

ABBREVIATIONS AND ACRONYMS

A

ABC: *Acinetobacter baumannii-calcoaceticus* complex
ABC: airway, breathing, and circulation
ABC: assessment of blood consumption
AC: alternating current
ACCP: American College of Chest Physicians
ACH: Army community hospital
ACRM: Anesthesia Crisis Resource Management
ACS: abdominal compartment syndrome
ACS: acute compartment syndrome
ACTH: adrenocorticotropin
AE: aeromedical evacuation
AECC: Aeromedical Evacuation Co-ordination Centre
AFRICOM: African Command
AKI: acute kidney injury
ALI: acute lung injury
AMEDD C&S: Army Medical Department Center and School
AMPA: alpha-amino-3-hydroxyl-5-methyl-4-isoxazole-propionate
AMPLE: allergies, medication, pregnancy, last eaten
AMR: advanced medical retrieval
APP: abdominal perfusion pressure
APRV: airway pressure-release ventilation
ARDS: acute respiratory distress syndrome
APLS: Advanced Paediatric Life Support
APS: acute pain service
APTR: activated partial thromboplastin time ratio
ATC: acute trauma coagulopathy
ATICE: Adaptation to the Intensive Care Environment (instrument)
ATLS: Advanced Trauma Life Support
ATN: acute tubular necrosis
ATP: adenosine triphosphate
AW2: Army Wounded Warrior Program

B

BABT: behind-armor blunt trauma
BAS: battalion aid station
BATLS: Battlefield Advanced Trauma Life Support
BIPAP: biphasic positive airway pressure ventilation
BK: bradykinin
BPF: bronchopleural fistula
BVM: bag-valve masks

C

<C>ABC: catastrophic hemorrhage, airway, breathing, and circulation
CASEVAC: casualty evacuation
CASF: contingency aeromedical staging facility
CAT: combat application tourniquet
CBF: cerebral blood flow
CBRN: chemical, biological, radiological, or nuclear
CC: combat casualty
CCAT: critical care air transport
CCAST: critical care air support team
CCPG: Canadian clinical practice guideline
CCR: Canadian C-Spine Rule
CENTCOM: Central Command
CMRO₂: cerebral metabolic rate of oxygen
CO: cardiac output
CONUS: continental United States
COTS: coagulopathy of trauma shock
COX: cyclooxygenase
CPAP: continuous level of positive airway pressure

CPG: clinical practice guideline
CPK: creatine phosphokinase
CPNB: continuous peripheral nerve block
CPP: cerebral perfusion pressure
CPR: cardiopulmonary resuscitation
CRM: Crew Resource Management
CRRT: continuous renal replacement therapy
CSH: combat support hospital
CSI: cervical spine injury
CT: clotting time
CT: component therapy
CT: computed tomography
CVC: central venous catheter
CVP: central venous pressure
CVVH: CRRT with a veno-venous technique of hemofiltration
CXR: chest x-ray

D

DLEBT: double-lumen endobronchial tube
DCR: damage control resuscitation
DLT: double-lumen endobronchial tube
DMS: Defence Medical Services (United Kingdom)
DNBI: disease non-battle-injury
DoA: depth of anesthesia
DPL: diagnostic peritoneal lavage
DR: disaster relief
DVPRS: Defense and Veterans Pain Rating Scale
DVT: deep venous thrombosis

E

EAST: Eastern Association for the Surgery of Trauma
ECCN: en-route critical care nurse
ECG: electrocardiogram
ECMO: extracorporeal membrane oxygenation
ED: emergency department
EDOCS: expeditionary deployable oxygen concentrator system
EMT-B: emergency medical technician-basic
EN: enteral nutrition
ESBL: extended spectrum β -lactamase
ESPEN: European Society for Parenteral and Enteral Nutrition
ETCO₂: elevated end-tidal carbon dioxide
ETT: endotracheal tube
EUCOM: European Command

F

F: French gauge
FiO₂: fraction of inspired oxygen
FAST: focused assessment with sonography for trauma
FFP: fresh frozen plasma
Fr: French gauge
FRC: functional residual capacity
FST: forward surgical team
FW: fixed wing
FWB: fresh whole blood

G

G: gauge
Ga: gauge
GABA: γ -aminobutyric acid
GAWS: Guardian Angel Weapon System
GCOs: Clinical Guidelines for Operations
GCS: Glasgow coma scale

G6PD: glucose-6-phosphate dehydrogenase

H

HA: humanitarian assistance
HbCO: carbon monoxide hemoglobin
HD: hemodialysis
HELLP: hemolysis, elevated liver enzymes, and low platelets (syndrome)
HEMS: Helicopter Emergency Medical System
HFOV: high-frequency oscillatory ventilation
HFV: high-frequency ventilation
HIV: human immunodeficiency virus
HMAP: high mean arterial pressure
HR: heart rate

I

IAP: intraabdominal pressure
ICO: infection control officer
ICP: intracranial pressure
ICU: intensive care unit
ID: internal diameter
IED: improvised explosive device
IJV: internal jugular
iLA: interventional lung assistance
ILV: independent lung ventilation
IM: intramuscular
IMV: intermittent mandatory ventilation
IN: intranasal
INR: international normalized ratio
IO: intraosseous
IOP: intraocular pressure
IPPV: intermittent positive-pressure ventilation
IRI: ischemia-reperfusion injury
IRT: immediate response team
ISO: International Organization for Standardization
ISS: injury severity score
IV: intravenous
IVC: inferior vena cava
IVCF: inferior vena cava filter

J

JTTR: Joint Theater Trauma Registry

L

LAST: local anesthetic systemic toxicity
LMA: laryngeal mask airway
LMAP: lower mean arterial pressure
LMWH: low molecular weight heparin
LOP: limb occlusion pressure
LRMC: Landstuhl Regional Medical Center
LSI: life-saving intervention
LTP: long-term potentiation

M

MAC: minimum alveolar concentration
MAP: mean arterial pressure
MASF: mobile aeromedical staging facilities
MCF: maximum clot firmness
MDCT: multidetector row spiral computed tomography
MDR: multidrug-resistant
MEAC: minimum effective analgesic concentration
MEDCEN: military medical center
MEDCOM: US Army Medical Command
MEDEVAC: medical evacuation
MERT: medical emergency response team

MERT(E): medical emergency response team (enhanced)
MH: malignant hyperthermia
MILS: manual inline stabilization
MIST-AT: mechanism of injury, injuries sustained, symptoms and signs, treatment given—age (adult/child) and time of injury
MHS: Military Health System
MODS: multiorgan dysfunction syndrome
MRAP: mine-resistant ambush-protected
MRI: magnetic resonance imaging
MRSA: methicillin-resistant *Staphylococcus aureus*
MRSN: Multidrug Resistant Organism Repository and Surveillance Network
MTF: medical treatment facility
MTP: massive transfusion protocol

N

NAPQI: *N*-acetyl-*p*-benzoquinone imine
NASA: National Aeronautics and Space Administration
NBI: nonbattle injury
NEXUS: National Emergency X-Radiography Utilization Study
NGF: nerve growth factor
NGO: nongovernmental organization
NHS: National Health Service (United Kingdom)
NK₁: neurokinin-1
NMBA: neuromuscular blocking agent
NMDA: *N*-methyl-*D*-aspartate
NMS: neuroleptic malignant syndrome
NS: normal saline
NSAID: nonsteroidal antiinflammatory drugs

O

OEF: Operation Enduring Freedom
OI: oxygenation index
OIF: Operation Iraqi Freedom
OL-ILV: one-lung independent ventilation
OR: operating room
OSCAR: High Frequency Oscillation in ARDS (trial)
OSCILLATE: Oscillation for Acute Respiratory Distress Syndrome Treated Early (trial)
OTFC: oral transmucosal fentanyl citrate

P

PACCOM: Pacific Command
PAG: periaqueductal grey
PCA: patient-controlled analgesia
PCR: polymerase chain reaction
PD: peritoneal dialysis
PE: pulmonary embolism
PECC: patient evacuation coordination center
PEEP: positive end-expiratory pressure
PetCO₂: partial pressure of end-tidal carbon dioxide
PG: propylene glycol
PICU: pediatric intensive care unit
PiO₂: partial pressure of the inspired oxygen
PIS: propofol infusion syndrome
PLT: platelets
PMI: patient movement item
PMRC: patient movement requirement center
PN: parenteral nutrition
PO: per os
POGS: portable oxygen generator system
PP: pulse pressures
PPE: personal protective equipment
Ppl: plateau pressure
PPV: positive pressure ventilation
PRBC: packed red blood cells

PRIS: propofol infusion syndrome
PTSD: posttraumatic stress disorder

Q

QEHB: Queen Elizabeth Hospital Birmingham

R

RA: regional anesthesia
RAAS: rennin-angiotensin-aldosterone system
RAF: Royal Air Force
RAP: regimental aid post
RASS: Richmond Agitation-Sedation Scale
RBC: red blood cell
RCC: red cell concentrate
RCDM: Royal Centre for Defence Medicine
RCT: randomized controlled trial
REBOA: resuscitative endovascular balloon of the aorta
rFVIIa: recombinant factor VIIa
RIFLE: risk, injury, failure, loss, and end-stage disease
ROSC: return of spontaneous circulation
RSI: rapid sequence induction
RTD: return-to-duty
RRT: renal replacement therapy
RSI: rapid-sequence induction
RW: rotary wing

S

SAVe: simplified automated ventilator
SCCM: Society of Critical Care Medicine
SCD: sequential compression device
SCM: sternocleidomastoid muscle
SCV: subclavian
ScvO₂: central venous oxygen saturation
SI: sacroiliac
SIB: self-inflating bag
SIMV/PS: synchronized intermittent mandatory ventilation with pressure support
SIRS: systemic inflammatory response syndrome
SO: standard operating instruction
SOP: standard operating procedures
SOUTHCOM: Southern Command
STRATEVAC: strategic evacuation
SVC: superior vena cava
SVR: systemic vascular resistance

T

TACEVAC: tactical evacuation
TARGIT: Triservice Research Group Initiative on TIVA
TBI: traumatic brain injury
TBSA: total burned surface area
TCCC: Tactical Combat Casualty Care
TCI: target-controlled infusion
TCRA: traumatic cardiorespiratory arrest
TD: tracheal disruption
TENS: toxic epidermal necrolysis syndrome
TIC: toxic industrial chemicals
TIVA: total intravenous anesthesia
TL-ILV: two-lung independent lung ventilation
TLR4: toll-like receptor 4
TRPV: transient receptor potential vallinoid
TTE: transthoracic echocardiogram
TTP: tactic, technique, or procedure
TRALI: transfusion-related acute lung injury
TrkA: tyrosine kinase A
TSAA: Triservice Anaesthetic Apparatus
TST: tuberculin skin testing

U

UFH: unfractionated heparin
UK: United Kingdom
UN: United Nations
US: ultrasound
USAF: US Air Force
USAISR: US Army Institute of Surgical Research

V

VA: Veterans Affairs (Department)
VAP: ventilator-associated pneumonia
VAS: visual analog scale
VDC: volts direct current
VGA: volatile gas anesthesia
VILI: ventilator-induced lung injury
VITRIS: Vasopressin in Refractory Traumatic Hemorrhagic Shock (study)
VRE: vancomycin-resistant *Escherichia coli*
VRS: verbal rating score
Vt: tidal volume
VTE: venous thromboembolism

W

WFWB: warm fresh whole blood
WHO: World Health Organization
WRAIR: Walter Reed Army Institute of Research
WWR: Wounded Warrior Regiment

INDEX

A

- ABC score. *See* Assessment of Blood Consumption score
<C>ABCDE guidelines, 286–287
- Abdominal compartment syndrome, 14–15, 298–299
- Abdominal injuries
 combat casualties, 8
 enteral feeding after surgery, 375–377
 multimodal analgesia, 207–208, 210
 penetrating, 210
- Acalculous cholecystitis, 343
- Acetaminophen, 223–225
- Acidosis
 combat casualties and, 4
 damage control resuscitation and, 90
 massive transfusion and, 98–99
- ACTH. *See* Adrenocorticotropic
- Acute kidney injury
 early management of, 14
 etiology of, 322
 incidence of, 322
 indications for renal support, 322–323
 management options, 323–324
 medical therapy for, 324
 outcomes, 324
 prevention of, 322
 “RIFLE” classification, 322–323
- Acute lung injury
 blast lung, 291
 critical care, 291–292
 infection prevention and control, 292
 management of, 136–137
 nutrition, 292
 pediatric trauma patients, 410
 pulmonary contusion, 291
 sedation, 292
 ventilation strategies, 111, 291–292
- Acute pain
 basic concepts, 194
 descending modulatory pathways, 196
 dorsal horn, 195–196
 pain matrix, 196–197
 pain mechanisms, 194–197
 pain perception in higher centers, 196–197
 pain transmission, 195–196
 peripheral nociceptors, 194
 role of the glia, 196
 transient receptor potential vallinoid channel subtypes, 195
 WHO pain ladder, 207
- Acute pain service
 clinical practice guideline, 263–264
 deployed acute pain service responsibilities, 262
 enabling change, 265
 governance, 262
 multidisciplinary team, 262–263
 pain education, 264
 predeployment training, 264
 role 3 facilities, 278–279
 specialist interest group responsibilities, 262
 standard operating instruction, 263–264
 team rounds and meetings, 265
 team training, 264
- Acute respiratory distress syndrome
 critical care, 291
 etiology of, 12
 management of, 12, 136–137
 pediatric trauma patients, 410
 ventilation strategies, 111
- Acute thermal injury, 164–165
- Acute trauma coagulopathy, 87
- Acute tubular necrosis, 322
- Adaptation to the Intensive Care Environment, 361
- Adrenal crisis, 335
- Adrenocorticotropic, 200
- Adult Advanced Life Support algorithm, 553
- Advanced Life Support algorithm
 adult, 553
 pediatric, 554
- Advanced medical retrieval, 48
- Aeromedical Evacuation Patient Record*, 397
- Aeromedical team, deployed, 263
- Aeromedical transport
 capabilities and responsibilities, 394, 396
 combat casualties and, 5–7
 documentation, 397–398
 fixed wing operations, 397
 history of, 392–393
 operations, 394–398
 patient movement concepts, 393–394
 patient movement items, 398
 patient movement requirement centers, 396
 preflight patient considerations, 395
 research, 398
 resupply items, 398
 rotary wing operations, 397
 tasking, 396–397
 team composition, 394
 for tracheal disruption and bronchopleural fistula, 316–317
 training, 398
- Afghanistan
 weight estimation for local national children, 471
- AFOI. *See* Awake fiberoptic intubation
- Aged. *See* Elderly populations
- Air Force pararescue, 47–48
- Air Rescue Service, 47
- Air transport. *See* Aeromedical transport
- Airway burns, 516
- Airway management
 acute management of asthma exacerbation algorithm, 406–407
 airway bleeding and, 77–78
 airway devices, 77–78
 airway equipment, 404–406, 470
 anesthetic considerations, 77–79
 blind nasal intubation, 79
 cervical spine injuries and, 122–123
 critical care, 296
 direct laryngoscopy, 78
 equipment for pediatric trauma patients, 404–406
 evidence for current practice, 76–77
 facial distortion and, 77–78
 facial injury and, 76
 fiberoptic intubation, 79
 following chemical, biological, radiological, and nuclear exposure, 512–516
 guidelines and techniques in the deployed setting, 79–80
 intrathoracic airway injuries, 134–135
 patient positioning, 77–78
 pediatric anesthesia, 470, 473, 477–478
 penetrating airway injury and, 77, 80
 penetrating neck injury and, 76–77
 pitfalls of, 81
 rapid sequence induction, 79

- surgical considerations, 79
 - team considerations, 79
 - Airway trauma, 10
 - ALI. *See* Acute lung injury
 - α_2 -Adrenergic agonists, 224–225
 - AmbIT Military PCA Pump, 231
 - American College of Surgeons' Advanced Trauma Life Support, 555
 - Amniotic fluid embolism, 499
 - "AMPLE" history, 109
 - Amputations
 - bilateral above-knee, 35–37
 - considerations, 150
 - rapid sequence induction and, 51
 - AMR. *See* Advanced medical retrieval
 - Analgesia
 - α_2 -adrenergic agonists, 224
 - abdominal injuries, 207–208, 210
 - acetaminophen, 223–224
 - advanced techniques, 206–207
 - anticonvulsants, 224
 - basics of, 206
 - compartment syndrome, 208–209
 - complex injuries, 209
 - current military practice, 271–272
 - frequency of intravenous and oral analgesic administration, 279
 - ideal battlefield analgesic, 268
 - inhalational analgesia, 270
 - injuries to local nationals, 209–210
 - isolated forearm gunshot wound, 210
 - isolated lower limb injury, 207
 - isolated upper limb injury, 207
 - ketamine, 270–271
 - multimodal applications, 206–210
 - N*-methyl-D-aspartate receptor antagonists, 222–223
 - narcotics, 269
 - nonopioid analgesics, 222–225
 - nonsteroidal antiinflammatory drugs, 223, 269–270
 - patient-controlled analgesia, 206, 221–222, 416
 - pediatric patients, 416, 474, 481–482
 - penetrating abdominal injuries, 210
 - prehospital medicine, 268–272
 - simple or single injuries, 207–209
 - thoracic injuries, 140, 208
 - treatment facilities, 209–210
 - Anaphylaxis, 333, 335
 - Anemia
 - obstetric considerations, 495
 - Anesthesia. *See also* Sedation
 - access to vascular space, 49
 - acute lung injury, 292
 - airway management, 77–79
 - arterial access, 68–69
 - burn injuries, 169–170
 - catheter and cannula sizes, 64
 - clinical management, 60–61
 - combat casualties and, 17
 - conscious sedation, 185–186
 - considerations for, 35–38
 - for critically injured military patients, 569
 - damage control philosophy, 61
 - decision-making, 60
 - the deployed military anesthesia system, 61
 - direct atrial cannulation, 68
 - elderly populations, 486–490
 - equipment, 528–544
 - extremity, junctional, and pelvic injury surgical procedures, 148
 - following chemical, biological, radiological, and nuclear exposure, 506–521
 - head trauma and, 127
 - human factors in, 32–34
 - humanitarian operations, 448–457
 - imaging management, 177
 - intraosseous access, 67–68
 - local anesthetics, 224–225, 235–236
 - monitoring depth of, 187
 - neuraxial anesthesia, 185
 - obstetric, 492–502
 - pediatric, 470–482
 - pediatric trauma patient handoff checklist, 405
 - percutaneous central venous access, 64–67
 - peripheral venous cutdown, 68
 - physics of flow, 64
 - post-anesthesia care of vascular access devices, 69
 - regional, 148, 179, 185, 242–244
 - for stable casualties, 184–187
 - stages of a complex military anesthetic, 61
 - target-controlled infusions, 186–187
 - thoracic injuries, 139
 - total intravenous anesthesia, 186–187
 - training, 61–62
 - ultrasound imaging and, 179
 - venous access, 179
 - volatile gas anesthesia, 185
 - Antenatal care, 496
 - Antibiotics
 - infection management, 387–388
 - sepsis management, 387–388
 - Anticoagulation
 - Factor VIIa effects, 352–353
 - hemostatic agents, 17
 - massive transfusion effects, 352–353
 - prevention of venous thromboembolism, 353–356
 - tranexamic acid effects, 352–353
 - Anticonvulsants, 224–225
 - Antifibrinolytics, 91
 - Aortic injuries, 136
 - Aortocaval compression, 496
 - APS. *See* Acute pain service
 - ARDS. *See* Acute respiratory distress syndrome
 - Arterial access, 68–69
 - Assessment of Blood Consumption score, 97
 - Asthma
 - acute management exacerbation algorithm, 406–407
 - ATC. *See* Acute trauma coagulopathy
 - Atelectasis, 344
 - ATICE. *See* Adaptation to the Intensive Care Environment
 - ATLS. *See* American College of Surgeons' Advanced Trauma Life Support
 - ATN. *See* Acute tubular necrosis
 - Atrial cannulation, 68
 - Atropine overdose, 518
 - Awake fiberoptic intubation, 79
- ## B
- BABT, 135
 - Back pain. *See also* Spinal injuries
 - disc lesions, 252
 - etiology of, 248–249, 251
 - facet joint pain, 250, 252
 - mechanical, 248, 250

- motions associated with lumbar facet joint strain, 252
 - musculature of the back, 250
 - myofascial pain, 250
 - nerve root compromise, 253
 - nerve root pathology, 249
 - nonspecific, 248, 250
 - sacroiliac joint pain, 250, 252
 - spinal stenosis, 253
 - treatment options, 255–256
 - Base deficit correction, 112
 - BATLS. *See* Battlefield Advanced Trauma Life Support
 - Battlefield Advanced Trauma Life Support, 139, 286–287, 555
 - Belmont Rapid Infuser FMS 2000, 542–543
 - Benzodiazepines, 361
 - Bilateral above-knee amputations, 35–37
 - Biofilms
 - infection and, 383–384
 - Biological exposure. *See* Chemical, biological, radiological, and nuclear exposure
 - Blast lung, 291
 - Blind nasal intubation, 79
 - Blister agents, 514
 - Blood pressure maintenance, 297
 - Blood product administration, 54
 - Bone fractures
 - fixation of, 114
 - general anesthesia for internal fixation of fractured femur neck, 489
 - pelvic, 150–151
 - Bowel damage control, 300
 - Brain injury, traumatic. *See* Traumatic brain injury
 - Braun Perfusor Compact S, 543–544
 - Braun Perfusor pump, 232, 237
 - Breathing management
 - critical care, 296–297
 - following chemical, biological, radiological, and nuclear exposure, 516–517
 - pediatric anesthesia, 473–474, 478–479
 - Brief Pain Inventory, 215
 - Bronchopleural fistula
 - aeromedical evacuation, 316–317
 - diagnosis of, 316
 - postoperative care, 316–317
 - preventing further injury, 316–317
 - ventilation considerations, 316–317
 - ventilator settings, 316–317
 - Buddy-buddy system, 43
 - Burn injuries
 - acute thermal injury, 164–165
 - airway burns, 516
 - airway management, 422
 - breathing management, 422–423
 - chemical burns, 518
 - circulatory evaluation, 168, 423
 - electrical injuries, 171
 - excision, 166
 - grafting, 166
 - infusions, 168–169
 - intraoperative anesthetic management, 169–170
 - intravenous fluid resuscitation formulas, 165
 - Lund-Browder charts, 422
 - neurologic evaluation, 168
 - nonsurgical care, 165–166
 - nonthermal skin diseases, 171
 - nutritional considerations, 168–169
 - operating room set-up, 166–167
 - patient evaluation, 167–169
 - pediatric patients, 478
 - postoperative care, 170
 - procedures outside the operating room, 170–171
 - pulmonary evaluation, 168
 - rule of nines, 422
 - vascular access, 168
- ## C
- <C>ABCDE guidelines, 286–287
 - Calcium management
 - damage control resuscitation and, 90
 - massive transfusion and, 97–98
 - Camp Bastion protocol, 242–244
 - Canadian C-Spine Rule, 123–124
 - Canadian clinical practice guidelines, 372–373, 375
 - Cannula cricothyroidotomy, 478
 - Cannula sizes, 64
 - Capnometry, 557
 - Carbohydrate metabolism
 - pain response and, 201
 - Carbon monoxide poisoning, 519
 - Cardiac arrest resuscitation, 552, 556–557
 - Cardiac injuries, 135–136, 178
 - Cardiac tamponade, 336
 - Cardiogenic shock, 10, 332–333
 - Cardiorespiratory arrest resuscitation, 556–557
 - Cardiovascular disease
 - elderly populations and, 486–487
 - obstetric considerations, 494–495
 - Cardiovascular injuries
 - cardiogenic shock, 10
 - combat casualties and, 8–10
 - hemorrhagic shock, 8–9
 - neurogenic shock, 10
 - obstructive shock, 10
 - traumatic shock, 8–9
 - Cardiovascular system
 - pain response, 202
 - volume status, 289–291
 - CASEVAC. *See* Casualty evacuation
 - Casualties. *See* Combat casualties
 - Casualty evacuation, 5–7, 46, 393
 - Catheter sizes, 64
 - Catheter techniques, 547
 - CATs. *See* Combat application tourniquets
 - Cauda equina syndrome, 253
 - Caudal anesthesia
 - for pediatric patients, 482
 - CBF. *See* Cerebral blood flow
 - CCASTs. *See* Critical Care Air Support Teams
 - CCATs. *See* Critical Care Air Transport Teams
 - CCPG. *See* Canadian clinical practice guidelines
 - CCR. *See* Canadian C-Spine Rule
 - CCs. *See* Combat casualties
 - Central venous access. *See* Percutaneous central venous access
 - Central venous pressure, 111–112
 - Cerebral blood flow, 125, 127
 - Cerebral metabolic rate of oxygen, 126–127
 - Cerebral perfusion pressure, 12–13, 125–126, 365, 417
 - Cervical myelopathy, 254
 - Cervical radiculopathy, 254
 - Cervical spine injuries
 - airway management, 122–123
 - Canadian C-Spine Rule, 123–124
 - epidemiology, 122
 - injury patterns, 122

- radiologic assessment, 110, 123–124
- steroids and, 124
- CGOs. *See* Clinical Guidelines for Operations
- Chemical, biological, radiological, and nuclear exposure
 - airway burns, 516
 - airway issues, 512–516
 - antidotes, 521
 - biological casualties, 516, 518–519
 - breathing issues, 516–517
 - chemical casualties, 517–518
 - circulation issues, 517–518
 - cyanides, 515–516
 - decontamination, 508, 510
 - direct-acting agents, 516–517
 - drug contraindications, hazards, and interactions, 520–521
 - emergency response, 506–512
 - hot-zone treatment, 510–512
 - incident management, 506
 - indirect-acting agents, 517
 - inhalational injuries, 515
 - initial investigations for casualties, 508
 - medical hazardous materials site plan, 507
 - nerve agents, 513–514, 517–519
 - neurological issues, 518–520
 - personal protective equipment, 507–508
 - pulmonary agents, 514–515
 - “Quick Look” assessment, 507, 509
 - radiological casualties, 516, 518, 519
 - recognizing incidents, 506–507
 - riot control agents, 515–516
 - triage, 510–512
 - vesicants, 514
- Chest compressions, 557
- Chest trauma
 - chest wall trauma, 10–11
 - pediatric patients, 402–403
- Children. *See* Pediatric trauma
- Choking agents, 514–515
- Cholecystitis, acalculous, 343
- Chronic pain
 - ascending pain pathways, 247
 - back pain, 248–253, 255–256
 - classification of, 246–248
 - definition of, 246–248
 - descending modulation, 247
 - interventional procedures, 256
 - neck pain, 253–256
 - neuropathic pain, 246
 - treatment options, 255–256
- Circulation management
 - critical care, 297–299
 - following chemical, biological, radiological, and nuclear exposure, 517–518
 - pediatric trauma, 474, 479
- Clinical Guidelines for Operations, 555
- Clinical practice guideline
 - acute pain service, 263–264
- Clonidine, 364
- CMRO₂. *See* Cerebral metabolic rate of oxygen
- Coagulopathy
 - combat casualties and, 4
 - dilutional, 99
- Coagulopathy of trauma shock. *See also* Shock
 - Camp Bastion protocol, 242–244
 - determining when to use regional anesthesia, 242
- Combat application tourniquets, 145
- Combat casualties
 - abdominal trauma, 8
 - aeromedical transport, 5–7
 - anesthesia and, 17
 - cardiovascular injuries, 8–10
 - care under fire, 5
 - damage control resuscitation, 7
 - extremity injuries and wounds, 8
 - golden hour concept, 4–7
 - hematologic injuries, 16–17
 - hepatic injuries, 15–16
 - improvised explosive devices injuries, 4
 - lethal triad, 4
 - management at role 2 and 3 facilities, 7–8
 - management of stable casualties, 182–188
 - neurologic injuries, 12–13
 - outcomes tracking and research, 276–280
 - physiology of, 4
 - pulmonary injuries, 10–12
 - renal injuries, 13–15
 - roles of care, 5–7
 - tactical combat casualty care, 4–5
 - tactical damage control surgery, 7–8
 - tactical field care, 5
 - thoracic trauma, 8
 - traumatic brain injuries, 7
- Combat casualty care, 43
- Combat support hospitals, 97
- Command representation, 263
- Compartment syndrome
 - abdominal compartment syndrome, 14–15, 298–299
 - early management of, 14, 298–299
 - extremity compartment syndrome, 7
 - multimodal analgesia, 208–209
 - risk factors, 7
- Component therapy, 101, 103–104
- Computed tomography imaging
 - cervical spine injuries, 110, 124
 - head trauma, 124–125
 - initial trauma assessment, 176–177
- Concurrent resuscitation, 49
- Conscious sedation, 185–186
- Continuing Promise mission, 449–450
- Continuous peripheral nerve block
 - benefits of, 235
 - complications, 235–236
 - contraindications, 235
 - daily rounding considerations, 237–238
 - drugs, 237
 - indications, 235
 - infusion settings, 237
 - isolated upper limb injuries, 207
 - for multiple extremity injuries, 235
 - nursing guidelines, 238
 - securing the catheter, 237
 - when to initiate, 236–237
- Continuous renal replacement therapy, 323
- COTS. *See* Coagulopathy of trauma shock
- COX. *See* Cyclooxygenase
- CPG. *See* Clinical practice guideline
- CPNB. *See* Continuous peripheral nerve block
- CPP. *See* Cerebral perfusion pressure
- Crew Resource Management, 32–33, 61
- Cricothyroidotomy, 478
- Critical care
 - acute lung injury, 291–292
 - adequacy of resuscitation, 288–289
 - admission history, 286

- airway management, 296
 - anesthetic considerations for critically injured military patients, 569
 - breathing management, 296–297
 - burn injuries, 164–171
 - circulation management, 297–299
 - compartment syndromes, 298–299
 - drug administration, 300
 - environment considerations, 299–300
 - ethical issues, 460–467
 - fluid administration complications, 297–298
 - gastric protection, 300
 - gut damage control, 300
 - hematology, 288
 - hemodynamic considerations, 288–291
 - imaging, 288, 300
 - intravascular lines, 300
 - maintaining blood pressure, 297
 - management plans, 288
 - management problems following damage control surgery, 293
 - patient discharge, 293
 - patient transfer, 300
 - pediatrics, 402–424
 - physical examination, 286
 - positioning, 300
 - receiving patients, 286–293
 - record-keeping, 299–300
 - regional techniques, 300
 - topical negative pressure dressings, 300
 - traumatic brain injury, 299
 - venous thromboembolism prophylaxis, 300
 - volume status of cardiovascular system, 289–291
 - Critical care, perioperative and interoperative adjuncts in trauma resuscitation, 114–115
 - admission to intensive care unit, 114–115
 - airway assessment, 108–110
 - the “AMPLE” history, 109
 - assessment regime, 108–112
 - base deficit correction, 112
 - circulation, 111
 - clearance of cervical spine, 110
 - conditions requiring rapid sequence induction of anesthesia, 110
 - early enteral nutrition, 115
 - early intensive care requirements for the severely injured, 109
 - end points in resuscitation, 113
 - fluids in trauma resuscitation, 114
 - fracture fixation, 114
 - hypotensive resuscitation, 113–114
 - immediate requirements and decision points in treating the severely injured, 109
 - infection care bundles, 115
 - initial management, 108
 - inotropic agents, 114
 - lactate correction, 112
 - patient history, 108
 - vascular volume status, 111–112
 - vasoactive agents, 114
 - ventilation, 110–111
 - Critical Care Air Support Teams, 392, 394–398
 - Critical Care Air Transport Teams, 6–7, 392–398
 - CRM. *See* Crew Resource Management
 - CRRT. *See* Continuous renal replacement therapy
 - Crystalloids, 88, 89, 114
 - CSHs. *See* Combat support hospitals
 - CSIs. *See* Cervical spine injuries
 - CT. *See* Component therapy
 - CT imaging. *See* Computed tomography imaging
 - CVP. *See* Central venous pressure
 - CVVH. *See* Veno-venous technique of hemofiltration
 - Cyanide antidotes, 521
 - Cyanide poisoning, 515–516
 - Cyclooxygenase, 223
- ## D
- Damage control resuscitation
 - acidosis, 90
 - antifibrinolytics, 91
 - calcium management, 90
 - damage control surgery, 37–38, 88, 293
 - end points of, 91–92
 - evolution of military trauma care, 86–87
 - fluids, 38, 88, 89
 - hematologic injuries, 16–17
 - hemostatic resuscitation, 88–89
 - hypothermia, 90–91
 - managing the physiology, 89–91
 - medical adjuncts, 91
 - pathophysiology, 87
 - permissive hypotension, 54, 88
 - point-of-care testing, 89
 - point of wounding, 87
 - potassium management, 90
 - principles of, 87–89
 - recombinant activated factor VII, 91
 - at role 2 and 3 facilities, 7
 - specialist retrieval teams, 88
 - Damage control surgery, 37–38, 88, 293
 - DCR. *See* Damage control resuscitation
 - Debridement, 150
 - Decontamination, 508, 510
 - Deep peripheral nerve block, 243–244
 - Deep venous thrombosis, 352–355
 - Defence Medical Rehabilitation Centre, 570
 - Defense and Veterans Pain Rating Scale, 278
 - Deontology, 460
 - Deployed aeromedical team, 263
 - Deployed pain service
 - clinical practice guideline, 263–264
 - deployed acute pain service responsibilities, 262
 - enabling change, 265
 - governance, 262
 - multidisciplinary team, 262–263
 - pain education, 264
 - predeployment training, 264
 - specialist interest group responsibilities, 262
 - standard operating instruction, 263–264
 - team rounds and meetings, 265
 - team training, 264
 - DeVilbiss Oxygen Concentrator, 536
 - Dexmedetomidine, 362, 364
 - Dilutional coagulopathy, 99
 - Direct atrial cannulation, 68
 - Direct laryngoscopy, 78
 - Disaster relief, 448, 449
 - Disease non-battle-injuries, 182
 - Distributive shock, 333–335
 - DLEBT. *See* Double-lumen endobronchial tube
 - DLT. *See* Double-lumen endobronchial tube
 - DNBI. *See* Disease non-battle-injuries
 - Dorsal horn, 195–196
 - Double-lumen endobronchial tube, 139–140, 307
 - Dräger Fabius Tiro M, 532–533

Dräger Narkomed M, 533–536
Dräger Vamos, 538
Draw-over systems, 528–532
Drug fever, 342–343
Dustoff units, 46–47
DVPRS. *See* Defense and Veterans Pain Rating Scale
DVT. *See* Deep venous thrombosis

E

EAST. *See* Eastern Association for the Surgery of Trauma guidelines

Eastern Association for the Surgery of Trauma guidelines, 354

ECCNs. *See* En-route critical care nurses

ECGs. *See* Electrocardiograms

Eclampsia, 498

ECMO. *See* Extracorporeal membrane oxygenation

Elderly populations

anesthesia, 488–489

cardiovascular disease, 486–487

considerations for deployed military teams, 489

general anesthesia for internal fixation of fractured femur neck, 489

medications, 487–488

operational factors, 488, 490

physiology of old age, 486–487

preoperative assessment, 486

preoperative clinical investigations, 487

renal disease, 487

respiratory disease, 487

Electrical injuries, 171

Electrical nerve stimulator, 546

Electrocardiograms, 135, 556

Electrolytes

postoperative maintenance for pediatric trauma patients, 412

En-route critical care nurses, 47–48

End-tidal CO₂

methods for measuring, 53

tourniquet effects, 157–158

Endotracheal intubation

estimation of tube size and length in children, 471

pediatric trauma patients, 477

Enteral nutrition

after abdominal surgery, 375

after temporary abdominal closure, 376–377

continuation during repeat operations, 377

early initiation of, 115

guidelines for initiating and advancing continuous feeding, 414

immunonutrition, 374–375

pediatric trauma patients, 414

postpyloric feeding, 375–376

routes of, 373–374

surgical access to the gastrointestinal tract, 376

types of, 374

Entonox, 496

Epidural analgesia

benefits of, 233

complications, 233

contraindications, 232–233

daily rounding considerations, 234

drugs, 234

epidural equipment changes, 234

indications, 232

infusion settings, 234

nursing guidelines, 234

obstetric anesthesia, 496–497

pumps, 234

securing the catheter, 233–234

when to initiate, 233

Epidural anesthesia

pediatric patients, 482

Epinephrine, 557

Equipment

airway equipment, 404–406, 470

anesthesia equipment, 528–544

Belmont Rapid Infuser FMS 2000, 542–543

Braun Perfusor Compact S, 543–544

catheter techniques, 547

conventional general anesthesia machines, 532–536

DeVilbiss Oxygen Concentrator, 536

Dräger Fabius Tiro M, 532–533

Dräger Narkomed M, 533–536

draw-over systems, 528–532

electrical nerve stimulator, 546

epidural equipment changes, 234

expeditionary deployable oxygen concentrator system, 536

General Electric Healthcare Datex-Ohmeda S/5 Compact, 537–538

intravenous infusion equipment, 541–544

Level 1 H-1200 Fast Flow Fluid Warmer, 541–542

medical ultrasound, 546–547

medication delivery systems, 547–549

monitors, 537–538

needle design, 547

nerve localization, 546–547

obstetric anesthesia, 493–494

oxygen supplies, 536–537

patient-controlled analgesia, 206, 221–222, 230–232, 547–549

pediatric trauma, 404–406, 470

personal protective equipment, 507–508

portable oxygen generator system, 536–537

specialist equipment for pain management, 546–549

Triservice Anesthetic Apparatus, 528–530

US anesthesia monitoring, 538

US draw-over system, 531–532

US ventilators, 539–540

Vela, 539

ventilators, 538–540

ESPEN. *See* European Society for Parenteral and Enteral Nutrition

Ethical issues

best interests, 463–464, 465

culture and autonomy, 465–466

deontology, 460

before deployment, 466–467

dual loyalties, 462–464

in the field hospital, 466

the “four principles,” 460

hypothetical scenarios, 464–465

the law of armed conflict, 461–462

medical ethics in times of war, 460–462

potential conflict in military critical care, 462–466

resource allocation, 462–465

reverse triage, 463

standards of deployed medical care, 461–462

triage, 462–463

utilitarianism, 460

European Society for Parenteral and Enteral Nutrition, 372–373, 375

Evacuation

buddy-buddy system, 43

chain of survival, 42–43

combat casualty care, 5–7, 43

evacuation chain, 42–44

higher levels of care, 43–44
 to higher levels of care, 43–44
 MEDEVAC, 48–54
 medical evacuation assets, 46–48
 patient evacuation coordination center, 42
 self treatment, 43
 team medics, 43

Expeditionary deployable oxygen concentrator system, 536

Exposure injuries
 pediatric patients, 482

Extracorporeal membrane oxygenation, 309

Extremity compartment syndrome, 7, 15

Extremity injuries
 classification of, 144
 combat casualties, 8
 continuous peripheral nerve block, 235
 general operative intervention considerations, 147–149
 infection control, 147
 limb injury revascularization, 155–160
 managing reperfusion after tourniquet removal, 155–160
 postoperative care, 151–152
 prehospital care, 145–146
 regional anesthesia, 148
 role 3 care, 146–147
 surgical considerations, 149–150
 tourniquet use, 148–149

Extubation
 pediatric trauma patients, 409

F

Facet joint pain, 250, 252

Facial injuries
 airway management, 76
 pediatric patients, 478

Factor VIIa. *See* Recombinant activated factor VIIa

FAST. *See* Focused assessment with sonography for trauma

Femoral vein catheterization, 66

Fentanyl, 496

Fetal monitoring, 497

Fever
 acalculous cholecystitis, 343
 atelectasis, 344
 drug fever, 342–343
 empiric therapy, 346
 infectious considerations, 340
 malignant hyperthermia, 343–344
 neurogenic fever, 342
 neuroleptic malignant syndrome, 343–344
 noninfectious causes, 341–344
 pancreatitis, 343
 pediatric trauma patients, 419
 serotonin syndrome, 344
 treatment of, 346
 workup of, 344–346

FFP. *See* Fresh frozen plasma

Fiberoptic intubation, 76, 79

Fiberoptic laryngoscopes, flexible, 78

Fibrinolytics
 massive transfusion and, 101

Flexible fiberoptic laryngoscopes, 78

Fluid management
 for burn injuries, 165
 conservative, 308–309
 mechanical ventilation and, 308–309
 pediatric trauma patients, 412–415, 479
 postnatal care, 501

Fluid resuscitation
 complications of administration, 297–298
 damage control resuscitation, 88, 89
 for multiple injuries, 38
 trauma resuscitation, 114

Focused assessment with sonography for trauma, 97, 176

Fracture fixation, 114

Fractures. *See* Bone fractures

Fresh frozen plasma, 99, 100, 101, 352–353

Fresh whole blood
 dilutional coagulopathy and, 99
 military use of, 101, 103–104

FWB. *See* Fresh whole blood

G

GABA. *See* γ -aminobutyric acid

γ -aminobutyric acid, 361, 363

Gastric protection, 300

Gastrointestinal tract
 surgical access to, 376

GAWS. *See* Guardian Angel Weapon System

General anesthesia
 conventional general anesthesia machines, 532–536
 for internal fixation of fractured femur neck, 489
 obstetric anesthesia, 497

General Electric Healthcare Datex-Ohmeda S/5 Compact, 537–538

Glasgow coma scale, 125, 365, 405, 479–480

Glial cells, 196

Glucocorticoids, 124

Golden hour concept, 4–7

Goldman risk factor and score, 486–487

Grafts, skin, 166

Guardian Angel Weapon System, 47

Gunshot wounds
 multimodal analgesia, 210

Gut damage control, 300

H

Hazardous materials site plan, 507

Head trauma. *See also* Traumatic brain injury
 anesthetic use, 127
 assessment of, 124–125
 decreasing cerebral oxygen consumption, 126
 Glasgow coma scale, 125
 imaging, 177–178
 intracranial hypertension and, 127
 management, 125–127
 monitoring, 124–125
 pediatric patients, 417–419
 rapid sequence induction for penetrating injuries, 51
 resuscitation, 127
 sedation, 365
 seizures and, 127

Helicopter Emergency Medical System, 49–50

Hematologic injuries
 anticoagulation, 17
 damage control resuscitation, 16–17
 hemostatic agents, 17
 massive transfusion, 16–17

Hematology
 critical care patients, 288
 pediatric trauma patients, 419–421

Hemodynamics
 pediatric trauma patients, 409–412

Hemorrhage
 battlefield and preoperative control, 155

control of catastrophic external hemorrhage, 49
 massive, 471, 474–477
 massive hemorrhage protocol, 498–499
 obstetric protocol, 498–499
 pediatric anesthesia, 471, 474–477
 preoperative control, 155
 tourniquet use, 155–160

Hemorrhagic shock, 8–9

Hemostatic agents, 17

Hemostatic resuscitation, 88–89

HEMS. *See* Helicopter Emergency Medical System

Hepatic injuries
 liver ischemia reperfusion injury, 16
 liver trauma, 15
 shock liver, 16

Hercules helicopters, 47

HFOV. *See* High-frequency oscillatory ventilation

High-frequency oscillatory ventilation, 307–308

High mean arterial pressure, 113

HMAP. *See* High mean arterial pressure

Hospital ships, 448–449

Host nation humanitarian operations, 449–450

Hot-zone treatment, 510–512

Human factors
 defense anesthesia and, 32–34

Human immunodeficiency virus infection
 obstetric considerations, 495

Humanitarian operations
 anesthesia techniques, 455–457
 austere and resource-limited environments, 455–457
 disaster relief, 448, 449
 hospital ships, 448–449
 host nations, 449–450
 humanitarian assistance as a primary mission, 448
 humanitarian assistance as an additional mission, 448
 intraoperative anesthesia management, 452–454
 medical personnel, 450
 mission overview and process, 449
 nongovernmental organizations, 449–450
 postoperative care, 454–455, 457
 preoperative assessment, 451–452
 surgical services, 450

Hyperkalemia
 acute management algorithm, 421
 damage control resuscitation and, 90
 massive transfusion and, 98
 medical therapy for, 324

Hyperthermia, malignant, 343–344

Hypocalcemia
 damage control resuscitation and, 90
 massive transfusion and, 97–98
 pediatric patients, 482

Hypomagnesemia, 98

Hypotension
 clinical presentation, 328
 general diagnostic approach, 329–331
 general principles of management, 329, 331–332
 pathophysiology of, 328

Hypotensive resuscitation, 54, 88

Hypothermia
 combat casualties and, 4
 damage control resuscitation and, 90–91
 massive transfusion and, 99
 pediatric patients, 482

Hypovolemia
 effect on systolic pressure variation, 289
 pediatric trauma patients, 475

Hypovolemic shock, 37, 332

I

ICP. *See* Intracranial pressure

ICUs. *See* Intensive care units

IED. *See* Improvised explosive devices

iLA. *See* Interventional lung assist

Imaging
 anesthesia management, 177
 basic radiography, 176
 cardiac injuries, 178
 cervical spine injuries, 123–124
 computed tomography, 176–177
 critical care patients, 288, 300
 focused assessment with sonography for trauma, 97, 176
 future considerations, 179
 head injuries, 177–178
 initial trauma assessment, 176–177
 interventional radiology, 179
 intraabdominal injuries, 178
 musculoskeletal injuries, 179
 pelvic injuries, 178
 thoracic injuries, 178
 ultrasound regional anesthesia, 179
 vascular injuries, 178
 venous access for anesthesia, 179

Immediate Response Team, 44–46

Immune function, 202

Immunoglobulin, 386

Immunologic complications
 massive transfusion and, 99–100

Immunonutrition, 374–375

Impact 754 Eagle Univent, 539–540

Improvised explosive devices. *See also specific injuries by name*
 injuries, 4

Independent lung ventilation, 306–307

Infants. *See* Pediatric trauma

Infection care bundles, 115

Infection prevention and control
 acute lung injury, 292
 antibiotic guidelines, 387–388
 biofilms and, 383–384
 chemoprophylaxis, 432–434
 colonization and infection, 382–383
 common infectious diseases in theater, 437, 441
 extremity, junctional, and pelvic injuries, 147
 individual interventions, 434–435
 institutional interventions, 435–436
 intravascular lines and, 383
 laboratory support, 386–387
 leishmaniasis, 436–440
 malaria, 436
 multidrug-resistant bacteria, 432–441
 operating room procedures, 147
 pediatric trauma patients, 419
 sources of infection, 382–384
 tailoring therapy, 386–388
 ventilators and, 383
 wounds, 383

Inferior vena cava filters, 355–356

Infusion pumps, 548–549

Inhalational analgesia, 270

Inhalational injuries, 515

Inotropic agents, 114

Institute of Surgical Research, 101, 103, 565

Intensive care units
 admission to, 114–115
 hypotension diagnosis and management, 328–336
 infection management, 382–388

nutritional support, 372–377
 receiving patients, 286–293
 sedation use, 360–366
 sepsis management, 382–388
 shock diagnosis and management, 328–336
 Intermittent positive-pressure ventilation, 557
 Internal jugular vein catheterization, 65–66
 Interoperative critical care
 adjuncts in trauma resuscitation, 114–115
 admission to intensive care unit, 114–115
 assessment regime, 108–112
 base deficit correction, 112
 circulation, 111
 early enteral nutrition, 115
 early intensive care requirements for the severely injured, 109
 end points in resuscitation, 113
 fluids in trauma resuscitation, 114
 fracture fixation, 114
 hypotensive resuscitation, 113–114
 immediate requirements and decision points in treating the severely injured, 109
 infection care bundles, 115
 initial management, 108
 inotropic agents, 114
 lactate correction, 112
 vascular volume status, 111–112
 vasoactive agents, 114
 ventilation, 110–111
 Interventional lung assist, 111
 Interventional radiology, 179
 Intraabdominal injuries, 178
 Intracranial hypertension, 127
 Intracranial pressure, 12–13, 125–127, 365, 417–419
 Intraosseous vascular access, 67–68, 411, 475
 Intrathoracic airway injuries, 134–135
 Intravascular lines
 infection prevention, 300, 383
 Intravenous infusion equipment, 541–544
 Intubation
 blind nasal intubation, 79
 cervical spine injuries and, 122–123
 confirmation of endotracheal tube position, 52–53
 drugs used with, 51–52
 failed intubation drills, 53
 fiberoptic, 79
 improving success rate of, 52
 initial indications for mechanical ventilation, 406
 management algorithm, 408
 methods for measuring end-tidal CO₂, 53
 pediatric trauma patients, 406, 408
 resuscitation guidelines, 557
 success rates for Medical Emergency Response Teams, 52
 Inverse-ratio ventilation, 306
 IPPV. *See* Intermittent positive-pressure ventilation
 IRT. *See* Immediate Response Team
 Ischemia-reperfusion injury, 9, 16. *See also* Vascular reperfusion
 IVC. *See* inferior vena cava filters

J

Joint Theater Trauma Registry, 277
 JTTR. *See* Joint Theater Trauma Registry
 Junctional injuries
 classification of, 144–145
 general operative intervention considerations, 147–149
 infection control, 147
 postoperative care, 151–152
 prehospital care, 145–146

regional anesthesia, 148
 role 3 care, 147
 surgical considerations, 150–151
 tourniquet use, 148–149

K

Ketamine
 prehospital analgesia, 270–271
 suggested doses for acute pain control, 223
 suggested doses in acute severe pediatric trauma, 474
 Kidney injury. *See* Acute kidney injury

L

Lactate correction, 112
 Landstuhl Regional Medical Center
 current capabilities, 562–563
 history of, 562
 specialty services, 563
 surgical specialties, 563
 Laryngoscopes, flexible fiberoptic, 78
 Laryngoscopy, 78
 LAST. *See* Local anesthetic systemic toxicity
 Lead clinicians, 263
 Leishmaniasis, 436–440
 “LEMON” airway assessment, 408
 Level 1 H-1200 Fast Flow Fluid Warmer, 541–542
 Ligands, 194
 Limb injuries. *See* Extremity injuries
 Limb occlusion pressure, 159–160
 Lipolysis, 201
 Liver injuries, 15–16
 Liver ischemia reperfusion injury, 16
 LMAP. *See* Lower mean arterial pressure
 LMWH. *See* Low-molecular weight heparin
 Local anesthetic systemic toxicity, 235–236
 Local anesthetics, 224–225, 235–236
 Local nationals injuries, 209–210
 Log roll, 49
 LOP. *See* Limb occlusion pressure
 Lorazepam, 362–363
 Low-molecular weight heparin, 353–355
 Lower limb injuries
 multimodal analgesia, 207
 Lower mean arterial pressure, 113
 LRMC. *See* Landstuhl Regional Medical Center
 LTV 1000 Series ICU Ventilator, 540
 Lund-Browder charts, 422
 Lung injuries, 136–137. *See also* Pulmonary injuries

M

MAAS. *See* Motor Activity Assessment Scale
 Macronutrients
 postoperative maintenance for pediatric trauma patients, 413
 Malaria, 436, 495
 Malignant hyperthermia, 343–344
 Manual inline stabilization, 122–123
 MAP. *See* Mean arterial pressure
 Massive hemorrhage. *See* Hemorrhage
 Massive transfusion
 acidosis and, 98–99
 anticoagulation and, 17
 complications of, 97–100
 considerations during military operations, 100–101
 dilutional coagulopathy and, 99
 effects of, 352–353
 example of, 16

- fibrinolytics, 101
 - hemostatic agents and, 17
 - hyperkalemia and, 98
 - hypocalcemia and, 97–98
 - hypomagnesemia and, 98
 - hypothermia and, 99
 - immunologic complications, 99–100
 - initiation protocols, 96–97
 - military use of fresh whole blood, 101, 103–104
 - recombinant factor VIIa, 101
 - UK operational protocol, 100, 102–103
 - US military protocol, 100–101, 104
- Massive transfusion protocol, 96–97
- McGill questionnaire, 215
- MDCT. *See* Multidetector computed tomography
- MDR. *See* Multidrug-resistant bacteria
- Mean arterial pressure, 156–157, 417
- Mechanical ventilation
- acute lung injuries and, 291–292
 - adjuncts to, 308–309
 - asymmetrical pulmonary pathologies, 307
 - for bronchopleural fistula, 316–318
 - conservative fluid management, 308–309
 - drugs used with, 51–52
 - extracorporeal membrane oxygenation, 309
 - the first 24 hours, 304–310
 - high-frequency ventilation, 307–308
 - independent lung ventilation, 306–307
 - infection issues, 383
 - inverse-ratio ventilation, 306
 - mode of, 305–308
 - monitoring and optimizing ventilation, 304–305
 - neuromuscular blocking agents, 308
 - nitric oxide and, 308
 - pediatric trauma patients, 402–409, 406–409
 - positive end-expiratory pressure, 305
 - prehospital procedures, 53
 - pressure-preset ventilation, 305–306
 - principles of safe ventilation, 304–305
 - prone positioning, 308
 - recruitment maneuvers, 308
 - resuscitation guidelines, 557
 - spontaneous ventilation, 306
 - thoracic injuries and, 140
 - tidal volume, 304
 - for tracheal disruption, 316–318
 - transfer ventilators, 309–310
 - volume-preset ventilation, 305
- MEDCENS. *See* Military medical centers
- MEDEVAC
- access to vascular space, 49
 - capabilities, 47
 - care during, 48–54
 - concurrent resuscitation, 49
 - control of catastrophic external hemorrhage, 49
 - drugs used with intubation and ventilation, 51–52
 - en-route care, 46–47
 - intubation, 52–53
 - the log roll, 49
 - patient movement concepts, 393
 - rapid sequence induction, 49–51
 - resuscitation, 53–54
 - thoracostomy, 53
 - training, 46
 - ventilation, 53
- Medical Emergency Response Team
- combat casualty retrieval, 46
 - composition of, 45
 - evolution of, 44–45
 - in-theater training, 45–46
 - intubation success rates, 52
 - patient movement concepts, 394
 - predeployment preparation, 45
- Medical evacuation assets
- CASEVAC, 4–7, 46, 394
 - MEDEVAC, 46–54, 393–394
 - US Air Force pararescue, 47–48
- Medical hazardous materials site plan, 507
- Medical ultrasound, 546–547
- MERT. *See* Medical Emergency Response Team
- MHS. *See* Military Health System
- Midazolam, 361–362
- Military Health System, 565
- Military hospitals
- Landstuhl Regional Medical Center, 562–563
 - in the United States, 564–566
- Military medical activities, 565
- Military medical centers, 564–565
- Military pain scoring systems, 215–216
- Military treatment facilities, 43–44
- MILS. *See* Manual inline stabilization
- Minimum alveolar concentration, 481
- MODS. *See* Multiorgan dysfunction syndrome
- Monitors, 537–538
- Morphine, 496
- Motor Activity Assessment Scale, 361
- MTFs. *See* Military treatment facilities
- MTP. *See* Massive transfusion protocol
- Multidetector computed tomography, 177
- Multidisciplinary trauma team, 34–35
- Multidrug-resistant bacteria
- antibiotic guidelines, 387
 - chemoprophylaxis, 432–434
 - common infectious diseases in theater, 437, 441
 - individual interventions, 434–435
 - infection from, 382
 - institutional interventions, 435–436
 - leishmaniasis and, 436–440
 - malaria and, 436
 - organism surveillance, 434
- Multimodal analgesia
- advanced techniques, 206–207
 - basics of, 206
 - compartment syndrome, 208–209
 - complex injuries, 209
 - injuries to local nationals, 209–210
 - isolated forearm gunshot wound, 210
 - isolated lower limb injury, 207
 - isolated upper limb injury, 207
 - multimodal applications, 207–210
 - penetrating abdominal injuries, 210
 - simple or single injuries, 207–209
 - thoracic injuries, 208
 - treatment facilities, 209–210
- Multiorgan dysfunction syndrome, 112–113, 115
- Musculoskeletal injury imaging, 179
- Myofascial pain, 250

N

- N-methyl-D-aspartate receptor antagonists, 222–223
- Narcotics. *See also specific drugs by name*
 - prehospital analgesia, 269
- NASA. *See* National Aeronautics and Space Administration
- Nasal intubation, blind, 79
- National Aeronautics and Space Administration, 32

- National Emergency X-Radiography Utilization Study, 123–124
 National Health Service, 32–33
 Neck injuries
 airway management, 76–77
 whiplash injuries, 254–255
 Neck pain
 cervical myelopathy, 254
 cervical radiculopathy, 254
 occipital neuralgia, 254
 prevalence of, 253
 treatment options, 255–256
 whiplash injuries, 254–255
 Needle design, 547
 Neonatal care, 501
 Nerve agents, 513–514, 517–519
 Nerve blocks
 needle design, 547
 pediatric patients, 481
 Nerve localization, 546–547
 Nerve stimulator, electrical, 546
 Neuraxial anesthesia, 185
 Neuraxial blockade, 355
 Neurogenic fever, 342
 Neurogenic shock, 10, 335
 Neuroleptic malignant syndrome, 343–344
 Neurologic injuries
 cerebral perfusion pressure, 12–13
 following chemical, biological, radiological, and nuclear exposure, 518–520
 intracranial pressure, 12–13
 pediatric patients, 479–480
 prophylaxis for severe traumatic brain injury, 13
 Neurological systems, 202
 Neuromuscular blocking agents, 308
 Neuropathic pain, 246
 NEXUS. *See* National Emergency X-Radiography Utilization Study
 NHS. *See* National Health Service
 Nitric oxide
 mechanical ventilation and, 308
 NMDA. *See* N-methyl-D-aspartate receptor antagonists
 Nociceptor receptors, 194
 Nongovernmental organizations, 449–450
 Nonopioid analgesics, 222–225
 Nonsteroidal antiinflammatory drugs, 223, 225, 269–270
 Nonthermal skin diseases, 171
 Novel hybrid resuscitation, 54
 NSAIDs. *See* Nonsteroidal antiinflammatory drugs
 Nuclear exposure. *See* Chemical, biological, radiological, and nuclear exposure
 Nurses
 continuous peripheral nerve block guidelines, 238
 en-route critical care nurses, 47–48
 epidural analgesia guidelines, 234
 pain nurses, 263
 patient-controlled analgesia guidelines, 232
 ward nurses, 263
 Nutritional support
 acute lung injuries and, 292
 burn injuries and, 168–169
 continuation of enteral nutrition during repeat operations, 377
 enteral feeding after abdominal surgery, 375
 enteral nutrition after temporary abdominal closure, 376–377
 enteral route, 373–377
 immunonutrition, 374–375
 initiation of, 372–373
 nutritional requirements, 372
 parenteral route, 373–377
 postoperative pediatric trauma patients, 412–415
 postpyloric feeding, 375–376
 surgical access to the gastrointestinal tract, 376
 types of enteral feed preparations, 374
- ## O
- Obstetric anesthesia
 anemia and, 495
 antenatal care, 496
 cardiac disease and, 494–495
 challenges in the deployed environment, 492–495
 civilian best practice, 501
 current civilian best practice, 495–501
 deployed civilian experience, 501
 environmental considerations, 493
 equipment considerations, 493–494
 fetal monitoring, 497
 high-risk conditions, 498–500
 human immunodeficiency virus infection and, 495
 malaria and, 495
 massive hemorrhage protocol, 498–499
 military experience, 501
 neonatal care, 501
 normal labor, 493, 496–497
 obstetric experience of deployed surgeons, 493
 operative interventions, 493, 497–498
 pain relief during labor, 496–497
 patient information, 495–496
 postnatal care, 501
 preexisting indigenous standards of care, 492–493
 preexisting pathology in the pregnant patient, 493–495
 resources for the deploying anesthesiologist, 501
 risk factors, 493
 sexual violence and, 495
 tocolysis, 498
 trauma management principles, 499–500
 Obstructive shock, 10, 335–336
 Occipital neuralgia, 254
 OL-ILV. *See* One-lung independent ventilation
 One-lung independent ventilation, 140
 Operating room procedures
 amputation, 150
 communication, 147
 debridement, 150
 extremity injuries, 149–150
 general principles for surgical management of battlefield wounds, 149
 infection control, 147
 junctional injuries, 150–151
 patient positioning, 147
 pelvic injuries, 151
 regional anesthesia, 148
 set-up for burn injuries, 166–167
 tourniquet use, 148–149
 vascular surgery, 149–150
 Operation Smile, 450
 Opioids
 adverse events, 222
 intravenous administration, 220–222
 pain regimen based on injury severity, 221
 per os administration, 220
 side effects, 231
 Orthopedic injuries, 149
 Oxygen supplies, 536–537

P

Packed red blood cells, 97, 99

Pain, acute. *See also* Acute pain service

- basic concepts, 194
- descending modulatory pathways, 196
- dorsal horn, 195–196
- measuring pain, 277–278
- pain matrix, 196–197
- pain mechanisms, 194–197
- pain perception in higher centers, 196–197
- pain transmission, 195–196
- peripheral nociceptors, 194
- role of the glia, 196
- transient receptor potential vallinoid channel subtypes, 195
- WHO pain ladder, 207, 277–278

Pain, chronic

- ascending pain pathways, 247
- back pain, 248–253, 255–256
- classification of, 246–248
- definition of, 246–248
- descending modulation, 247
- interventional procedures, 256
- neck pain, 253–256
- neuropathic pain, 246
- treatment options, 255–256

Pain management

- catheter techniques, 547
- communication and, 278
- continuous peripheral nerve block, 235–238
- electrical nerve stimulator, 546
- epidural analgesia, 232–234
- future of pain management on the battlefield, 279–280
- history of, 276–277
- measuring pain, 277–278
- medical ultrasound, 546–547
- medication delivery systems, 547–549
- needle design, 547
- nerve localization, 546–547
- obstetric anesthesia, 496–497
- pain management champions, 263
- patient-controlled analgesia, 206, 221–222, 230–232, 547–549
- pediatric trauma patients, 415–417
- postnatal care, 501
- roles of care, 278
- specialist equipment for, 546–549

Pain medications

- acetaminophen, 223–225
- adverse events, 222
- anticonvulsants, 224
- frequency of intravenous and oral analgesic administration, 279
- intravenous administration, 220–222
- local anesthetics, 224–225
- N*-methyl-*D*-aspartate receptor antagonists, 222–223
- nonopioid analgesics, 222–225
- nonsteroidal antiinflammatory drugs, 223, 225
- opioids, 220–222
- pain regimen based on injury severity, 221
- per os administration, 220
- α_2 -adrenergic agonists, 224–225

Pain nurses, 263

Pain relief

- carbohydrate metabolism, 201
- cardiovascular response, 202
- immune function response, 202
- initial stress response, 200

- key hormones released, 200
- lipolysis, 201
- metabolic responses, 200–202
- neurological systems response, 202
- patient outcomes, 203
- protein catabolism, 200
- psychological responses, 202
- respiratory response, 202
- system responses, 202
- water and electrolyte balance, 201–202

Pain scoring

- difficulties with, 214
- importance of, 214
- military scoring systems, 215–216
- scoring effects of pain, 215
- scoring pain intensity, 215
- when to score pain, 217

Pain service

- clinical practice guideline, 263–264
- deployed acute pain service responsibilities, 262
- enabling change, 265
- governance, 262
- multidisciplinary team, 262–263
- pain education, 264
- predeployment training, 264
- specialist interest group responsibilities, 262
- standard operating instruction, 263–264
- team rounds and meetings, 265
- team training, 264

Pancreatitis, 343

Pararescuemen, 47–48

Parenteral nutrition

- immunonutrition, 374–375
- initiation and advancement of, 414
- pediatric trauma patients, 414–415
- postpyloric feeding, 375–376
- recommendations for nutrition components, 415
- routes of, 373–374
- surgical access to the gastrointestinal tract, 376

Patient-controlled analgesia, 547–549

- benefits of, 206, 230
- complications, 230–231
- contraindications, 230
- indications, 230
- nursing guidelines, 232
- opioid administration, 221–222
- pediatric trauma patients, 416
- pump settings, 231
- types of drugs, 230
- when to initiate, 232

Patient evacuation coordination center, 42

Patient movement requirement centers, 396

Patient positioning

- airway management, 77–78
- critical care, 300
- mechanical ventilation and, 308
- operating room procedures, 147
- percutaneous central venous access, 65, 66
- prone positioning, 308

Patient transfer, 300

Patient transport. *See also* Aeromedical transport

pediatric trauma patients, 423

Pave Hawk helicopters, 47–48

PCA. *See* Patient-controlled analgesia

PECC. *See* Patient evacuation coordination center

Pediatric Advanced Life Support algorithm, 554

Pediatric trauma

- acute management of asthma exacerbation algorithm, 406–407
- acute management of hyperkalemia algorithm, 421
- airway equipment, 404–406, 470
- airway management, 477–478
- analgesia, 481–482
- analgesic drug doses, 474
- anatomy and physiology, 403, 473–474
- anesthesia, 470–482
- anesthesia handoff checklist, 405
- blood product dosing guidelines, 420
- breathing management, 478–479
- burn care, 421–423
- caudal anesthesia, 482
- chest trauma, 402–403
- circulation management, 474, 479
- commonly used analgesics, 416
- disability, 479–482
- dosing for commonly used medications, 428
- dosing for single-injection peripheral nerve block, 481
- emergency resuscitation dosing, 427
- enteral feeding, 414
- epidural anesthesia, 482
- equipment, 404, 470
- estimated blood volumes, 420
- estimation of endotracheal tube size and length in children, 471
- exposure, 482
- fever, 419
- fluid management, 412–415, 479
- Glasgow coma scale, 405, 479–480
- head trauma, 417–419
- hematologic issues, 419–421
- hemodynamic principles, 409–412
- infection, 419
- initial ventilator settings, 409
- intraosseous insertion, 411
- massive hemorrhage, 471, 474–477
- mechanical ventilation, 402–409
- minimum alveolar concentration, 481
- neurologic injuries, 479–480
- normal physiological values for children, 470
- nutritional support, 412–415
- pain management, 415–417
- parenteral feeding, 414
- patient-controlled analgesia, 416
- pediatric parameters, 404
- physiologic considerations, 403, 473–474
- preparation, 470–471
- pulmonary support, 402–409
- rapid sequence induction, 420, 477–478
- receiving pediatric critical care patients, 402
- recommended extubation criteria, 409
- refeeding syndrome, 415
- resuscitation, 412, 427, 475–477
- sedation management, 415–417, 480
- spinal cord trauma, 417–419
- thermoregulation, 474
- transport principles, 423
- trauma considerations, 471–473
- vascular access, 410–412, 475
- vasoactive agents, 411
- ventilator-associated pneumonia bundle, 410
- ventilatory management techniques, 406–410
- weight estimation for Afghanistan local national children, 471
- Pedro helicopters, 47
- PEEP. *See* Positive end-expiratory pressure
- Pelvic injuries
- anterior posterior compression, 145
- classification of, 145
- general operative intervention considerations, 147–149
- imaging, 178
- infection control, 147
- lateral compression, 145
- management strategy for fractures, 150–151
- postoperative care, 151–152
- prehospital care, 145–146
- regional anesthesia, 148
- role 3 care, 147
- surgical considerations, 151
- tourniquet use, 148–149
- vertical shear, 145
- Percutaneous central venous access
- complications of, 67
- femoral vein, 66
- history of, 64–65
- internal jugular vein, 65–66
- patient positioning, 65, 66
- pediatric trauma patients, 412, 427, 475–477
- subclavian vein, 65
- tasks to be completed on arrival of patient, 65
- techniques, 65, 66
- ultrasound-guided, 66–67
- Perioperative critical care
- adjuncts in trauma resuscitation, 114–115
- admission to intensive care unit, 114–115
- airway assessment, 108–110
- the “AMPLE” history, 109
- assessment regime, 108–112
- base deficit correction, 112
- circulation, 111
- clearance of cervical spine, 110
- conditions requiring rapid sequence induction of anesthesia, 110
- early enteral nutrition, 115
- early intensive care requirements for the severely injured, 109
- end points in resuscitation, 113
- fluids in trauma resuscitation, 114
- fracture fixation, 114
- hypotensive resuscitation, 113–114
- immediate requirements and decision points in treating the severely injured, 109
- infection care bundles, 115
- initial management, 108
- inotropic agents, 114
- lactate correction, 112
- patient history, 108
- vascular volume status, 111–112
- vasoactive agents, 114
- ventilation, 110–111
- Peripheral nerve blocks
- needle design, 547
- pediatric patients, 481
- Peripheral nociceptors, 194
- Peripheral venous cutdown, 68
- Peritoneal dialysis, 325
- Permissive hypotension, 54, 88
- Personal protective equipment, 507–508
- Pethidine, 496
- Pharmacists
- acute pain service responsibilities, 263
- Physical examinations, 286
- Physiotherapists, 263
- PIS. *See* Propofol infusion syndrome
- PMRCs. *See* Patient movement requirement centers

Pneumonia
ventilator-associated pneumonia bundle, 410
Pneumothorax, 67
Point-of-care testing, 89
Portable oxygen generator system, 536–537
Positioning. *See* Patient positioning
Positive end-expiratory pressure, 111, 292, 305–306
Postnatal care, 501
Postoperative care
burn injuries, 170
extremity injuries, 151–152
junctional injuries, 151–152
pediatric trauma patients, 412–415
pelvic injuries, 151–152
Postpyloric feeding, 375–376
Posttraumatic stress disorder
pain response, 202
Potassium management
damage control resuscitation and, 90
massive transfusion and, 98
PRBCs. *See* Packed red blood cells
Preeclampsia, 498
Prehospital medicine
analgesia, 268–272
care during MEDEVAC, 48–54
considerations for the future, 54
evacuation chain, 42–44
extremity, junctional, and pelvic injuries, 145–146
Medical Emergency Response Team, 44–46
medical evacuation assets, 46–48
prehospital resuscitation guidelines, 555–556
Pressure-preset ventilation, 305–306
PRIS. *See* Propofol infusion syndrome
Project HOPE, 450
Prone positioning, 308
Propaq, 538
Propofol, 362–364
Propofol infusion syndrome, 126, 363–364
Protein catabolism, 200
PTSD. *See* Posttraumatic stress disorder
Pulmonary agents, 514–515
Pulmonary embolism, 335
Pulmonary injuries. *See also* Respiratory disease
acute respiratory distress syndrome, 12
airway trauma, 10
chest wall trauma, 10–11
lung injuries, 136–137
pediatric trauma patients, 402–409
pulmonary contusion, 291
pulmonary trauma, 10–11

Q

Q fever, 341, 437, 441
QEHB. *See* Queen Elizabeth Hospital Birmingham
Queen Elizabeth Hospital Birmingham
anesthetic considerations for critically injured military patients, 569
clinical and anesthetic considerations for patients admitted to the military trauma ward, 569
coordinating clinical care, 569–570
essential requirements for receiving casualties at Role 4, 568
external relationships, 570
operating room activity, 570
patient admissions and disposition, 568–569
“Quick Look” assessment, 507, 509

R

RAAS. *See* Renin-angiotensin-aldosterone system
Radiologic assessment. *See also* Imaging
cervical spine injuries, 123–124
Radiological exposure. *See* Chemical, biological, radiological, and nuclear exposure
RAP. *See* Regimental aid posts
Rapid sequence induction
airway management, 79, 122–123
care during MEDEVAC, 49–51
indications for, 50–51
medications commonly used for, 420
pediatric trauma patients, 420, 477–478
risks during MEDEVAC flight, 50
RASS. *See* Richmond Agitation-Sedation Scale
RBCs. *See* Red blood cells
RCC. *See* Red cell concentrate
RCDM. *See* Royal Centre for Defence Medicine
Recombinant activated factor VIIa
damage control resuscitation and, 91
effects of, 352–353
massive transfusion and, 101
Record-keeping, 299–300
Recruitment maneuvers, 308
Red blood cells, 98
Red cell concentrate, 100
Refeeding syndrome, 415
Regimental aid posts, 43
Regional anesthesia
Camp Bastion protocol, 242–244
continuum of risk, 243
determining when to use, 242
for extremity, junctional, and pelvic injury surgical procedures, 148
obstetric anesthesia, 497
pediatric patients, 480–481
potential benefits of, 242
for stable casualties, 185
ultrasound imaging and, 179
venous access, 179
Remifentanyl, 496
Renal disease
elderly populations and, 487
Renal failure
etiology of, 322
incidence of, 322
Indications for renal support, 322–323
management options, 323–324
outcomes, 324
prevention of, 322
“RIFLE” classification, 322–323
Renal injuries
abdominal compartment syndrome, 14–15
acute kidney injury, 14, 322–324
compartment syndrome, 14
extremity compartment syndrome, 15
renal replacement therapy, 15
“RIFLE” criteria for acute renal failure, 15
risk factors for acute renal failure, 13
Renal replacement therapy, 15, 322–325
Renal support
constructing a field-expedient peritoneal dialysis system, 325
etiology of injuries, 322
history of, 322
incidence of injuries, 322
indications for, 322–323

management options, 323–324
 modes of, 324
 outcomes, 324
 prevention of acute kidney injury and renal failure, 322

Renin-angiotensin-aldosterone system, 290–291

Reperfusion. *See also* Vascular reperfusion
 ischemia-reperfusion injury, 9, 16

Respiratory disease. *See also* Pulmonary injuries
 elderly populations and, 487
 Goldman risk factor and score, 486–487

Respiratory system
 pain response, 202

Restraints
 sedation and, 366

Resuscitation. *See also* Damage control resuscitation
 adequacy of resuscitation, 288–289
 areas of controversy, 557
 blood product administration, 53–54
 capnometry as a guide to resuscitation, 557
 cardiac arrest guidelines, 552
 chest compressions, 557
 concurrent, 49
 end points, 113
 epinephrine, 557
 evidence for military traumatic cardiorespiratory arrest,
 556–557
 guidelines, 552–558
 head trauma, 127
 hypotensive resuscitation, 54
 ideal goals of, 113
 intubation, 557
 novel hybrid resuscitation, 54
 obstetric algorithm, 500
 pediatric emergency resuscitation dosing, 427
 pediatric trauma patients, 412, 427, 475–477
 prehospital resuscitation guidelines, 555–556
 the resuscitation bundle, 384–385
 trauma resuscitation guidelines, 552–555
 vasopressors, 557
 ventilation, 557

Return of spontaneous circulation, 556–557

Richmond Agitation-Sedation Scale, 292, 360–361

“RIFLE” criteria, 15, 322–323

Riot control agents, 515–516

Roles of care
 acute pain services at role 3 facilities, 278–279
 burn casualties at role 3 facilities, 164–171
 for combat casualties, 5–7
 combat casualty management at role 2 and 3 facilities, 7–8
 damage control resuscitation at role 2 and 3 facilities, 7
 essential requirements for receiving casualties at Role 4, 568
 extremity injury management at role 3 facilities, 146–147
 junctional injury management at role 3 facilities, 147
 pelvic injury management at role 3 facilities, 147

Royal Air Force
 Critical Care Air Support Teams, 392

Royal Centre for Defence Medicine, 568

RRT. *See* Renal replacement therapy

RSI. *See* Rapid sequence induction

Rule of nines, 422

S

Sacroiliac joint pain, 250, 252

SCCM. *See* Society of Critical Care Medicine

SCD. *See* Sequential compression device

Scoring pain. *See* Pain scoring

Sedation. *See also* Anesthesia
 acute lung injury, 292
 benzodiazepines, 361
 conscious sedation, 185–186
 daily interruption of sedation, 365–366
 dexmedetomidine, 362, 364
 head injuries, 365
 pediatric trauma patients, 415–417, 480
 pharmacology of sedatives, 362
 propofol, 362–364
 restraints and, 366
 sedation scales, 360
 sedatives, 361–364, 417

Seizures
 head trauma and, 127

Sepsis
 antibiotic guidelines, 387–388
 diagnosis of, 333
 goal-directed therapy, 334
 immunoglobulin doses, 386
 laboratory support, 386–387
 patient management, 333, 384
 the resuscitation bundle, 384–385
 the sepsis management bundle, 385–386
 supportive therapy, 385
 tailoring therapy, 386–388

Sequential compression device, 354

Serotonin syndrome, 344

Sexual violence, 495

Shock
 adrenal crisis, 335
 anaphylaxis, 333, 335
 cardiac tamponade, 336
 cardiogenic shock, 332–333
 categories of, 328–329
 clinical presentation, 328
 coagulopathy of trauma shock, 242–244
 combat casualties and, 8–10
 distributive shock, 333–335
 hypovolemic shock, 37, 332
 management of, 332–336
 neurogenic shock, 335
 obstructive shock, 335–336
 pathophysiology of, 328
 pulmonary embolism, 335
 sepsis, 333–334
 traumatic shock, 8–9

Shock liver, 16

SIRS. *See* Systemic inflammatory response syndrome

Situational awareness
 trauma teams and, 34

Skin diseases, nonthermal, 171

Skin grafts, 166

Society of Critical Care Medicine, 360, 365

Sodium maintenance, 412–413

SOL. *See* Standard operating instruction

SOP. *See* Standard operating procedures

Specialist retrieval teams, 88

Spinal-epidural analgesia, 497

Spinal injuries. *See also* Back pain
 airway management, 122–123
 Canadian C-Spine Rule, 123–124
 CT imaging, 110
 epidemiology, 122
 injury patterns, 122
 pediatric patients, 417–419
 radiologic assessment, 110, 123–124

- steroids and, 124
- Spinal stenosis, 250, 253
- Spontaneous ventilation, 306
- Stable casualties
 - choosing anesthetic technique, 184–187
 - classification of, 182
 - common operations, 183–184
 - conscious sedation, 185–186
 - monitoring depth of anesthesia, 187
 - neuraxial anesthesia, 185
 - perioperative considerations, 184
 - population at risk, 182–183
 - regional anesthesia, 185
 - special considerations, 183
 - total intravenous anesthesia, 186–187
 - volatile gas anesthesia, 185
- Standard operating instruction
 - acute pain service, 263–264
- Standard operating procedures
 - trauma teams and, 33–34
- Steroids
 - spinal injury use, 124
- Strategic evacuation, 394, 397
- STRATEVAC. *See* Strategic evacuation
- Subclavian vein catheterization, 65
- Superficial peripheral nerve block, 244
- Supraglottic airways, 78
- Surgical principles, 149. *See also* Operating room procedures
- Surviving Sepsis Campaign, 333, 384
- SVR. *See* Systemic vascular resistance
- Systemic inflammatory response syndrome, 115
- Systemic vascular resistance, 156–157

T

- TACEVAC. *See* Tactical evacuation
- Tactic, technique, or procedure calls, 47
- Tactical Combat Casualty Care, 4–5, 48, 271
- Tactical damage control surgery, 7–8
- Tactical evacuation, 394, 397
- TAP block. *See* Transversus abdominis plane block
- Target-controlled infusions, 186–187
- TBI. *See* Traumatic brain injury
- TCCC. *See* Tactical Combat Casualty Care
- TCI. *See* Target-controlled infusions
- TCRA. *See* Traumatic cardiorespiratory arrest
- Team medics, 43
- Thermal injury, acute, 164–165
- Thermoregulation
 - pediatric trauma patients, 474
- Thoracic injuries
 - analgesia principles, 140
 - anesthesia principles, 139
 - aortic injuries, 136
 - blunt injuries, 135
 - cardiac injuries, 135–136
 - combat casualties, 8
 - imaging, 178
 - intrathoracic airway injuries, 134–135
 - lung injuries, 136–137
 - multimodal analgesia, 208
 - operative intervention, 137–139
 - pathophysiology, 134–137
 - penetrating injuries, 134
 - practical conduct of anesthesia, 139–140
 - ventilation strategies, 140
- Thoracostomy, 53
- Thoracotomy, 137–138, 556
- Thromboembolic disease
 - chemical prophylaxis, 354–355
 - Factor VIIa effects, 352–353
 - inferior vena cava filters, 355–356
 - massive transfusion effects, 352–353
 - mechanical prophylaxis, 354
 - neuraxial blockade, 355
 - pathophysiology of venous thromboembolism, 352–353
 - prevalence of venous thromboembolism, 353
 - prevention of venous thromboembolism, 353–356
 - prophylaxis, 300
 - tranexamic acid effects, 352–353
- Tidal volume, 304
- TIVA. *See* Total intravenous anesthesia
- TL-ILV. *See* Two-lung independent ventilation
- Tocolysis, 498
- Topical negative pressure dressings, 300
- TOSC. *See* Return of spontaneous circulation
- Total intravenous anesthesia, 186–187
- Tourniquets
 - cardiovascular effects, 156–157
 - combat application tourniquet, 145
 - complications association with, 148
 - extremity injuries and, 148–149
 - junctional injuries and, 148–149
 - managing reperfusion after removal, 155–160
 - metabolic effects, 159
 - neurologic effects, 158
 - pelvic injuries and, 148–149
 - physiologic effects, 156–160
 - respiratory effects, 157
 - safety of, 159–160
 - tourniquet pain, 158–159
- Tracheal disruption
 - aeromedical evacuation, 316–317
 - diagnosis of, 316
 - postoperative care, 316–317
 - preventing further injury, 316–317
 - ventilation considerations, 316–317
 - ventilator settings, 316–317
- Tracheostomy, 478
- TRALI. *See* Transfusion-related acute lung injury
- Tranexamic acid, 352–353
- Transfer ventilators, 309–310
- Transfers, patient, 300
- Transfusion, massive. *See* Massive transfusion
- Transfusion-related acute lung injury, 100
- Transient receptor potential vallinoid, 194–195
- Transport, patient. *See also* Aeromedical transport
 - pediatric trauma patients, 423
- Transversus abdominis plane block, 207–108
- Trauma shock
 - coagulopathy of trauma shock, 242–244
- Trauma team
 - communication, 33
 - considerations for, 35–38
 - crew resource management, 33–34
 - familiarization with environment and equipment, 34
 - leadership and followership, 34
 - multidisciplinary trauma team, 34–35
 - roles of, 36
 - situational awareness, 34
 - training, 35
 - use of standard operating procedures, 33–34
- Traumatic brain injury
 - anesthetic use, 127

assessment of, 124–125
 critical care, 299
 decreasing cerebral oxygen consumption, 126
 Glasgow coma scale, 125
 intracranial hypertension and, 127
 management, 125–127
 monitoring, 124–125
 neuroprotective measures, 13
 prophylaxis for, 13
 resuscitation, 127
 seizures and, 127
 tactical damage control surgery, 7
 Traumatic cardiorespiratory arrest, 552, 556–557
 Traumatic shock, 8–9
 Triage
 ethical issues, 462–463
 following chemical, biological, radiological, and nuclear exposure, 510–512
 Triservice Anesthetic Apparatus, 528–530
 TRPV. *See* Transient receptor potential vallinoid
 TTPs. *See* Tactic, technique, or procedure calls
 Tuberculin skin testing, 437
 Two-lung independent ventilation, 140

U

UFH. *See* Unfractionated heparin
 Ultrasound, medical, 546–547
 Unfractionated heparin, 353–355
 United Kingdom
 buddy-buddy system, 43
 Defence Medical Services, 32
 massive transfusion operational protocol, 100, 102–103
 Medical Emergency Response Team, 44–46
 Queen Elizabeth Hospital Birmingham, 568–571
 team medics, 43
 United Kingdom Defence Medical Services
 pain scoring systems, 215–216
 United States
 combat casualty care, 43
 massive transfusion military protocol, 100–101, 104
 medical evacuation assets, 46–48
 military anesthesiologists, 32
 military hospitals, 564–566
 Upper limb injuries
 multimodal analgesia, 207
 US Air Force
 Critical Care Air Transport Teams, 6–7, 392
 pararescue, 47–48
 US anesthesia monitoring, 538
 US Army's Institute of Surgical Research, 101, 103, 565
 US draw-over system, 531–532
 US ventilators, 539–540
 USAF, Form 3899, *Aeromedical Evacuation Patient Record*, 397
 USAISR. *See* US Army's Institute of Surgical Research
 USNS *Comfort*, 448–449, 450, 452, 454
 USNS *Mercy*, 448, 452
 Utilitarianism, 460

V

VAP. *See* Ventilator-associated pneumonia
 Vascular access
 access to vascular space, 49
 arterial access, 68–69
 catheter and cannula sizes, 64
 direct atrial cannulation, 68
 intraosseous access, 67–68

pediatric trauma patients, 410–412, 475
 percutaneous central venous access, 64–67
 peripheral venous cutdown, 68
 physics of flow, 64
 post-anesthesia care of vascular access devices, 69
 Vascular injuries
 imaging, 178
 surgical considerations, 149–150
 Vascular reperfusion, 155–160
 Vasoactive agents, 114, 411
 Vasopressors, 557
 Vela ventilators, 539
 Veno-venous technique of hemofiltration, 323–324
 Venous thromboembolism
 chemical prophylaxis, 354–355
 factor VIIa effects, 352–353
 inferior vena cava filters, 355–356
 massive transfusion effects, 352–353
 mechanical prophylaxis, 354
 neuraxial blockade, 355
 pathophysiology of, 352–353
 prevalence of, 353
 prevention of, 353–356
 prophylaxis, 300
 tranexamic acid effects, 352–353
 Ventilation, mechanical
 acute lung injuries and, 291–292
 adjuncts to, 308–309
 asymmetrical pulmonary pathologies, 307
 for bronchopleural fistula, 316–318
 conservative fluid management, 308–309
 drugs used with, 51–52
 extracorporeal membrane oxygenation, 309
 the first 24 hours, 304–310
 high-frequency ventilation, 307–308
 independent lung ventilation, 306–307
 infection issues, 383
 inverse-ratio ventilation, 306
 mode of, 305–308
 monitoring and optimizing ventilation, 304–305
 neuromuscular blocking agents, 308
 nitric oxide and, 308
 pediatric trauma patients, 406–410
 positive end-expiratory pressure, 305
 prehospital procedures, 53
 pressure-preset ventilation, 305–306
 principles of safe ventilation, 304–305
 prone positioning, 308
 recruitment maneuvers, 308
 resuscitation guidelines, 557
 spontaneous ventilation, 306
 thoracic injuries and, 140
 tidal volume, 304
 for tracheal disruption, 316–318
 transfer ventilators, 309–310
 volume-preset ventilation, 305
 Ventilator-associated pneumonia, 383
 Ventilators, 538–540
 Vesicants, 514
 Veterans Affairs Medical Centers, 565–566
 Video laryngoscopy, 78
 Virchow triad, 352
 Visual analogue pain scale, 215
 Volatile gas anesthesia, 185
 Volume-preset ventilation, 305
 VTE. *See* Venous thromboembolism

W

Walter Reed Army Institute of Research, 437–440
Ward nurses, 263
Water/electrolyte balance, 201–202
Whiplash injuries, 254–255
World Health Organization
 pain ladder, 207, 277–278
 surgical checklist, 33
WRAIR. *See* Walter Reed Army Institute of Research

Z

Zygopaphyseal joint pain, 250



MERT Head Out Again by Tony Green, acrylic on paper, 2009.

Art: Courtesy of Tony Green.

