

# Index

## A

- Abbreviations, xxiii
- Abdominal closure, 273
- Abdominal compartment syndrome
  - burns and, 388
- Abdominal hysterectomy, 292–293
- Abdominal injuries
  - abdominal closure, 273
  - antimicrobial agent selection and duration, 116
  - biliary tract, 269
  - Clinical Practice Guidelines, 273
  - colon, 270
  - CT scans, 262–263
  - damage control surgery, 169–170
  - diagnosis of, 256
  - diagnostic adjuncts, 257
  - diagnostic peritoneal aspiration, 259–262
  - duodenal, 265–266
  - exposure techniques, 263–264
  - focused abdominal sonography for trauma, 257–259
  - gastric injuries, 264–265
  - indications for laparotomy, 256–257
  - liver, 267–268
  - operative planning, 263–264
  - pancreatic, 266–267
  - penetrating, 255
  - rectal, 270–271
  - retroperitoneal, 272–273
  - small bowel, 269
  - splenic, 269
  - wound exploration, 263
- ABO incompatibility, 486–487
- ABO typing, 476, 486
- Abrasions, corneal, 203–205
- AC. *See* Hydrogen cyanide
- Acalculous cholecystitis, 153–154
- Acceleration stress
  - aeromedical evacuation and, 44
- Acclimatization, 404–405
- Acidosis
  - blood transfusions and, 482–483
  - mechanical ventilation and, 140
- Acronyms, xxiii
- ACS monitoring, 170–171
- Acute coronary syndrome, 147–148
- Acute glaucoma, 199
- Acute hemolytic transfusion reaction, 486–487
- Acute lung injury, 488–489
- Acute mountain sickness, 416–418
- Acute respiratory distress syndrome, 138–139, 141–142
- Acute tubular necrosis, 154–155, 157
- Acute vaginal hemorrhage, 295–296
- Adnexal injuries, 294–295
- Adrenal insufficiency, 161
- Advanced Trauma Life Support, 199, 456
- AE. *See* Aeromedical evacuation
- AELT. *See* Aeromedical Evacuation Liaison Team
- Aeromedical evacuation. *See also* Patient evacuation
  - Air Force system, 48–49
  - clearance, 48
  - Clinical Practice Guidelines, 53
  - Critical Care Air Transport Teams, 49–51
  - description of, 41–42
  - humanitarian transport requests, 51, 53
  - implications of the aviation environment, 43–45
  - intertheater transport checklist, 51, 52
  - local flight surgeon responsibilities, 48
  - medical considerations, 42–43
  - patient movement requirements, 45, 47
  - patient requests, 48
  - patient selection, 49–50
  - patient stability, 47–48
  - precedences, 45–46
  - process, 48
  - reporting a patient, 47
  - tactical combat casualty care guidelines, 531–543
  - validation, 48
- Aeromedical Evacuation Liaison Team, 47
- Aeromedical Staging Facilities, 46–47
- Afghanistan War
  - vascular injuries during, 355
- Air Force
  - aeromedical evacuation system, 45–49
- Air splints
  - aeromedical evacuation and, 44
- Airway management
  - Backward Upward Rightward Pressure maneuver, 59–60

- Clinical Practice Guidelines, 63
- difficult airway, 61, 90
- direct laryngoscopy, 58
- evacuation care, 532–534
- facial injuries and, 175–176
- heatstroke and, 408
- indications for a definitive airway, 85–86
- initial, 55–56
- King laryngeal tube insertion, 63
- laryngeal mask airway, 62–63
- oro-tracheal intubation, 57–60
- rapid sequence intubation, 57–58, 86–89
- secondary airway compromise, 86
- surgical cricothyrotomy, 61–62
- tactical field care, 520–522
- two-person mask ventilation, 56–57
- ventilation, 56–57
- AK-47 rifles, 12
- AK-74 rifles, 12
- Albumin, 130
- Albumin volume
  - burn care, 383–384
- ALI. *See* Acute lung injury
- Alkalosis
  - mechanical ventilation and, 140
- Allied contractors
  - triage considerations, 27
- Altitude illness
  - acute mountain sickness, 416–418
  - altitude basics, 414–415
  - descent basics, 415–416
  - high-altitude bronchitis, 419
  - high-altitude cerebral edema, 423–425
  - high-altitude peripheral edema, 419
  - high-altitude pharyngitis, 419
  - high-altitude pulmonary edema, 421–423, 425
  - high-altitude retinal hemorrhage, 419–420
  - subacute mountain sickness, 420–421
  - thromboembolic events, 420
- American Academy of Pediatrics Algorithm, 309
- Amnestics, 89
- Amputations
  - battlefield amputations, 342
  - Clinical Practice Guidelines, 346
  - dressings, 345
  - indications for, 341
  - length preserving amputations, 342–343
  - postoperative management, 346
  - skin retraction prevention, 345
  - skin traction, 345
  - special considerations, 344–345
  - surgical technique, 343–344
  - vascular injury and, 356
- AMS. *See* Acute mountain sickness
- Anal lacerations, 290
- Analgesia
  - evacuation care, 539–541
  - tactical field care, 525–527
- Anaphylactoid transfusion reactions, 490
- Anemia, pediatric, 455
- Anesthesia
  - Clinical Practice Guidelines, 96
  - conclusion of general anesthesia, 92
  - difficult airway, 90
  - endotracheal intubation, 89–90
  - field anesthesia equipment, 94–96
  - indications for a definitive airway, 85–86
  - induction agents, 88
  - induction of general anesthesia, 86
  - local, 93
  - maintenance of general anesthesia, 90–91
  - neuraxial, 93
  - rapid sequence intubation, 86–89
  - regional, 92–93
  - secondary airway compromise, 86
  - sedatives, 88
- Angina, unstable, 149
- Angiography
  - vascular injuries, 358–359
- Anhidrotic heat exhaustion, 412–413
- Ankle injuries
  - ankle disarticulation, 344
  - technique to span ankle, 339
- Anthrax, 436, 437, 440–441
- Antibiotics
  - antibiotic beads, 102–103
  - dosage for infection treatment, 124
  - duration of use, 116–119
  - evacuation care, 541
  - field care, 528
  - selection of, 116–119
  - treatment spectrum, 124
- Anticoagulation
  - vascular injuries and, 374
- Antidote Treatment Nerve Agent Autoinjectors, 445
- Antimicrobial agents
  - burn care, 385
  - duration of use, 116–119
  - selection of, 116–119
- Antipersonnel landmines, 10–11
- Antitank landmines, 15–16
- Anxiolytics, 89
- AOF. *See* Areas of focus

- AOR. *See* Areas of responsibility  
 Aorta injuries, 366–367  
 Arch bars, 179  
 ARDS. *See* Acute respiratory distress syndrome  
 Areas of focus, 499  
 Areas of responsibility, 499  
 Arm injuries  
   burns, 386–388  
   compartment syndrome, 492  
   vascular, 359–361  
 Armored vehicle crew casualties, 14–16  
 Army  
   medical evacuation precedences, 46  
 ASFs. *See* Aeromedical Staging Facilities  
 Aspiration pneumonitis, 145–146  
 Assist-control ventilation, 137–138  
 Ataxia, 424  
 Atelectotrauma, 137  
 ATLS. *See* Advanced Trauma Life Support  
 ATN. *See* Acute tubular necrosis  
 ATNAAs. *See* Antidote Treatment Nerve Agent Autoinjectors  
 Auricular injury, 186  
 Autologous vein harvest, 373–374  
 Axillary artery injuries, 360
- B**  
 B-Lynch sutures, 303–304  
*Bacillus anthracis*, 440–441  
 Backward Upward Rightward Pressure maneuver, 59–60  
 Bacteremia  
   blood transfusions and, 487–488  
 Bacterial agents, 440–441  
 Bacterial keratitis, 205  
 Ballistic injuries, 6, 11–13  
 Bandages, 69–70  
 Barometric pressure  
   aeromedical evacuation and, 44  
 Barotrauma, 137  
 Battlefield transfusions. *See* Transfusions  
 Battlefield trauma system model, 499–501.  
   *See also* Joint Theater Trauma System  
 Biliary tract injuries, 269  
 Biological agents, 440  
 Biological contamination. *See also* Nuclear, biological, and chemical casualties  
   aeromedical evacuation and, 45  
   bacterial agents, 440–441  
   biological agents, 440  
   Clinical Practice Guidelines, 442  
   decontamination, 437–438  
   detection of biological warfare agents, 435–436  
   diagnosis of, 436  
   hemorrhagic fevers, 438, 439, 441  
   infection control, 438  
   medical evacuation, 438–439  
   prevention of, 437  
   protection from, 437  
   symptoms of, 440–442  
   treatment of, 440–442  
   triage considerations, 26  
   viral agents, 441–442  
 Biotrauma, 137  
 Bladder  
   dysfunction associated with spinal injuries, 319  
   injuries of, 283–284  
 Blast injuries, 4–5, 7–9, 430–431  
 Blast overpressure, 16  
 Blast waves, 4–5  
 Bleeding. *See* Hemorrhage  
 Blindness, flash, 431  
 Blood, fresh whole  
   ABO matching, 473, 476, 486  
   emergency collection in the field, 505–514  
   onsite specimen processing, 513–514  
   posttransfusion verification, 513  
   rapid testing of, 512–513  
   role of care, 473, 474–475  
   specimen processing, 513  
 Blood agents, 447  
 Blood donors  
   appropriate criteria, 513  
   frequency of donations, 514  
   medication use, 514  
   performing phlebotomy, 508–511  
   postdonor care, 511–512  
   screening of, 507–508  
 Blood products  
   ABO matching, 473, 476, 486  
   contaminated, 487–488  
   Rh matching, 477  
   role of care, 473, 474–475  
   types of, 473  
 Blood Support Detachment, 513  
 Blood transfusions. *See* Transfusions  
 Blood volume, pediatric, 455  
 Blowout fractures, 210  
 Blunt injuries  
   cardiac, 147  
   pelvic, 322–323  
   renal, 275, 276  
 Body surface area, pediatric, 454  
 Bone fractures  
   amputation considerations, 344  
   burns and, 388  
   casts, 340

- external fixation, 329, 331–340
  - extremities, 329–340
  - facial, 178–183
  - hands, 350
  - LeFort fracture classification, 182–183
  - mandible, 178–180
  - maxillofacial, 181–183
  - nasal, 180–181
  - orbital floor, 210
  - patient evacuation, 340
  - pelvic, 290
  - skull, 216–217
  - skull base, 194–195
  - temporal bone, 194–197
  - temporary external fixation, 329
  - Botulinum toxins, 440
  - Bounding landmines, 11
  - Brachial artery injuries, 360–361
  - Brain injuries. *See also* Head injuries
    - antimicrobial agent selection and duration, 118
    - evacuation care, 538
    - high-altitude cerebral edema, 423–425
    - traumatic brain injury, 151, 538
  - Breathing support. *See also* Airway management
    - burn care, 379–380
    - tactical field care, 521–522
  - Bronchitis, high-altitude, 419
  - Brucella*, 440–441
  - Brucellosis, 440–441
  - Buddy aid, 20
  - Burkholderia mallei*, 440
  - Burn Center, 49, 391
  - Burn Resuscitation Flowsheet, 384
  - Burns. *See also* Chemical contamination
    - abdominal compartment syndrome and, 388
    - airway interventions, 379
    - albumin volume, 383–384
    - antimicrobials, 118, 385
    - breathing interventions, 379–380
    - Burn Resuscitation Flowsheet, 384
    - cellulitis, 386
    - chemical, 389
    - circulation management, 380
    - Clinical Practice Guidelines, 392
    - complications, 388
    - corneal abrasions, 386
    - ears, 386
    - edema and, 387
    - electrical injuries, 388–389
    - electrolyte disturbances, 384
    - escharotomy, 387
    - evacuation care, 541–542
    - extremity care, 386–388
    - fasciotomy, 388
    - fluid resuscitation, 380–382
    - fractures and, 388
    - glycosuria, 383
    - hyperkalemia and, 389
    - hypothermia, 378
    - infection control, 386
    - inhalation injury, 378, 388
    - local national burn patients, 390–391
    - metabolic considerations, 388
    - patient evaluation, 391
    - patient monitoring, 382
    - pediatric, 381–382, 454
    - point-of-injury care, 377–378
    - primary survey, 378–380
    - radiological injuries, 430–431
    - respiratory care, 388
    - resuscitation, 383–384
    - Rule of Nines, 380, 381
    - Rule of Tens, 380, 391
    - secondary survey, 382–383
    - silver nylon dressings, 385
    - surgical debridement, 389
    - tactical field care, 528–529
    - total body surface area, 380–382, 390
    - triage considerations, 390
    - urine output target, 383
    - US Army Institute of Surgical Research Burn Center, 391
    - white phosphorus, 389–390
    - wound care, 384–386
  - BURP. *See* Backward Upward Rightward Pressure maneuver
  - BZ, 447–448
- C**
- Cabin altitude restriction
    - aeromedical evacuation and, 44
  - Calcium, 135
  - Calf. *See* Lower extremities
  - Caloric requirements
    - pediatric, 452
  - Cantholysis, 208–210
  - CAR. *See* Cabin altitude restriction
  - Cardiac disease
    - acute coronary syndrome, 147–148
    - cardiac tamponade, 146–147, 237–238
    - congestive heart failure, 147, 148, 149–151
    - non-ST elevation myocardial infarction, 149
    - ST elevation myocardial infarction, 147–148
  - Cardiac injuries. *See* Heart injuries
  - Cardiac stroke volume, pediatric, 453

- Cardiac tamponade, 146–147, 237–238
- Cardiogenic shock, 74, 128
- Cardiopulmonary resuscitation
  - evacuation care, 543
  - hypothermia and, 402
  - tactical field care, 529
- Cardiopulmonary technicians, 51
- Cardiovascular system, pediatric, 453–454
- Care under fire
  - hemorrhage, 65, 518
  - tactical combat casualty care guidelines, 518
- Carotid artery injuries, 190–191, 368–369
- Case fatality rate, 554
- CASEVAC. *See* Casualty evacuation
- Casts
  - extremity fractures and, 340
- Casualty evacuation. *See also* Patient evacuation
  - description of, 41
  - tactical combat casualty care guidelines, 531–543
- Casualty recorders, 34
- CCATs. *See* Critical Care Air Transport Teams
- Cellulitis, 120, 386
- Central nervous system wounds
  - antimicrobial agent selection and duration, 117
- Central venous pressure, 227
- Cerebral edema, high-altitude, 423–425
- Cerebral perfusion pressure, 217, 225–226
- Cerebrovascular accidents, 151–153
- Cervical collars, 315
- Cervical injuries, 291
- Cervical spine injuries
  - anatomical considerations, 315
  - instability, 313–314
  - management of, 176
  - patient transport, 314
- Cervical vascular injury, 368–375
- Cesarean sections, emergency, 300–302
- CFR. *See* Case fatality rate
- CG. *See* Phosgene
- Chemical contamination. *See also* Nuclear, biological, and chemical casualties
  - aeromedical evacuation and, 45
  - burn injuries, 389
  - Clinical Practice Guidelines, 450
  - corneal injuries, 199, 202–203
  - cyanogens, 447
  - hypochlorite solution use, 449
  - incapacitation agents, 447–448
  - initial treatment priorities, 444
  - lung-damaging agents, 446–447
  - nerve agents, 444–445
  - off-gassing, 448–449
  - personal protection, 443–444
  - post-surgery procedures, 450
  - pretreatment of, 445
  - Reactive Skin Decontamination Lotion use, 446, 449
  - surgical treatment, 448–450
  - symptoms of, 445–448
  - thickened agents, 448
  - treatment of, 445–448
  - triage, 26, 446–447
  - vesicants, 445–446
  - wound decontamination, 448
  - wound exploration and debridement, 449–450
- Chest injuries. *See* Thoracic injuries
- Chest tubes, 239–241
- Chest wall injuries, 253
- Chest well compliance, 136
- CHF. *See* Congestive heart failure
- Chilblains, 393–394
- Childbirth, emergency
  - acute vaginal hemorrhage, 296
  - emergency cesarean section, 300–302
  - neonatal resuscitation, 306–309
  - postpartum hemorrhage, 302–306
  - precipitous vaginal delivery, 297–299
  - uterine atony, 302–306
- Children. *See* Pediatric trauma
- Chlorine, 446–447
- Chloropicrin, 446–447
- Choking agents, 446–447
- Cholecystitis, acalculous, 153–154
- Cholera, 440–441
- Cisatracurium, 88
- Civilian internees. *See* Internees
- CK. *See* Cyanogen chloride
- Clamping vessels, 67
- Clinical Practice Guidelines
  - compliance with, 500
  - website, 18, 22, 39, 53, 63, 71, 83, 96, 108, 126, 163, 173, 197, 234, 254, 273, 287, 310, 319, 328, 340, 346, 354, 375, 392, 425, 433, 442, 450, 461, 470, 490, 498, 504, 514
- Clostridial myonecrosis, 120
- Coagulopathy
  - blood transfusions and, 484–485
  - dilutional, 484–485
  - heatstroke and, 406, 409–410
  - trauma-induced, 484–485
- COCOM. *See* Combatant Command
- Cold injuries
  - cardiopulmonary resuscitation, 402
  - chilblains, 393–394
  - field treatment, 397, 400–401

- frostbite, 396–397
- frostnip, 396
- hypothermia, 399–402
- medical facility treatment, 397–399, 401–402
- nonfreezing, 393–396
- pernio, 394
- rapid rewarming, 398–399
- trench foot, 394–396
- Colon injuries, 270
- Combat-associated healthcare pneumonia, 146, 161–162
- Combat lifesavers, 20
- Combat stress
  - triage considerations, 27–28
- Combatant Command, 499–500
- Common femoral artery injuries, 361–362
- Compartment syndrome
  - abdominal, 388
  - burns and, 388
  - Clinical Practice Guidelines, 498
  - description of, 106–108, 491
  - early clinical diagnosis of, 107, 491
  - fasciotomy technique, 107–108, 492–497
  - foot, 353, 496
  - hand, 348–349
  - late clinical diagnosis of, 107, 491
  - lower extremities, 494–496
  - measurement of compartment pressures, 491–492
  - mechanisms of injuries associated with, 107, 491
  - orbital, 199, 207–208
  - prophylactic fasciotomy, 491–492
  - treatment of, 107–108, 491–498
  - upper extremities, 492–494
- Compensated shock, 128–129
- Compression sutures, 303–304
- Computed tomographic angiography
  - vascular injuries, 359
- Computed tomography imaging
  - abdominal injuries, 262–263
  - head injuries, 220–221
- Congestive heart failure, 147, 148, 149–151
- Conjunctival injuries
  - foreign bodies, 205–206
- Consciousness
  - head injuries and, 218
- Continental United States-based hospitals
  - military trauma systems, 499
- Contractors
  - triage considerations, 27
- Contrast dye-associated nephropathy, 156
- Controlled hypotensive resuscitation, 70, 78–79
- CONUS-based hospitals. *See* Continental United States-based hospitals
- Corneal injuries
  - abrasions, 203–205, 386
  - burns, 386
  - chemical injuries of, 202–203
  - foreign bodies, 205–206
- Corneal ulcers, 205
- Coronary syndrome, acute, 148–148
- Coxiella burnetii*, 440–442
- CPP. *See* Cerebral perfusion pressure
- CPR. *See* Cardiopulmonary resuscitation
- Craniectomies, 228–233
- Cricothyrotomy, 61–62
- Critical care
  - acalculous cholecystitis, 153–154
  - acute coronary syndrome, 147–148
  - acute respiratory distress syndrome, 138–139, 141–142
  - acute tubular necrosis, 154–155, 157
  - adrenal insufficiency, 161
  - aspiration pneumonitis, 145–146
  - blunt cardiac injury, 147
  - cardiac disease, 146–151
  - cardiac tamponade, 146–147
  - cardiogenic shock, 128
  - cerebrovascular accidents, 151–153
  - Clinical Practice Guidelines, 163
  - combat-associated healthcare pneumonia, 146, 161–162
  - compensated shock, 128–129
  - congestive heart failure, 147, 148, 149–151
  - damage control surgery, 170–171
  - diabetic ketoacidosis, 159–161
  - disseminated intravascular coagulation, 157–158
  - distributive shock, 128
  - endocrine disease, 159–161
  - endpoints of resuscitation, 127–129
  - fluid management, 129–130
  - gastrointestinal disease, 153–154
  - glucose control, 162
  - heparin-induced thrombocytopenia, 158–159
  - hyperglycemic hyperosmolar syndrome, 159–161
  - hyperkalemia, 133–134
  - hypermagnesemia, 131
  - hypocalcemia, 136
  - hypokalemia, 132–133
  - hypomagnesemia, 134–135
  - hyponatremia, 130–131
  - hypovolemic shock, 127–128

- iatrogenic complications of therapy, 157
  - ICU prophylaxis, 161–163
  - mechanical ventilation, 136–143
  - nephrolithiasis, 156–157
  - neurological disease, 151–153
  - nutrition, 162–163
  - obstructive shock, 128
  - prerenal azotemia, 154–155
  - pulmonary contusion, 143
  - pulmonary embolism, 143–145
  - pulmonary medicine, 136–146
  - renal disease, 154–157
  - rhabdomyolysis, 155–156
  - serum calcium levels and, 135
  - serum electrolyte management, 130
  - serum magnesium levels and, 134
  - serum potassium levels and, 132
  - shock, 127–129
  - stress gastritis, 153
  - strokes, 151–153
  - thrombotic thrombocytopenic purpura, 157–158
  - traumatic brain injury, 151
  - uncompensated shock, 127, 128
  - ventilator-associated pneumonia, 161–162
  - Critical Care Air Transport Teams
    - cardiopulmonary technicians, 51
    - critical care nurses, 51
    - definition of CCATT patient, 50
    - intensivist physicians, 51
    - patient selection, 49–50
    - use of, 50
  - Critical care nurses, 51
  - Crush injuries
    - rhabdomyolysis and, 155–156
  - Crush syndrome, 104–105
  - CT. *See* Computed tomography imaging
  - CTA. *See* Computed tomographic angiography
  - CVA. *See* Cerebrovascular accidents
  - CVP. *See* Central venous pressure
  - Cyanogen chloride, 447
  - Cyanogens, 447
  - Cyanosis, 418
  - Cyclohexyl sarin, 444
  - Cyclosarin, 444
- D**
- Damage control surgery
    - ACS monitoring, 170–171
    - Clinical Practice Guidelines, 173
    - craniectomies, 230–231
    - critical care, 170–171
    - definition of, 165
    - early resuscitation phase, 167
    - general principles of, 166
    - planned reoperation, 171–172
    - prehospital phase, 167
    - primary operation, 167–170
    - relaparotomy, 172
    - temporary abdominal closure, 169–170
    - thoracic injuries, 172–173
    - unplanned reexploration, 172
    - vacuum pack technique, 169–170
  - Debridement
    - burn care, 389
    - chemical contamination injuries, 449–450
    - renal injuries, 279
    - soft-tissue injuries, 99
  - Decontamination
    - biological contamination, 437–438
    - chemical injuries, 437, 448
    - mechanical, 437
    - physical, 437–438
    - radiological injuries, 432–433
  - Decubitus ulcers, 319
  - Deep venous thrombosis
    - diagnosis of, 144
    - pulmonary embolism and, 143–144
    - spinal injuries and, 319
    - treatment of, 144
  - Delayed evacuation
    - antimicrobial agent selection and duration, 118
  - Deliveries. *See* Childbirth, emergency
  - Department of Defense Trauma Registry
    - function of, 500, 553
    - methods, 555–557
    - minimum essential data, 555
    - resuscitation records, 556–560
    - situational awareness, 554–555
    - technology, 555–557
    - uses of, 555
  - Detainees. *See also* Internees
    - triage considerations, 27
  - Diabetic ketoacidosis, 159–161
  - Diagnostic peritoneal aspiration, 259–262
  - Diaphragm injuries, 252–253
  - Died of wounds, 500
  - Dilaudid, 87
  - Dilutional coagulopathy, 484–485
  - Diphosgene, 446–447
  - Dirty bombs. *See* Radiological dispersal devices
  - Disseminated intravascular coagulation, 157–158, 486
  - Distal femoral artery, 363–364

## Emergency War Surgery

- Distributive shock, 74, 128  
Dizziness, 197  
DKA. *See* Diabetic ketoacidosis  
DOW. *See* Died of wounds  
DPA. *See* Diagnostic peritoneal aspiration  
Drawover vaporizer, 94  
Dressings, 69–70  
Duodenal injuries, 265–266  
DVT. *See* Deep venous thrombosis
- E**
- Ear injuries  
    burns, 386  
    otological injuries, 194–197  
    temporal bone injuries, 194–196
- Ebola fever, 439
- ECFV. *See* Extracellular fluid volume
- Ectopic pregnancies, 294, 296
- Edema  
    burns and, 387  
    heat edema, 413–414  
    high-altitude cerebral, 423–425  
    high-altitude peripheral, 419  
    high-altitude pulmonary, 421–423, 425
- Electrical burn injuries, 388–389
- Electrolyte management, 130, 384, 451
- Emergency cesarean sections, 300–302
- Emergency childbirth. *See* Childbirth, emergency
- Emergency whole blood collection  
    activation, 507–508  
    blood donor criteria, 513  
    Clinical Practice Guidelines, 514  
    donor screening, 507–508  
    materials and equipment, 505–507  
    onsite specimen processing, 513–514  
    performing phlebotomy, 508–511  
    performing rapid testing, 512–513  
    postdonor care, 511–512  
    posttransfusion verification, 513  
    specimen processing, 513
- Empyema, 122
- En route care  
    description of, 42
- Encephalopathy  
    heatstroke and, 406, 408
- Endocrine disease  
    adrenal insufficiency, 161  
    diabetic ketoacidosis, 159–161  
    hyperglycemic hyperosmolar syndrome, 159–161
- Endotracheal intubation, 89–90
- Endotracheal tubes, 60–61, 90
- Endovascular techniques, 372–373
- Enemy prisoners of war. *See also* Internees triage considerations, 27
- Enteral nutrition, 162–163, 452
- Enucleation, 212
- Environmental injuries  
    acclimatization, 404–405  
    acute mountain sickness, 416–418  
    altitude illness, 414–425  
    anhidrotic heat exhaustion, 412–413  
    cardiopulmonary resuscitation, 402  
    chilblains, 393–394  
    Clinical Practice Guidelines, 425  
    cold injuries, 393–403  
    field treatment, 397, 400–401  
    frostbite, 396–397  
    frostnip, 396  
    heat-induced syncope, 413  
    heat cramps, 410–411  
    heat edema, 413–414  
    heat exhaustion, 411–412  
    heat injury, 403–414  
    heat tetany, 414  
    heatstroke, 405–410  
    high-altitude bronchitis, 419  
    high-altitude cerebral edema, 423–425  
    high-altitude peripheral edema, 419  
    high-altitude pharyngitis, 419  
    high-altitude pulmonary edema, 421–423, 425  
    high-altitude retinal hemorrhage, 419–420  
    hypothermia, 399–402  
    medical facility treatment, 397–399, 401–402  
    miliaria profunda, 412–413  
    miliaria rubra, 412  
    minor illnesses, 412–414  
    nonfreezing cold injuries, 393–396  
    pernio, 394  
    pruritus, 412–413  
    rapid rewarming, 398–399  
    subacute mountain sickness, 420–421  
    sunburn, 414  
    thromboembolic events, 420  
    trench foot, 394–396
- EPWs. *See* Enemy prisoners of war
- Escharotomy, 387
- Eschmann stylet, 60
- Esophageal fistulas, 194
- Esophageal injuries  
    diagnosis of, 193  
    treatment of, 193, 252
- Esophageal reflux, 454
- Ethics. *See* Medical ethics
- Etomidate, 88
- ETT. *See* Endotracheal tubes

- Evacuation. *See* Aeromedical evacuation;  
Patient evacuation
- Explosive ordnance disposal, 17–18
- Explosive-related injuries  
categories of, 7  
head injuries, 215–216
- External bleeding, 66
- External fixation  
extremity fractures, 329, 331–340  
foot injuries, 354  
pelvic injuries, 326–327
- Extracellular fluid volume, 129, 132
- Extraperitoneal injuries, 284
- Extremity fractures  
bivalved casts, 340  
casts, 340  
Clinical Practice Guidelines, 340  
external fixation, 329, 331–340  
femur diaphyseal fracture technique,  
332–334  
intramedullary nailing, 329  
patient evacuation, 340  
skeletal traction, 339  
splints, 329  
technique to span ankle, 339  
technique to span knee, 337–338  
temporary external fixation, 329  
tibia shaft fracture technique, 334–337  
wound management, 330–331
- Extremity injuries  
antimicrobial agent selection and  
duration, 116  
burns, 386–388  
fractures, 329–340  
vascular, 359–366
- Eye injuries. *See* Ocular injuries
- Eyelid lacerations, 210–211
- F**
- Facial injuries. *See also* Head injuries;  
Neck injuries  
airway management, 175–176  
auricular injury, 186  
bone fractures, 178–183  
cervical spine injuries, 176  
Clinical Practice Guidelines, 197  
evaluation of, 177–178  
facial lacerations, 184  
facial nerve injury, 184–185  
high-altitude peripheral edema, 419  
immediate management of, 175–178  
parotid duct injury, 185–186  
soft-tissue injuries, 183–186  
vascular injuries, 176–177
- Fallopian tube injuries, 294
- Fasciotomy  
arm, 492  
burn care, 388  
foot, 496  
forearm, 492–494  
hand, 348–349  
leg, 494–496  
lower extremities, 494–496  
prophylactic, 491–492  
technique, 107–108, 492–498  
thigh, 494  
upper extremities, 492–494  
wound management, 496–498
- FAST. *See* Focused abdominal sonography  
for trauma
- Febrile nonhemolytic transfusion reaction,  
488
- Femoral artery injuries, 361–362
- Femur diaphyseal fracture technique,  
332–334
- Fentanyl, 87
- Fetal heart rate, 297, 300
- Field anesthesia equipment, 94–96
- Field treatment  
analgesia, 525–527  
antibiotics, 528  
burns, 528–529  
cardiopulmonary resuscitation, 529  
cold injuries, 397, 400–401  
documentation of care, 529  
evacuation preparation, 529–530  
fluid therapy, 523–524  
hemorrhage, 66–70, 519, 522–523  
hypothermia, 400–401, 525  
penetrating eye injuries, 525  
shock, 523–524  
tactical combat casualty care guidelines,  
519–530
- Flail chest, 238
- Flash blindness, 431
- Flash burns, 430
- Fluid therapy  
burns and, 380–382  
critical care, 129–130  
evacuation care, 536–537  
pediatric, 451  
shock, 76–77, 81–82, 523–524, 536–537  
tactical field care, 523–524
- Focused abdominal sonography for  
trauma, 257–259
- Fogarty thrombectomy catheters, 371
- Foot compartment syndrome, 353–354,  
496
- Foot injuries  
Clinical Practice Guidelines, 354  
evaluation of, 351–352

## Emergency War Surgery

- external fixation, 354
  - foot compartment syndrome, 353–354
  - hindfoot, 352
  - initial management, 351–352
  - midfoot, 352
  - penetrating, 351
  - stabilization, 354
  - toes, 353
  - types of, 347
- Forearm compartment syndrome, 492–494
- Foreign bodies
- ocular, 205–206
- Forward Surgical Teams
- aeromedical evacuation from, 43
- Fractures. *See* Bone fractures
- Francisella tularensis*, 440–441
- Fresh frozen plasma
- ABO matching, 476
  - role of care, 473, 474–475
- Fresh whole blood
- ABO matching, 476
  - emergency collection in the field, 505–514
  - onsite specimen processing, 513
  - posttransfusion verification, 513
  - rapid testing of, 512–513
  - releasing, 512–513
  - role of care, 473, 474–475
  - specimen processing, 513
- Frostbite, 396–397
- Frostnip, 396
- ## G
- Gardner-Wells tongs, 315–317
- Gas gangrene, 120
- Gastric injuries, 264–265
- Gastritis, stress, 153
- Gastrointestinal disease
- acalculous cholecystitis, 153–154
  - pediatric care, 454–455
  - spinal injuries and, 319
  - stress gastritis, 153
- GCS. *See* Glasgow Coma Scale
- General anesthesia
- conclusion of, 92
  - induction of, 86
  - maintenance of, 90–91
- Geneva Convention for the Amelioration of the Wounded and Sick in Armed Forces in the Field, 464
- Geneva Convention Relative to the Treatment of Prisoners of War, 464
- Geneva Conventions, 463–464
- Genitalia injuries, 286–287
- Genitourinary tract injuries
- bladder, 283–284
  - Clinical Practice Guidelines, 287
  - external genitalia, 286–287
  - renal, 275–280
  - ureteral, 280–283
  - urethral, 284–286
- Glasgow Coma Scale, 213, 218, 219, 221, 223, 551–552
- Glasgow Outcomes Scale, 213
- Glaucoma, acute, 199
- Glucose control, 162
- Glycosuria, 383
- GOS. *See* Glasgow Outcomes Scale
- GPW. *See* Geneva Convention Relative to the Treatment of Prisoners of War
- Graft material
- vascular injuries, 373
- Gum Elastic Bougie, 60
- Gunshot wounds, 5
- GWS. *See* Geneva Convention for the Amelioration of the Wounded and Sick in Armed Forces in the Field
- Gynecological emergencies. *See also* Childbirth, emergency
- acute vaginal hemorrhage, 295–296
  - Clinical Practice Guidelines, 310
  - postpartum hemorrhage, 302–306
  - uterine atony, 302–306
- Gynecological injuries. *See also* Childbirth, emergency
- abdominal hysterectomy, 292–293
  - adnexal, 294–295
  - cervical, 291
  - Clinical Practice Guidelines, 310
  - fallopian tubes, 294
  - ovarian, 294–295
  - retroperitoneal hematoma, 295
  - uterine, 291
  - vaginal, 290–291
  - vulvar, 289–290
- ## H
- HACE. *See* High-altitude cerebral edema
- Hand compartment syndrome, 348–349
- Hand injuries
- Clinical Practice Guidelines, 354
  - deep space infections, 347
  - dressing, 350–351
  - evaluation of, 348
  - hand compartment syndrome, 348–349
  - high-altitude peripheral edema, 419
  - initial management, 348
  - splinting, 350–351

- surgical technique, 349–350
- tendons, 347, 350
- tissue management, 350
- types of, 347
- Hanta fever, 439
- HAPE. *See* High-altitude pulmonary edema
- Hayman compression sutures, 303–304
- Head injuries. *See also* Brain injuries; Facial injuries; Neck injuries
  - classification of, 216–217
  - Clinical Practice Guidelines, 234
  - evacuation of head-injured patients, 233–234
  - Glasgow Coma Scale, 213, 218, 219, 221, 223
  - intracranial pressure and, 213, 214, 217, 219, 223–228
  - mechanisms of injury, 217–218
  - medical management, 221–227
  - patient assessment, 218–220
  - primary injuries, 217
  - pupillary reactivity and, 229–220
  - radiographic evaluation, 220–221
  - secondary injuries, 217–218
  - surgical management, 227–233
  - triage, 218–220
  - types of combat head injuries, 214–216
- Health Insurance Portability and Accountability Act, 465
- Health services. *See* Roles of medical care
- Hearing loss, 195–196
- Heart disease. *See* Cardiac disease
- Heart injuries
  - blunt, 147
  - penetrating, 249
  - treatment of, 249, 250
- Heart rate
  - fetal, 297, 300
  - infant, 308–309
- Heat-induced syncope, 413
- Heat cramps, 410–411
- Heat edema, 413–414
- Heat exhaustion, 411–412
- Heat injury
  - acclimatization, 404–405
  - anhidrotic heat exhaustion, 412–413
  - heat-induced syncope, 413
  - heat cramps, 410–411
  - heat edema, 413–414
  - heat exhaustion, 411–412
  - heat tetany, 414
  - heatstroke, 405–410
  - miliaria profunda, 412–413
  - miliaria rubra, 412
  - minor illnesses, 412–414
  - prevention of, 403–405
  - pruritus, 412–413
  - sunburn, 414
- Heat tetany, 414
- Heatstroke
  - clinical presentation, 406–407
  - complications of, 409–410
  - core temperature and, 407
  - evaluation of, 405
  - treatment of, 407–408
- Hematology
  - pediatric care, 455
- Hematomas
  - head injuries and, 230–231
  - intrafascial, 290
  - retroperitoneal, 295
  - suprafascial, 290
  - vaginal, 290, 291
  - vulvar, 290
- Hematuria, 275–276
- Hemicraniectomy, 228
- Hemorrhage. *See also* Transfusions
  - acute vaginal hemorrhage, 295–296
  - care under fire, 65, 518
  - clamping vessels, 67
  - Clinical Practice Guidelines, 71
  - control of, 65
  - controlled resuscitation, 70
  - dressings and bandages, 69–70
  - early control of, 472–473
  - evacuation care, 531–532, 534–535
  - external, 66
  - hemostatic agents, 70
  - high-altitude retinal hemorrhage, 419–420
  - internal, 66, 68–69
  - junctional wounds, 67
  - limb splints, 67
  - orbital, 201–209
  - postpartum, 302–306
  - pressure points, 67, 68
  - scalp bleeding, 67–68
  - sites of, 66
  - subconjunctival, 202
  - tactical field care, 66–70, 519, 522–523
  - tourniquets, 66–67
  - treatment of, 66–70
  - uterine atony, 302–306
- Hemorrhagic fevers, 438, 439, 441
- Hemorrhagic shock, 76–78, 523–524
- Hemostatic agents, 70
- Hemothorax, 237
- Hemotympanum, 195
- Heparin-induced thrombocytopenia, 158–159

## Emergency War Surgery

- Hepatic artery injuries, 367
  - Hetastarch, 82
  - Hextend, 82
  - HHS. *See* Hyperglycemic hyperosmolar syndrome
  - High-altitude bronchitis, 419
  - High-altitude cerebral edema, 423–425
  - High-altitude peripheral edema, 419
  - High-altitude pharyngitis, 419
  - High-altitude pulmonary edema, 421–423, 425
  - High-altitude retinal hemorrhage, 419–420
  - High explosive antitank rounds, 14
  - High-frequency oscillatory ventilation, 142–143
  - Hindfoot injuries, 352
  - HIPAA. *See* Health Insurance Portability and Accountability Act
  - HIT. *See* Heparin-induced thrombocytopenia
  - Horizontal spray mines, 11
  - HTS. *See* Hypertonic saline
  - Humanitarian transport requests, 51, 53
  - Humidity
    - aeromedical evacuation and, 45
  - Hydrogen cyanide, 447
  - Hyperglycemic hyperosmolar syndrome, 159–161
  - Hyperkalemia
    - acute, 133
    - blood transfusions and, 483
    - burns and, 389
    - chronic, 133
    - heatstroke and, 409
    - pseudohyperkalemia, 133
    - redistribution, 133
    - treatment of, 133–134
  - Hypermetabolism
    - burns and, 388
  - Hypernatremia, 131
  - Hypertension
    - cerebrovascular accidents and, 152
  - Hypertonic saline, 82, 130
  - HypHEMA, 206–207
  - Hypocalcemia, 409
    - blood transfusions and, 136, 484
    - treatment of, 136
  - Hypochlorite solution, 449
  - Hypokalemia, 132–133
  - Hypomagnesemia, 134–135
  - Hyponatremia, 130–131
  - Hypopharyngeal injuries, 193
  - Hypotension
    - heatstroke and, 408
    - pediatric, 454
    - permissive, 70, 78–79
    - shock and, 74
  - Hypothermia
    - blood transfusions and, 482, 483
    - burn care, 378
    - cardiopulmonary resuscitation, 402
    - causative factors, 399
    - evacuation care, 538–539
    - field treatment, 400–401, 525
    - medical facility treatment, 401–402
    - mild, 400, 402–403
    - moderate, 400
    - prevention of, 399
    - profound, 400
    - severe, 400, 403
    - shock and, 78–79
  - Hypovolemic shock, 74, 75–76, 127–128
  - Hysterectomy, abdominal, 292–293
- ## I
- ICFV. *See* Intracellular fluid volume
  - ICP. *See* Intracranial pressure
  - ICU. *See* Intensive care units
  - IED. *See* Improvised explosive devices
  - Ileus
    - spinal injuries and, 319
  - Iliac artery injuries, 368
  - Immune system, pediatric, 456
  - Impact Uni-Vent Eagle Model 754 portable ventilator, 95–96
  - Improvised explosive devices, 11
  - Incapacitation agents, 447–448
  - Indoles, 447–448
  - Infant heart rate, 308–309
  - Infants. *See also* Pediatric trauma
    - neonatal resuscitation, 306–309
  - Infections
    - antimicrobial agent selection and duration, 116–119
    - battlefield environment and, 109
    - biological contamination and, 438
    - burn care, 386
    - Clinical Practice Guidelines, 126
    - diagnosis of, 109
    - hand injuries and, 347
    - intraabdominal, 121–122
    - microorganisms causing, 110
    - patterns of, 110–111
    - prevention of, 113–115
    - pulmonary, 122
    - soft-tissue infections, 120–121
    - spectrum and dosage of antibiotic agents, 124
    - systemic sepsis, 123, 125

- tetanus, 112, 119–120
  - treatment of, 111–125
- Inferior vena cava filters, 372–373
- Intrafascial hematoma, 290
- Inhalation injuries
  - burns, 378, 388
  - toxic fumes from antitank landmines, 16
  - types of, 16
- Initial airway management, 55–56
- Initial triage officers, 32, 34
- Intensive care units
  - prophylaxis treatment, 161–163
- Intensivist physicians, 51
- Internal bleeding, 66, 68–69
- Internal carotid artery injuries, 190–191
- Internal jugular vein injuries, 191
- Internal jugular venipuncture, 79–81
- Internees
  - advocates for, 469
  - care of, 463–469
  - Clinical Practice Guidelines, 470
  - Geneva Conventions, 463–464
  - legal issues, 468–469
  - medical care of, 465–466
  - medical ethics principles, 547–549
  - medical information, 466
  - medical records, 465–466
  - medical staffing, 468
  - planning for, 466–467
  - screening, 468
  - security, 469
  - setup up for, 466–467
  - supplies, 468
  - triage considerations, 27
  - workload, 464
- Intertheater transport checklist, 51, 52
- Intraabdominal infections, 121–122
- Intracellular fluid volume, 132
- Intracranial pressure
  - head injuries and, 213, 214, 217, 219, 223–228
  - monitoring, 223–227
- Intramedullary nailing, 329
- Intraocular injuries, 200, 201, 206, 207
- Intraoral injuries, 190
- Intraosseous infusion, 81–83, 523, 535–536
- Intravascular resuscitation fluids, 76–77
- Intravascular volume, 127, 130, 157
- Intravenous access, 523, 535–536
- Intubation
  - endotracheal, 89–90
  - orotracheal, 57–60
  - rapid sequence, 57–58, 86–89, 457, 458
- IO. *See* Intraosseous infusion
- Iraq War
  - vascular injuries during, 355
- Irrigation, 102
- IVV. *See* Intravascular volume
- J**
- JBPO. *See* Joint Blood Program Office
- Joint Blood Program Office, 505
- Joint Theater Trauma System
  - battlefield trauma system model, 499–501
  - Burn Resuscitation Flowsheet, 384
  - “Damage Control Resuscitation,” 82
  - development of, 1
  - goals of, 501–502
  - purpose of, 501
  - triage, 23
- Joint Trauma System, 502–504, 553
- JTS. *See* Joint Trauma System
- JTTS. *See* Joint Theater Trauma System
- Jugular vein injuries, 191, 369–370
- Jugular venipuncture, 79–81
- Junctional wounds, 67
- K**
- Ketamine, 88
- Ketoacidosis, diabetic, 159–161
- Kidney disease. *See* Renal disease
- Kidney injuries. *See* Renal injuries
- Kinetic energy rounds, 14–15
- King laryngeal tube, 63
- Knee injuries
  - primary knee disarticulation, 344
  - technique to span knee, 337–338
- Korean War
  - vascular injuries during, 355
- L**
- Lacerations
  - anal, 290
  - cervix, 291
  - eyelid, 210–211
  - facial, 184
  - vaginal, 291
  - vulvar, 289
- Lactated Ringer’s solution, 82, 129, 380
- Laparotomy, abdominal, 256–257, 263
- Large vein injuries, 370
- Laryngeal injuries, 191–192
- Laryngeal mask airway, 62–63
- Laryngoscopy, 58–60
- Laryngotracheal injuries, 192
- Laser eye injuries, 211
- Lassa fever, 439

## Emergency War Surgery

- Lateral canthotomy, 208–210
  - LD. *See* Lethal dose of radiation
  - LeFort fracture classification, 182–183
  - Leg injuries
    - burns, 386–388
    - compartment syndrome, 494–496
    - vascular, 361–366
  - Lethal dose of radiation, 429
  - Lewisite, 445
  - Ligation of vessels, 177, 370–371
  - Limb splints, 67
  - Liver injuries, 267–268
  - LMA. *See* Laryngeal mask airway
  - Local anesthesia, 93
  - Local national patients
    - burns, 390–391
  - Lower extremities
    - compartment syndrome, 494–497
    - vascular injuries, 361–366
  - Lumbar spine injuries, 314–315, 317
  - Lung-damaging agents, 446–447
  - Lung infections, 122
  - Lung injuries. *See also* Pulmonary medicine
    - transfusion-related, 488–489
    - treatment of, 249–251
- M**
- M-4 rifles, 12
  - M-16 rifles, 12, 13
  - MAC. *See* Minimal alveolar concentration
  - Machine guns, 11
  - Macintosh laryngoscopy blade, 58
  - Magnesium, 134
  - Mandible fractures, 178–180
  - MAP. *See* Mean arterial pressure
  - Marine Corps
    - medical evacuation precedences, 46
  - Mask ventilation, 56–57, 62–63
  - Mass casualty events. *See also* Triage response to, 23
  - Maxillary-mandibular fixation, 179–180
  - Maxillofacial fractures, 181–183
  - Maxillofacial injuries
    - antimicrobial agent selection and duration, 116
  - Mean arterial pressure, 217, 225
  - Mechanical ventilation
    - basics of, 136–138
    - compliance of chest wall, 136
    - high-frequency oscillatory ventilation, 142–243
    - initial settings, 137
    - positive pressure ventilation, 57, 137, 138, 140, 307–309
    - pressure control modes, 137
    - protocol, 139–141
    - setup and adjustment, 139–140
    - ventilator-associated pneumonia, 161–162
    - volume control modes, 137
    - volume cycled, 137–138
    - weaning, 141
  - MEDEVAC. *See* Medical evacuation
  - Median sternotomies, 244–247
  - Medical care roles. *See* Roles of medical care
  - Medical ethics principles, 547–549
  - Medical evacuation. *See also* Patient evacuation
    - precedences, 45–46
    - tactical combat casualty care guidelines, 531–543
  - Medical personnel, 20
  - Medical Readiness Training, 515
  - Medical treatment facilities
    - aeromedical evacuation from, 43
    - case fatality rates, 554
    - cold injury care, 397–399, 401–402
    - hypothermia care, 401–402
    - roles of medical care, 21–22
    - triage considerations, 30
  - Mesenteric artery injuries, 367–368
  - Methylphosphonothioic acid, 444
  - Microvascular bleeding
    - blood transfusions and, 484
  - Midazolam, 89
  - Midfoot injuries, 352
  - Miliaria profunda, 412–413
  - Miliaria rubra, 412
  - Military operations, 2007–2017
    - casualties by weapon type, 2
    - cause of injuries, 2
  - Military trauma systems, 499
  - Miller laryngoscopy blade, 59
  - Minimal alveolar concentration, 91
  - Mission-Oriented Protective Posture gear, 404, 443, 448
  - MOPP. *See* Mission-Oriented Protective Posture gear
  - Morphine, 87
  - Mountain sickness
    - acute, 416–418
    - subacute, 420–421
  - MRSA pneumonia
    - antibiotic coverage, 122
  - MRT. *See* Medical Readiness Training
  - MTFs. *See* Medical treatment facilities
  - Muscle relaxants, 87
  - Mycotoxins, 440

- Myocardial infarction  
  non-ST elevation, 149  
  ST elevation, 147–148
- Myoglobinuria, 388–389
- N**
- Narcotics, 87
- Nasal fractures, 180–181
- National Defense Authorization Act, 502
- NATO. *See* North Atlantic Treaty Organization
- Navy  
  medical evacuation precedences, 46
- NBC. *See* Nuclear, biological, and chemical casualties
- NDAA. *See* National Defense Authorization Act
- Neck injuries. *See also* Facial injuries; Head injuries  
  antimicrobial agent selection and duration, 116  
  Clinical Practice Guidelines, 197  
  combined injuries, 194  
  esophageal fistulas, 194  
  esophageal injuries, 193  
  hypopharyngeal injuries, 193  
  immediate management, 187  
  internal carotid artery injuries, 190–191  
  internal jugular vein injuries, 191  
  intraoral injuries, 190  
  laryngeal injuries, 191–192  
  laryngotracheal injuries, 192  
  neck anatomy, 186–189  
  operative strategy, 187–189  
  otological injuries, 194–197  
  penetrating wounds, 187–189  
  skull base injuries, 194–195  
  surgical principles, 189–194  
  temporal bone injuries, 194–197  
  tracheal injuries, 192–193  
  vertebral artery injuries, 190
- Necrotizing infections, 120–121
- Negative pressure wound therapy, 102, 345
- Neonatal resuscitation, 306–309
- Neonatal Resuscitation Algorithm, 309
- Nephrectomies, 277–280
- Nephrolithiasis, 156–157
- Nerve agents, 444–445, 448
- Nerve injuries  
  facial, 184–185  
  hand, 350
- Neuraxial anesthesia, 93
- Neurogenic shock  
  diagnosis of, 75  
  spinal injuries and, 318  
  treatment of, 82
- Neurological disease. *See also* Brain injuries; Head injuries  
  cerebrovascular accidents, 151–153  
  strokes, 151–153  
  traumatic brain injury, 151
- Neurosurgical patients  
  aeromedical evacuation and, 44
- Nitrogen mustard, 445
- Noise  
  aeromedical evacuation and, 45
- Non-ST elevation myocardial infarction, 149
- Noncombatant locals  
  triage considerations, 26–27
- Nonfreezing cold injuries, 393–396
- Normal saline, 129
- North Atlantic Treaty Organization  
  NATO STANAG 2131, 467  
  7.62 rifle cartridge, 12, 13
- NPWT. *See* Negative pressure wound therapy
- NSTEMI. *See* Non-ST elevation myocardial infarction
- Nuclear, biological, and chemical casualties. *See also* Biological contamination; Chemical contamination  
  aeromedical evacuation and, 45  
  blast injuries, 430–431  
  casualty yield by type of weapon, 427–428  
  conventional nuclear weapons, 427–428  
  decontamination, 432–433  
  flash blindness, 431  
  flash burns, 430  
  lethal dose of radiation, 429  
  logistics of casualty management, 433  
  medical aspects of, 429  
  potential injuries, 430–431  
  radiation injuries, 431  
  radiological dispersal devices, 427–428  
  retinal burns, 431  
  thermal burns, 430  
  treatment of, 430  
  treatment of combined injuries, 432  
  triage, 428–429
- Nurses, critical care, 51
- Nutrition  
  critical care, 162–163  
  pediatric requirements, 451–452

**O**

- Obstetrical emergencies
  - acute vaginal hemorrhage, 295–296
  - emergency cesarean sections, 300–302
  - neonatal resuscitation, 306–309
  - postpartum hemorrhage, 302–306
  - precipitous vaginal delivery, 297–299
  - uterine atony, 302–306
- Obstructive shock, 128
- Ocular injuries
  - acute glaucoma, 199
  - anterior segment injuries, 202–219
  - antimicrobial agent selection and duration, 117
  - bacterial keratitis, 205
  - cantholysis, 208–210
  - chemical injuries of the cornea, 199, 202–203
  - corneal abrasions, 203–205
  - corneal ulcer, 205
  - emergencies, 199
  - enucleation, 212
  - evacuation care, 539
  - flash blindness, 431
  - foreign bodies, 205–206
  - high-altitude retinal hemorrhage, 419–420
  - hyphema, 206–207
  - identifying severe injuries, 200–201
  - laser eye injuries, 211
  - lateral canthotomy, 208–210
  - lid lacerations, 210–211
  - open globe injuries, 199, 201–202
  - orbital floor fractures, 210
  - penetrating injuries, 525, 539
  - retinal detachment, 199
  - retrobulbar hemorrhage, 199, 207–208
  - subconjunctival hemorrhage, 202
  - triage of, 199–200
- Off-gassing, 448–449
- Ohmeda Universal Portable Anesthesia Complete, 95–96
- Open globe injuries, 199, 201–202
- Open joint injuries, 97–108
- Open pneumothorax, 237, 238
- Orbital compartment syndrome, 199, 207–208
- Orbital floor fractures, 210
- Orbital hemorrhage, 201–209
- Orotacheal intubation, 57–60, 89
- Ostomy patients
  - aeromedical evacuation and, 44
- Otological injuries
  - burns, 386
  - diagnosis and management of, 194–197

- Ovarian cysts, 294
- Ovarian injuries, 294–295
- Oxygenation, 137, 140

**P**

- Pancreatic injuries, 266–267
- Pancreaticoduodenectomy, 267
- Pancuronium, 88
- Parenteral nutrition, 163
- Parotid duct injuries, 185–186
- Partial pressure of oxygen
  - aeromedical evacuation and, 44
- Patient evacuation
  - aeromedical evacuation system, 41–53
  - biological contamination and, 438–439
  - CASEVAC, 41
  - extremity fractures and, 340
  - head-injuries, 233–234
  - MEDEVAC, 41
  - Patient Evacuation Coordination Cell, 529
  - spinal injuries, 314–315
  - tactical combat casualty care guidelines, 531–543
- Patient Evacuation Coordination Cell, 529
- Patient Movement Requirements Center, 47, 53
- Patient transportation. *See* Patient evacuation
- Pediatric trauma
  - anatomic considerations, 451–452
  - blood volume, 455
  - body surface area, 454
  - burns, 381–382, 454
  - caloric requirements, 452
  - cardiovascular system, 453–454
  - Clinical Practice Guidelines, 461
  - commonly used drugs and dosages, 457–458, 460
  - diagnosis of, 456–457
  - electrolytes, 451
  - evaluation of, 456–457
  - fluid requirements, 451
  - gastrointestinal system, 454–455
  - hematology, 455
  - hypotension, 454
  - immune system, 456
  - nutrition, 451–452
  - physiological considerations, 451–452
  - protein requirements, 452
  - pulmonary system, 452–453
  - rapid sequence intubation, 457, 458
  - renal system, 455
  - resuscitation equipment and supplies, 457, 459

- surgical management, 460–461
- thermoregulation, 455–456
- treatment of, 457
- vascular injuries, 372
- venous access, 454
- vital signs, 453
- PEEP. *See* Positive end-expiratory pressure
- Pelvic binders, 324–326
- Pelvic injuries
  - blunt, 322–323
  - Clinical Practice Guidelines, 328
  - diagnosis of, 321–322
  - external fixation, 326–327
  - fractures, 290
  - pelvic binders, 324–326
  - penetrating, 325
  - retroperitoneal packing, 327–328
  - sheet binder application, 325–326
  - treatment of, 323–325
- Penetrating injuries
  - abdominal, 255
  - antimicrobial agent selection and duration, 117
  - eye, 525, 539
  - feet, 351
  - head, 214–215
  - neck, 187–189
  - pelvic, 325
  - renal, 276
  - spinal, 318
- Penile injuries, 286
- Performance improvement program, 500–501
- Peripheral edema, high-altitude, 419
- Peritoneal aspiration, 259–262
- Permanent cavity injuries, 2, 12
- Permissive hypotension, 70, 78–79
- Pernio, 394
- Pharyngitis, high-altitude, 419
- Phlebotomy, 508–511
- Phosgene, 446–447
- Phosgene oxime, 445
- Physicians, Intensivist, 51
- Pigmenturia, 388–389
- Pistols, 11
- Plague, 436, 437, 438, 440–441
- Plasma
  - ABO matching, 476
  - role of care, 473, 474–475
- PM. *See* Program Managers
- PMRC. *See* Patient Movement Requirements Center
- Pneumonia
  - combat-associated healthcare pneumonia, 146, 161–162
  - diagnosis and treatment, 122
  - MRSA and, 122
  - ventilator-associated pneumonia, 161–162
- Pneumonitis, aspiration, 145–146
- Pneumothorax
  - aeromedical evacuation and, 44
  - open, 237, 238
  - positive pressure ventilation and, 57
- Pneumothorax, tension
  - diagnosis of, 235, 237
  - positive pressure ventilation and, 57
  - treatment of, 237
- Point of injury care
  - burns, 377–378
  - infection prevention, 118
- Polymicrobial infections, 120
- Popliteal artery injuries, 363–365
- Portable ventilators, 95–96
- Portal vein injuries, 367
- Positive end-expiratory pressure, 37, 138, 140
- Positive pressure ventilation, 57, 137, 138, 140, 307–309
- Postoperative care
  - vascular injuries, 374–375
  - wound infections, 120
- Postpartum hemorrhage, 302–306
- Potassium, 132
- Precipitous vaginal delivery, 297–299
- Pregnancy. *See also* Childbirth, emergency
  - acute vaginal hemorrhage, 296
  - ectopic, 294, 296
- Prerenal azotemia, 154–155
- Pressure pelvic pack, 305–306
- Pressure points, 67, 68
- Primary blast injuries
  - description of, 5, 7–8
  - head injuries, 217
- Primary Symes, 344
- Prisoners of war. *See* Enemy prisoners of war
- Product manufacturers, xxxv
- Profunda femoris artery injuries, 362–363
- Program Managers, 500
- Projectile injuries, 2, 3, 6
- Propofol, 88
- Proptosis, 201
- Prosthetics
  - vascular injury treatment, 373
- Protein requirements, pediatric, 452
- Pruritus, 412–413
- Pseudohyperkalemia, 133
- Psoas hitch, 281
- Pulmonary contusion, 143

## Emergency War Surgery

- Pulmonary edema, high-altitude, 421–423, 425
- Pulmonary embolism
  - deep venous thrombosis and, 143–144
  - hemodynamically significant, 144–145
  - prevention of venous thromboembolism, 145
- Pulmonary infections, 122
- Pulmonary medicine
  - acute respiratory distress syndrome, 138–139, 141–142
  - aspiration pneumonitis, 145–146
  - combat-associated healthcare pneumonia, 146
  - high-altitude bronchitis, 419
  - high-altitude pharyngitis, 419
  - high-altitude pulmonary edema, 421–423, 425
  - lung injury treatment, 249–251
  - mechanical ventilation, 136–138, 139–141
  - pediatric, 452–453
  - pulmonary contusion, 143
  - pulmonary embolism, 143–145
  - pulmonary infections, 122
  - transfusion-related acute lung injury, 488–489
- Pupillary reactivity
  - head injuries and, 229–220
- Q**
- Q fever, 437, 440–442
- Quaternary blast injuries, 7, 8
- R**
- Radial artery injuries, 361
- Radiation injuries, 431
- Radiographic evaluation
  - head injuries, 220–221
- Radiological dispersal devices, 427–428
- Radiological injuries. *See also* Nuclear, biological, and chemical casualties
  - blast injuries, 430–431
  - casualty yield by type of weapon, 427–428
  - Clinical Practice Guidelines, 433
  - conventional nuclear weapons, 427–428
  - decontamination, 432–433
  - flash blindness, 431
  - flash burns, 430
  - lethal dose of radiation, 429
  - logistics of casualty management, 433
  - medical aspects of, 429
  - potential injuries, 430–431
  - radiation injuries, 431
  - radiological dispersal devices, 427–428
  - retinal burns, 431
  - thermal burns, 430
  - treatment of, 430
  - treatment of combined injuries, 432
  - triage, 428–429
- Rapid sequence intubation, 57–58, 86–89, 457, 458
- RDDs. *See* Radiological dispersal devices
- Reactive Skin Decontamination Lotion, 446, 449
- Rectal injuries, 270–271
- Red blood cells
  - ABO matching, 476
  - role of care, 473, 474–475
- Redistribution hyperkalemia, 133
- Reflux, esophageal, 454
- Regional anesthesia, 92–93
- Relaparotomies, 172
- Renal arteries injury, 368
- Renal disease
  - acute tubular necrosis, 154–155, 157
  - heatstroke and renal failure, 406
  - hemorrhagic fever with renal syndrome, 439
  - iatrogenic complications of therapy, 156
  - nephrolithiasis, 156–157
  - prerenal azotemia, 154–155
  - rhabdomyolysis, 155–156
- Renal injuries
  - blunt trauma, 275, 276
  - grading, 276
  - hematuria, 275–276
  - major, 277
  - minor, 276–277
  - nephrectomies, 277–280
  - operative technique, 277–280
  - penetrating, 276
- Renal system, pediatric, 455
- Respiration, 137
- Respiratory rate, 137
- Resuscitation, 457, 459
  - burn injuries, 383–384
  - cardiopulmonary, 402
  - controlled hypotensive, 70, 78–79
  - endpoints, 78–79, 127–129
  - equipment and supplies, 457, 459
  - hypothermia, 402
  - intravascular resuscitation fluids, 76–77
  - neonatal, 306–309
  - pediatric, 457, 459
  - shock, 78–79, 127–129

- transfusion damage control principles, 480–482
  - Resuscitation records, 556–560
  - Resuscitation stations, 37
  - Resuscitative thoracotomies, 241–243
  - Retained personnel. *See* Internees
  - Retinal burns, 431
  - Retinal detachment, 199
  - Retinal hemorrhage, high-altitude, 419–420
  - Retrobulbar hemorrhage, 199, 207–208
  - Retrograde urethrography, 284–285
  - Retroperitoneal hematomas, 295
  - Retroperitoneal injuries, 272–273
  - Retroperitoneal packing
    - pelvic injuries, 327–328
  - Returned to duty, 554
  - Rh blood matching, 477
  - Rhabdomyolysis
    - crush injury and, 155–156
    - diagnosis of, 155
    - heatstroke and, 406, 409
    - treatment of, 156
  - Ricin, 440
  - Rifle cartridges, 12–13
  - Rifles, 11
  - Rift Valley fever, 439
  - Ringer's solution, lactated, 82, 129, 380
  - Rocuronium, 87
  - Roles of medical care
    - advanced trauma management, 21
    - Clinical Practice Guidelines, 22
    - emergency medical treatment, 21
    - function of, 19
    - medical treatment facility care, 21–22
    - military hospital care, 22
    - unit-level medical care, 19–20
    - vascular injuries, 356–357
  - RSDL. *See* Reactive Skin Decontamination Lotion
  - RSI. *See* Rapid sequence intubation
  - RTD. *See* Returned to duty
  - Rule of Nines, 380, 381
  - Rule of Tens, 380, 391
- S**
- Saphenous vein cutdowns, 79
  - Sarin, 444
  - Scalp bleeding, 67–68
  - Scalp injuries, 216
  - Scopolamine, 89
  - Scrotal injuries, 286
  - SEB. *See* Staphylococcal enterotoxin B
  - Secondary blast injuries
    - description of, 7, 8
    - head injuries, 217–218
  - Sedatives, 88
  - Seizures
    - heatstroke and, 407
  - Self-aid, 20
  - Sepsis
    - antibiotic coverage, 125
    - blood transfusions and, 487–488
    - systemic sepsis, 123, 125
  - Septic shock, 82–83
  - Serum calcium, 135
  - Serum electrolyte management, 130
  - Serum magnesium, 134
  - Serum potassium, 132
  - SG. *See* Surgeon Generals
  - Shaped charges, 14, 15
  - Shock
    - cardiogenic, 74, 128
    - classification of, 73–75
    - Clinical Practice Guidelines, 83
    - compensated shock, 128–129
    - controlled hypotensive resuscitation, 78–79
    - critical care, 127–128
    - diagnosis of, 73–75
    - distributive, 74, 128
    - evacuation care, 535–536
    - fluid therapy, 76–77, 81–82
    - hemorrhagic, 76–78
    - hypotension and, 74
    - hypothermia and, 78–79
    - hypovolemic, 74, 75–76, 127–128
    - internal jugular venipuncture, 79–81
    - intraosseous infusion, 81–83
    - intravascular resuscitation fluids, 76–77
    - neurogenic, 75, 82, 318
    - obstructive, 128
    - saphenous vein cutdowns, 79
    - septic, 82–83
    - subclavian vein access, 79–81
    - tactical field care, 523–524
    - treatment of, 75–83
    - uncompensated shock, 127, 128
    - vascular access, 79–81
  - Shunts, 371–372
  - SIMV. *See* Synchronized intermittent mandatory ventilation
  - Skeletal traction, 339
  - Skull base injuries, 194–195
  - Skull flaps, 228–231
  - Skull fractures, 216–217
  - Small arms injuries, 11–13
  - Small bowel injuries, 269
  - Smallpox, 436, 437, 438, 441–442
  - Sniper rifles, 12
  - Soft-tissue infections, 120–121

## Emergency War Surgery

- Soft-tissue injuries
    - Clinical Practice Guidelines, 108
    - compartment syndrome, 106–108
    - crush syndrome, 104–105
    - facial, 183–186
    - fasciotomy technique, 107–108
    - presurgical care, 97
    - surgical wound management priorities, 97–98
    - therapy, 105–106
    - wound care, 98–103
    - wound management after initial surgery, 103–104
  - Soman, 444
  - Sonography
    - focused abdominal sonography for trauma, 257–259
  - Spermatic cord injuries, 286
  - Spinal column support, 313
  - Spinal injuries
    - anatomical considerations, 315–318
    - antimicrobial agent selection and duration, 117
    - bladder dysfunction and, 319
    - classification of, 311–312
    - Clinical Practice Guidelines, 319
    - decubitus ulcers and, 319
    - deep vein thrombosis and, 319
    - emergent surgery, 318
    - facial injuries and, 176
    - Gardner-Wells tongs, 315–317
    - gastrointestinal tract and, 319
    - halo use, 315
    - instability, 313–314
    - mechanical integrity of the vertebral column, 312–314
    - neurogenic shock, 318
    - pathophysiology of, 312
    - penetrating, 318
    - transport considerations, 314–315
  - Splenic injuries, 269
  - Splints
    - extremity fractures, 329
  - ST elevation myocardial infarction, 147–148
  - Staphylococcal enterotoxin B, 440
  - Static landmines, 10
  - STEMI. *See* ST elevation myocardial infarction
  - Sternotomies, 244–247
  - Stomach injuries, 264–265
  - Stress gastritis, 153
  - Stress ulcers
    - spinal injuries and, 319
  - Strokes, 151–153
  - Subacute mountain sickness, 420–421
  - Subclavian artery injuries, 359–360
  - Subclavian vein access, 79–81
  - Subconjunctival hemorrhage, 202
  - Subxiphoid pericardial window, 244
  - Succinylcholine, 87
  - Suicide-vest improvised explosive devices, 11
  - Sulfur mustard, 445
  - Sunburn, 414
  - Superficial femoral artery injuries, 363
  - Supraclavicular thoracotomies, 246, 247
  - Suprafascial hematoma, 290
  - Surgeon Generals, 500
  - Surgery. *See* Damage control surgery; *specific injury type*
  - Surgery debridement
    - burn care, 389
  - Surgical cricothyrotomy, 61–62
  - Surviving Sepsis Campaign, 123
  - Synchronized intermittent mandatory ventilation, 137–138
  - Syncope, heat-induced, 413
  - Systemic sepsis, 123, 125
- ## T
- T-2 mycotoxins, 440
  - Tabun, 444
  - TACEVAC. *See* Tactical evacuation care
  - Tactical combat casualty care
    - care under fire guidelines, 518
    - function of, 515–516
    - tactical evacuation care guidelines, 531–543
    - tactical field care guidelines, 519–530
  - Tactical evacuation care guidelines, 531–543
  - TBI. *See* Traumatic brain injury
  - TBSA. *See* Total body surface area
  - TCCC. *See* Tactical combat casualty care
  - Temporal bone injuries, 194–197
  - Temporary cavity injuries, 2, 4, 12
  - Temporary external fixation, 329
  - Tendon injuries, 347, 350
  - Tension pneumothorax
    - diagnosis of, 235, 237
    - positive pressure ventilation and, 57
    - treatment of, 237
  - Tertiary blast injuries, 7, 8
  - Testicular injuries, 286–287
  - Tetanus, 112, 119–120
  - Theater Medical Directors, 500
  - Theater of Operations, 499
  - Thermal burns, 430
    - from antitank landmines, 15–16
  - Thermal injuries, 10

- Thermal stress  
 aeromedical evacuation and, 44–45
- Thermobaric injuries, 9–10
- Thermoregulation, pediatric, 455–456
- Thickened agents, 448
- Thigh compartment syndrome, 494
- Third country nationals  
 triage considerations, 26–27
- Thoracic injuries  
 anatomical considerations, 236, 315, 317  
 antimicrobial agent selection and duration, 116  
 cardiac tamponade, 237–238  
 chest wall injuries, 253  
 Clinical Practice Guidelines, 254  
 damage control surgery, 172–173  
 diagnosis of, 236–238  
 diaphragm injuries, 252–253  
 esophageal injuries, 252  
 evaluation of, 236–238  
 flail chest, 238  
 heart injuries, 249, 250  
 lung injuries, 249–251  
 massive hemothorax, 237  
 open pneumothorax, 237, 238  
 surgical management, 239–253  
 tension pneumothorax, 235, 237  
 thoracotomies, 241–253  
 tracheobronchial tree injuries, 251  
 tube thoracostomy, 239–241  
 vascular, 248–249
- Thoracic spine injuries, 314–315
- Thoracoabdominal thoracotomies, 247–248
- Thoracotomies  
 damage control surgery, 172  
 median sternotomy, 244–247  
 resuscitative, 241–243  
 subxiphoid pericardial window, 244  
 supraclavicular, 246, 247  
 thoracoabdominal, 247–248  
 trap door, 247, 248  
 tube thoracotomies, 239–241
- Thrombectomy catheters, 371
- Thrombocytopenia  
 heparin-induced, 158–159  
 thrombotic thrombocytopenic purpura, 157–158
- Thromboembolic events  
 altitude-related, 420  
 venous thromboembolism, 152
- Thrombotic thrombocytopenic purpura, 157–158
- Tibia shaft fracture technique, 334–337
- Tibial artery injuries, 365–366
- Tidal volume, 137
- TMD. *See* Theater Medical Directors
- TNCs. *See* Trauma Nurse Coordinators
- Toe injuries, 353
- Torsion injuries  
 ovarian, 294–195
- Torso vascular injuries, 366–368
- Total body surface area, 380–382, 390
- Tourniquets, 66–67, 473, 518, 522, 535
- TOWs. *See* Tube-launched, optically tracked, wire-guided missiles
- Toxic fumes  
 from antitank landmines, 16
- Tracheal injuries, 192–193
- Tracheobronchial tree injuries, 251
- Tracheostomy, 192
- Traction, skeletal, 339
- Tractotomies, 250
- TRALI. *See* Transfusion-related acute lung injury
- Tranexamic acid, 523, 536
- Transfusion-related acute lung injury, 488–489
- Transfusions  
 ABO matching of blood products, 473, 476, 486  
 acidosis, 482–483  
 acute hemolytic transfusion reaction, 486–487  
 anaphylactoid transfusion reactions, 490  
 bacteremia, 487–488  
 blood products available by role, 473, 474–475  
 Clinical Practice Guidelines, 490  
 coagulopathy, 484–485  
 contaminated blood products, 487–488  
 damage control resuscitation principles, 480–482  
 early control of hemorrhage, 472–473  
 emergency collection of fresh whole blood in the field, 505–514  
 febrile nonhemolytic transfusion reaction, 488  
 hyperkalemia, 483  
 hypocalcemia, 484  
 hypothermia, 482, 483  
 importance of battlefield transfusions, 471–472  
 management of complications, 482–485  
 massive, 477–485  
 microvascular bleeding, 484  
 posttransfusion verification, 513  
 principles of, 480–482

- protocol, 479
  - reactions in the field, 485–490
  - Rh blood matching for female casualties, 477
  - sepsis, 487–488
  - transfusion-related acute lung injury, 488–489
  - treatment plan for transfusion reaction, 485–486
  - urticarial transfusion reactions, 489–490
  - Trap door thoracotomies, 247, 248
  - Trauma-induced coagulopathy, 484–485
  - Trauma Medical Directors, 500
  - Trauma Nurse Coordinators, 500–501
  - Trauma Registry, DoD
    - function of, 500, 553
    - methods, 555–557
    - minimum essential data, 555
    - resuscitation records, 556–560
    - situational awareness, 554–555
    - technology, 555–557
    - uses of, 555
  - Trauma systems. *See also* Joint Theater Trauma System
    - battlefield trauma system model, 499–501
    - Clinical Practice Guidelines, 504
    - description of, 499
    - Joint Trauma System, 502–504, 521
    - military trauma systems, 499
  - Traumatic brain injury, 151, 538. *See also* Brain injuries; Head injuries
  - Trench foot, 394–396
  - Triage
    - anatomical location of injuries and, 34
    - BICEPS mnemonic, 27–28
    - burns, 390
    - categories, 24–25
    - chemical contamination injuries, 446–447
    - Clinical Practice Guidelines, 39
    - decision-making, 31–32
    - delayed category, 24–25
    - emergent treatment area, 35–38
    - expectant area, 36, 38
    - expectant category, 25
    - external factors, 28–29
    - head injuries, 218–220
    - immediate category, 24
    - initial triage area, 32–34
    - internal factors, 29–31
    - management, 25–26
    - mass casualties and, 23–24
    - mechanism of injuries and, 33
    - minimal category, 25
    - nonemergent treatment area, 36, 38
    - ocular injuries, 199–200
    - operation of, 32–38
    - operation tips, 38–39
    - principle of, 23
    - radiological injuries, 428–429
    - resource constraints, 28–31
    - resuscitation stations, 37
    - setup, 32–38
    - special considerations, 26–28
    - staffing, 32–38
    - types of injuries and, 32
  - TTP. *See* Thrombotic thrombocytopenic purpura
  - Tube-launched, optically tracked, wire-guided missiles, 14
  - Tube thoracotomies, 239–241
  - Tularemia, 437, 440–442
  - Two-person mask ventilation, 56–57
  - TXA. *See* Tranexamic acid
- U**
- Ulcers
    - corneal, 205
    - decubitus, 319
    - stress, 319
  - Ulnar artery injuries, 361
  - Ultrasonography
    - focused abdominal sonography for trauma, 257–259
  - Uncompensated shock, 127, 128
  - Unexploded ordnances
    - injuries from, 16–18
    - triage considerations, 26
  - United Nations General Assembly, 547–549
  - Unstable angina, 149
  - UPAC. *See* Ohmeda Universal Portable Anesthesia Complete
  - Upper extremities
    - compartment syndrome, 492–494
    - vascular injuries, 359–361
  - Ureteral injuries, 280–283
  - Ureteroneocystostomy, 281–282
  - Ureteroureterostomy, 281–282
  - Urethral injuries, 284–286
  - Urethrography, retrograde, 284–285
  - Urinary tract injuries. *See* Genitourinary tract injuries
  - Urticarial transfusion reactions, 489–490
  - U.S. Air Force
    - aeromedical evacuation system, 45–49
  - US Army Institute of Surgical Research Burn Center, 391
  - U.S. Department of Defense. *See* Department of Defense Trauma Registry

- Uterine atony, 302–306  
 Uterine compression sutures, 303–304  
 Uterine injuries, 291  
 UXOs. *See* Unexploded ordnances
- V**
- Vacuum pack technique, 169–170  
 Vacuum wound closure system, 497  
 Vaginal hemorrhage, acute, 295–296  
 Vaginal injuries, 290–291  
 Vaporizers, 94  
 Vascular access  
   shock and, 79–81  
 Vascular injuries  
   anastomotic disruption, 374  
   angiography, 358–159  
   anticoagulation, 374  
   aorta, 366–367  
   autologous vein harvest and use, 373–374  
   axillary artery, 360  
   brachial artery, 360–361  
   carotid artery, 368–369  
   cervical vascular injury, 368–375  
   Clinical Practice Guidelines, 375  
   common femoral artery, 361–362  
   diagnosis of, 357–359  
   endovascular capability, 372–373  
   epidemiology of, 356  
   evaluation of, 357–359  
   facial injuries and, 176–177  
   Fogarty thrombectomy catheters, 371  
   hepatic artery, 367  
   history of, 355  
   iliac arteries, 368  
   inferior vena cava filters, 372–373  
   injury patterns, 355–356  
   jugular vein, 369–370  
   large veins, 370  
   ligation of vessels, 177, 370–371  
   lower extremities, 361–366  
   management of, 356–357  
   mesenteric arteries, 367–368  
   pediatric, 372  
   popliteal artery, 363–365  
   portal vein, 367  
   post-operative care, 374–375  
   profunda femoris artery, 362–363  
   prosthetic graft material use, 373  
   radial artery, 361  
   renal arteries, 368  
   roles of care, 356–357  
   shunts, 371–372  
   soft tissue coverage, 374  
   subclavian artery, 359–360  
   superficial femoral artery, 363  
   thoracic, 248–249  
   tibial artery, 365–366  
   torso, 366–368  
   ulnar artery, 361  
   upper extremities, 359–361  
   vena cava, 367  
   venous injury, 366  
   vertebral artery, 369  
 Vascular shunts, 371–372  
 Vecuronium, 87  
 VEE. *See* Venezuelan equine encephalitis  
 Vehicle-borne improvised explosive devices, 11  
 Vena cava filters, 372–373  
 Vena cava injuries, 367  
 Venezuelan equine encephalitis, 441–442  
 Venipuncture, Internal jugular, 79–81  
 Venous injuries, 366, 370  
 Venous thromboembolism, 145  
 Ventilation, 56–57, 137. *See also* Mechanical ventilation  
 Ventilator-associated pneumonia, 161–162  
 Ventilators, portable, 95–96  
 Ventricular fibrillation  
   hypothermia and, 401–402  
 Vertebral artery injuries, 190, 369  
 Vertebral column  
   mechanical integrity of, 312–314  
 Vertigo, 197  
 Vesicants, 445–446, 448  
 VHF. *See* Viral hemorrhagic fever  
*Vibrio cholerae*, 440–441  
 Vietnam War  
   casualties by weapon type, 2  
   vascular injuries during, 355  
 Viral agents, 441–442  
 Viral hemorrhagic fever, 436, 441–442  
 Vital signs  
   head injuries and, 218  
   pediatric, 453  
 Volutrauma, 137  
 Vulvar injuries, 289–290
- W**
- Walking blood banks, 479  
 War wounds. *See also specific type of injury*  
   anatomical distribution of primary penetrating wounds, 3  
   antipersonnel landmines, 10–11  
   armored vehicle crew casualties, 14–16  
   ballistic injuries, 6  
   blast injuries, 4–5, 7–9  
   epidemiology of injuries, 1–4  
   explosive injuries, 4–5, 7–9

## Emergency War Surgery

- inhalation injuries, 16
- mechanism of injury, 2, 4
- open joint injuries, 97–108
- projectile injuries, 2, 3, 6
- small arms injuries, 11–13
- soft-tissue injuries, 97–108
- thermal injuries, 10
- thermobaric injuries, 9–10
- unexploded ordnances, 16–18
- Weapons effects
  - antipersonnel landmines, 10–11
  - armored vehicle crew casualties, 14–16
  - ballistic injuries, 6
  - blast injuries, 4–5, 7–9
  - casualties by weapon type, 2
  - Clinical Practice Guidelines, 18
  - epidemiology of injuries, 1–4
  - explosive injuries, 4–5, 7–9
  - inhalation injuries, 16
  - mechanism of injury, 2, 4
  - projectile injuries, 2, 3, 6
  - small arms injuries, 11–13
  - thermal injuries, 10
  - thermobaric injuries, 9–10
  - unexploded ordnances, 16–18
- Websites
  - American Academy of Pediatrics Algorithm, 309
  - Clinical Practice Guidelines, 18, 22, 39, 53, 63, 71, 83, 96, 108, 126, 163, 173, 197, 234, 254, 273, 287, 310, 319, 328, 340, 346, 354, 375, 392, 425, 433, 442, 450, 461, 470, 490, 498, 504, 514
  - Neonatal Resuscitation Algorithm, 309
  - White phosphorus burns, 389–390
  - Whole blood, fresh
    - ABO matching, 476
    - emergency collection in the field, 505–514
    - posttransfusion verification, 513
    - rapid testing of, 512–513
    - role of care, 473, 474–475
  - WIA. *See* Wounded in action
  - World War II
    - casualties by weapon type in Bougainville Campaign, 2
    - vascular injuries during, 355
  - Wound Data and Munitions Effectiveness Team, 1
  - Wounded in action, 554
  - Wounds. *See* War wounds; *specific injury type*
- Y
  - Yersinia pestis*, 440–441