

INDEX

A

- Abbreviations, xix–xxii
- Aberdeen Proving Ground, 9
- Acceleration injury, 268
- Accreditation Council for Graduate Medical Education, 122
- ACGIH. *See* American Conference of Governmental Industrial Hygienist
- Acquisition, Technology, and Logistics, Under Secretary of Defense for, 115–116
- Acronyms, xix–xxii
- ADA. *See* Americans with Disabilities Act
- Adams, John, 42
- Administrative medical examinations, 63–64
- Advanced Very High Resolution Radiometer, 76
- Aerospace medicine
- acceleration injury, 268
 - altitude-induced hypoxia, 264–265
 - barotrauma, 265–266
 - circadian rhythm disturbance, 273–275
 - color vision, 279–281
 - counter fatigue programs, 278–279
 - decompression sickness, 266–267
 - ejection injury, 268
 - environmental risk factors, 276–277
 - ergonomics, 275
 - fatigue, 273–275
 - fitness testing programs, 278
 - hazards, illness and injury, 264–276
 - heat stress, 268
 - hypothermic injury, 268
 - industrial hazards, 275–276
 - laser eye protection, 281
 - loss of consciousness, 268
 - military aviation administration, 283–286
 - modified duty programs, 278
 - motion sickness, 271–272
 - new accession exams, 277–278
 - night vision goggles, 281–282
 - noise-induced hearing loss, 272–273
 - personal protective equipment, 279
 - pressure illness, 265–268
 - readiness and deployment, 277–279
 - refractive surgery, 282–283
 - sleep deprivation, 273–275
 - spatial disorientation, 270–271
 - structure of atmosphere, 264
 - sustained acceleration, 269–270
 - thermal stress, 268
 - three-dimensional motion, 268–272
 - transient acceleration, 269
 - travel health hazards, 275
 - visual performance and protection, 279–283
 - weaponry and injury, 275
- Afghanistan, Operation Enduring Freedom, 86–100
- AFMSA. *See* Air Force Medical Support Agency
- Agency Query System, 146
- Agent Orange, 72
- Ahmadi Oil Fields, Kuwait, 73
- Air evacuation, 285–286
- Air Force Medical Support Agency, 13
- Air Force occupational and environmental health program
- critical elements of, 17
 - emerging developments in Air Force Occupational Medicine, 19
 - employee role and responsibilities, 16
 - execution of, 17–18
 - exposure assessment model, 17–18
 - headquarters level role and responsibilities, 12–13
 - installation level role and responsibilities, 13–16
 - major command roles and responsibilities, 13
 - management review, 19
 - overview, 12
 - planning process, 16–17
 - role and responsibilities, 12–16
 - supervisor role and responsibilities, 16
- Air pollution, 478
- Air-purifying respirators, 220–222
- Air sampling, 84–85
- Airborne hazards, 596–599
- Al Tuwaitha Nuclear Research Center, 92
- Aliphatic nitrate esters
- nitrocellulose, 572
 - nitroglycerin, 568–572
- Altitude-induced hypoxia, 264–265
- Ambient air regulations, 392
- AMC. *See* Army Materiel Command
- AMCOM. *See* Aviation and Missile Life Cycle Management Command
- American Conference of Governmental Industrial Hygienist, 156, 236, 239, 368
- American Industrial Hygiene Association, 236, 368
- Americans with Disabilities Act, 129
- Ammunition plants, 5–7
- Amsden, Sergeant 1st Class Lance, vi
- Anesthetic gases, 175–176
- Anniston Army Depot, 4
- Anniston Defense Munitions Center, 5
- Anthrax attacks, 88–89
- Anti-G straining maneuver, 270
- Antineoplastic agents, 176–177
- AOEHP. *See* Army Occupational and Environmental Health Program
- APHC. *See* Army Public Health Center
- Armed Forces Health Longitudinal Technology Application, 100
- Army Center for Health Promotion and Preventive Medicine, 74
- Army Chemical Materials Activity, 8
- Army Contracting Command, 7
- Army ergonomics program, 244–245
- Army Health Promotion Program, 65–66
- Army Hearing Conservation Program, 200–213
- Army industrial hygiene program, 239–240
- Army Materiel Command
- Army Materiel Systems Analysis Activity, 8
 - The Logistics Support Activity, 8
 - mission of, 3
 - motto, 2
 - quality of work environment, 8–9
 - US Army Aviation and Missile Life Cycle Management Command, 5
 - US Army Chemical Materials Activity, 8
 - US Army Communications-Electronics Command, 5
 - US Army Contracting Command, 7
 - US Army Joint Munitions Command, 5–7
 - US Army Military Surface Deployment and Distribution Command, 7–8
 - US Army Security Assistance Command, 8
 - US Army Sustainment Command, 7
- Army Materiel Systems Analysis Activity, 8
- Army Medical Command, 117

Army Military Surface Deployment and Distribution Command, 7–8

Army Occupational and Environmental Health Program

- budgeting, 123–124
- contracting for occupational health services, 124
- DoD program structure and management, 115–117
- expanding service delivery, 124
- funding, 123–124
- management of, 117–118
- overview, 114–115
- personnel, 120–123
- quality measures, 118–120

Army Occupational Health Programs

- administrative medical examinations, 63–64
- Army Occupational and Environmental Health Program, 115–124
- in Bosnia, Herzegovina, and Kosovo, 83–86
- credentialing and privileging, 60–61
- disability retirement examinations, 64
- emergency treatment, 66
- employee health clinics, 60
- employees, 62
- epidemiological investigations, 65
- evaluation of, 59
- fitness-for-duty examinations, 64
- health hazard education, 64
- health promotion, 65–66
- health providers, 61
- immunizations, 65
- industrial hygienists, 61
- informatics, 100–103
- laws, regulations, and guidance, 56–59
- marketing, 58–59
- medical centers, 59–60
- medical directives, 58
- medical records management, 62–63
- medical surveillance, 63
- monitoring absences due to illness, 64–65
- nurses, 61
- occupational health business plan, 58
- occupational health clinics, 59–60
- Operation Enduring Freedom, 86–100
- Operation Iraqi Freedom, 86–100
- organization of, 59–62
- during Persian Gulf War, 72–83
- program document, 57–58
- safety personnel, 61–62
- staffing, 60–62
- standard operating procedures, 58
- status report, 57–58
- supervisors, 62
- worksites evaluations, 64

Army Public Health Center, 117–118

Army Public Health Command, 117

Army Security Assistance Command, 8

Army surgeon general, 117

Army Sustainment Command, 7

Arsenals, 7

Arsenic, 369–370

Arterial gas embolism, 266–267, 323, 328, 335–338

Asbestos

- asbestos medical surveillance program, 162, 163
- forms of, 380
- health effects, 161–162
- medical surveillance, 381
- routes of exposure, 380
- toxicology, 380–381
- uses, 380

Asbestosis, 380

Aseptic bone necrosis, 332

Assistant Secretary of Defense for Health Affairs, Office of, 116

Atmosphere-supplying respirators, 223–224

Atmospheric structure, 264

Atomic Energy Commission, 424

Atomic fission, 401

Attack submarines, 355

Audiograms, 134–135

Audiology, 33

Audiometry, 208

Aviation and Missile Life Cycle Management Command, 5

Aviation and Missile Research, Development, and Engineering Center, 3

Aviation medicine, 46–47. *See also* Aerospace medicine

B

Back injuries, 252–256

Baggage inspection systems radiation, 415

Ballast handling, 390

Ballistic missile submarines, 356

Barotrauma, 265–266, 319–323

Base operational medicine clinic, 19

Basic Program Elements for Federal Employee Occupational Safety and Health Programs, 56

Beaver, Hull Technician Fireman R., 35

Benton, Thomas Hart, 46

Beryllium

- acute beryllium disease, 510
- biomarkers of exposure, 511–512
- carcinogenesis of, 511
- dermatologic effects, 511
- diagnosis of chronic beryllium disease, 513
- environmental exposure, 507–508
- exposure prevention and control, 514
- genetic predisposition, 513
- health effects, 509–512
- industrial use, 506
- manufactured products that use beryllium, 507
- occupational exposure, 508–509
- occupational surveillance, 512–513
- pathophysiology of chronic beryllium disease, 509–510
- regulation and legislation, 509
- sensitization, 510
- symptoms of chronic beryllium disease, 510–511
- treatment of chronic beryllium disease, 513–514
- workers with potential occupational exposure to, 507

Bioenvironmental engineering, 14–15

Biological exposure indices, 239

Biological hazards, 178–181

Biological monitoring

- airborne hazards, 596–599
- big data analysis, 606–607
- biomarker discovery and applications, 599–602
- biomarkers definition, 594
- biomarkers of pulmonary injury, 604
- DoD needs for exposure assessment and biomarkers, 596–599
- epigenetic biomarkers, 604–606
- exhaled breath condensate, 603
- exposure memory, 603–604
- genetic biomarkers, 604–606
- genetics in pulmonary injury research, 605–606
- nasal lavage analysis, 603
- physiological test matrices, 602–603
- protein biomarkers, 604
- saliva, 603
- serum cytokines, 604
- types of biomarkers, 594–596

- Biological surveillance initiative, 74, 75
- Biomarkers
- applications, 599–602
 - comparison of, 596
 - definition, 594
 - discovery of, 599–602
 - DoD needs for, 596–599
 - of effect, 595
 - epigenetic, 604–606
 - of exposure, 594–595
 - genetic, 604–606
 - limitations on use of, 596
 - protein biomarkers, 603–604
 - of pulmonary injury, 604
 - of susceptibility, 595–596
- Blane, Sir Gilbert, 43
- Blood-borne pathogen exposure control plan, 193–198
- Blue Grass Army Depot, 7
- BOMC. *See* Base operational medicine clinic
- Borden, Captain William C., 403
- Bosnia and Herzegovina
- air sampling, 84–85
 - environmental concerns, 83–84
 - Operation Joint Guardian, 86
 - Operations Joint Endeavor, Joint Guard, and Joint Forge, 84–85
 - pesticide wipe sampling, 86
 - soil sampling, 86
 - water sampling, 85–86
- Boyle's law, 315–316
- Brachytherapy, 410
- Bradley fighting vehicles, 480–481
- Breath-hold diving
- compression of descent, 339–340
 - decompression sickness, 340
 - diving reflex, 338–339
 - hypercapnia, 340
 - hypoxia, 340
- Brown, Dr. Ernest, 48
- Brown, Tarnisha, 33
- BSI. *See* Biological surveillance initiative
- Buchan, Dr. William, 42
- BUMED. *see* Bureau of Medicine and Surgery
- Buoyancy, 306–307, 317
- Bureau of Medicine and Surgery, 24, 30
- Burn pits, 98–100
- Bush, George W., 87, 143
- C**
- Cadmium, 370–371
- Camp Freedom, Kuwait, 72
- CAP. *See* Computer/Electronic Accommodations Program
- Capstone Report, 77
- Carbon dioxide retention, 297–298
- Carbon dioxide toxicity, 325–326
- Carbon monoxide exposure
- altitude and, 494–495
 - appliances, 478
 - Army housing and tents, 492
 - autopsy findings, 487
 - cardiovascular effects, 487
 - central nervous system effects, 485–487
 - chronic effects, 487
 - clinical presentation, 485–487
 - Committee on Toxicology Emergency Exposure Guidance Levels, 493–494
 - confounders, 494–496
 - diagnosis of, 487–488
 - emergency and accidental exposures, 493–495
 - emergency response planning guidelines, 494–495
 - environmental exposure standards, 493
 - exposure incidents, 483–484
 - health standards and guidelines, 489–496
 - health status and, 496
 - heat stress and, 495
 - high temperature and, 495
 - historical exposures, 479–480
 - hydrogen cyanide and, 496
 - hyperbaric oxygen treatment location, 489
 - industrial exposures, 478–479
 - internal combustion engines, 479
 - medical surveillance, 497
 - methylene chloride, 479, 496
 - military occupational exposures, 490–492
 - military sources of exposure, 479–484
 - mines, 479
 - modern era exposures, 480–483
 - Navy submarine escape action levels, 494
 - nitric oxide and, 496
 - nonmilitary sources of exposure, 478–479
 - ototoxicity, 496
 - outdoor air pollution, 478
 - pathophysiology, 484–485
 - structural fires, 479
 - symptoms, 485
 - tobacco smoke, 478, 495–496
 - toxicity, 326–327
 - treatment for, 488–489
 - work-effort constants for predicting carboxyhemoglobin blood content, 490, 503
- Carboxyhemoglobin, 490, 503
- Cardiovascular disease
- carbon monoxide exposure effects, 487
 - risk assessment for respirator wearers, 229
- Cargo inspection systems radiation, 415–416
- CEMR. *See* Civilian employee medical records
- Center for Health Promotion and Preventive Medicine, 74, 76, 79, 84, 86–91, 93–95
- Center for Unit Records Research, 75, 80
- Central Intelligence Agency, 79, 81
- Central nervous system
- carbon monoxide exposure effects, 485–487
 - oxygen toxicity in divers, 293, 324–325
- Central Technical Support Facility, 5
- Certification exams, 34–35, 157–158
- Champion, Hospital Corpsman 3rd Class James, 33
- Charles's law, 316
- Chelation, 395
- Chemical agent monitor, 413
- Chemical agent-resistant coatings, 373
- Chemical hazards, 175–178
- Chemical Materials Activity, 8
- Chemical Volatile Organic Compound Unit, 28
- Chemical warfare agents, 8, 78–81, 96–98
- Chest radiographs, 135
- Chiarelli, General Peter, 8
- CHPPM. *See* Center for Health Promotion and Preventive Medicine
- Chrome holes, 90, 91
- Chromium, 371–372
- Chromium exposure, 89–92
- Chronic diseases surveillance, 165
- CIA. *See* Central Intelligence Agency
- Circadian rhythm disturbance, 273–275
- Civilian employee medical records, 62–63

Civilian employees medical care, 47–48
Civilian Personnel Advisory Centers, 128
Civilian Personnel Policy/Defense Civilian Personnel Advisory Services, 128
Claim management process, 144–145
Clean Air Act, 76, 392
Clinton, Bill, 128
Closed-circuit mixed-gas scuba, 296
Closed-circuit oxygen scuba, 294–296
COCOs. *See* Contractor-owned, contractor-operated plants
Cold stress
 accidental hypothermia, 624–627
 body protection and insulation, 619
 cold injuries, 620–627
 estimated survival time in cold water, 624
 exposure guidelines, 619–620
 external equipment, 620
 freezing cold injuries, 620–622
 hand protection and insulation, 619
 insulation value of clothing, 628
 medical surveillance, 627
 nonfreezing cold injuries, 622–624
 photokeratitis treatment, 620
 physiology of, 618–619
 prevention, 627–630
 temperature measurements, 619
 work cycle recommendations during cold environmental conditions, 629
Cold temperature risks, 246, 252
Color vision, 279–281
Commercial driver medical examinations, 159
Commission on Illumination, 463
Committee on Toxicology Emergency Exposure Guidance Levels, 493–494
Communications-Electronics Command, 5
Compensation. *See* Federal workers' compensation
Compensation specialist, 140–143
Comprehensive Environmental Response, Compensation, and Liability Act, 391
Computed tomography, 405–406, 410
Computer/Electronic Accommodations Program, 140
Consciousness loss, 268
Constrictive bronchiolitis, 95
Consultative support, 33–34
Consumer Product Safety Improvement Act, 392
Contact lenses, 282
Contaminated diving, 352–354
Continuing education units, 123
Continuing medical education, 123
Contracting Command, 7
Contractor-owned, contractor-operated plants, 3
Corrosion control, 36
Cotinine, 602
Counter fatigue programs, 278–279
CPACs. *See* Civilian Personnel Advisory Centers
Crane Army Ammunition Activity, 5–6
Crane operators examination, 159
Credentialing, 60–61
Cryogenic fluids, 465
Crystalline silica, 381–382
CS. *See* Compensation specialist
CURR. *See* Center for Unit Records Research
Cutbush, Dr. Edward, 44–45
CWAs. *See* Chemical warfare agents
CWM. *See* Chemical warfare materiel
Cyanide, 372–373
Cyclosarin, 80
Cytokines, 604

D

Dalton's law, 317
Data quality, 119
DBNP. *See* 2,6-Di-tert-butyl-4-nitrophenol
DCPAS. *See* Defense Civilian Personnel Advisory Service
Decompression procedures
 decompression sickness, 266–267, 299, 328–338
 dive computers, 301
 diving at altitude, 303, 332–333
 flying after diving, 303, 332–333
 helium-oxygen diving, 302
 in-water decompression stops, 300
 multilevel diving, 301
 nitrogen-oxygen diving, 301–302
 no-stop dives, 299–300
 omitted decompression, 302–303
 repetitive diving, 300, 301
 safety of decompression practices, 303
 surface decompression, 301
 trimix diving, 302
Decompression sickness
 altitude exposure after diving, 303, 332–333
 arterial gas embolism, 266–267, 328
 aseptic bone necrosis, 332
 bubble formation, 329
 clinical presentation, 330–332
 decompression tables, 334
 diving at altitude, 303, 332–333
 factors affecting individual susceptibility, 333–334
 of free diving, 340
 inert gas exchange, 329
 oxygen treatment for table, 267
 patent foramen ovale as risk factor, 334
 pathophysiology of, 329–330
 prevention of, 299, 334
 probability of, 334
 in saturation diving, 337–338
 symptoms of, 331
 treatment of, 266, 335–338
 types of, 266
 US Navy treatment tables, 335–337
Defense Ammunition Center, 5
Defense Civilian Personnel Advisory Service, 141, 143
Defense Health Agency, 116–117
Defense Health Board, 91
Defense Manpower Data Center, 75, 80–81
Defense Medical Surveillance System, 553
Defense Occupational and Environmental Health Readiness System, 12, 100–101, 240, 553
Defense Occupational and Environmental Health Readiness System-Hearing Conservation, 36, 100–101
Defense Occupational and Environmental Health Readiness System-Industrial Hygiene, 9, 86, 100–102
Defense Safety Oversight Council, 115
Department of Defense
 Federal Employees Compensation Act program, 141–143, 146
 Hearing Center of Excellence, 210
 industrial hygiene exposure assessment model, 237–239
 Laser Injury Hotline, 452
 military workers' compensation cost and rates, 143–144
 needs for exposure assessment and biomarkers, 596–599
 occupational health regulations and guidance, 57–58
 policy for handling exposures to depleted uranium, 434–435
 program structure and management, 115–117
 Protecting Our Workers and Ensuring Reemployment, 143, 146–148
 radiation safety program, 429–434

- reviews of military compensation programs, 144–146
 - Serum Repository, 553, 599
 - Department of Labor
 - compensation program management efforts, 146–148
 - Department of the Navy
 - organization of, 24–26
 - safety and occupational health programs, 26–37
 - Department of Transportation
 - commercial driver medical examination, 159
 - Depleted uranium, 76–78, 414, 434–436
 - Deployment assessment, 277–279
 - Deployment Environmental Surveillance Program, 100, 101, 555
 - Deployment surveillance
 - active deployment medical surveillance, 554–555
 - challenges, 556–557
 - consequences of the Persian Gulf War, 550–551
 - data repositories, 552–553
 - Deployment Environmental Surveillance Program, 555
 - Disease Reporting System-internet, 554
 - documenting exposures, 551–552
 - during the Ebola outbreak, 555–556
 - medical situational awareness in the theater, 554
 - modeling, 555
 - passive deployment medical surveillance, 554
 - Periodic Occupational and Environmental Monitoring Summary, 552
 - postdeployment health surveys, 554
 - Theater Medical Information Program, 554–555
 - Depots, 7
 - Dermatitis, 567
 - DHA. *See* Defense Health Agency
 - 2,6-Di-tert-butyl-4-nitrophenol, 357–358
 - Diesel exhaust, 373
 - Digital radiography, 408
 - Dignified Burial and Other Veterans' Benefits Improvement Act, 99
 - Diisocyanates, 373–374
 - Dinitrotoluene, 576–577
 - Disabilities. *See* Employees with disabilities
 - Disability retirement examinations, 64
 - Disabled submarines, 359–361
 - Disease Reporting System-internet, 554
 - Disease vector control centers, 27, 28
 - Disinfectants hazards, 174
 - Dive computers, 301
 - Dive medicine, 46–47
 - Diving. *See also* Undersea medicine
 - barotrauma, 319–323
 - breath-hold diving, 338–340
 - buoyancy, 306–307, 317
 - carbon dioxide retention, 297–298
 - carbon dioxide toxicity, 325–326
 - carbon monoxide toxicity, 326–327
 - central nervous system oxygen toxicity in divers, 293, 324–325
 - contraindications to diving, 308–309
 - decompression procedures, 299–303
 - decompression sickness, 299, 328–338
 - dyspnea, 297–298
 - gas laws, 315–317
 - hearing underwater effects, 318–319
 - helium effects, 327–328
 - hydrogen effects, 328
 - hyperbaric oxygen therapy, 309–310
 - individual susceptibility to impaired consciousness, 299
 - inert gas effects, 328
 - interactions between gases and impaired consciousness, 298–299
 - medical standards for diving, 307–309
 - nitrogen narcosis, 327, 351
 - ocular oxygen toxicity, 325
 - overview, 292
 - oxygen toxicity, 324–325, 350–351
 - pathophysiological effects of common diving gases, 323–328
 - physical principles, 314–317
 - pulmonary oxygen toxicity, 324
 - recompression chambers, 309–310
 - role of respiration in diving injuries, 297–299
 - saturation diving, 303–306
 - thermal protection, 306–307
 - underwater breathing apparatuses, 293–296
 - vision underwater effects, 317–318
 - Diving medical officers, 307
 - Diving reflex, 338–339
 - DMDC. *See* Defense Manpower Data Center
 - DoD. *See* Department of Defense
 - DOEHRS. *See* Defense Occupational and Environmental Health Readiness System
 - DOEHRS-IH. *See* Defense Occupational and Environmental Health Readiness System-Industrial Hygiene
 - DoN. *See* Department of the Navy
 - Dosimetry, 422
 - Drinking water regulations, 392
 - Drugs, hazardous, 176–177
 - DSOC. *See* Defense Safety Oversight Council
 - DVCCs. *See* Disease vector control centers
 - Dysbaric osteonecrosis, 332
 - Dyspnea, 297–298, 354
- ## E
- Ear. *See also* Hearing conservation programs
 - anatomy and physiology, 200–202
 - inner ear barotrauma, 321
 - Ebola outbreak, 555–556
 - Edison, Thomas, 419
 - Ejection injury, 268
 - Electrical soldering hazards, 390
 - Electrocardiograms, 135
 - Electromagnetic radiation, 402
 - Electronic Data Interchange system, 141
 - Elemental exposures, 380–383
 - Emergency contact information, 452
 - Emergency Exposure Guidance Levels, 493–494
 - Emergency Fleet Corporation, 48
 - Emergency treatment, 66
 - Emotional stress, 183
 - Employees. *See* Federal workers' compensation; Personnel
 - Employees with disabilities, 129–131, 165
 - Energy Research and Development Administration, 424
 - Environment, safety, and occupational health, 12
 - Environmental exposures, 391
 - Environmental extremes, 182
 - Environmental health. *See* Occupational and environmental health program
 - Environmental monitoring, 84–86
 - Environmental Protection Agency, 73, 76, 84–86, 273, 423–424
 - Environmental regulations, 391–392
 - Environmental Surveillance Integration Program, 101–102
 - EPA. *See* Environmental Protection Agency
 - Epidemiological investigations, 65
 - Epigenetic biomarkers, 604–606
 - Epigenomics, 602
 - Ergonomics
 - active surveillance, 246–247
 - aviation risks, 275
 - basic ergonomics assessment survey form, 260–261

cold temperature assessment, 252
duration assessment, 251
forceful exertion assessment, 251
health contribution, 249
manual material handling, 252–256
mechanical compression assessment, 251
passive surveillance, 247
personal protective equipment, 249–250
posture assessment, 250
program organization, 244–245
program regulations, 244
recognizing hazards, 246–247
repetition assessment, 251
risk factor management, 247–249
risk factors, 245–246
US Army ergonomics program, 244–245
vibration assessment, 252
wellness contribution, 248–249
worksites task analyses, 250–252

ESIP. *See* Environmental Surveillance Integration Program

ESOH. *See* Environment, safety, and occupational health

Exercise stress test, 135

Exhaled breath condensate, 603

Experimental Diving Unit, 47

Explosive ordinance handlers examination, 159–160

Explosives

- acute exposure decontamination, 567
- administrative controls, 566
- aliphatic nitrate esters, 568–572
- carcinogenesis, 568
- composites, 583–584
- dermatitis and, 567
- energetic materials, 563–564
- engineering controls, 565–566
- exposure, 564–566
- history of, 562–563
- industrial hygiene principles, 565–566
- initiating explosives, 583
- methemoglobinemia and, 567–568
- nitramines, 577–583
- nitroaromatics, 572–577
- personal protective equipment, 566
- preplacement considerations, 566–567
- safety practices, 565
- vasodilation and, 568

Explosives vehicle operators examination, 159–160

Exposome, 596

Exposure assessment model, 237–239

Eye tests, 134

F

FAA. *See* Federal Aviation Administration

Facilities maintenance, 182–183

Fatigue risks, 273–275, 278–279

FDPUMs. *See* Forward deployable preventive medicine units

FECA. *See* Federal Employees Compensation Act

FEDCUs. *See* Fleet epidemic disease control units

Federal Aviation Administration, 133

Federal Employees Compensation Act, 48, 57, 140–143, 146

Federal Motor Carrier Safety Agency, 128, 133

Federal Radiation Council, 423

Federal workers. *See* Personnel

Federal workers' compensation

- Computer/Electronic Accommodations Program, 140
- Department of Labor program management efforts, 146–148
- DoD FECA program, 141–143
- FECA management challenges, 146

Federal Employees Compensation Act program, 140–141

military workers' compensation cost and rates, 143–144

Office of Workers' Compensation Programs, 140–141

reviews of military compensation programs, 144–146

Felloney, Landing Signal Officer Brian, 33

Firefighters examination, 160

Firefighting operations, 93–96

Firing ranges hazards, 389–390

Fit test records, 233

Fitness-for-duty examinations, 64, 278, 284–285

Fitness standards, 128–131

Fleet epidemic disease control units, 26

Flight and operational medicine, 16

Flight medicine, 46–47, 284–286

FMCSA. *See* Federal Motor Carrier Safety Agency

FOM. *See* Flight and operational medicine

Food and Drug Administration, 392

Food contamination, 392

Forceful exertion risks, 246, 251

Forklift operators examination, 160

Formaldehyde, 177

Fort Campbell, Kentucky, 484

Fort Hood, Texas, 483–484

Fort Irwin National Training Center, California, 484

Forward deployable preventive medicine units, 28

Free diving, 338–340

Free electron laser, 462

Fukushima, Japan, 429

Full-face respirators, 221, 223

Functional health status, 119

G

G-induced loss of consciousness, 269–270

GAO. *See* Government Accountability Office

Gas laws, 315–317

Gas removing respirators, 222

Genetic biomarkers, 604–606

Genetic Information Nondiscrimination Act, 130–131

Genomics, 600

Gilmer, Thomas, 45, 46

GINA. *See* Genetic Information Nondiscrimination Act

Glutaraldehyde, 177

GOCOs. *See* Government-owned, contractor-operated plants

GOGOs. *See* Government-owned, government-operated plants

Goiania, Brazil, 411–412

Gordon, Dr. Maurice Bear, 42

Government Accountability Office, 102, 144, 146

Government-owned, contractor-operated plants, 3

Government-owned, government-operated plants, 3

Green, Dr. Ezra, 42

Ground System Enterprise, 4

Guided missile submarines, 356

Gulf War illness, 72–73, 83

Gun propellants, 585

GW. *See* Gulf War illness

H

Half-face respirators, 221

Hawthorne Army Depot, 7

Hazardous substances. *See also* specific substances

- arsenic, 369–370
- asbestos, 380–381
- cadmium, 370–371
- chromium, 371–372
- crystalline silica, 381–382
- cyanide, 372–373
- diesel exhaust, 373

- diisocyanates, 373–374
 - elemental exposures, 380–383
 - inorganic exposures, 380–383
 - lead, 388–395
 - metals, 369–372
 - methyl ethyl ketone, 375–376
 - methylene chloride, 374–375
 - mustard agents, 376–377
 - occupational exposure limits, 238–239, 368
 - organic exposures, 372–380
 - organophosphate nerve agents, 377–378
 - pentachlorophenol, 378–379
 - trichloroethylene, 379–380
 - tritium, 382–383
 - white phosphorus, 383
 - Hazards. *See* Health hazards
 - HCV exposure, 195
 - Health Advisory Program, 85
 - Health Affairs, Assistant Secretary of Defense for, 116
 - Health hazard education, 64
 - Health Hazard Information Management, 100
 - Health hazards
 - abatement strategies, 183–185
 - anesthetic gases, 175–176
 - antineoplastic agents, 176–177
 - biological hazards, 178–181
 - blood-borne pathogen exposure control plan, 193–198
 - chemical hazards, 175–178
 - emotional stress, 183
 - environmental extremes, 182
 - facilities maintenance, 182–183
 - formaldehyde, 177
 - glutaraldehyde, 177
 - hazardous drugs, 176–177
 - hepatitis B, 178–179
 - hepatitis C, 178–179
 - human immunodeficiency virus, 179
 - latex, 180–181
 - medical maintenance, 182–183
 - mercury, 178
 - methicillin-resistant *Staphylococcus aureus*, 181
 - methyl methacrylate, 178
 - in military healthcare facilities, 172, 173
 - musculoskeletal strain, 182
 - noise hazards, 181–182
 - overview, 172–174
 - personnel and population screening, 174–175
 - physical hazards, 181–183
 - psychosocial hazards, 183
 - radiation hazards, 181
 - of selected solvents, reagents, and disinfectants, 174
 - shift work, 183
 - tuberculosis, 179–180
 - types of, 175–183
 - workplace violence, 185
 - Health Insurance Portability and Accountability Act, 62, 130–131, 158
 - Health Program business plan, 58
 - Health promotion, 65–66
 - Health risk assessment, 74, 75
 - Health Services Command, 56
 - Health status measurement, 119
 - Healthcare workers health hazards. *See* Health hazards
 - Hearing, underwater effects, 318–319
 - Hearing Center of Excellence, 210
 - Hearing conservation programs
 - Army program, 200–213
 - DoD Hearing Center of Excellence, 210
 - engineering controls, 208
 - expanded program components, 211
 - garrison-based hearing conservation programs, 207
 - health education, 208–209
 - hearing anatomy and physiology, 200–202
 - hearing conservation on the battlefield, 211–213
 - hearing protection, 208
 - improving hearing loss prevention efforts, 209–211
 - incidence of hearing loss in the Army, 205–206
 - medical surveillance, 165–166
 - mission-critical hearing studies, 210–211
 - monitoring audiometry, 208
 - Navy program, 35–36
 - noise hazard evaluation, 207–208
 - noise-induced hearing loss, 202–204
 - preventing noise-induced hearing loss, 207–209
 - program evaluation, 209
 - sound identification, 212–213
 - sound localization, 212
 - tinnitus, 205
 - Hearing Evaluation Automated Registry System, 100
 - Hearing loss, 35
 - Hearing protection devices, 208
 - Heat stress, 268
 - Helium-oxygen diving, 302, 327–328
 - Henry's law, 317
 - Hepatitis B, 178–179, 196
 - Hepatitis C, 178–179
 - Hexahydro-1,3,5-trinitro-1,3,5-triazine, 577–579
 - High frequency exposures, 203
 - High power illuminator radar, 458
 - High pressure nervous syndrome, 305–306
 - HIPAA. *See* Health Insurance Portability and Accountability Act
 - HIV. *See* Human immunodeficiency virus
 - Holston Army Ammunition Activity, 6
 - Horner, Dr. G.R.B., 45
 - Hot-particle trauma, 426
 - HRA. *See* Health risk assessment
 - HRM. *See* Human resource management
 - Human Capital Distribution Plan, 120
 - Human immunodeficiency virus, 179, 195
 - Human resource management, 128
 - Hybrid Single-Particle Lagrangian Integrated Trajectories, 76
 - Hydrogen cyanide, 496
 - Hydrogen diving, 328
 - Hyperbaric arthralgia, 305
 - Hyperbaric oxygen therapy, 309–310, 489
 - Hypercapnia, 340, 354
 - Hyperthermia, 307, 352
 - Hypothermia, 306–307, 351–352, 624–627
 - Hypothermic injury, 268
 - Hypoxia, 340, 354
 - Hypoxia, altitude-induced, 264–265
- ## I
- Imaging radiation, 414–416
 - Immunizations, 65
 - Immunomics, 602
 - Improvised explosive devices, 202
 - IMX, 580–583
 - In-water decompression stops, 300
 - Industrial hygiene, 28, 31–32, 61, 75
 - Industrial hygiene program management
 - Army-specific requirements, 239–240
 - Defense Occupational and Environmental Health Readiness System, 240
 - DoD exposure assessment model, 237–239

- metrics, 240
- organization of program, 236–237
- overview, 236
- practicing Army industrial hygiene, 237–240

Inert gas diving, 328, 329

Informatics, 100–103

Initiating explosives, 583

Injury statistics, 143

Inner ear barotrauma, 321

Inorganic exposures, 380–383

Insensitive munitions, 580–583

Installation occupational health regulations, 57

Institute of Medicine, 78, 99–100

Ionizing radiation

- Army personnel exposure standards, 425
- biological effects of radiation, 417–421
- categories of effects, 420
- combined internal and external exposures, 426
- controlling contamination in the medical treatment facility, 428–429
- depleted uranium, 414
- development of dosimetry, 422
- development of standards, 422–423
- developments in atomic fission, 401
- discovery and applications of X-rays, 402–408
- discovery and uses of radioisotopes, 408–413
- DoD radiation safety program, 429–434
- electromagnetic radiation, 402
- external irradiation, 426
- the Fukushima incident, 429
- high-dose exposures, 427–428
- hot-particle trauma, 426
- imaging techniques, 414–416
- intermediate-dose exposures, 427
- internal deposition, 425–426
- low-dose exposures, 427
- mass casualties, 426–427
- mechanisms of effects, 420
- medical examination, 162–164
- medical response to depleted uranium exposure, 434–436
- medical response to incidents, 425–429
- in military operations, 413–417
- non-occupational dose limits, 424–425
- nuclear reactors, 413–414
- occupational dose limits, 424
- occupational radiation risks, 420–421
- particulate radiation, 400, 402
- personnel security screening systems, 416
- physical security systems, 414
- procedures for whole-body exposures, 427–428
- properties of, 400–402
- protecting the medical team, 428
- protection against radiation, 421–425
- radiation dispersal devices, 416
- radiation produced by nuclear weapons, 414
- radiological base camp assessments, 416–417
- recognition of effects, 417–420
- regulatory agencies, 423–424
- types of exposures, 425–427

Iowa Army Ammunition Activity, 6

Iraq, Operation Iraqi Freedom, 86–100

Isocyanates, 373–374

J

Jet propellants JP-5 and JP-8, 82

JMC. *See* Joint Munitions Command

Joint Munitions Command, 5–7

Jones, Captain John Paul, 42

Jones, Dr. John, 42

Jones, Dr. Robert, 48

K

Kellogg Brown and Root, 89

Kennon, Captain Beverly, 45, 46

Kerst, Donald, 407

Khamisiyah Ammunition Supply Point, 78–81

Kleghorn, Dr. James, 45

Kosovo

- air sampling, 84–85
- environmental concerns, 83–84
- Operation Joint Guardian, 86
- Operations Joint Endeavor, Joint Guard, and Joint Forge, 84–85
- pesticide wipe sampling, 86
- soil sampling, 86
- water sampling, 85–86

Kuwait

- Ash Shuaiba Port, 92–93
- oil well fires, 72–76

L

Laboratory tests, 134

Lake City Army Ammunition Activity, 6

Laser eye protection, 281

Laser Injury Hotline, 452

Lasers

- direct biological effects, 462–464
- exposure incidents, 469–471
- indirect biological effects, 464–466
- laser-generated air contaminants, 465
- military applications, 467–469
- overview, 460–461
- properties of, 461–462
- protection standards, 466–467
- safety program, 471–473

LASIK, 282–283

Latex, 180–181

Lead

- air exposures, 391
- ambient air regulations, 392
- from ballast handling, 390
- blood lead level, 393
- bone lead measurement, 393
- cardiovascular effects, 395
- chelation, 395
- clinical implications of lead exposure, 394–395
- cumulative blood lead index, 393
- drinking water regulations, 392
- effects in adults, 394–395
- effects in children, 394
- from electrical soldering, 390
- endocrine effects, 394
- environmental exposures, 391
- environmental regulations, 391–392
- exposure tests, 393
- from firing ranges, 389–390
- food contamination, 392
- gastrointestinal effects, 395
- hematological effects, 394
- history of lead toxicity, 388
- military occupational exposures, 389–390
- neurological effects, 394
- occupational surveillance, 392

in paint, 392
 from paint stripping, 389
 pregnancy effects, 394
 renal effects, 394
 soil exposures, 391
 water exposures, 391
 from welding, 389
 zinc protoporphyrin test, 393
 Lead azide, 583
 Lead styphnate, 583
 Letterkenny Munitions Center, 6
 Life Cycle Management Command, 4–5
 Lightfoot, Hull Maintenance Technician 2nd Class A., 35
 Lind, Dr. James, 43
 Linear accelerator, 407
 Liquid propellants, 584–585
 Livingston, Stanley, 409
 Log of Federal Occupational Injuries and Illnesses, 59
 Logistics and Readiness Center, 5
 Logistics Support Activity, 8
 Longshore and Harbor Workers' Compensation Act of 1927, 48
 Lukavac Base, 84

M

Maiello, Commander Richard, 28
 Mail inspection systems radiation, 415
 MAJCOM. *See* Major command
 Major command roles, 13
 Malaria and Epidemic Control Organization, 26
 Management information system, 12, 13
 Manpower Review Program, 120
 Manual material handling
 administrative control, 253–254
 engineering control, 253
 frequency factors, 256
 individual risk factors, 254–255
 lifting, 252–254
 objects distribution, 255–256
 weight distribution, 255–256
 Marine Corps
 Marine Corps War Memorial, 26
 Navy and Marine Corps Public Health Center, 24, 26, 30, 34, 49–50
 Marine Corps safety and occupational health program
 components of, 34–37
 organization of, 30, 31
 Public Health Center technical manuals, 34
 resources, 34–37
 staffing, 30
 Marine life risks, 354–355
 Marshall, General George E., 274
 Mass casualties, 426–427, 544
 Materiel Systems Analysis Activity, 8
 Maximum contaminant levels, 85
 McAlester Army Ammunition Activity, 6
 McCann rescue chamber, 47
 MCLs. *See* Maximum contaminant levels
 M1E1 tanks, 480
 Mechanical compression, 246, 251
 MEDCOM. *See* Medical Command
 MEDEVAC, 285
 Mediastinal emphysema, 322
 Medical Command, 117, 120–121
 Medical Department of the Army Coat of Arms, iii
 Medical directives, 58
 Medical evaluation records, 232–233
 Medical Information Module, 100
 Medical intelligence, 535
 Medical maintenance, 182–183
 Medical Matrix, 50
 Medical Matrix Committee, 50
 Medical Matrix Validation Committee, 34–35, 50
 Medical records management, 62–63
 Medical standards of fitness, 128–131, 307–309
 Medical surveillance
 Army program, 63
 asbestos, 161–162, 163
 assessing need for programs, 154–155
 certification examinations, 157–158
 crane operators, 159
 Department of Transportation commercial driver medical examination, 159
 documenting physical exam and managing results, 158–159
 employees with chronic diseases, 165
 employees with physical disabilities, 165
 examinations, 132–133
 explosive ordinance handler, 159–160
 explosives vehicle operator, 159–160
 firefighter, 160
 forklift operator, 160
 hearing conservation, 165–166
 Navy program, 34–35
 police, 160–161
 program design, 155–157
 radiation, 162–164
 reproductive hazards, 164–165
 security guards, 160–161
 specific occupations, 159–161
 Medical Surveillance Procedures Manual, 50
 Medical treatment facilities, 24–25
 Mercury, 178
 MESL. *See* Military Exposure Surveillance Library
 Metabolomics, 601
 Metallomics, 602
 Metals toxicology, 369–372
 Methemoglobinemia, 567–568
 Methicillin-resistant *Staphylococcus aureus*, 181
 Methyl ethyl ketone, 375–376
 Methyl methacrylate, 178
 Methylene chloride, 374–375, 496
 MicroRNA, 602
 Microwave radar, 448, 456–457
 Middle ear barotrauma, 319–321
 Milan Army Ammunition Activity, 6
 Military aviation administration
 air evacuation, 285–286
 aviation fitness evaluation, 284–285
 determining flight status, 285
 determining work relatedness, 285
 facility and equipment design, 283
 flight medicine, 284–286
 health hazard evaluations, 284
 inspections, 284
 management commitment, 283
 mishap investigation, 284
 safety and health, 283–284
 training and education, 283–284
 Military diving operations. *See* Diving
 Military Exposure Guidelines, 86
 Military Exposure Surveillance Library, 86, 101–102
 Military Surface Deployment and Distribution Command, 7–8
 MIS. *See* Management information system
 Mishap investigation, 284
 Mishraq State Sulfur Mine, 93–96
 Modified duty programs, 278

Motion sickness, 271–272
Mouth bit respirators, 221
MRSA. *See* Methicillin-resistant *Staphylococcus aureus*
MTFs. *See* Medical treatment facilities
Multilevel diving, 301
Musculoskeletal strain, 182
Mustard agents, 376–377

N

NAS-CT. *See* National Academy of Science's Committee on Toxicology
Nasal lavage analysis, 603
National Academy of Science's Committee on Toxicology, 77
National Ambient Air Quality Standards, 76, 84
National Defense Authorization Act for Fiscal Years 1992 and 1993, 73
National Fire Protection Association, 160
National Institute for Occupational Safety and Health, 368, 493
National Research Council, 390, 493
National Safety Council, 115
National Toxicology Program, 389–390
Natural uranium, 76
Naval Armament Act of 1797, 43
Naval Diving and Salvage Training Center, 292
Naval Health Research Center, 50
Naval Medical Center, 24–25, 28
Naval Ordnance Systems Command Environmental Health Center, 49
Naval Safety Center, 29
Navy and Marine Corps Public Health Center, 24, 26, 30, 34, 49–50
Navy Bureau of Medicine and Surgery, 24
Navy Entomology Center of Excellence, 28
Navy Environmental and Preventative Medicine Units, 28
Navy Environmental Health Center, 28
Navy Industrial Environmental Health Center, 49–50
Navy Medical Department organization, 27
Navy Medical Service Corps, 28
Navy Medicine
 the colonial Navy, 42–43
 establishment of flight and dive medicine, 46–47
 evolution of occupational medicine practice, 42–50
 the new Navy, 43–46
 occupational and environmental health programs, 24–37, 50
 organization of, 24–26
 preventive medicine, 26–28
 role of, 30
Navy Occupational Health Information Management System, 50
Navy safety and occupational health program
 audiology, 33
 certification exams, 34–35
 components of, 34–37
 consultative support and oversight, 33–34
 current strategic-level responsibilities, 29
 history of, 26–28
 industrial hygiene, 31–32
 laws, regulations, and guidance, 30
 Medical Matrix Validation Committee, 34–35
 medical surveillance, 34–35
 occupational and environmental medicine, 32–33, 50
 organization of, 30–34
 process improvement, 37
 program self-assessment, 37
 Public Health Center technical manuals, 34
 resources, 34–37
 safety officers, 30–31
 staffing, 30–34
 worksite visits, 36

NECE. *See* Navy Entomology Center of Excellence
Negative pressure respirators, 230–231
NEHC. *See* Navy Environmental Health Center
NEPMUs. *See* Navy Environmental and Preventative Medicine Units
New accession exams, 277–278
NIEHC. *See* Navy Industrial Environmental Health Center
Night vision goggles, 281–282
Nightingale, Florence, 172
NIHL. *See* Noise-induced hearing loss
9/11 terrorism attacks, 87–88
NIOSH. *See* National Institute for Occupational Safety and Health
Nitramines
 hexahydro-1,3,5-trinitro-1,3,5-triazine, 577–579
 insensitive munitions, 580–583
 nitroguanidine, 579–580
 octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine, 579
Nitric oxide, 496
Nitroaromatics
 dinitrotoluene, 576–577
 trinitrotoluene, 572–576
Nitrocellulose, 572
Nitrogen narcosis, 327, 351
Nitrogen-oxygen diving, 301–302
Nitroglycerin
 freezing point of, 568
 health effects, 569–570
 manufacture and exposure hazards, 569
 medical surveillance, 570–571
 primary prevention, 571–572
Nitroguanidine, 579–580
NITROX, 301–302
NMC. *See* Naval Medical Center
NMCPHC. *See* Navy and Marine Corps Public Health Center
No-stop dives, 299–300
NOHIMS. *See* Navy Occupational Health Information Management System
Noise Control Act of 1972, 273
Noise hazards, 181–182
Noise-induced hearing loss
 aviation hazards, 272–273
 high frequency exposures, 203
 mechanisms of, 202–203
 ototoxins, 203–204
 preventing, 207–209, 273
 susceptibility to, 203
 ultrasonic exposures, 203
Non-coding RNAs, 604–605
Nonionizing radiation
 absorption, 447
 characteristics of electromagnetic radiation, 443–447
 coherence, 445
 diffraction, 447
 divergence, 444–445
 electromagnetic spectrum, 442
 emergency contact information, 452
 interaction with matter, 445–447
 interference, 445
 lasers, 460–473
 optical radiation, 460–473
 overview, 442–443
 physical properties, 444–445
 polarization, 445
 radio frequency radiation, 447–460
 reflection, refraction, and scatter, 445–446
 transmission, 446–447
Nonneutral postures, 245, 250

Nuclear medicine, 49
 Nuclear reactors, 413–414
 Nuclear Regulatory Commission, 423–424
 Nuclear weapons radiation, 414
 Nurses, occupational health, 61

O

Obama, Barack, 143
 Occupational and Environmental Health Data Portal, 101–102
 Occupational and environmental health programs. *See also* Army Occupational Health Programs
 Air Force, 12–19
 Navy, 24–37, 50
 Occupational and Environmental Health Site Assessment, 102–103
 Occupational and environmental medicine, 32–33
 Occupational exposure limits, 238–239, 368
 Occupational hazards. *See* Health hazards
 Occupational health business plan, 58
 Occupational health clinicians, 142–143
 Occupational Health Management Information System, 101
Occupational Health Program Evaluation Guide, 37
 Occupational Medicine Program Assessment, 37
 Occupational Safety and Health Act of 1970, 30, 50, 101
 Occupational Safety and Health Administration
 ionizing radiation regulation, 423–424
 lead standard, 389–390
 occupational exposure limits, 368
 Occupational Safety and Health Administration Act, 12, 56–57
 required medical surveillance examinations, 132–133
 respiratory protection, 220–233
 standards, 30
 Occupational Safety and Health Administration Act, 12, 56–57
 Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine, 579
 Ocular oxygen toxicity, 325
 OEH. *See* Occupational and environmental health programs
 OEHSA. *See* Occupational and Environmental Health Site Assessment
 Office of Personnel Management
 general schedule occupations with medical or physical requirements, 130
 role of, 128
 Office of the Special Assistant for Gulf War Illnesses, 77, 79–81
 Office of the Surgeon, 2
 Office of Workers' Compensation Programs, 140–141, 146
 OHP. *See* Occupational Health Program
 OHPEG. *See* *Occupational Health Program Evaluation Guide*
 Oil well fires, 72–76
 Olsbrucken, Germany, 484
 "OMICS" technologies, 600
 Omitted decompression, 302–303
 OMPA. *See* Occupational Medicine Program Assessment
 Open-circuit, self-contained underwater breathing apparatus, 293
 Operation Enduring Freedom, 86–100
 Operation Iraqi Freedom, 86–100
 Operation Joint Guardian, 86
 Operation New Dawn, 87
 Operation Vigilant Warrior, 92–93
 Operations Joint Endeavor/Joint Guard/Joint Forge, 84–85
 OPM. *See* Office of Personnel Management
 Optical radiation
 direct biological effects, 462–464
 exposure incidents, 469–471
 indirect biological effects, 464–466
 overview, 460–461
 properties of, 461–462
 Organ of Corti, 202–203

Organic exposures, 372–380
 Organophosphate nerve agents, 377–378
 OSAGWI. *See* Office of the Special Assistant for Gulf War Illnesses
 OSHA. *See* Occupational Safety and Health Administration
 OSHA 300 Log of Federal Occupational Injuries and Illnesses, 59
 Ototoxicity, 496
 Ototoxins, 203–204
 OWCP. *See* Office of Workers' Compensation Programs
 Oxygen toxicity, 293, 324–325, 350–351

P

Paint
 lead from paint stripping, 389
 lead in, 392
 Particulate matter, 84–85, 94
 Particulate radiation, 400, 402
 Particulate respirators, 222
 Pascal's law, 317
 Patent foramen ovale, 334
 Pathogens, blood-borne, 193–198
 "Peacemaker," 45–46
 Pentachlorophenol, 378–379
 Pentagon terrorism attacks, 86–88
 Performance measurement systems, 119
 Periodic evaluations, 131–135
 Periodic Occupational and Environmental Monitoring Summary, 102–103, 552
 Permissible exposure levels, 156, 239
 Perry, Commodore Matthew, 45
 Persian Gulf War
 chemical weapons use, 78–81
 depleted uranium exposure, 76–78
 deployment surveillance consequences, 550–551
 Gulf War illness, 72–73, 83
 jet propellants JP-5 and JP-8, 82
 Khamisiyah storage facility, 78–81
 Kuwaiti oil well fires, 72–76
 Personal protective equipment, 155, 237–238, 248–250, 279, 566
 Personnel. *See also* Federal workers' compensation
 Army staffing assessment model for civilian occupational health providers, 121–122
 documentation requirements, 135
 employees with disabilities, 129–131
 Human Capital Distribution Plan, 120
 making the case for more personnel, 122
 managing authorizations and requirements, 120–121
 medical standards of fitness, 128–131
 medical tests and procedures, 134–135
 OSHA-mandated medical surveillance examinations, 132–133
 periodic evaluations, 131–135
 physical requirements, 129
 physician professional development, 122–123
 policy enforcement examinations, 135–136
 preplacement evaluations, 131–135
 provider-patient relationship, 128–129
 recruitment and retention, 122
 role of providers, 121
 role of surgeon general's consultant, 120–121
 special surveillance programs and examinations, 133
 surveillance examination content, 133–134
 termination medical examinations, 137
 training and competencies, 122
 Personnel and Readiness, Under Secretary of Defense for, 115–116
 Personnel Proponency Directorate, 121
 Personnel security screening systems, 416
 Pesticide wipe sampling, 86
 Phased array antenna systems, 457

Phillips, Dr. Ralph, 406
Photokeratitis, 620
Photorefractive keratectomy, 282–283
Physical examinations
 documenting, 158–159
 managing results, 158–159
 pre-employment, 43
Physical hazards, 181–183
Pine Bluff Arsenal, 7
Pleural plaques, 380
PMUs. *See* Preventive medicine units
Pneumothorax, 322–323
POEMS. *See* Periodic Occupational and Environmental Monitoring Summary
Police examination, 160–161
Policy enforcement examinations, 135–136
Position risks, 245–246
Positive pressure respirators, 230–231
Postdeployment health surveys, 554
Postexposure prophylaxis, hepatitis B, 196
Posture risks, 245, 250
POWER. *See* Protecting Our Workers and Ensuring Reemployment
Powered air-purifying respirators, 221–222
Pre-employment physicals, 43
Preplacement evaluations, 131–135
Pressure equivalents, 316
Pressure illness, 265–268
Preventative health assessment, 277
Preventive medicine, 26–28
Primary prevention, 154
Privileging, 60–61
Process improvement, 37
Program assessment tools, 119–120
Program Objective Memorandum, 9
Program self-assessment, 37
Propellants
 acute exposure decontamination, 567
 administrative controls, 566
 aliphatic nitrate esters, 568–572
 carcinogenesis, 568
 composites, 583–584
 dermatitis and, 567
 energetic materials, 564
 exposure, 564–566
 history of, 562–563
 industrial hygiene principles, 565–566
 initiating explosives, 583
 liquid, 584–585
 methemoglobinemia and, 567–568
 nitramines, 577–583
 nitroaromatics, 572–577
 personal protective equipment, 566
 preplacement considerations, 566–567
 safety practices, 565
 vasodilation and, 568
Protecting Our Workers and Ensuring Reemployment, 143, 146–148
Protein biomarkers, 604
Proteomics, 601
Provider-patient relationships, 128–129
Psychosocial hazards, 183
Public health
 Air Force, 15–16
 Navy and Marine Corps Public Health Center, 24, 26, 30, 34, 49–50
 Public Health Center technical manuals, 34

Public Law 79-658, 56
Puget Sound Naval Shipyard and Intermediate Maintenance Facility, 36
Pulmonary barotrauma, 321–322
Pulmonary function tests, 90–91, 94–95, 135, 156, 229
Pulmonary oxygen toxicity, 324
Pyrotechnics, 564

Q

Qarmat Ali Water Treatment Plant, 89–92
Quality improvement, 119–120
Quality measures, 118–120
Quality of life measurement, 119
Quality of work environment, 8–9
Quiet Communities Act of 1978, 273
QWE. *See* Quality of work environment

R

Radar technology, 447–448
Radford Army Ammunition Activity, 7
Radiation. *See also* Ionizing radiation; Nonionizing radiation
 classification of, 162–163
 regulations, 163
Radiation Control for Health and Safety Act, 423
Radiation dispersal devices, 416
Radiation hazards, 181
Radiation safety program
 administrative controls, 431–432
 designation of restricted areas, 432
 elements of, 431–434
 engineering controls, 432
 goals of, 429–430
 medical surveillance, 433
 personnel monitoring, 433–434
 radiation safety committee, 430
 radiation safety officer, 430–431
 recordkeeping, 434
 respiratory protection, 434
 responsibilities, 430–431
 standard operating procedures, 431
 training, 431–432
Radio communication, 447–448
Radio communications systems, 455
Radio frequency radiation
 absorption, 450
 administrative procedures, 460
 conduction, 449
 controls, 460
 coupling, 449–450
 direct biological effect, 450–451
 emergency contact information, 452
 emission of, 454–455
 exposure incidents, 457–459
 exposure limits, 452
 indirect biological effects, 451
 inventory of radio frequency-producing sources, 460
 low-level effects, 451
 microwave radar, 448
 military applications, 455–458
 physical properties that determine energy transfer, 449–450
 radar during World War II, 448–449
 radar technology, 447–448
 radiation control, 453
 radiation protection, 451–453
 radio communication, 447–448
 safety program, 459–460
 training programs, 460

- Radioisotopes
 accident at Goiânia, Brazil, 411–412
 brachytherapy, 410
 diagnostic uses, 409–410
 industrial uses, 411–413
 medical uses, 408–411
 nondestructive inspection, 411
 radioactive commodities, 411–413
 radiopharmaceutical therapy, 410
 teletherapy, 410–411
 therapeutic uses, 410
 Radiological base camp assessments, 416–417
 Radiopharmaceutical therapy, 410
 RDECOM. *See* Research, Development and Engineering Command
 Readiness assessment, 277–279
 Reagents hazards, 174
 Recompression chambers, 309–310
 Recording and Reporting Occupational Injuries and Illnesses, 57
 Recruit screening, 45
 Red River Army Depot, 4
 Redstone Arsenal, 7, 8
 Refractive surgery, 282–283
 Rehabilitation Act of 1973, 129
 Repetition risks, 245–246, 251
 Repetitive diving, 300, 301
 Reproductive hazards, 164–165
 Research, Development and Engineering Command, 3–4
 Resource Conservation Recovery Act, 391
 Respiration, diving injuries and, 297–299
 Respiratory protection
 air-purifying respirators, 220–222
 atmosphere-supplying respirators, 223–224
 breathing air for supplied-air respirators, 232
 cardiovascular risk assessment and evaluation procedures, 229
 cleaning and storage, 231
 color coding, 231
 disqualifying conditions for respirator use, 227
 filtration mechanisms and classification, 222–223
 fit test records, 233
 function checks, 231
 inspection, 231
 maintenance, 231–232
 medical considerations and evaluation, 226–229
 medical evaluation records, 232–233
 physiological effects of respirator wear, 226
 physiological problems, 226–228
 program evaluation, 232
 psychological problems, 226–228
 pulmonary function testing, 229
 purpose of medical evaluation, 228
 record keeping, 232–233
 respirator classification, 220–224
 respirator selection guidelines, 225–226
 respirator service life, 224
 respirator tests and checks, 230–231
 respiratory protection programs, 224–225
 training, 232
 training records, 233
 Risk adjustment, 119
 Risk categorization, 15
 Risk management process, 12, 14
 Rock Island Arsenal, 5, 7
 Rock Island Arsenal Joint Manufacturing and Technology Center, 4
 Rocket propellants, 584
 Roentgen-ray tubes, 403
- S**
- Safe Drinking Water Act, 85, 391
 Safety, Health, and Return to Employment, 143
 Safety and occupational health programs
 Air Force, 12–19
 Marine Corps, 30, 31
 Navy, 24–37
 Safety officers, 30–31
 Saliva analysis, 603
 Sarin, 80
 Saturation diving
 atmospheric control, 304–305
 decompression, 306
 decompression sickness, 337–338
 fire risk, 305
 high pressure nervous syndrome, 305–306
 hyperbaric arthralgia, 305
 infection risk, 305
 overview, 303–304
 temperature control, 306
 Scott Air Force Base, 7
 Scranton Army Ammunition Activity, 7
 Scuba diving. *See* Diving
 Scurvy prevention, 43
 Sea port of debarkation/embarkation, 92–93
 SEAL delivery vehicles, 292
 Seaman's Sickness and Disability Act of 1798, 45
 Secondary prevention, 154
 Secret Internet Protocol Router Network, 102
 Secretary of Defense, Office of, 115–116
 Security Assistance Command, 8
 Security guards examination, 160–161
 Self-contained breathing apparatus, 223–224
 Self-propelled howitzers, 481–483
 Semmelweis, Dr. Philipp Ignaz, 172
 Serum cotinine, 602
 Serum cytokines, 604
 Serum IgE, 602
 Serum Repository, 553, 599
 SHARE. *See* Safety, Health, and Return to Employment
 Shift work hazards, 183
 Shipboard medicine
 amphibious operations, 530–531
 blood bank, 544
 classes of ships, 524
 competence for duty examinations, 543
 corpses, 544
 crew preparation and screening, 535–536
 disposal of medical waste, 544–545
 disposition of the sick sailor, 541
 elective surgery, 543
 environment in shipyards, underway, and at port calls, 536–540
 epidemiology and epidemics, 538–539
 flight operations, 539–540
 heat issues, 537
 hypoxic spaces, 539
 isolation and confinement, 537–538
 life aboard, 523, 525–526
 mass casualties, 544
 medical care of women, 542–543
 medical departments, 524, 531–534
 medical evacuation, 541–542
 medical intelligence, 535
 mortality associated with drinking seawater, 531
 noise issues, 537
 operational medicine during wartime, 527–531

- organization aboard ship, 522
- pests and vectors, 539
- planning for medical evacuation, 535
- port calls, 542
- predeployment planning, 534–536
- requirements for specific medical equipment, 529
- ships and missions, 522–523
- the ship's cycle, 526–527
- sick call, 540–541
- sinking, immersion, and survival, 529–530
- telemedicine, 541
- Sick call, 540–541
- Sierra River Army Depot, 4–5
- Silicosis, 381–382
- Similar exposure groups, 238
- Sinus barotrauma, 321
- SIPRNet, 102
- Sleep deprivation risks, 273–275
- SMART-PM. *See* Special Medical Augmentation and Response Team-Preventive Medicine
- Smith, Lieutenant Linwood, 48
- Snow blindness, 620
- Software Engineering Center, 5
- SOH. *See* Safety and occupational health programs
- Soil sampling, 86
- Solvents hazards, 174
- Sound navigation, 355
- Spatial disorientation, 270–271
- Special Medical Augmentation and Response Team-Preventive Medicine, 87, 89–91
- SPOD/E. *See* Sea port of debarkation/embarkation
- SRDRS. *See* Submarine rescue diving and recompression system
- St. Medard, Dr. Peter, 44
- Standard operating procedures, 58
- Standards of fitness, 128–131
- Staphylococcus aureus*, methicillin-resistant, 181
- Status report, 57–58
- Steam-powered ships, 45–46
- Stephenson, Rear Admiral Charles, 49
- Stockton, Captain Robert F., 46
- Stoddert, Benjamin, 44
- Stress, emotional, 183
- Submarine rescue diving and recompression system, 360–361
- Submarines
 - 2,6-di-tert-butyl-4-nitrophenol, 357–358
 - atmosphere management and control, 358–359
 - attack submarines, 355
 - ballistic missile submarines, 356
 - carbon monoxide exposure, 494
 - central atmosphere monitoring system, 357
 - disabled submarines, 359–361
 - environment, 357
 - escape and rescue, 360–361, 494
 - guided missile submarines, 356
 - oxygen depletion, 359–360
 - sleep, 361–362
 - toxic gases, 359–360
 - types and classes, 355–356
 - working schedule, 361–362
- Sulfur mine fire, 93–96
- Supplied-air respirators, 232
- Surface decompression, 301
- Surface-supplied diving, 293–294
- Surveillance programs. *See* Medical surveillance
- Sustained acceleration, 269–270
- Sustainment Command, 7

T

- Tank-Automotive and Armaments Command Life Cycle Management Command, 4–5
- Team Aerospace
 - bioenvironmental engineering, 14–15
 - flight and operational medicine, 16
 - public health, 15–16
- TEH. *See* Total Exposure Health
- Telemedicine, 541
- Teletherapy, 410–411
- Termination medical examinations, 137
- Terrorism attacks, 9/11, 87–88
- Tertiary prevention, 154
- The Gulf War Oil Spill, 73
- The Logistics Support Activity, 8
- Theater Medical Information Program, 554–555
- Thermal stress, 268
- Three-dimensional motion, 268–272
- Threshold limit values, 156, 239
- Tinnitus, 35, 205
- Tobacco smoke, 478, 495–496
- Tobyhanna Army Depot, 5
- Tooele Army Depot, 7
- Total Exposure Health, 19
- TRANSCOM. *See* US Transportation Command
- Transcriptomics, 600–601
- Transient acceleration, 269
- Transmission imaging, 414–415
- Travel health hazards, 275
- Treadway, Lieutenant Commander Paul, 32
- Tri-service industrial base, 3–9
- TRICARE Management Agency, 116
- Trichloroethylene, 379–380
- Trimix diving, 302
- Trinitrotoluene, 572–576
- Troop Movement Database, 75, 80
- Tuberculosis, 179–180, 382
- Tuzla Air Base, 84
- Tyler, John, 45

U

- UHF radio communications systems, 455
- Ultrasonic exposures, 203
- Under Secretary of Defense for Personnel and Readiness, 115–116
- Undersea medicine
 - contaminated diving, 352–354
 - dyspnea, 297–298, 354
 - hypercapnia, 340, 354
 - hyperthermia, 307, 352
 - hypothermia, 306–307, 351–352
 - hypoxia, 340, 354
 - illness or injury resulting from diving, 349–350
 - marine life risks, 354–355
 - nitrogen narcosis, 327, 351
 - oxygen toxicity, 293, 324–325, 350–351
 - physical properties, 350
 - pressure, 350
 - problems with underwater breathing equipment, 354
 - protective gear, 352–354
 - sound, 351
 - sound navigation and ranging, 355
 - submarines, 355–362
 - temperature, 351–352
 - undersea operations, 348–349
 - underwater hazards, 354–355
 - visibility, 351
 - water quality, 352–354

- Underwater breathing apparatuses, 293–296
- United Nations Special Commission, 80
- Universal gas equation, 316
- Upshur, Abel, 45, 46
- Uranium, depleted, 76–78
- US Air Force occupational and environmental health program
 - critical elements of, 17
 - emerging developments in Air Force Occupational Medicine, 19
 - employee role and responsibilities, 16
 - execution of, 17–18
 - exposure assessment model, 17–18
 - headquarters level role and responsibilities, 12–13
 - installation level role and responsibilities, 13–16
 - major command roles and responsibilities, 13
 - management review, 19
 - overview, 12
 - planning process, 16–17
 - role and responsibilities, 12–16
 - supervisor role and responsibilities, 16
- US Army Armament Research, Development and Engineering Center, 4
- US Army Aviation and Missile Life Cycle Management Command, 5
- US Army Center for Health Promotion and Preventive Medicine, 74
- US Army Chemical Materials Activity, 8
- US Army Communications-Electronics Command, 5
- US Army Communications-Electronics Research, Development and Engineering Center, 4
- US Army Contracting Command, 7
- US Army Edgewood Chemical Biological Center, 4
- US Army Environmental Hygiene Agency, 74
- US Army ergonomics program, 244–245
- US Army Joint Munitions Command, 5–7
- US Army Materiel Command
 - Army Materiel Systems Analysis Activity, 8
 - The Logistics Support Activity, 8
 - mission of, 3
 - motto, 2
 - quality of work environment, 8–9
 - Research, Development and Engineering Command, 3–4
 - Tank-Automotive and Armaments Command Life Cycle Management Command, 4–5
 - US Army Aviation and Missile Life Cycle Management Command, 5
 - US Army Chemical Materials Activity, 8
 - US Army Communications-Electronics Command, 5
 - US Army Contracting Command, 7
 - US Army Joint Munitions Command, 5–7
 - US Army Military Surface Deployment and Distribution Command, 7–8
 - US Army Security Assistance Command, 8
 - US Army Sustainment Command, 7
- US Army Military Surface Deployment and Distribution Command, 7–8
- US Army Natick Soldier Research, Development and Engineering Center, 4, 5
- US Army Occupational Health Programs
 - administrative medical examinations, 63–64
 - Army Occupational and Environmental Health Program, 115–124
 - in Bosnia, Herzegovina, and Kosovo, 83–86
 - credentialing and privileging, 60–61
 - disability retirement examinations, 64
 - emergency treatment, 66
 - employee health clinics, 60
 - employees, 62
 - epidemiological investigations, 65
 - evaluation, 59
 - evaluation of, 59
 - fitness-for-duty examinations, 64
 - health hazard education, 64
 - health promotion, 65–66
 - health providers, 61
 - immunizations, 65
 - industrial hygienists, 61
 - informatics, 100–103
 - laws, regulations, and guidance, 56–59
 - marketing, 58–59
 - medical centers, 59–60
 - medical directives, 58
 - medical records management, 62–63
 - medical surveillance, 63
 - monitoring absences due to illness, 64–65
 - nurses, 61
 - occupational health clinics, 59–60
 - Operation Enduring Freedom, 86–100
 - Operation Iraqi Freedom, 86–100
 - organization of, 59–62
 - during Persian Gulf War, 72–83
 - program document, 57–58
 - safety personnel, 61–62
 - staffing, 60–62
 - standard operating procedures, 58
 - status report, 57–58
 - supervisors, 62
 - worksite evaluations, 64
- US Army Research Laboratory, 3
- US Army Security Assistance Command, 8
- US Army Sustainment Command, 7
- US Army Tank Automotive Research, Development and Engineering Center, 4
- US Department of Defense
 - Federal Employees Compensation Act program, 141–143, 146
 - Hearing Center of Excellence, 210
 - industrial hygiene exposure assessment model, 237–239
 - Laser Injury Hotline, 452
 - military workers' compensation cost and rates, 143–144
 - needs for exposure assessment and biomarkers, 596–599
 - occupational health regulations and guidance, 57–58
 - personnel medical evaluations, 128–137
 - policy for handling exposures to depleted uranium, 434–435
 - program structure and management, 115–117
 - Protecting Our Workers and Ensuring Reemployment, 143, 146–148
 - radiation safety program, 429–434
 - reviews of military compensation programs, 144–146
 - Serum Repository, 553, 599
- US Department of Labor
 - compensation program management efforts, 146–148
- US Department of Transportation
 - commercial driver medical examination, 159
- US Marine Corps
 - Navy and Marine Corps Public Health Center, 24, 26, 30, 34, 49–50
 - US Marine Corps War Memorial, 26
- US Marine Corps safety and occupational health program
 - components of, 34–37
 - organization of, 30
 - Public Health Center technical manuals, 34
 - resources, 34–37
 - staffing, 30

US Navy
the colonial Navy, 42–43
comprehensive occupational health programs during World War II, 48–49
decompression sickness treatment tables, 335–337
development of steam-powered ships, 45–46
evolution of occupational medicine practice, 42–50
Navy and Marine Corps Public Health Center, 24, 26, 30, 34, 49–50
the new Navy, 43–46
occupational health programs during World War I, 48–49
organization of, 24–26
in the 20th Century, 46–50

US Navy Medical Department
the colonial Navy, 42–43
organization of, 27

US Navy Medicine
care for civilian employees, 47–48
establishment of flight and dive medicine, 46–47
organization of, 24–26
preventive medicine, 26–28
role of, 30

US Navy safety and occupational health program
audiology, 33
certification exams, 34–35
components of, 34–37
consultative support and oversight, 33–34
current strategic-level responsibilities, 29
hearing conservation program, 35–36
history of, 26–28
industrial hygiene, 31–32
laws, regulations, and guidance, 30
Medical Matrix Validation Committee, 34–35
medical surveillance, 34–35
occupational and environmental medicine, 32–33, 50
organization of, 30–34
process improvement, 37
program self-assessment, 37
Public Health Center technical manuals, 34
resources, 34–37
safety officers, 30–31
staffing, 30–34
worksite visits, 36

US Transportation Command, 285

USAEHA. *See* US Army Environmental Hygiene Agency

USS *Constitution*, 26, 43–44

USS *Falcon*, 47

USS *Harry S. Truman*, 35

USS *Independence*, 45

USS *Ohio*, 36

USS *Princeton*, 45–46

V

VA Airborne Hazards and Open Burn Pit Registry, 99

Vapor removing respirators, 222

Vehicle inspection systems radiation, 415–416

Very small aperture terminal communication systems, 456

Veterans Health Care Act of 1992, 73

VHF radio communications systems, 455

Vibration risks, 246, 252

Vietnam War, 72

Violence, workplace, 185

Vision, underwater effects, 317–318

Vision tests, 134

W

Walter Reed National Military Medical Center, 25

Waste anesthetic gases, 176

Water sampling, 85–86

Watervliet Arsenal, 5

Weaponry injuries, 275

Welding hazards, 389

White phosphorus, 383

Whole-blood tests, 90

Workers. *See* Federal workers' compensation; Personnel Workers' compensation program. *See also* Federal workers' compensation systems analysis, 144–145

Workplace
risk categorization, 15
violence in, 185

Worksite evaluations, 64

Worksite task analyses, 250–252

Worksite visits, 36

World Trade Center terrorism attacks, 86–88

World War I
need for occupational health programs, 48

World War II
comprehensive Navy occupational health programs, 48–49

WRNMMC. *See* Walter Reed National Military Medical Center

X

X-rays
diagnostic uses, 405–406
digital radiography, 408
industrial uses, 407–408
medical uses, 402–407
therapeutic uses, 406–407

Y

Yellow sodium dichromate exposure, 89

Z

Zinc protoporphyrin test, 393