

INDEX

A

- Abdominal fat, 135
- Absolute intensity scale, 66
- Acid-base equilibrium, 62
- Adenosine diphosphate (ADP), 65
- Adenosine triphosphate (ATP), 65, 66
- Adipocytes, 128
- Adipose tissue, 128, 133, 134
- Adolescents and physical activity
 - bicycling activities, 200, 205
 - bone mass development, 131, 132
 - breast cancer incidence, 117
 - cardiovascular disease risk factors, 91, 102
 - high school physical education, 204, 205
 - injuries, 142
 - no regular activity, 189
 - obesity, 43, 47, 133
 - recommendations, 28–29
 - regular, vigorous activity, 191, 196–197, 205
 - school-based interventions, 6, 236–243
 - sports team participation 200
 - stretching activities, 194, 200–201
 - surveys, 175, 205
 - trends, 8
 - walking activities, 200, 205
- Adults and physical activity
 - assessment procedures, 30
 - cardiovascular response, 75
 - communications strategies, 229–230, 231
 - community approaches, 227–229, 234
 - determinants, modifiable, 215, 234
 - exercise enjoyment, 215, 216
 - health care settings, 226–227, 242
 - individual approaches, 217, 226, 234
 - promotion, 217, 234
 - pulmonary ventilation rates in untrained, 64
 - recommendations, 24–27, 43
 - self-efficacy, 214–215, 217, 248
 - self-monitoring, 217, 226, 234
 - social support, 216, 226
 - surveys, 175
 - trends, 8
 - worksites, 229–231, 234, 229
- Aerobic exercise, 66
- Aerobics Center Longitudinal Study, 86
- Affective disorders, 135
- African Americans
 - adult activity interventions, 232, 236, 232
 - bicycling activities by, 203
 - Fitness Through Churches Project, 245
 - high school physical education enrollment, 205
 - no regular physical activity, 177, 192, 195
 - physical activity trends in, 8
 - regular, sustained physical activity, 183
 - regular, vigorous physical activity, 185, 187, 196–197
 - sports team participation, 200
 - strengthening activities by, 189, 191, 198, 193
 - stretching activities by, 191, 194, 201
 - walking activities by, 203
- Age factors, 74–76
 - cardiorespiratory capacity and, 187
 - exercise intensity and, 31–33
 - hypertension and, 103
 - no regular activity and, 177, 179, 192, 195
 - physical activity and mortality rates, 86
 - regular, sustained activity and, 183
 - regular, vigorous activity and, 185, 187
 - weight gain prevention and, 133, 232–233
- Agility. *See* Psychomotor performance
- Alabama
 - Physical Activity for Risk Reduction project, 232

A Report of the Surgeon General

Amenorrhea, 131, 143
American Academy of Pediatrics, 28
American Alliance for Health, Physical Education,
Recreation and Dance, 3, 244
American Association of Cardiovascular and
Pulmonary Rehabilitation, 23
American Association of Health, Physical
Education, and Recreation (AAHPER), 18
Health Related Physical Fitness Test, 18
Youth Fitness Test, 18
American Cancer Society (ACS), 112
American College of Sports Medicine (ACSM), 5
cardiorespiratory fitness (endurance) and, 4, 20
consultation for report by, 3
Guidelines for Exercise Testing and Prescription, 23
National Coalition for Promoting Physical
Activity, 244
physical activity recommendations, 33, 148
American Diabetes Association, 127
American Heart Association (AHA), 244
cardiorespiratory endurance (fitness) and, 4
consultation for report by, 3
National Coalition for Promoting Physical
Activity, 244
physical activity counseling
recommendation, 244
American Hospital Association, 23
American Medical Association (AMA)
exercise and physical fitness, 17
Guidelines for Adolescent Preventive Services
(GAPS), 28, 242
Health and Fitness Program, 17
physical activity counseling
recommendation, 244
Anemia, 143
Angina pectoris, 45, 110–112, 143
Anovulation, 143
Anxiety, 8, 137, 150
Anxiety disorders, 135, 136
Aortic aneurysms, 103
Aortic valve stenosis, 45

Appetite, 135
Arrhythmias, 110, 112, 143
Arterial baroreflex, resetting of, 63
Arterial-mixed venous oxygen ($A-\bar{v}O_2$), 62, 64, 70,
75–77
Arterial vasodilatation, 111
Arthritis, 7, 129–130, 142
Arthritis, rheumatoid, 129
Asthma, 143
Atherosclerosis, 5, 102, 103, 110–111, 128
Australian Heart Week (1990) campaign, 233

B

B-lymphocytes. *See* Lymphocytes
Balance. *See* Equilibrium
Bank of America physical activities program, 230
Basal metabolic rate, 66
Bed rest, prolonged, 71, 72
Behavioral sciences, adult
ecological perspective, 214–215, 244
health-belief model, 213, 217
intervention studies. *See under* Intervention
studies (adolescent; adult; children)
learning theories, 211, 214, 226, 228, 230
planned behavior theory, 213–214, 226
reasoned action theory, 213–214, 217
relapse prevention model, 213, 226, 228
social learning (cognitive) theory, 214, 217,
226, 228, 230, 235, 236
social support, 220, 214, 227, 228
transtheoretical model, 213, 235
Behavioral sciences, children and adolescents,
234–243
planned behavior theory, 213
reasoned action theory, 213
social learning (cognitive) theory, 214
Biogenic monoamines, 141
Blood flow, 63, 64, 65, 71, 111, 112, 128

Blood pressure, 16, 71, 90, 110, 111, 145
 adaptation to exercise, 73
 diastolic, 63, 70, 72, 102, 110
 end-diastolic volume, 71, 72
 mean arterial, 63
 response to resistance exercise, 65
 systolic, 63, 64, 70, 102, 110
See related Hypertension; Hypotension

Blood volume, 70, 71, 72

Body composition, 21, 22, 35, 54, 134

Body fat, 7, 35, 102, 128–129, 134, 135, 145

Body mass index, 35, 90, 102, 126–127, 133, 134

Body surface area to mass ratio, 73–74

Body temperature, 62, 64, 141

Body weight, loss practices, 50, 44

Bone density, 69, 72, 73, 75, 130, 131, 132

Bone marrow, 67

Breast cancer, 7, 117–119, 123

British Association for the Advancement of
 Science, 19

Building Your Fitness Futures program, 232

C

Calcium, balance, 72

Caloric expenditure, 147

Calorimetry, 21, 29, 32
 indirect, 21, 32

Cancer, 43, 67, 149

breast, 7, 117–119

colon, 4, 5, 7, 114, 144, 145, 149

endometrial, 7, 120–121, 149

hormone-dependent in women, 117–121

mortality incidence, 113

ovarian, 7, 120, 149

physical activity and, 7

prostate, 7, 121–122, 124–125

testicular, 7, 124, 149

rectal, 7, 113, 116

uterine, 117, 120–121

Capillaries, 71

density of, 63, 65, 73

endurance training and, 69

Carbohydrate, adenosine triphosphate
 production, 66

Carbon dioxide (CO₂), 18, 32, 61–62, 66

Cardiac output (Q), 62, 71

contribution to mean arterial blood pressure,
 63

and heart rate, 62

maximal (Q_{max}), 62, 70, 71

rest vs. exercise, 63

stroke volume, 62, 63, 65

Cardiomyopathy, hypertrophic, 45

Cardiorespiratory endurance (fitness), 4, 6, 17
 age and, 187

cholesterol, total, and, 102

epidemiologic studies of, 131, 137, 143, 147,
 182, 187, 201–205

interventions, 244

measurement of, 19–20, 32–37

multiple sclerosis and, 233

population-based studies, 85–90

prostate cancer and, 121–125

regular, intermittent exercise, 5

sex factors and, 187

See also Physical fitness

Cardiovascular diseases, 87

of adolescents, interventions for, 236–243

community-based intervention programs for,
 227–229

of children, interventions for, 236–243

diabetes risk factors for, 127

health care interventions for, 242

myocardial infarction, 5, 43, 45, 112, 143

physical activity and, 43–48, 43–45, 47

Cardiovascular system adaptations, 5, 7, 19

to exercise, 7, 21, 61–62, 65, 70, 71, 87

myocardial wall stress in, 63–64, 71

Cartilage, 130, 143

Catecholamine, 64, 66, 74

A Report of the Surgeon General

Causality, 144–145

Centers for Disease Control and Prevention (CDC), 5

Behavioral Risk Factor Surveillance System (BRFSS), 175, 205

exercise recommendations, 23, 28, 33, 148

Guidelines for School and Community Health Programs to Promote Physical Activity Among Youths, 237, 244

School Health Policies and Programs Study, 236–237

Youth Risk Behavior Survey, 175, 176, 189, 193–199, 205

Cerebrovascular disorders, 7, 47, 45, 102–103, 104–107, 110

Child and Adolescent Trial for Cardiovascular Health (CATCH) study, 239, 244

Children and physical activity, 75

assessment procedures, 29

behavioral research, 234–243

bone mass development, 131, 132

cardiovascular factors, 75, 91, 102

environmental factors, 73–74

goals, 28, 43

hypertension, 87

injuries, 142

minimum health standard, 17–18, 19

no regular activity, 4

obesity, 43, 47, 133, 134

obesity interventions, 248

regular, vigorous activity, 191

school-based interventions, 6

school program interventions, 236–243

Cholesterol, 19, 23, 47, 91, 102, 110–111

Church programs, 245

Cognition, 135, 141, 142

College Alumni Study, 36

Colon cancer, 4, 5, 7, 113–117, 146, 149

Colorectal cancer, 113

Communications interventions, 230–231

Community-based programs, 6, 227–229, 245–246

Community behavioral approaches, 227–229

Coronary artery

perfusion pressure increase, 64

vasodilation of, 64

Coronary artery bypass, 45

Coronary circulation, 63–64

Coronary disease, 16, 23, 28, 35, 37, 49, 47, 133, 140, 144–147, 149

inverse association with physical activity, 91

physical activity and, 4, 5, 7, 87, 90–91

population-based studies, 92–101

Coronary plaque, 110, 111, 112

Crime, 246–247

D

Dehydration, 75, 143

Dementia, 136

Depression, 8, 135, 136, 140, 150

Detraining, 21, 61, 72

Diabetes mellitus, 4–6, 28, 35, 37, 43, 90, 125, 133, 144–149, 232

Diabetic retinopathy, 128

Diastolic blood pressure. *See under* Blood pressure

Diet, 5, 12–13, 116, 127, 128, 134, 232–233

Dietary Guidelines for Americans, 5, 28, 244

Disability. *See* Physically handicapped

Disuse atrophy, 72–73

Dyslipoproteinemia, 133

E

Eating disorders, 136

Edema, 133

Educational factors

no physical activity and, 177, 178, 196

regular sustained physical activity, 183

regular, vigorous physical activity, 183, 187

strengthening activity, 191

stretching activity, 191

- Eisenhower, President Dwight D., 17, 18
- Elderly persons
- behavioral intervention programs for, 233
 - cardiovascular response to exercise, 75–76
 - cold stress in, 74
 - community-based programs for, 245–246
 - falling, 7, 132
 - health-related quality of life, 142
 - maximal oxygen uptake in, 32, 70
 - osteoporosis, 130–133
 - physical activity interventions for, 233
 - physical assessment procedures for, 30
 - psychomotor performance of, 35
 - resistance training and, 44
- Electrocardiographic changes, 111
- Emotional functioning, 141
- Emphysema, 140
- End-diastolic volume. *See under* Blood pressure
- Endocrine factors, 66, 67, 70
- Endocrine glands, 5, 7
- hormonal responses to exercise, 66
 - See related* Hormones
- Endometrial cancer, 7, 114, 120, 149
- Endorphins, 141
- Endurance training, 4, 18, 19, 21, 61, 63, 65
- capillary increase by, 69
 - health benefits of, 7, 43
 - health-related quality of life, 142
 - insulin sensitivity and, 127
 - ischemia and, 112
 - lactate threshold and, 67
 - metabolic adaptations, 69–70
 - muscle fibers in, 67
 - obesity and, 135
 - osteoporosis and, 150
- Enkephalins, 141
- Environmental exposure, 19, 73–74
- air pollution, 74
 - cold climate disorders, 74
 - hot and humid conditions, 63, 73, 143
- Epicondylitis, 143
- Equilibrium, 35, 44
- Ergometer tests. *See under* Exercise tests
- Erythropoietin, 68, 74
- Estradiol-progesterone, 68
- Estrogen, 130, 131
- Estrogen replacement therapy, 132
- Exercise, 20, 21, 140. *See also* Physical activity; Physical activity, specific; Physical fitness; Physical fitness programs
- Exercise physiology
- research, 18–20
 - responses to, 61
 - textbooks on, 61
- Exercise tests
- accelerometers, 32
 - bicycle ergometry, 62–63, 64, 66, 74–75
 - maximal, 86, 87, 90
 - motion sensors, 31–32
 - for muscle fitness, 34–35
 - pedometers, 31
 - stabilometers, 32
 - submaximal, 86, 87, 89
 - treadmill, 32, 34, 122
- Exercise training
- American College of Sports Medicine recommendations, 22
 - benefits, 7
 - bone adaptations, 67, 69
 - cardiovascular diseases and, 45
 - definition of, 20
 - diabetes mellitus and, 128
 - frequency of, 61
 - interval vs. continuous, 19
 - and lipoprotein, HDL, 43
 - muscle, skeletal, adaptations, 67, 69
 - triglycerides and, 111
 - ventricular fibrillation, 112

A Report of the Surgeon General

F

Falls, 143, 150
Fatty acids, 111
Fibrinogen, 43
Fibrinolysis, 43, 112
Fitness Through Churches Project, 245
Foot injuries, 128, 143
Fractures, 130–132, 143

G

Gastrointestinal system
 problems, 130
 transit time, 122
Genetic factors
 diabetes mellitus, 126–127
 maximal oxygen uptake and, 66, 70
 training and, 65
Glossary, 21
Glucagon, 69
Glucose intolerance, 72, 123
Glucose tolerance, 127
Glucose-6-phosphate, 132
Glycogen, muscle storage of, 69
Glycolysis
 energy system for, 65–67
 muscle fiber capacity, 66
Go For Health (GFH), 239
Governor's Councils on Physical Fitness and Sports, 245
Guidelines for Adolescent Preventive Services (GAPS), 28
Guidelines for Exercise Testing and Prescription (ACSM), 23, 28
Guidelines for School and Community Health Programs to Promote Physical Activity Among Youths, 237, 244

H

Handicapped. *See* Physically handicapped
Harvard University, 16
 alumni study, 86
 Fatigue Laboratory, 19
Health, 16–18, 22, 141
 American College of Sports Medicine 1990 recommendations, 22–23
 exercise physiology research and, 18–20
 physical activity recommendations, 28–30
 World Health Organization definition of, 141
Health and Human Services (HHS),
 Department of, 245
 Office of Public Health and Science, 3
Health and Religion Project (HARP), 245
Health-related fitness, 20, 22
Health-related quality of life, 141–142, 150
Healthy People 2000, 23
 cardiorespiratory fitness, 244
 daily, moderate physical activity, 181, 200
 exercise intensity in, 33
 leisure-time activity target, 177
 muscle strength, endurance, 187, 189, 192, 199, 200
 objectives, 5, 175, 237, 245
 physical education, 205
 regular, vigorous activity, 182
 worksite programs, 229–231
Heart, adaptation to exercise, 71
Heart defects, congenital, 45
Heart disease, 142
Heart failure, congestive, 45, 103
Heart rate (HR), 31–32, 62, 72, 73
 coronary circulation and, 66
 maximal, 21
 mean daily, 31
 oxygen consumption and, 63
 resting, 19, 31
 training response and, 71
Heat stress disorders, 74
Heat exhaustion, 74

- Heat stroke, 74
- Hematocrit, 43
- Hematuria, 143
- Hemoconcentration, 74
- Hemoglobinuria, 143
- High blood pressure *See* Hypertension
- Hill's causality criteria, 144–145
- Hip fracture, 130, 132
- Hispanics
 - bicycling activities by, 203
 - child behavioral intervention program, 232
 - diabetes mellitus and occupational physical activity, 126
 - high school physical education enrollment and, 205
 - no regular activity by, 177, 195
 - physical activity trends in, 8
 - regular, sustained activity by, 183
 - regular, vigorous activity by, 183, 187, 183, 196–197
 - sports team participation by, 200
 - strengthening activities by, 191, 193, 198,
 - stretching activities by, 191, 194, 201
 - walking activities by, 203
- Home care programs, 46
- Hyaline cartilage, 130
- Hydrogen ions (H⁺) concentration, 64
- Hygiene, 11–18
- Hyperglycemia, 127
- Hyperinsulinism, 72
- Hyperplasia, 69
- Hypertension, 4–5, 7, 23, 47, 43, 63, 66, 71, 126–127, 133
 - obesity and, 133
 - physical activity and, 103, 110, 144–145, 149
 - population studies of, 108–109
- Hyperthermia, 143
- Hypertrophy, 69, 71, 76, 103
- Hypoglycemia, 127–128, 143
- Hypotension, 63, 74
- I**
-
- Immobilization, 71–72, 130
- Immune system, responses to exercise, 7, 67
- Immunoglobins, 67
- Immunosuppression, 143
- Inactivity. *See* Physical inactivity
- Indian Health Service, 232
- Industrywide Network for Social, Urban, and Rural Efforts (INSURE) project, 227
- Infection control and exercise, 67
- Injuries, 5
 - exercise-related, 8, 44, 69, 150, 248
 - joint, 129
 - musculoskeletal, 142–143
 - sports-related, 7
- Insulin, 44, 67, 68, 72, 125–129
- Intermodal Surface Transportation Efficiency Act, 247
- International Consensus Conference
 - of Physical Activity Guidelines for Adolescents (1993), 28
 - on Physical Activity, Physical Fitness, and Health (1988), 22
- Interpersonal relationships, 46
 - behavioral sciences theories, 213,
 - social support role in activity, 214, 243
- Intervention studies, adolescent, 8, 236
 - accessibility, 236
 - church programs for, 245
 - determinants, modifiable, 243
 - factors influencing, 243
 - health care settings, 242
 - outdoor activities, 243
 - parental involvement, 243
 - school-community programs, 242, 245
 - school programs, 236–243, 236–243
 - self-efficacy, 242, 248
 - societal barriers, 246–247
 - societal resources, 247

A Report of the Surgeon General

- Intervention studies, adult, 8, 217
- communications, 229–230
 - community approaches to, 227–229, 234, 227–229, 234, 245
 - church programs for, 245
 - environmental approach to, 244–245
 - factors influencing, 215–217
 - health care settings, 226–227
 - individual approaches, 217, 226, 234
 - mental disorders, 136
 - policy approaches, 244–245
 - promotion of, 226, 234
 - societal barriers, 246–247
 - societal resources, 247
 - worksites, 229–231, 229–231, 236
- Intervention studies, children, 8, 236
- accessibility, 243
 - church programs for, 246
 - determinants, modifiable, 243
 - factors influencing, 243
 - health care settings, 242
 - outdoor activities, 243
 - parental involvement, 243
 - school-community programs, 242, 245
 - school programs, 236–243
 - self-efficacy, 242, 248
 - societal barriers, 246–247
 - societal resources, 247
- Intervertebral disc displacement, 142
- Intra-abdominal fat distribution, 128–129
- Ischemia, 110, 111–112

J

- Johnson, President Lyndon B., 18
- Johnson & Johnson Live for Life program, 230

K

- Kennedy, President John F., 18
- Kilocalorie (kcal), 21, 29, 140, 143, 146–147, 148
- Kilojoule (kJoule), 21, 29
- Know Your Body (KYB) program, 238

L

- Lacerations, 143
- Lactate threshold (LT), 66, 67, 69, 70
- Lactates, 66, 67, 70, 74
- Leukocytes, 128
- Ligaments, 69
- Lipoproteins, 110
- HDL, 43, 91, 102
 - LDL, 91, 102
 - lipase activity, 111
 - profile, 111, 145
- Low back pain, 233–234
- Lung diseases, obstructive, 233–234
- Lymphocytes, 67

M

- Magnetic resonance imaging, 35
- Marfan syndrome, 45
- Mass spectrometer, 32
- Maximal oxygen uptake ($\dot{V}O_2$ max), 21, 23, 32–34, 62–63, 66, 67, 69–70, 72, 75–77, 110
- Media. *See* Communications interventions
- Men and physical activity
- no regular activity, 4, 8, 177, 178, 188, 189
 - regular, sustained activity, 183, 188, 205
 - regular vigorous activity, 185, 187, 188, 205
 - selected physical activities, 188
 - strengthening activities, 191
 - trends, 8
- Menopause, 130, 131
- Mental disorders, 135
- Mental health, 4, 8, 135–141, 150

- Mental retardation, 73
- Metabolic equivalent (MET), 21, 29, 32, 33, 66, 148, 204
- Metabolic rate, 66
- Metabolism
- aerobic, 20, 21
 - bed rest and disturbances of, 72
 - benefits, 7
 - carbohydrate, 128
 - energy expenditure, 134
 - glucose, 65, 128
 - fat, 68
 - muscle, skeletal, 65–67, 71–72
 - protein, 66
 - response to exercise, 18–19, 121, 64, 69–70
- Metropolitan Life Insurance Company weight tables, 133
- Minnesota Heart Health Program (MHHP), 227–228, 232
- Minnesota Leisure-Time Physical Activity Questionnaire, 31, 36
- Missouri “Bootheel” behavioral sciences study, 229, 232
- Mitochondria, 66
- Monocyte-macrophage system, 67
- Mortality, 85–87, 149
- all-cause, 133
 - diabetes mellitus, 125
 - heart disease, 87
 - lowering, 7
 - premature, 4, 16
 - traffic fatalities, 246
- Multiple sclerosis, 73, 233–234
- Muscle contractions, 34
- Muscle fatigue, 65
- Muscle fibers, 21
- fast- and slow-twitch, 65, 67, 69, 73
- Muscles, skeletal, 5
- adaptations to exercise, 7, 44, 65, 67, 69–70
 - atrophy of, 69, 72–73
 - capillaries in trained, 71
 - energy metabolism of, 65–67
 - fibers in, 65, 67, 69, 73
 - immobilization and, 72–73
 - insulin and, 125, 130
 - metabolic adaptations of, 69–70
 - multiple sclerosis and, 233–234
 - soreness in, 69
 - structural damage to, 69
- Muscular endurance (fitness), 21, 34–35
- Muscular strength, 34, 44
- Myocardial contraction, 65, 72
- Myocardial infarction, 5, 44, 45, 112, 143
- Myocardium, 111
- Myosin ATP, 65
- N**
-
- National Association for Sport and Physical Education, National Physical Education Standards, 244
- National Coalition for Promoting Physical Activity, 244
- National Institutes of Health (NIH), 5
- Consensus Development Conference Statement, Physical Activity and Cardiovascular Health, 5, 23, 28, 48, 148, 245
 - intervention campaigns, 245
 - National Physical Education Standards, 244
- Native Americans, 12
- adult physical activity interventions, 232
 - behavioral intervention program, 232
- Neoplasms. *See* Cancer
- Neural factors, 67
- Neuromas, 143
- Nitric oxide, 132
- Nitrogen, balance, 72

A Report of the Surgeon General

O

- Obesity, 7, 43, 133–135, 150, 248
 abdominal, 35, 128–129
 adult physical activity interventions, 232–234
 behavioral intervention programs, 232–233
 in adolescents, 102
 in children, 102
 childhood intervention, 244
 trends in, 47, 46
- Occupational medicine, 15
- Occupational physical activity, 113, 116, 175, 189.
 See also Worksite physical fitness programs
- Olympic Games, 12, 15
- Osteoarthritis, 7, 129–130, 133, 149–150
- Osteoporosis, 7, 23, 43, 69, 130–133, 150.
 See related Bone density
- Otitis externa, 143
- Ovarian cancer, 7, 114, 116–118, 149
- Overtraining, 21, 140
- Overweight, 133. *See also* Obesity
- Oxidative capacity, of muscle fibers, 65, 67
- Oxidative energy system, 65, 66
- Oxygen
 arterial-mixed venous, 62, 63, 70
 ATP production within mitochondria, 66
 body's use of, 61
 delivery, 74
 extraction, blood flow, 63
 myocardial demand/use, 63, 64
- Oxygen consumption ($\dot{V}O_2$), 18, 31, 32, 34, 66, 70, 74, 110
- Oxygen uptake. *See* Maximal oxygen uptake

P

- Pain threshold, 130
- Paleolithic rhythm, 11
- Pawtucket Heart Health Program (PHHP), 229
- Pediatricians, physical activity counseling by, 244

- Peripheral vascular disease, 45
- Personality disorders, 136
- Phosphocreatine (PCr), 65
- Physical activity, 21
 of adolescents. *See* Adolescents and physical activity
 of adults. *See* Adults and physical activity
 adverse effects of, 142–144
 approaches to, 46–47
 of children. *See* Children and physical activity
 definition of, 20
 dosage, 146–148
 duration of, 44, 147, 148
 evolution of recommendations, 22–28
 frequency of, 44
 intensity of, 29–33, 35–36, 44
 measures of, 211–215
 no regular, 15–16, 23, 50, 46–48, 177–189, 188, 195, 248
 regular, intermittent, 11, 148
 regular, sustained, 4, 6, 23, 37, 49, 43, 110, 146–147, 182–183, 244
 regular, vigorous, 4, 6, 11, 23, 37, 50, 110, 127–128, 146–147, 182–187, 188, 244
 research considerations, 47, 150
 social environmental approaches to, 244–245
 surveys of, 175, 177
- Physical activity, specific
 aerobics, 200, 205
 baseball, 129, 143, 200, 205
 basketball, 143, 200, 205
 bicycling, 4, 143, 144, 187, 200, 203
 boxing, 143
 carpentry, 140
 dancing, 14, 143, 144, 148, 187, 200, 205,
 football, 129, 143, 200, 205
 Frisbee, 197–198, 205
 gardening, 8, 140, 144, 147, 187
 golfing, 140
 hockey, 140, 148
 horseback riding, 14

- housecleaning, 147, 148, 200, 205
- jogging, 140, 142, 144, 148, 187, 198, 205,
- kickball, 12
- lacrosse, 12
- racquetball, 143, 197–198, 205
- running, 4, 12, 65, 66, 70, 129, 140, 142, 143, 144, 148, 187, 198, 205
- skating, 197–198, 205
- skateboarding, 197–198, 205
- skiing, 197–198, 205
- soccer, 129, 143, 197–198, 205
- softball, 144, 197–198, 205,
- stair climbing, 127, 147, 187
- squash, 197–198, 205
- swimming, 140, 143, 144, 197–198, 205,
- tennis, 14, 140, 197–198, 205
- volleyball, 4, 148,
- walking, 4, 8, 14, 33, 127, 140, 144, 148, 187, 197–198, 203, 204, 205, 233
- weight lifting, 129, 143
- yard work, 4, 8, 147, 187, 202, 200, 205, 205
- Physical Activity for Risk Reduction (PARR) project, 232
- Physical education, 8, 16–18
 - enrollment in, 4
 - in high school, 205, 205
 - school program interventions, 243, 246–249
- Physical examination, 6, 45, 47
- Physical fitness, 16–18, 21
 - assessment procedures, direct monitoring, 31–36
 - assessment procedures, self-reporting, 29–31
 - definition of, 20
 - level of, 61
 - maintenance of, 71–72
 - maximal oxygen uptake and. *See* Maximal oxygen uptake
 - measurement of, 33–35
 - physical activity relationship, 43
 - worksite programs, 48, 46, 48
 - See also* Cardiorespiratory endurance (fitness)
- Physical fitness programs
 - detraining and, 61, 72
 - endurance training, 61, 63, 65, 67, 69–70
 - exercise training, 61, 67, 69
 - resistance training, 61, 65, 69, 70
- Physical functioning, 141
- Physical inactivity, 5, 6, 72, 73, 145–146, 148
 - bone loss and muscle atrophy in, 69
 - diseases of, 15–16
 - exercise programs and, 37
 - health burden of lifestyle, 42–43
 - mortality and, 86
 - percentage of, 4
 - physical activity recommendations for, 29
 - physiological alterations after endurance training, 70
 - societal inducements for, 254–247
 - working toward recommendations, 44
- Physically handicapped, 73
 - behavioral intervention programs, 233–234
 - childhood interventions, 233, 244
 - no regular activity and, 189
 - regular, moderate activity and, 189
 - regular, vigorous activity and, 189
- Physician-based Assessment and Counseling for Exercise (PACE), 227
- Plasma insulin concentration, 128
- Plasma lipid/lipoprotein, 110, 111
- Plasma volume, 71, 72, 74
- Platelet function, 43
- Population attributable risk (PAR), 145–146
- Postmenopause, 131
- Postpoliomyelitis syndrome, 73
- Power, 21, 85
- President's Citizens Advisory Committee on the Fitness of American Youth, 18
- President's Conference on Fitness of American Youth, 18
- President's Council on Physical Fitness, 18, 23
- President's Council on Physical Fitness and Sports (PCPFS), 3, 5, 18, 227, 245

A Report of the Surgeon General

President's Conference on Youth Fitness, 18
Presidential Physical Fitness Award, 18
Preventive medicine, 11–18
Prostaglandin, 68, 113–117, 124
Prostate cancer, 7, 121–122, 124–125
Proteoglycan synthesis, 130
Psychological assessments, 136–137
Psychomotor performance, 17, 19–20, 35, 44
Pulmonary ventilation, 64, 71
Pulse rate, 16

Q

Quadriplegia, 75
Quality of life, 8, 141–142, 150
Quetelet's index, 133

R

Rating of perceived exertion (RPE) scale, 33
Reaction time, 21
Receptors, sensory, 141
Rectal cancer, 7, 113, 116, 122, 149
Relative perceived exertion (RPE), 21
Renin-angiotensin system, 68
Resistance training, 4, 19, 21, 29, 37, 44, 61, 65, 69
 adolescent, 196, 198–200
 elderly persons and, 7, 132–133
 glucose-insulin dynamics, 128
 muscle, skeletal effects of, 69
 obesity and, 135
 osteoporosis and, 150
 risk factors, 67
 strengthening activities for, 187, 189, 191–192, 193, 199–200
 sex factors, 70
Respiration rate (RR), 70, 71

Respiratory system, 5
 adaptation to exercise, 71
 physiological alterations after endurance training, 70
 resistance exercise and, 65
 response to exercise, 61–62, 64
Retraining, 21
Rhabdomyolysis, 143
Rhode Island
 Department of Parks and Recreation, 229
 Health and Religion Project, 245
 Pawtucket Heart Health Program, 229
Roosevelt, President Franklin D., 17

S

Schizophrenia, 136
School program interventions, 6, 236–243, 246–248
Sedentary persons. *See* Physical inactivity
Self concept, 130, 141, 142
Self-help, 13–15, 29–31
Senior citizens. *See* Elderly persons
Sex factors
 in exercise training, 70, 76–77
 hormonal responses to exercise, 67
 hormone-dependent cancers in men, 121–125
 hormone-dependent cancers in women, 114–121
 physical inactivity and, 177–178
 specific physical activities and, 187–189
 strengthening, stretching activities by, 191
 weight gain prevention and, 232
Shoulder dislocation, 142
Skeletal muscles. *See* Muscles, skeletal
Skin, receiving cardiac output at rest vs. exercise, 63
Skinfold measures, 133, 134
Sleep disorders, 136

Social environment
 barriers, 246–247
 behavioral influences, 215,
 resources, 247

Social functioning, 141

Social sciences. *See* Behavioral sciences, adult;
 children and adolescents

Socioeconomic factors
 bicycling activities and, 203
 physical inactivity and, 177, 178, 196
 resistance training and, 193
 stretching activities and, 194
 walking activities and, 200

Speed, 21, 203–204

Splanchnic circulation, 63

Sports, Play, and Active Recreation for Kids
 (SPARK) study, 239

Stanford Adolescent Heart Health Program, 238

Stanford Five-City Project (SFCP), 229

Strength, 21, 22

Strength testing, 16, 34

Strength training. *See* Resistance training

Stretching activities, 187, 191–192

Stroke volume (SV), 62, 71–73

Substance use disorders, 136

Suicide, 135, 140

Systolic blood pressure (SBP), 63, 64, 70

T

T-lymphocytes. *See* Lymphocytes

Tai chi chuan, 12, 113

Taoism, 12

Tecumseh questionnaire, 31

Temperature. *See* Body temperature

Tendinitis, 143

Tendons, 69

Testicular cancer, 7, 124, 147

Thrombosis, 102, 110, 112

Thymus gland, 67

Tidal volume (TV), 70, 71

Training heart rate (THR), 21

Transient constriction, 111

Triglycerides, 111

Trust for Public Land, The, 245

U

Ulnar nerve palsies, 143

United Kingdom Testicular Cancer Study Group,
 122

United States regions
 East, 12
 Midwest, 229
 North central, 177, 187
 Northeast, 177, 187
 South, 177, 189, 187
 Southwest, 12
 West, 177, 182, 187, 189, 187

U.S. Preventive Services Task Force, 28

Urogenital system, 143

Uterine cancer, 114, 120–121

V

Vasoconstriction, 76

Ventilatory volume (\dot{V}_E), 70, 74

Ventricular dysfunction, left, 103

Ventricular end-diastolic volume, 71, 72

Ventricular fibrillation, 112

Vertebral fractures, 130

Virginia
 Smyth County program, 245

W

Water-electrolyte imbalance, 143

Weather factors
 seasonality, 184, 196, 196, 200, 204
 summer months, 184, 187
 walking, bicycling activities and, 204

Weight Gain Prevention Program, 232

A Report of the Surgeon General

West Virginia

elderly mall walking campaign in, 233

Whites

behavior intervention program for, 232

bicycling activities by, 203

high school physical education enrollment, 205

no regular activity, 177, 188, 195

physical activity trends in, 8

regular, sustained activity, 183

regular, vigorous activity, 183, 187, 188,
196–197

sports team participation, 200

strengthening activities by, 189, 191, 193, 199

stretching activities by, 191, 194, 201

walking activities by, 203

Wise Weighs program, 232

Women and physical activity

no regular activity, 177, 178, 188, 205

regular, sustained activity, 183, 188, 205

regular, vigorous activity, 185, 187, 188, 189

selected physical activities, 188

strengthening activities, 191

trends, 8

Work rate, 64, 71

energy metabolism and, 65

energy systems and, 65–66

increasing, 62–63, 64

Worksite physical fitness programs, 48, 46, 48,
184

World Health Organization, definition of health,
141

World War I, 16

World War II, 17, 18, 19

Y

YMCA, 23

Yoga, 12

Z

Zuni Diabetes Project, 232