, CHD, $VO_{2\max}$
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Gardner et al., 1996)	2,253 men 17 to 21 y	Marine corps (South Carolina, United States)	Physical Fitness test Scores 1.5 mile run (min) Pull-ups (n°/2 min) Sit-ups (n°/2 min) 3 mile run (min) Body composition	H, W, BMI
Cardiorespiratory fitness Body composition	(Heir & Eide, 1996)	912 men 19 to 22 y	Norwegian recruits armed forces (Norway)	3 km run test (min:sec) Body composition	H, W, BMI
Muscle skeletal fitness Body composition	(Hodgdon, Friedl, Beckett, Westphal, & Shippee, 1996)	Study 1 38 women 63 men 27.9 y Study 2 100 women 21.5 y Study 3: 42	Study 1 NAVY sailors (Not reported) Study 2 Army (Not reported) Study 3 Army Ranger students (Not reported)	Incremental lift test (IL1RM) Incremental lift to 152 cm Military press Arm curl Bench press Box lift to knuckle height Incremental lift to elbow height Isometric hand grip Leg press Isometric upright lift Body composition	SFB, SFT, SFS, SFP, FFM, S^2/R , H, W

		22.8 y			
Cardiorespiratory fitness Muscle skeletal fitness	(J. J. Knapik et al., 1996)	5,346 male 18 to 53 y	U.S. Army soldiers (Indiana, Kentucky, Virginia, North Carolina, Georgia, Alabama, Kansas, Texas, Colorado, California, and Washington, United States)	Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) 3.2 km run (sec)	W, H, BMI
Cardiorespiratory fitness	(Bricknell, 1997)	130 men	Soldiers (Cyprus)	Combat Fitness test 12.8 km march carrying 36 pounds load (hours)	Core temperature, pulse rate
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Brock & Legg, 1997)	73 women 19.2 y	Women's Royal Army Corps (UK)	NATO test (time) Hand grip (Newton) 38 cm upright pull (Newton) Incremental dynamic lift to 152 cm (Newton) Body composition	%BF, SFT, SFB, SFS, SFP, FFM, VO ₂ max
Cardiorespiratory fitness Body composition	(Heir & Eide, 1997)	480 men 21 y	Conscripts (Norway)	3,000 meter run test (min and sec) Self-assessed physical fitness by a questionnaire Body composition	BMI
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Bishop et al., 1999)	47 men 20.3 y	U.S. Military Academy cadets (United States)	Indoor Obstacle Course Test (sec) Grip strength (Kilopond) Grip endurance (sec) Leg press 1RM (Kg) Leg press 150% body weight endurance (repetitions) Latissmus dorsi pull-down 1 RM (Kg) Latissmus dorsi pull-down 50% body weight endurance (repetitions) Wingate test leg (W) Wingate test arm (W)	SKC, SFA, SFTh, %BF

				Continuous incremental graded treadmill protocol: lower body ($VO_{2\max}$) Continuous incremental protocol with the ergometer used for Wingate test: upper body ($VO_{2\max}$) Body composition	
Cardiorespiratory fitness	(Pope, Herbert, Kirwan, & Graham, 1999)	1,317 men 17 to 35 y	Army recruit (New South Gales, Australia)	20 m shuttle run test (min)	
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(M. P. Rayson, Harwood, & Nevill, 1999)	38 women 23.4y 68 men 22.8 y	British Army official cadets (UK)	20 m shuttle run test (sec) 2.4 km run (sec) 38 cm upright pull (kg) Incremental lift test (kg) Custom-made back extension rig (kg) Sit-ups (sec) Pull-ups (n° maximum) Body composition Military task Single lift Carry Repetitive lift Loaded march	%BF, FFM
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(K. L. Reynolds, White, Knapik, Witt, & Amoroso, 1999)	218 men 21.4 y	U.S. Infantry soldiers (California, United States)	Army Physical Fitness Test 3.2 km run (min) Sit-ups ($n^{\circ}/2\text{min}$) Push-ups ($n^{\circ}/2\text{min}$) Body composition	BMI, %BF, FFM
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness Body composition	(Stanish, Wood, & Campagna, 1999)	21 men 23.9 y 27 women 23.0 y	Royal Canadian Mounted Police and civil (Canada)	1 RM bench press (kg) 1 RM leg press (kg) 70 lbs Bench press ($n^{\circ}/30\text{sec}$) 40 m sprint (sec) 1.5 mile walk/run (min:sec) Barrow zigzag agility run (sec)	H, W, BMI, $VO_{2\max}$

				Vertical jump test (cm) Long jump (cm) Push-ups (n ^o) Sit-up (n ^o /min) Physical Ability Requirement Evaluation (PARE) (min:sec)	
				Body composition	
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Altarac et al., 2000)	915 women 1087 men 20 y	U.S. Army recruits (South Carolina, United States)	Army Physical Fitness Test 1.6 or 3.2 km run test (min) Sit-ups (n ^o /2min) Push-ups (n ^o /2 min)	BMI
				Body composition	
Cardiorespiratory fitness Body composition	(Brenner, Severs, Rhind, Shephard, & Shek, 2000)	23 male 21.8 y	Military personnel (Ontario, Canada)	Submaximal cycle ergometer test (VO _{2 max}) Body composition	%BF, immune function
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Croteau & Young, 2000)	2 women 25 men 29.8 y	U.S. NAVY personnel (Maine, United States)	Physical Readiness Test 2.4 km run/walk test (min) sit-ups (n ^o /2 min) push-ups (n ^o /2 min) Body composition	%BF
				Sit and reach (touch toes yes/no)	
Cardiorespiratory fitness	(Fothergill & Sims, 2000)	19 men. 29 y	US Navy's SEAL Special Operation Forces (Hawaii, United States)	12 min run (m)	VO _{2 max} , HR _{mean} , HR _{max} , HR _{rectime} , HR _{recslope}
Body composition	(Graham, Hourani, Sorenson, & Yuan, 2000)	1,292 women and men	U.S. NAVY and Marine Corps (United States)	Body composition	NC, WC, HC, SFT, SFS, BMI, %BF from circumference measurements and height, %BF from circumferences, age and height

Muscle skeletal fitness	(Kaiser, Hawksworth, & Gray, 2000)	49 women 1,448 men	U.S. Duty Seabees veterans (California and Mississippi, United States)	Hand Grip Strength Test (kg)	
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Popovich, Gardner, Potter, Knapik, & Jones, 2000)	1,357 men 17 to 40 y	U.S. Army recruits (Texas, United States)	Army Physical Fitness Test 3.2 km run (min) Sit-ups (n°/2min) Push-ups (n°/2 min) Body composition Sit and reach (cm)	NC, AC, BMI, %BF
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(M. Rayson, Holliman, & Belyavin, 2000)	75 women 304 men 23.5 y	British Army (UK)	Physical performance test Upright pull (newton) 85 cm height from the ground (newton) Arm flexion strength (newton) Hand grip strength (newton) Back extension strength (newton) Plantar flexion strength (newton) Hydrodynamic lift power Incremental Lift Machine 1.45m (kg) Incremental Lift Machine 1.70m (kg) Static arm flexion endurance with an ammunition box weighting 14 kg (sec) Dynamic arm flexion endurance with a 15 kg barbell (sec) Upright row maneuver with a 15 kg load on a stacked weight system (sec) Abdominal Curl Conditioning test (sec) Push-ups at a prescribed cadence (sec) Pull-up (n°) 20 m shuttle run test (sec) Anthropometry Body composition	H, PW, arm span, bi-acromial and elbow diameters, neck, chest, waist and gluteal girth, %BF, FFM, SFB, SFT, SFS, SFP, mean lift power, normalization of some strength/power scores to body mass

Cardiorespiratory fitness Muscle skeletal fitness	(Vanderburgh & Flanagan, 2000)	59 male	U.S. Military Cadets (United States)	3.2 km run (min) Push-up (n ^o /min) Sit-up (n ^o /min)	W, %BF, average oxygen cost, adjusted 3.2 km run time and body weight
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(von Restorff, 2000)	62 female 20.5 y 48 male 20.2 y	Conscripts (Germany)	Lifting from the squatting position (newton) Lifting from a height of 38 cm (newton) Lifting from the hip position (newton) Pressing upward from the shoulder position (newton) Hand grip (newton) Anthropometry Body composition Bundeswehr-specific Physical Fitness Test 20 m shuttle run test (sec) Sit-up (n ^o) Long jump from standing position (m) Push-ups (n ^o) 12 min run (m)	Body length, trunk length, grip height, W, BMI, % relative fat, LBM
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Bilzon, Scarpello, Smith, Ravenhill, & Rayson, 2001)	15 women 34 men 26 y	Royal Navy (UK)	Hand grip strength (newton) Incremental treadmill run to volitional fatigue Body composition	VO ₂ , VCO ₂ , VE, W, %BF, VO _{2 max} , VO _{2AT}
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Croteau, 2001)	2 women 25 men 29.8 y	Navy personnel (Not reported)	Physical Readiness Test 2.4 km run/walk test (min) curl-ups (n ^o /2min) Push-ups (n ^o /2 min) Body composition	%BF, W
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(J. J. Knapik, Canham-Chervak, Hauret, et al., 2001)	474 women 756 men	US army (South Carolina, United States)	Army Physical Fitness Test Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) 3.2 km run (min) Body composition	BMI

Cardiorespiratory fitness		95 women 21.9 y				
Muscle skeletal fitness		44 men 23.1 y			Army Physical Fitness Test	
Body composition	(J. J. Knapik, Canham-Chervak, Hoedebecke, et al., 2001)	Compared with 379 women (21.3 y) and 712 (21.4 y) men from retrospective review	Fitness training unit (FTU) (South Carolina, United States)	Push-ups (n°/2 min) Sit-ups (n°/2 min) 3.2 km run (min)		BMI
Cardiorespiratory fitness					Physiological testing	
Muscle skeletal fitness					Uphill treadmill running protocol (Peak VO ₂)	
Body composition					Body composition	
					Incremental dynamic lifting (kg)	
					Seated arm and shoulder pull (kg)	
					Seated leg press (kg)	
					Standing upright pull involving the legs and back (kg)	
	(J. J. Knapik, Sharp, et al., 2001)	474 women 746 men 17 to 20 y	U.S. Army (South Carolina, United States)	Counter Movement Jump (cm) Sit-and-reach (cm)		BMI, %BF, BMD
					Army Physical Fitness Test	
					Push-ups (n°/2 min)	
					Sit-ups (n°/2 min)	
					3.2 km run (min)	
Muscle skeletal fitness	(Lagarde et al., 2001)	8 women 19 men 20 to 48 y	U.S. Air Force Reservists (United States)	Hand grip strength (newton) Squat jump test (m) Multiple jump test (n°/15 sec)		Watts
Cardiorespiratory fitness					Army Physical Fitness Test (score)	
Muscle skeletal fitness		85 women 62 men	U.S. Army recruits (South Carolina, United States)	Push-ups (n°/2 min) Sit-ups (n°/2 min) 3.2 km run (min)		Genotypes
Body composition	(Sonna et al., 2001)	21 y			Body composition	

				Treadmill running Protocol ($VO_{2\max}$)	
Cardiorespiratory fitness	(Trank, Ryman, Minagawa, Trone, & Shaffer, 2001)	1,703 men 20.1 y	U.S. Navy recruits (Illinois, United States)	2.4 km run test (min)	
Cardiorespiratory fitness Muscle skeletal fitness	(Bilzon, Scarpello, Bilzon, & Allsopp, 2002)	66 women (n=10, 27 y; n=15, 26 y; n=41, 29 y) 106 men (n=20, 29 y; n=34, 26 y; n=52, 28 y)	Royal Navy (Not reported)	2.4 km run (time) Multi-stage fitness test Hand grip strength (newton) standing broad jump (cm) upright pull (newton) 20 m sprint (n°/2 min) Press-ups (n°/min) Sit-ups (n°/min) Pull-ups (n°/min)	%BF, LBM, FM, $VO_{2\max}$
Motor fitness	(Demeritt, Shultz, Docherty, Gansneder, & Perrin, 2002)	40 men Chronic ankle instability 20.4 y Control group 19.8 y	Military academy (Not reported)	4 Shuttle run test of 6.1 m (sec) Co-contraction test (sec) Agility hop test (n° of errors)	
Cardiorespiratory fitness	(Fothergill & Sims, 2002)	19 men 29.2 y	U.S. Duty from SEAL Special Operation (Hawaii, United States)	12 min run test (m)	HR_{mean} , HR_{max} , HR_{recslope} , HR_{rectime}
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Friedl & Leu, 2002)	347 women 1,043 men < 21 y to >40 y	Combat arms, combat supports and combat service support branches (North Carolina, South Carolina and Missouri, United States)	Army Physical Fitness Test (score) Body composition	BMI, %BF, AC
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Gregg, Banderet, Reynolds, Creedon, & Rice, 2002)	8 women 42.0 y 118 men 40.7 y	U.S. Army senior non- commissioned officers (Texas, United States)	Army Physical Fitness Test (score) Push-ups (n°/2 min) Sit-ups (n°/2 min) 3.2 km run (min)	BMI

				Body composition	
Muscle skeletal fitness Motor fitness Body composition	(Nindl et al., 2002)	10 men 22 y	Soldiers (Not reported)	Maximal lift squat Maximal lift bench press Repetitive bench-press throw (Mean power (W), peak power (W), mean velocity (m/s), peak velocity (m/s), maximum displacement (m), minimum displacement (m), and work (J)) Squat-jump test (Mean power (W), peak power (W), mean velocity (m/s), peak velocity (m/s), maximum displacement (m), minimum displacement (m), and work (J)) Repetitive box lift (J) Obstacle course (sec) Body composition	%BF, BMD, bodily content of bone, fat, and non-bone lean tissue, SFChi, SFT, SFChc, SFS, SFM, SFP, SFA, SFTTh, SFCalf,
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(K. Reynolds, Cosio-Lima, Creedon, Gregg, & Zigmont, 2002)	125 construction engineer men 24.1 y 188 combat artillery men 26.6 y	Construction engineer and combat artillery soldiers (New York, United States)	Army Physical Fitness Test Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) 3.2-km run (min) Body composition	H, W, BMI
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(M. A. Sharp et al., 2002)	168 women 1978 - 20.7 y 1983 - 20.4 y 1993 - 21.4 y 1998 - 21.4 y 182 men 1978 - 19.9 y 1983 - 19.5 y 1998 - 21.8 y	Recruits (South Carolina, United States)	Continuous uphill treadmill running protocol Upper- body isometric strength (Newton) Lower-body isometric strength (Newton) Isometric upright pull strength (Newton) Body composition	W, SFB, SFT, SFS, SFP, %BF, FFM, VO _{2 max} , HR, VE
Muscle skeletal fitness	(Szasz, Zimmerman, Frey, Brady, & Spalletta, 2002)	13 women 21 men 21.2 y	Reserve officer training corps (Pennsylvania, United States)	Sit-ups (n ^o /2 min)	EM

States)					
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(A. G. Williams, Rayson, & Jones, 2002)	9 women 19.1 y 43 women 19.2 y	Recruits (UK)	Maximal box lift to 1.45 m (kg) Maximal box lift to 1.70 m (kg) Repetitive lift and carry tests of 10 kg (n ^o /10min) Repetitive lift and carry tests of 22 kg (n ^o /10min) Loaded march tests of 15 kg (sec) Loaded march tests of 25 kg (sec) 20 m shuttle run test (sec) Isometric 38 cm upright pull (newton) Incremental dynamic lift to 1.45 m (kg) Kinanthropometric	%BF, FFM, W, FM, VO _{2max}
Cardiorespiratory fitness Muscle skeletal fitness	(Booth, Coad, & Roberts, 2003)	20 men 19 to 32 y	Soldiers from the British 25 Engineer Regiment (Malaysia)	20 m shuttle run test Sit-ups (n ^o /2 min) Vertical jump (cm) Hand-grip (kg)	W, nutrient intakes, immune function, micronutrient and visceral protein status, hydration, VO _{2max} , mood states and cognitive ability
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Frykman et al., 2003)	2 men 25 y	Norwegian Navy SEALs (Greenland)	Continuous incremental treadmill running test Wingate cycle ergometer test (W) CMJ (cm and W) 2-handed box lifts to a height of 132 cm (kg) Squats with a 45.3 kg barbell (n ^o) 3.2-km cart-pulling (min) Obstacle course (sec) Body composition	LBM, total body and segment fat mass, %BF, bone mineral content, VO _{2max}
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(J. J. Knapik et al., 2003)	1,166 women 1,414 men 20 y	Recruits from U.S. Army Physical Fitness School (United States)	Army Physical Fitness Test Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) 3.2-km run (min) Body composition	BMI, % of soldiers passing the final Army Physical Fitness Test (APFT) on the first administration, % of soldiers who failed the final APFT after all retakes

Muscle skeletal fitness Motor fitness Body composition	(Pandorf et al., 2003)	10 men 22 y	Soldiers (United States)	Obstacle course (sec) Repetitive box lift task (n°/10 min) Body composition	H, W
Cardiorespiratory fitness Muscle skeletal fitness	(Rosendal, Langberg, Skov-Jensen, & Kjaer, 2003)	330 men 20 y	Royal Danish Life Guard conscript (Denmark)	Cooper 12 minutes run test (m) Modified 20 m shuttle run test (Yoyo intermittent endurance test) (VO_{2max}) Incremental maximal oxygen uptake test on a treadmill (VO_{2max}) Counter movement jump (cm) Counter movement jump 15 kg loaded (cm)	W, H, VO_{2max}
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Zajdowicz & McKenzie, 2003)	547 women 1,017 men 31.7 y	Active duty (Portsmouth, United States)	Physical Readiness Test (OPNAV Instruction 6110.1F) Body composition	BMI
Cardiorespiratory fitness Muscle skeletal fitness	(Arora, Lettieri, & Claybaugh, 2004)	40 women 54 men 29 y	Military physicians (United States)	Army Physical Fitness Test (score) Push-ups (n°/2 min) Sit-ups (n°/2 min) 3.2 km run (min)	W
Cardiorespiratory fitness	(Hansen, Johnsen, Sollers, Stenvik, & Thayer, 2004)	37 men 19.1 y	Sailors from the Royal Norwegian Navy (Norway)	Continuous incremental on cycle ergometer until maximal exhaustion	HR, VO_{2max}
Cardiorespiratory fitness	(Huang et al., 2004)	27 men 25 y	Military recruits (not reported)	Maximal treadmill exercise protocol-Standard Bruce protocol	Thyroid hormone, thyroid-stimulating hormone, hematocrit, hemoglobin, red blood cell
Cardiorespiratory fitness Muscle skeletal	(Kraemer et al., 2004)	35 men 23.3 y, 22.9 y, 24.3 y and 21.4 y	Soldiers in the U.S. Army (Massachusetts, United States)	Army Physical Fitness Test Push-ups (n°/2 min) Sit-ups (n°/2 min)	%BF, FFM, HR

fitness				3.2 km run (sec)	
Body composition				CMJ	
				Body composition	
Cardiorespiratory fitness	(Southard & Pugh, 2004)	15 men 18 to 22 y	Cadet U.S. Air force (Colorado, United States)	Submaximal Cycle Ergometry (VO_{2max})	Hydration, urine specific gravity
Cardiorespiratory fitness				Army Physical Fitness Test (score)	
Muscle skeletal fitness				Push-ups ($n^{\circ}/2$ min)	
Body composition	(Thomas, Lumpp, Schreiber, & Keith, 2004)	13 women 20 y 30 men 21 y	Army ROCT cadets (United States)	Sit-ups ($n^{\circ}/2$ min) 3.2 km run (min)	%BF
				Maximal treadmill exercise protocol-Standard Bruce protocol (VO_{2max})	
				1 repetition maximum bench press (kg)	
				Body composition by Hydrostatic Weighing	
Cardiorespiratory fitness				Army Physical Fitness Test (score)	
Muscle skeletal fitness	(Adler, Thomas, & Castro, 2005)	60 women 373 men 25 y	U.S. soldier (In Europe in garrison or deployed to Kosovo)	Push-ups (0 to 100 point) Sit-ups (0 to 100 point) 3.2 km run (0 to 100 point)	
Body composition				Physical Readiness Test	
	(Bohner, Sack, Wedierhold, & Malakooti, 2005)	22,314 (duty) and 4,254 (civil) women 131,287 (duty) and 31,503 (civil) men 18 y to +40 y	Active duty (Virginia, United States)	Body composition	BMI
Cardiorespiratory fitness				Initial Fitness Assessment	
Muscle skeletal fitness	(J. Knapik et al., 2005)	825 women 1,142 men 21 y	Basic Combat Training recruits (United States)	Push-up (n°/min) Sit-up (n°/min) 1.6 km run test (min)	BMI
Body composition				Army Physical Fitness Test	

				(score) Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) 3.2 km run (min)	
				Body composition	
Cardiorespiratory fitness Muscle skeletal fitness	(Riley et al., 2005)	1,583 men 19.2 y	Marine corps recruits (California, United States)	Physical Fitness Test Push-up (n ^o /2 min) Pull-up (n ^o /2 min) 4.8 km run (min and sec)	BMI
Cardiorespiratory fitness Body composition	(A. G. Williams, 2005)	90 men (British Army) 18 y 20 men (Territorial Army recruits) 23 y 20 men (active male university students) 20 y	British Army recruits and territorial Army recruits (UK)	20 m shuttle run test (sec) Body composition	BMI, %BF, FFM, VO _{2max}
Cardiorespiratory fitness	(Aidman & Crameri, 2006)	82 Army officers	Army officers (not reported)	2.4 km road run Mental effort ratio	HR, VO _{2max}
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Bathalon et al., 2006)	909 women 26.2 y	Soldiers (North Carolina, United States)	Army Physical Fitness Test (score) Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) 3.2 km run (min) Body composition	BMI, NC, FC, WrC AC, HC, %BF
Cardiorespiratory fitness Body composition	(Dregval & Vaicaitiene, 2006)	197 men 19 to 25 y	Lithuanian soldiers (Lithuania)	EUROFIT test 2 km walking test (sec and score) Body composition	BMI, HR, index of ability (obtained from 2 km walking test)

Body composition	(Hoyt et al., 2006)	6 women 10 men 21 to 27 y	Cadets from Norwegian Military (Norway)	Body composition	FM, FFM, Bone mass, TEE, fat oxidation
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(J. J. Knapik et al., 2006)	167 women 98 men	Recruits (South Carolina, United States)	Initial Fitness Assessment Push-up (n°/min) Sit-up (n°/min) 1.6 km run test (min) Army Physical Fitness Test Push-ups (n°/2 min) Sit-ups (n°/2 min) 3.2 km run (min) Body composition	BMI
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness Body composition	(Leyk et al., 2006)	15 men 23.8 y	Medical services of German Army (Germany)	Increment exercise test on a treadmill Stretcher-carriage test (sec and m) Hand-steadiness test (number and seconds of contact) Hand-grip strength (newton) Body composition	SFB, SFT, SFS, SFP, BMI, %BF, VO _{2max} , Lactate, HR
Muscle skeletal fitness Motor fitness	(McMillian, Moore, Hatler, & Taylor, 2006)	14 women 10.4 y 16 men 20.2 y	Cadets at the United States Military Academy (United States)	5-step jump (m) medicine ball throw (m) T-drill (sec)	
Cardiorespiratory fitness Muscle skeletal fitness	(M. Santtila et al., 2006)	387,088 men for endurance performance 280,285 men for muscle fitness 324,911 men for body anthropometric data 20 y	The subjects gave written informed consent to participate in the military service (Finland)	12 min run test (m) Muscle Fitness Index Sit-ups (n°) Push-ups (n°) Pull-ups (n°) Back-muscle test (n°) Standing long jump (m) Anthropometry	H, W

Cardiorespiratory fitness Muscle skeletal fitness	(Sekulic, Men, & Miletic, 2006)	295 men 23 y	Croatian Navy Recruits (Croatia)	Army Physical Fitness Test 3.2 km run (min and sec) Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) Potential alternative test 1,500 m run (min and sec) Push-ups (n ^o /30 sec) sit-ups (n ^o /30 sec) squats (n ^o /2 min)	
Cardiorespiratory fitness Body composition	(Shaffer, Rauh, Brodine, Trone, & Macera, 2006)	2,962 women 17 to 33 y	Marine Corps recruits (South Carolina, United States)	1.6 km run Body composition	BMI
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Simpson et al., 2006)	20 men 26 and 29 y	Soldiers of the British Army's Reserve Forces (UK)	Bruce protocol (sec) 29 km time-trial (min) 3.2 km backpack run test (sec) Isokinetic strength (newton · m) Body composition	Skinfold, %BF, HR, lactate, VO _{2max}
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Wallace et al., 2006)	2,306 men 172 women 20 y	U.S. Marine Corps recruits (United States)	Physical Fitness Test 0.75 mile run for women (min) 1.5 mile run for men (min) Duration pull-ups position for women Pull-ups for men (n ^o /2 min) Sit-ups (n ^o /2 min) 1.5 mile run for women (min) 3 mile run time for men (min) Body composition	H, W, BMI, VO _{2 max} ,
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(A. G. Williams & Rayson, 2006b)	Study 1 24 women 20 y 32 men 21 y Study 2 92 men	British Army recruits (UK)	Incremental lift (kg) Up-right pull (newton) Back extension (newton) Static arm endurance (sec) Shuttle run time (sec) 3.2 km (15 kg) load carriage time (sec) 3.2 km (25 kg) load carriage time (sec) Body composition	FFM, %BF

		18 y			
Muscle skeletal fitness Body composition	(A. G. Williams & Rayson, 2006a)	Study 1 15 women 20 y 21 men 21 y Study 2 56 men 19 y	British Army recruits (Not reported)	Incremental lift (kg) Up-right pull (newton) 1.45 m maximal box lift (kg) 1.70 m maximal box lift (kg) Body composition	FFM, %BF
Muscle skeletal fitness Body composition	(Armentano et al., 2007)	8 women 10 men 27.4 y 7 women 10 men 25.9 y	U.S. Army active duty (Texas, United States)	Push-up (n ^o /2 min) Body composition	LBM, %BF, Body Water, systolic blood pressure, diastolic blood pressure, Creatine Phosphokinase
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Dyrstad, Miller, & Hallen, 2007)	71 men 20.5 y	Norwegian infantry soldiers in the international KFOR (Norway and Kosovo)	Treadmill running using a stepwise incremental protocol with constant inclines of 5.2% and speed increment of 1 km/hour every 1 minute (min) 3 km run (min) Sit-ups (n ^o max) Push-ups (n ^o max) Chin-ups (n ^o max) Body composition	VO _{2max} , HR, lactate, W
Cardiorespiratory fitness Body composition	(Grosz, Toth, & Peter, 2007)	250 men 33 y	Military air pilots (Hungary)	Submaximal load by bicycle ergometry Body composition	BMI
Cardiorespiratory fitness	(Lunt, 2007)	1,531 women 6,592 men	Royal Navy recruits (Not reported)	Pre-joining fitness test (PJFT) 2.4 km on a treadmill	

Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Mattila et al., 2007)	140 men 19.8 y	Finnish conscripts (Finland)	12 min run test (m) Standing long jump distance (cm) Sit-up (n ^o /min) Pull-up (n ^o /min) Push-up (n ^o /min) Back extension (n ^o /min) Body composition	BMI, BMD, FM, %BF, LBM, bone mass
Cardiorespiratory fitness Body composition	(McAuley, Myers, Abella, & Froelicher, 2007)	6,649 men 227 women 58 y	Veterans (Not reported)	Ramp treadmill protocol (METs) Body composition	H, W, BMI, systolic blood pressure, diastolic blood pressure, HR
Muscle skeletal fitness Body composition	(Nindl et al., 2007)	50 men 24.6 y	Soldiers (United States)	Maximal lifting strength (kg) Vertical jump (cm) Body composition	LBM, FFM, %BF, peak power of jump
Cardiorespiratory fitness	(Novack et al., 2007)	358 recruits 18 to 20 y	Infantry recruits (Israel)	2 km run (sec)	Iron storage markers, hemoglobin levels
Cardiorespiratory fitness	(O'Hara et al., 2007)	6 women 6 men 26 to 36 y	Air force (United States)	Ebbeling protocol Submaximal load by bicycle ergometry Bruce protocol on treadmill Body composition	Rate pressure product, %BF, VO _{2max} , HR
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Ricciardi, Deuster, & Talbot, 2007)	17 women 30.4 y 17 men 31.9 y	Military personnel (Not reported)	Walking on a treadmill during 30 min Pull-up (n ^o) Hang time (sec) Stair-stepping (n ^o) Body composition	WC, HC, BMI, %BF, Systolic blood pressure, Diastolic blood pressure, lactate, VO _{2max}
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Wen-Chyuan Chen et al., 2007)	166 men 18.2 y	National Defense College of Management (Taiwan)	Pull-up (n ^o /min) Sit-up (n ^o /min) 3 km run (sec) Body composition	BMI
Cardiorespiratory fitness Muscle skeletal fitness	(Westcott et al., 2007)	37 women 46 men 20 to 49 y	U.S. Air Force personnel (United States)	2.4 km run (min and sec) Push-up (n ^o /min) Sit-up (n ^o /min) Body composition	VO _{2max} , AC, WC

Body composition					
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(A. G. Williams & Evans, 2007)	36 men Means of 29 and 25 y	British Army soldiers (UK)	Repetitive lift and carry (n°) Single box lift (kg) Shuttle run (sec) Body composition	
Cardiorespiratory fitness Muscle skeletal fitness Body composition	("Soldiers fitness after 9-month deployment," 2008)	110 soldiers 18 to 43 y	Soldier deployed (Afghanistan)	Treadmill run Muscle strength Vertical jump Body composition	W, %BF, FFM, Bone mineral content, BMD
Body composition	(R. Boyce, Jones, Lloyd, & Boone, 2008)	30 women 297 men 24.6 y and 37.1 y	Police officers (North Carolina, United States)	Body composition	W, %BF, SFChe, SFA, SFTh, SFT, SFP, SFTh, %LM
Cardiorespiratory fitness Body composition	(Ceriani, de Pontes, & de Sousa, 2008)	15 men 18.7 y	Regimento de Cavalaria Motorizada (Brasil)	Cirilo's Seat Test Bench test Body composition	VO _{2max} , H, W, HR, rhythm of the metronome, subjective effort
Muscle skeletal fitness Body composition	(Christensen et al., 2008)	5 men 32.2 y	Elite soldiers Danish National Guard (Denmark)	Knee extensors of the left leg. CMJ Body composition	W, Fat Mass, FFM, total body water content
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Evans et al., 2008)	199 women 58 men 19 y	Israeli Defense Forces (Israel)	Continuous uphill stepwise treadmill Protocol Push-up Sit-up 2 km run Body composition	SFB, SFT, SFP, SFS, %BF, FM, LBM, VO _{2max} , H, W, HR
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Finestone et al., 2008)	99 women 36 men 55 controls	Karakal recruits (Israel)	2 km run (min) Push-up (n°) Sit-up (n°) Body composition	H, W, %BF

Cardiorespiratory fitness Muscle skeletal fitness	(Harman, Gutekunst, Frykman, Nindl, et al., 2008)	32 men Between 18 and 35 y	Civilian who met the U.S. Army weight for height induction standard (United States)	400-m Run With an 18-kg Load (min) 3.2-km Run or Walk With a 32-kg Load (min) Obstacle Course With the Fighting Load (sec) 30-m Rushes With the Fighting Load (sec) Simulated Casualty Rescue With the Fighting Load (sec) Treadmill continuous, uphill, stepwise protocol (VO _{2max}) U.S. Army Physical Fitness Test (score) 3.2 km run (min) Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) Standing Vertical Jump (cm) Standing Horizontal Jump (cm) Maximal Bench Press (kg) Maximal Squat (kg)	W, H
Cardiorespiratory fitness Muscle skeletal fitness	(Harman, Gutekunst, Frykman, Sharp, et al., 2008)	32 men 28.0 y	Civilian who met the U.S. Army weight for height induction standard (United States)	U.S. Army Physical Fitness Test (score) 3.2 km run (min) Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) Standing Vertical Jump (cm) Standing Horizontal Jump (cm) 400-m Run With an 18-kg Load (min) Obstacle Course With the Fighting Load (sec) 30-m Rushes With the Fighting Load (sec) Simulated Casualty Rescue With the Fighting Load (sec)	W, H
Cardiorespiratory fitness Muscle skeletal fitness	(Kyröläinen et al., 2008)	7,179 male 37 y	Finnish soldiers (Finland)	12 min running test and/or a cycling test (m) Push-ups (n ^o /min) Sit-ups (n ^o /min) Hand grip strength (kg) Body composition	VO _{2max} , BMI

Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Moran et al., 2008)	227 women 18 to 19 y	Army recruits (Not reported)	Continuous, uphill, stepwise, treadmill protocol 30-s Wingate Anaerobic Test on a cycle ergometer Vertical jump (W, m·s ⁻¹ , m, J) Body composition Bar-Or basic fitness test 2 km run Push-ups Sit-ups	%BF, SFB, SFT, SFS, SFP, VO _{2max} , BMI
Muscle skeletal fitness Body composition	(M. Neovius et al., 2008)	1,191,027 men 18.3 y	Military conscription (Sweden)	Hand grip (newton) Arm flexion (newton) Leg extension (newton) Body composition	BMI
Body composition	(Martin Neovius & Rasmussen, 2008)	1,578,694 men 18.3 y	Military conscription (Sweden)	Body composition	BMI
Muscle skeletal fitness Body composition	(Niebuhr et al., 2008)	1,514 women 7,682 men 18 to >30 y	Recruits (Georgia, New York, Illinois, California, Texas, United States)	Assessment of Recruit Motivation and Strength Modified Harvard step test (n°/5 min) Push-ups (n°/min) Body composition	BMI, HR
Cardiorespiratory fitness Body composition	(Oliveira Ede & Anjos, 2008)	50,523 men 25.8 y	Military of the Brazilian Army (Brazil)	12 min run test Body composition	W, H, WC, VO _{2max} , BMI
Muscle skeletal fitness Body composition	(Piiirainen, Salmi, Avela, & Linnamo, 2008)	18 men 18.9 y	Conscript (Finland)	Leg extension (N) Body composition	W, FFM, %BF, Fat
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Richmond et al., 2008)	45 women 92 men 31.1 y	Royal Air Force (UK)	Sprint and go to ground Hand grip Long jump Back extension Biceps curl	HR, BF, HC, WC

				Sit-ups Press-ups Multistage fitness test Body composition	
Muscle skeletal fitness	(Ross, 2008)	8 men 5 women 20.3 y	U.S. Air Force Cadets (Colorado, United States)	Knee extension test (grades) Single Hop for Distance Test (cm)	H, W
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(M. A. Sharp et al., 2008)	110 soldiers 23.1 y	U.S. infantry soldiers deployed (Afghanistan)	Continuous uphill treadmill running protocol Lifting strength (kg) Two-handed medicine ball put (cm) Vertical jump (height) Body composition	%BF, BF, FFM, Bone mineral content, BMD, VO_{2max}
Cardiorespiratory fitness Muscular endurance Body composition	(Taylor et al., 2008)	31 men 21.7 y	Military personnel (San Diego, United States)	Physical Readiness Test 2.4 km run Sit-ups ($n^{\circ}/2$ min) push-ups ($n^{\circ}/2$ min) Body composition	BMI
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Yanovich et al., 2008)	109 women 28 men 19 y	Infantry of Israeli Defense Forces (Israel)	Israeli Defense Force fitness test (IDF-PT) 2 km run (min) Push-ups (n°) Sit-ups (n°) Bruce treadmill protocol Wingate anaerobic test Leonardo Ground Reaction Force Plate (newton/kg) (W/kg) Body composition	W, %BF, BMI, LBM, SFB, SFT, SFS, SFP, VO_{2max}
Cardiorespiratory fitness Muscle skeletal fitness	(Aberg et al., 2009)	1,221,727 men 18 y	Enlisted for military service (Sweden)	Cycle ergometry test Knee extension Elbow flexion Hand grip	Cognitive test
Cardiorespiratory fitness	(R. W. Boyce, Jones, Schendt, Lloyd, &	30 women 24.3 y	Police (United States)	2.4 km run Bench press (kg)	BW, %BF

Muscle skeletal fitness Body composition	Boone, 2009)	297 men 24.6 y		Sit and reach Push-ups Curl-ups Body composition	
Cardiorespiratory fitness Body composition	(Chai et al., 2009)	36 men 18 to 23 y	Naval unit of Singapore Army Force (Singapore)	Incremental exercise protocol on cycle ergometer 2.4 km run (sec) Body composition	BMI, %BF, VO _{2max} , VO _{2at} , Watts _{max} , Borg scale
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Childs et al., 2009)	392 women 1,075 men 18 to 35 y	Soldiers (Texas, United States)	Army Physical Fitness Test (score) 3.2 km run Sit-ups (n°/2 min) Push-ups (n°/2 min) Body composition	BMI
Body composition	(Del Sal et al., 2009)	13 men 36.3 y	Military Italian firefighters (Italy)	Body composition	HR, BMI, %BF, MET
Cardiorespiratory fitness	(Jouanin, Dussault, Van Beers, Pierard, & Beaumont, 2009)	12 male 22.1 y	Soldiers (France)	Maximal running speed test	HR, Blood pressure, electro- cardiogram, arterial oxygen saturation
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Mattila, Tallroth, Marttinen, Ohrankammen, & Pihlajamaki, 2009)	14 men 19.8 y	Conscripts (Finland)	12 min run test (m) Muscular performance test (score) Standing long jump Sit-ups (n°) Push-ups (n°) Pull-ups (n°) Back extensions Body composition	BMI, FM, %BF, LBM, bone mineral mass, BMD
Cardiorespiratory fitness	(McClung, Karl, Cable, Williams, Young, et al., 2009)	94 women 20.6 y	Soldiers (United States)	3.2 km run test	Iron status

Cardiorespiratory fitness	(McClung, Karl, Cable, Williams, Nindl, et al., 2009)	219 women 20.8 y	Soldiers (South Carolina, United States)	3.2 km run test (sec)	Iron status
Muscle skeletal fitness Body composition	(Niebuhr et al., 2009)	1,975 women 9,685 men 18 to >30 y	U.S. Army recruits (Georgia, New York, Illinois, California, Texas, United States)	Assessment of Recruit Motivation and Strength Modified Harvard step-ups (n°/5 min) Push-ups (n°/min) Body composition	BMI, %BF
Cardiorespiratory fitness Muscle skeletal fitness	(Rice et al., 2009)	60 women 140 men 17 to 40	Soldiers in training battalion (Texas, United States)	Army Physical Fitness Test (score) 3.2 km run (min) Push-ups (n°/2 min) Sit-ups (n°/2 min)	
Cardiorespiratory fitness Body composition	(Sloan et al., 2009)	709 men 18 to 49 y	Navy service center (United States)	Modified Balke protocol Body composition	HR, MET, BMI, systolic blood pressure, diastolic blood pressure
Cardiorespiratory fitness	(Sperlich, Fricke, de Marees, Linville, & Mester, 2009)	5 women 12 men 24.9 y	German Special Forces Police Squad (Germany)	Ramp test protocol on a treadmill (velocity _{max})	VO _{2max} , HR, respiratory data, lactate
Cardiorespiratory fitness Body composition	(Takken, Ribbink, Heneweer, Moolenaar, & Wittink, 2009)	4 women 25 y 16 men 32 y	Police (Netherlands)	Maximum ergospirometry test on a cycle ergometer Body composition	VO _{2max} , HR _{max} , HR at ventilatory threshold, respiratory compensation point, BMI
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Talbot, Weinstein, & Fleg, 2009)	27 women 109 men 29.8 y	Army National Guard Soldiers (Not reported)	Army Physical Fitness Test (score) 3.2 km run (min) Push-ups (n°/2 min) Sit-ups (n°/2 min) Body composition	VO _{2max} , BMI, systolic blood pressure, diastolic blood pressure, cholesterol, CHD
Cardiorespiratory fitness Body composition	(Tanskanen et al., 2009)	24 men 19.6 y	Signal Battalion of Northern Finland (Finland)	Maximal treadmill test Body composition	BMI, FFM, FM, %BF, VO _{2max} , lactate, HR

Cardiorespiratory fitness Muscle skeletal fitness Motor fitness	(Velepec, Tušak, Tušak, & Pori, 2009)	94 men 26.5 y	Slovenian Armed Forces (Slovenia)	2.4 km run Medicine ball throw, Standing long jump Sit-ups Squats Pull-ups on horizontal bar Hand tapping in two fields with the better arm Shoulder flexibility Sit and reach Polygon backwards Running and bending test Balance on T-bench	
Cardiorespiratory fitness Body composition	(Zagatto, Beck, & Gobatto, 2009)	40 men 19.7 y	Member of armed forced (Brazil)	Running Anaerobic Sprint Test (W) Wingate Test (W) Running performance Tests in distances of 35, 50, 100, 200, and 400 meters (sec) Body composition	Lactate, % fatigue index, power per weight, BF
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Bedno, Lang, et al., 2010)	1,218 women 6,990 men 20.8 y	Army recruits (United States)	Army Physical Fitness Test Body composition	BMI
Muscle skeletal fitness Body composition	(Bedno, Li, et al., 2010)	9,667 men 20.3 y	Recruits from U.S. Army (Georgia, New York, Illinois, California and Texas, United States)	Army Physical Fitness Test 5-min step test (n ^o) Push-up (n ^o /min) Body composition	H, W, BMI

Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Bigelman et al., 2010)	14 women 44 men 18 to 40 y	Army and Air Force Reserve Officers' Training Corps (United States)	Army Physical Fitness Test (score) 3.2 km run (min) Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) Modified Astrand protocol (min) Wingate Anaerobic test (W) 36.6 m sprint (sec) Body composition	VO _{2max} , lactate, HR, BMI, %BF, FFM
Cardiorespiratory fitness Muscle skeletal fitness	(Brothers et al., 2010)	55 men	U.S. Air force (United States)	1.5 mile run (sec) Physical Fitness Test (score) Push-ups Sit-ups Pull-ups Standing long jump	H, W, Hematological data
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Childs et al., 2010)	496 women 645 men 22.9 y	U.S. Army soldiers (Texas, United States)	Army Physical Fitness Test (score) Body composition	BMI
Cardiorespiratory fitness Body composition	(Hamari, Toljamo, Nieminen, & Kinnula, 2010)	1,130 men 19.4 y	Military recruits (Finland)	12 min run Cooper test (m) Body composition	W, H, BMI
Cardiorespiratory fitness Muscle skeletal fitness	(Hammermeister, Pickering, McGraw, & Ohlson, 2010)	427 men 25.6 y	Soldiers from United States Army Stryker Battalions (United States)	Army Physical Fitness Test (score) 3.2 km run (min and sec) Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min)	

Cardiorespiratory fitness Muscle skeletal fitness	(Jeraj, Burnik, & Pori, 2010)	54 women 226 men 21.7 y	Slovenian Armed Forces (Slovenian)	3.2 km run Push-ups Sit-ups	
Muscle skeletal fitness Motor fitness	(Pori et al., 2010)	115 men 27.1 y	Soldiers from Slovenian Armed Forces (Slovenia)	Medicine ball throw (cm) Standing load jump (cm) Pull-ups (Newton) Sit-ups (n ^o /min) Squats (n ^o /min) Polygon backwards (sec) Figure 8 with bending (sec) Arm twist with a stick (cm) Bend and touch while sitting (cm) Tapping with dominant arm (Newton) Ruler catch (cm)	Working efficiency
Cardiorespiratory fitness	(Rocha, Canellas, Monteiro, Antoniazzi, & Azevedo, 2010)	9 soldiers 18.4 y	Presidential guard (Not reported)	Incremental test performance on a treadmill	Individual glucose threshold
Cardiorespiratory fitness Body composition	(Prieto Saborit et al., 2010)	37 men 29 y	Firefighters (Spain)	Bruce protocol Body composition	VO _{2max} , BMI
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Sheaff et al., 2010)	7 women 26 men 28 y	Firefighters (Washington, United States)	Wingate anaerobic test Graded treadmill exercise protocol Chest press 1RM Leg press 1RM Chest press (n ^o) Leg press (n ^o) Knee extension (W) Body composition	W, VO _{2max} , HR, FFM, %BF, BMI

Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Strating, Bakker, Dijkstra, Lemmink, & Groothoff, 2010)	1,400 women 5,599 men <40 to >55 y	Police (Netherland)	Physical Competence Test (Running 226.5 m while climbing an obstacle (1 m 10 cm) and jumping over low obstacles, pushing a 200 kg cart three times over a distance of 6 m, pulling the cart two times over the same distance, lifting and carrying a ball of 5 kg 18 times for 3 m a time and dragging a 48 kg dummy casualty for 5 m) (min and sec) Body composition	BMI, age
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Teixeira & Pereira, 2010)	1,011 men 28.3 y	Brazilian Air Force (Brazil)	Air Force Physical Fitness Test Arm muscular endurance (n°) Trunk flexion test (n°) 12 min run test Flexitest Araujo protocol (score) Body composition	BMI, VO _{2max}
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Tyyska, Kokko, Salonen, Koivu, & Kyrolainen, 2010)	9 officers 30 y	Army officers (Finland)	Push-up (n°/min) Sit-up (n°/min) Hand grip strength (kg) Squat (n°/min) 12 min run test (m)	BMI, VO _{2max} , Serum total testosterone, cortisol, sex-hormonebinding Globulin, HR
Cardiorespiratory fitness Body composition	(Aandstad, Holme, Berntsen, & Anderssen, 2011)	42 home guard soldiers men 34.8 y 28 Air Force Cadets men 23.3 y	Norwegian home guard soldiers and Air Force Cadets (Norway)	20 meter shuttle run test Incremental test performance on a treadmill Body composition	BMI, VO _{2max} , HR, lactate
Cardiorespiratory fitness Body composition	(Aslani et al., 2011)	40 military men 35.1 y 40 nonmilitary sedentary healthy men 37.4 y	Military sport men, nonmilitary sedentary healthy and nonmilitary obese (Not reported)	Bruce protocol Body composition	BMI, diastolic blood pressure, systolic blood pressure, VO _{2max} , HR

40 nonmilitary obese men 35.6 y					
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Cederberg et al., 2011)	1,112 men 19.3 y	Finland conscripts (Finland)	12 min run test Sit-ups (n°/min) Back-muscle test (n°/min) Push-ups (n°/min) Pull-ups (n°/min) Standing long jump (cm) Body composition	BMI, WC, FM, %BF, LBM, Skeletal mass, Visceral Fat area, systolic blood pressure, diastolic blood pressure, cholesterol, triglycerides
Muscle skeletal fitness	(Gubata, Cowan, Bedno, Urban, & Niebuhr, 2011)	1,717 women 7,415 men 18 to >25	Army (regular, National Guard, and Reserve) (Georgia, New York, Illinois, California, Texas, United States)	Assessment of Recruit Motivation and Strength 5-minute modified Harvard Step Test Push-ups (n°/min)	
Body composition	(Jauregui Lobera, Tomillo Cid, Santiago Fernandez, & Bolanos Rios, 2011)	950 men 20.11 y	Armed Forces (Spain)	Body composition	BMI, Questionnaire of Influences on Body Shape Model, Eating Attitudes Test-40
Cardiorespiratory fitness Muscle skeletal fitness	(J. J. Knapik et al., 2011)	6,298 men and women Age not reported	FBI new agent (Virginia, United States)	Physical Fitness Test Push-ups (n°) Sit-ups (n°) Pull-ups (n°) 300-meter sprint (sec) 2.4 km run (min)	
Cardiorespiratory fitness Body composition	(Sharma, Golby, Greeves, & Spears, 2011)	468 men 18.9 y	British infantry recruits (UK)	2.4 km run time (sec) Body composition	BMI
Cardiorespiratory fitness Muscle skeletal fitness	(Thebault, Leger, & Passelergue, 2011)	19 men 31 y	Active soldiers (France)	The University of Montreal maximal multistage running track test (km/h) 20 m shuttle run test (km/h) 40 m sprint test (m/s) Leg extension (Newton) Squat jump (W)	Fatigue indices

CMJ (W)					
Cardiorespiratory fitness Muscle skeletal fitness	(Warr et al., 2011)	7 women 26.9 y 53 men 26.6 y	Arizona National Guard Soldiers (Arizona, United States)	Wingate anaerobic cycle test (W) 1 RM back squat (kg) 1 RM bench press (kg) Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) Sit and reach (cm) Trunk extension (cm) Shoulder elevation (cm) Standing broad jump (cm)	%BF, BMI, VO _{2max}
Cardiorespiratory fitness Body composition	(Weiglein, Herrick, Kirk, & Kirk, 2011)	24 men 33.0 y	Active duty from U.S. Air Force (United State)	1.6 km walk (min) 2.4 km run (min) Treadmill VO _{2max} Test Body composition	HR, BMI, %BF, FM, FFM, VO _{2max}
Cardiorespiratory fitness Body composition	(Aandstad, Hageberg, Saether, & Nilsen, 2012)	30 men 23 y	Royal Norwegian Air Force Cadets (Norway)	Incremental treadmill protocol Body composition	W, H, BMI, %BF, VO _{2 max} , HR _{max} , Lactate, respiratory exchange ratio
Muscle skeletal fitness	(Bedno et al., 2012)	8,456 men 18 to >25 y	U.S. Army Recruits (United States)	Assessment of Recruit Motivation and Strength Modified Harvard step test (n ^o /5 min) Body composition	BMI
Cardiorespiratory fitness Muscle skeletal fitness	(Carlson & Jaenen, 2012)	46 men 26.2 y	Canadian Forces regular and reserve forces from the Royal Canadian Air Force, the Royal Canadian Navy and the Canadian Army (Canada)	Graded Exercise Test Wingate anaerobic test Push-ups (n ^o) Sit-ups (n ^o /min) Pull-ups (n ^o) Hand grip (kg) 1 RM bench press (kg) 1 RM squat (kg) Vertical jump (cm)	HR, VO _{2max} ,

Muscle skeletal fitness	(Cowan, Bedno, Urban, Lee, & Niebuhr, 2012)	1,568 women 18 to > 25 y	Army trainees (United States)	Harvard step test (n ^o /5 min) Body composition	BMI
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Crombie, Pei-Yang, Ormsbee, & Ilich, 2012)	40 men 18 to 21 y	Freshman male students, including Reserve Officer Training Corps (ROTC) cadets (United States)	Army Physical Fitness Test 3.2 km run Push-ups (n ^o /2 min) Sit-ups (n ^o /2 min) Body composition Godin Leisure-Time Exercise Questionnaire	Blood pressure, HR, VO _{2max} , BMI, W, H, %BF, gynoid and android percent fat, android-to-gynoid ratio, amounts of total body fat and LM
Body composition	(George et al., 2012)	373 women 852 men 22.3 y	Combat medic in the U.S. Army (Texas, United States)	Army Physical Fitness Test (Score) Body composition	BMI
Cardiorespiratory fitness	(Giovannetti, Bembem, Bembem, & Cramer, 2012)	2,104 women 11,305 men 18 to 60 y	United State Air Force (Oklahoma, United States)	Submaximal cycle ergometry test 2.4 km run test	VO _{2max}
Cardiorespiratory fitness Muscle skeletal fitness	(Goodall, Pope, Coyle, & Neumayer, 2012)	47 women 732 men 17 to 50 y	Australian Army (Australia)	2.4 km run test Sit-ups Push-ups	
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness Body composition	(Heinrich, Spencer, Fehl, & Poston, 2012)	11 women 56 men 27 y	Active duty army personnel (not reported)	Army Physical Fitness test Push-ups (n ^o /min) Sit-ups (n ^o /min) 3.2 km run test (min/sec) 2.4 km run time (min/sec) Vertical jump (cm) Standing broad jump (cm) Agility (sec) 1 RM bench press (kg) Sit and reach (cm) Step test	H, W, HR, BMI, %BF, systolic blood pressure, diastolic blood pressure, VO _{2max}

Body composition					
Cardiorespiratory fitness	(Hickey, Donne, & O'Brien, 2012)	35 men 21 y	Irish Defence Force (Ireland)	20m shuttle run test (distance) 3.2 km run (time) terrain walk conducted over 10km carrying a 20kg pack (m/s)	VO _{2 max} , HR max,
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Hofstetter et al., 2012)	259 male 20.7 y	Recruits from the Fusilier Infantry Training School in Neuchlen (Switzerland)	Swiss Physical Fitness Test Battery Standing long jump (m) Seated 2 kg shot put (m) One leg standing test (sec) Trunk muscle strength test (sec) Progressive endurance run (min)	BMI
Body composition					
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Kinnunen, Suihko, Hankonen, Absetz, & Jallinoja, 2012)	482 men 20 y	Conscripts (Finland)	Muscle fitness test (Points) Pull-ups Push-ups Sit-ups Standing long jump Back-muscle test 12 min run test Body composition	BMI, VO _{2max}
Muscle skeletal fitness	(Larsson, Tegern, & Harms-Ringdahl, 2012)	862 men 19 y	Swedish artillery, ranger and soldiers (Sweden)	Maximally flexing one knee at a time Stright-leg raising in lying supine Push-ups (n ^o) Sit-ups (n ^o) Pull-ups (n ^o) Sørensen isometric endurance test for back extensión (time)	
Muscle skeletal fitness	(McGill, Frost, Andersen, Crosby, & Gardiner, 2012)	282 men 36.5 y	Firefighters (Canada)	Coin lift Box lift	Movement task WC, HC

				Torsion Control Single leg squat Stand-sit-stand Stand-drop-stand In-line lunge Biering-Sorensen extension (sec) Side plank (sec) Front plank (sec) Hand grip strength (kg) Pull-ups (n ^o)	
Cardiorespiratory fitness Body composition	(Mikkola et al., 2012)	1,467 men 19.2 y	Compulsory military service (Finland)	12 min run test Body composition	W, WC, BMI, VO _{2max} , FFM, FM, Visceral fat area
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Moran, Finestone, Arbel, Shabshin, & Laor, 2012)	116 men 18 to 19 y	Israeli recruits (Israel)	Bar-Or Basic Fitness Test 2 km run Push-ups (n ^o) Sit-ups (n ^o) Continuous, uphill, stepwise, treadmill protocol Wingate anaerobic test Vertical jump (W, m, m/s) Body composition	%BF, SFB, SFT, SFS, SFP, VO _{2max}
Muscle skeletal fitness Body composition	(K. Neovius, Rehnberg, et al., 2012)	45,920 men 18.7 y	Swedish military conscription (Sweden)	Hand grip strength (newton) Arm flexion (newton) Leg extension (newton) Body composition	BMI
Muscle skeletal fitness Body composition	(K. Neovius, Neovius, et al., 2012)	43,989 men 18.7 y	Swedish military conscription (Sweden)	Hand grip strength (newton) Arm flexion (newton) Leg extension (newton) Body composition	BMI
Cardiorespiratory fitness Body composition	(Nindl et al., 2012)	93 women 18.8 y	Israeli recruits (Israel)	Treadmill protocol Body composition	VO _{2max} , %BF, SFT, SFB, SFS, SFP, FM, FFM, W

		29 men 19.1 y			
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Rintamäki et al., 2012)	20 men 20 to 28 y	Finnish soldiers (Finland)	12 min run test (m) Hand grip strength (kg) Push-ups (n ^o /min) Sit-ups (n ^o /min) Squats (n ^o /min) Leg extension (newton) CMJ (cm) Body composition	W, BMI, %BF, FM
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Rossomanno, Herrick, Kirk, & Kirk, 2012)	34 women 131 men 26.4 y	Commissioned employees of the St. Louis Metropolitan Police Department (Missouri, United States)	Physical Ability Test Obstacle course (sec) Body composition	W, H, BMI
Body composition	(Santana et al., 2012)	5 women 85 men 34.4 y	Military police officers (Brazil)	Body composition	BMI, WC, %BF, Blood pressure
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Matti Santtila, HÄKkinen, Nindl, & KyrÖLÄInen, 2012)	57 men 19.2 y	Conscripts (Finland)	Bicycle ergometer until exhaustion Leg extensors (Newton) Arm extensors (Newton) Body composition	W, %BF, WC, VO _{2max}
Muscle skeletal fitness	(Savage, Best, Carstairs, & Ham, 2012)	70 men 23.7 y	Soldiers from the Australia Army (Australia)	Proper technique (kg) and maximum acceptable lift protocol (kg) on 7 strength-based lifting tasks. 7 strength-based lifting tasks Box lift and placed Box lift to shoulder place Box lift to reach height Barbell lift and press Pack lift and place Partnered toolbox lift and place	

Ammunition tin lift and place					
Body composition	(D. S. Sharp, Andrew, Burchfiel, Violanti, & Wactawski-Wende, 2012)	107 women 302 men 42.9 y	Buffalo police department (New York, United States)	Body composition	Systolic blood pressure, HDL cholesterol, blood glucose, BMI, Fat Mass Index, Lean Mass Index, bone density
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness Body composition	(Sporis, Harasin, Bok, Matika, & Vuleta, 2012)	25 members 27.9 y	Special Operation Battalion of Croatian Armed Forces (Croatia)	Crawling and jumping (cm) Agility test 93639 with turn (sec) 1 kg medicine ball throw from a seated position (cm) Relative sergeant test (cm) Standing broad jump (cm) 20 m sprint (sec) Push-ups (n°/2 min) Sit-ups (n°/2 min) Pull-ups (n°) Thrust from the bench with 70% of body weight (kg) The maximum thrust from the bench (kg) Sit and reach (cm) 274.32 m run (sec) 3.2 km run (sec) Body composition	Upper arm girth-prone, Upper arm girth-extended, Forearm girth, thigh girth, Calf girth, Thorax girth, abdominal girth, W, SFT, SFS, SFChe, SFA, SFP, SFTTh, SFCalf, SFAx, %BF
Cardiorespiratory fitness Muscle skeletal fitness	(Tomczak et al., 2012)	221 men 20.1 y	Polish ground force unit recruits (Poland)	International Physical Fitness Test Standing long jump (cm) Pull-ups (n°) Sit-ups (n°/ 30 sec) 1,000 metres run (sec) Body composition	BMI, BF, SFB, SFT, SFS, SFP
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness	(Whitehead, Schilling, Peterson, & Weiss, 2012)	42 women 137 men 37.7 y	Duty military and civilian (United States)	Physical Readiness Event Single-Leg Plank Test for Time (sec) Single-Leg Wall Squat (sec) Push-ups (n°/2 min) Leg/Hip Dynamometer (lbs)	

				Standing Long Jump (inches) Pro-Agility Test (sec) 274.32 m Shuttle Run (sec) 2,000-m Row (sec) 5,000-m Bike (sec)	
Cardiorespiratory fitness Muscle skeletal fitness Motor fitness	(Wilken et al., 2012)	130 men 24.5 y 50 women 24.5 y	Active duty (Texas, United States)	Walking velocity on level ground and on a loose-rock surface (sec) Timed stair ascent (sec) Sit-to-stand five times test (sec) Four-square step test (sec) 6-minute walk test (m)	H, W
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Wilson, Markey, & Markey, 2012)	114 men 31.4 y	Duty Air Force members (New Jersey, United States)	Air Force Physical Fitness Test 2.4 km run Sit-ups (n ^o /min) Push-ups (n ^o min) Body composition	H, W, AC
Cardiorespiratory fitness Muscle skeletal fitness Body composition	(Worden & White, 2012)	5 women 81 men	U.S. Air Force (Ohio, United States)	Air Force Physical Fitness Test 2.4 km run Push-ups (n ^o /min) Sit-ups (n ^o min) Body composition Army Physical Readiness Test Standing long jump Power squat Shuttle run Push-ups 1.6 km run Heel hooks Marine test 804.7 m run 30 lb lift Maneuver-Under-Fire drill Combat Fitness Test	AC, BMI

Cardiorespiratory fitness			Recruits from rescue technicians, armoured infantry, fusilier infantry and reconnaissance infantry school (Switzerland)	Progressive endurance test (sec) Trunk muscle strength test (sec)	
Muscle skeletal fitness	(Wyss, Von Vigier, Frey, & Mader, 2012)	459 recruits 20 y		Standing long jump (m) Seated shot put (m)	W, H, BMI
Body composition				One leg standing test (sec) Body composition	
Cardiorespiratory fitness				Physical Fitness Test	
Muscle skeletal fitness	(Foynes, Shipherd, & Harrington, 2013)	648 women 868 men 19.3 y	Duty United States Marine Corps recruits (South Carolina, United States)	For men: Dead-hang pull-ups Abdominal crunches 4.8 km run	
				For women: Timed flexed-arm hangs Abdominal crunches 4.8 km run	

5S, 5 skinfolds; %BF, Percentage of Body Fat; %LM, Lean mass percentage; AC, Abdominal circumference; BMI, Body Mass Index; BMD, Bone mineral Density; BP, Blood Pressure; CHD, coronary heart disease; CRF, cardiorespiratory fitness (also refers to maximum oxygen consumption (VO_{2max})); EM, Electromyography; FBC, Flexed biceps circumference; FC, Forearm circumference; FFA, Free fatty acids; FM, fat mass; FFM, Fat Free Mass; GT, General Technical; H, Height; HC, Hip circumference; HR, Heart Rate; HR_{max} , Heart rate maximum; HR_{mean} , Hear rate mean; $HR_{rectime}$, Heart rate recovery curve; $HR_{recslope}$, Heart rate recovery time; LBM, Lean body mass; MEC, Mixed Expired Concentration of oxygen and carbon dioxide; MET, metabolic equivalent; MV; Minute Ventilation; NC, Neck circumference; POIQT, Performance-oriented Infantry Qualification Test; PW, Power; S^2/R , Stature²/Resistance; SC, Shoulder circumference; SFA, skinfold abdominal; SFAx, Skinfold Axillary; SFB, skinfold biceps; SFCalf, skinfold Calf; SFChe, skinfold chest; SFChi, skinfold chin; SFI, skinfold iliac crest; SFM, skinfold midaxillary; SFP, skinfold suprailiac; SFS, skinfold subscapular; SFT, skinfold triceps; SFTh, skinfold thigh; TC, Thigh circumference; TEE, total energy expenditure; VCO_2 , carbon dioxide production; VE, ventilation; VO_2 , Oxygen uptake; W, Weight; WC, waist circumference; WrC, Wrist circumference.