

# Index

- 7q11.23 deletion (Williams syndrome), 8, 78, 82–83, 314
- 8q12 mutation (CHARGE syndrome), 77, 83–84, 104
- 22q11.2 deletion *see* DiGeorge syndrome
- abdominal compartment syndrome, 233, 235, 242, 246, 278, 334
- abdominal examination, 106
- abdominal surgery, 243–49
- anesthetic considerations (general), 242–43
  - intestinal atresia, 246–47, 318–19
  - liver transplants, 332–38
  - necrotizing enterocolitis, 14, 25, 28, 244–45, 421
  - regional anesthesia, 384–85, 386
- abdominal wall defects
- bladder exstrophy, 81, 257–58
  - gastroschisis, 25, 140, 233–35
  - hydrocele, 238
  - inguinal hernia, 16, 237–38, 384–85
  - omphalocele, 25, 235–36
  - umbilical hernia, 236–37
- absolute risk reduction (ARR), 418
- acetaminophen, 17, 120, 371–73
- acetylcholine receptors (AChRs), 120
- acid–base status, 6, 15
- blocked ETs, 158
  - hypertonic saline use, 141–42
  - hypothermia, 64–65
  - monitoring, 41
  - pyloric stenosis, 244
- acne, 7
- acute coronary syndromes (adult), 54
- acute lymphoblastic leukemia (ALL), 321–22
- acute myelogenous leukemia (AML), 321–22
- adenotonsillectomy, 207–8, 408
- adrenal gland insufficiency, 8, 78, 258
- adrenal gland tumors, 257, 324–25
- adverse effects of anesthetic agents, 115–16, 407
- see also* malignant hyperthermia; neurotoxicity of anesthetics
- aging process, 53
- air embolus
- in CHD, 280–81, 306
  - venous, 196, 222, 224
- airway fires, 207, 209
- airway management, 124–32
- anatomical and physiological differences in the infant, 124
  - apnea *see* apnea
  - bag-mask ventilation, 124–25, 276–77
  - CHAOS syndrome, 359–60
  - choanal atresia, 83, 104, 199
  - conjoined twins, 350
  - craniofacial disorders, 81, 129, 131–32, 203
    - cleft lip/palate, 204, 214–16
    - craniosynostosis, 217–19, 221
    - Robin sequence, 88–89, 214
  - difficult airways, 128–32
    - “cannot intubate, cannot ventilate”, 130–31
    - unanticipated, 129–30
  - Down syndrome, 76, 129
  - fetal interventions, 359–60
  - lymphatic malformations, 202, 227, 343, 359
  - mediastinal masses, 104, 127–28
  - mucopolysaccharidoses, 85
  - in neurosurgery, 196
  - one-lung ventilation, 125–27, 266–68
    - and sedation, 399, 401
    - suspension laryngoscopy, 208–9
  - in tracheal surgery, 201
  - URI patients, 407
  - vascular malformations, 202–3
  - vocal cord paralysis, 207
  - see also* endotracheal intubation; ventilation
- albumin
- pharmacokinetics, 112, 115, 370
  - use in fluid management, 140–41
- alcohol (sclerotherapy agent), 343
- alfentanil, 120
- $\alpha$ 1-acid glycoprotein, 112, 370, 383
- alveolar gas equation, 51
- ambulatory surgery, 405–8
- age requirements, 101, 405–6, 408
  - infants with chronic diseases, 408
  - infants with URIs, 406–8
  - postoperative analgesia, 408
  - postoperative apnea risk, 100, 405–6
- aminophylline, 413
- amniotic band sequence, 225
- amyoplasia, 86–87
- analgesia
- acetaminophen, 17, 120, 371–73
  - fetal, 356–57, 364
  - non-pharmacological measures, 370–71
  - NSAIDs, 208, 373–74
  - opioids *see* opioids
  - postoperative
    - ambulatory surgery, 408
    - biopsies, 342
    - bladder exstrophy, 257–58
    - circumcision, 259–60
    - cleft lip/palate surgery, 217
    - epidurals, 376–77
    - hypospadias repair, 261
    - Kasai portoenterostomy, 248
    - liver transplantation, 338
    - in the NICU, 29
    - preterm neonates, 17
    - tonsillectomy, 207–8
  - preterm neonates, 17, 369, 373, 374
    - and surgical outcomes, 423
  - xenon, 172
  - see also* neuraxial anesthesia/analgesia
- Andersen disease (GSD type IV), 94
- anemia, 4, 142–43
- preterm neonates, 14, 102, 143, 411, 412
- Anesthesia Quality Institute registry, 415
- angiography, cerebral, 344–45
- ankyloglossia, 206
- anomalous left coronary artery from the pulmonary artery (ALCAPA), 287
- anorectal malformations, 247–48
- antibiotics, 27, 305–6
- anticoagulants, 343
- anticonvulsants, 105
- antifibrinolytic drugs, 223–24
- antioxidants, 53, 54
- Antley–Bixler syndrome, 81
- anxiety
- parental, 99, 100
  - stranger anxiety in infants, 99–100, 405
- aorta
- coarctation, 287–88, 308–9
  - interrupted arch, 288–89
  - vascular rings, 200, 299
- aortic stenosis, 288, 358
- aortopulmonary window, 286

## Index

- Apert syndrome, 81, 88, 129, 203, 219
- Apgar, Virginia, 19
- apnea, 4, 410–13  
definition, 410  
incidence, 410  
intermittent (during suspension laryngoscopy), 208–9  
management, 58, 412–13  
obstructive/sleep apnea, 207, 217–18, 410, 411  
and opioids, 370, 411, 412  
pathophysiology, 410–11  
postoperative, 12, 100, 102, 237, 405–6, 412–13  
in preterm neonates, 12, 410–11  
during sedation, 400
- Arndt Endobronchial Blocker®, 126, 268
- arrhythmias, 179, 222, 307  
Ebstein's anomaly, 293  
fetal, 357  
long QT syndrome, 225  
*see also* bradycardia
- arterial blood gases (ABGs)  
PaCO<sub>2</sub>, 38, 41–42  
in pregnancy, 355  
PaO<sub>2</sub>, 51–52, 57–58
- arterial catheterization, 179–82, 195  
umbilical artery, 70, 151, 181–82
- arterial switch procedure, 294, 311
- arteriovenous malformations (AVMs), 202, 203  
intracranial, 344–45
- arthrogryposis, 80, 86–87
- ASD (atrial septal defect), 283–84, 309
- aspiration of gastric contents, fasting guidelines, 101, 399–400
- astrocytoma, 323
- atelectasis, 58
- atrial septal defect (ASD), 283–84, 309
- atrial septostomy, 294, 296–89  
fetal, 359
- atrial switch procedure, 294, 311
- atrioventricular septal defect (AVSD), 285, 310–11, 318–19
- atropine, 16, 413
- auricular branch of vagus nerve, 208
- auscultation, 178–79
- autonomic nervous system  
cardiac innervation, 34  
thermoregulation, 62, 63
- autoregulation of CBF, 36, 193–94
- AVSD (atrioventricular septal defect), 285, 310–11, 318–19
- awareness during anesthesia, monitoring, 175–76
- axillary monitoring of temperature, 67, 186
- bag-mask ventilation, 124–25, 276–77
- barbiturates, 117
- baroreceptors, 115
- Beckwith–Wiedemann syndrome, 78, 84, 236
- benign tumors  
germ cell/teratoma, 256–57, 327–28, 359, 361  
hemangioma, 201–3  
laryngeal papillomatosis, 208–9  
mesenchymal hamartoma, 326
- benzodiazepines, 118, 173  
midazolam, 12, 100, 118, 400
- bias (in research studies), 417, 430–31
- bidirectional Glenn procedure, 296, 313
- biliary atresia, 248–49
- bilirubin, 5, 25–26
- biopsies, 341–42
- bispectral index (BIS), 175–76
- bladder exstrophy, 81, 257–58
- bladder monitoring of temperature, 67, 186
- bladder outlet obstruction (posterior urethral valves), 252–53
- Blalock–Taussig (BT) shunt, 295, 296, 297, 312
- bleomycin, 343–44
- blinding in clinical trials, 435
- blood loss, 140  
blood conservation techniques, 223–24  
craniectomy, 219–20, 223–24  
intraventricular hemorrhage, 12, 20, 103  
tonsillectomy, 208  
vascular malformations, 202–3  
*see also* blood transfusion
- blood pressure, 2, 179  
aortic hypertension, 288  
and cerebral blood flow, 36, 193–94  
hypotension, 35–36, 160  
maternal, 355  
monitoring, 179–82, 306  
cuff use, 16, 179  
portal hypertension, 332  
preterm neonates, 14, 35  
*see also* pulmonary hypertension
- blood transfusion  
complications, 145–46, 148–49  
congenital heart disease, 144, 282  
conjoined twins, 349, 351–52  
craniectomy, 223  
hemoglobinopathies, 144–45  
infants under four months, 145, 146  
liver transplantation, 336  
older infants/children, 143–44  
preparation of blood products, 145–46  
preterm neonates, 14–15, 143
- blood volume, 137, 149–50
- body surface area, 109
- Bonferroni correction, 416
- bowel conditions  
atresia, 246–47, 318–19  
Hirschsprung's disease, 247  
intussusception, 248  
long-term outcomes of surgery, 420–21  
malrotation, 246  
meconium ileus, 245–46  
necrotizing enterocolitis, 14, 25, 28, 244–45, 421
- bowel distention, and nitrous oxide use, 117, 336
- box plots, 437
- BPD (bronchopulmonary dysplasia), 13, 22–23, 27, 59, 102
- brachial artery catheters, 181
- brachial plexus block, 387–88
- bradycardia, 179, 410, 411, 413  
atropine use, 16, 413
- brain, 191–97  
anesthetic considerations in neurosurgery, 194–97  
anesthetics, effects of, 10–12  
animal models, 164–65, 196  
clinical studies, 165–66  
and current clinical practice, 166–67  
sevoflurane, 116  
xenon, 172
- AVMs, 344–45
- CBF, 193–94  
autoregulation, 36, 193–94  
CPP, 175, 192  
hypocapnia, 42, 194  
monitoring, 177
- craniosynostosis, 219–20
- development, 6–7, 163–64
- encephalopathy  
hypoxic–ischemic, 20, 66, 74, 172  
of prematurity, 12
- epilepsy/seizures, 105, 197
- glucose-level abnormalities, 45, 46–47
- hydrocephalus, 197, 219
- hyperoxia, 55, 194  
and hypotension, 36
- ICP  
increased, 192, 194, 217, 219, 224–25  
and intracranial compliance, 193  
monitoring, 175
- IVH, 12, 20, 103  
monitoring, 175–77  
physiology, 192–94  
preterm neonates, 10–12, 42, 103, 419
- trauma, 175  
tumors, 322–23
- brainstem auditory-evoked potentials (BAEPs), 177
- branchial cleft cyst, 201
- breastfeeding, preoperative, 101

- breathing, 3–4  
 apnea *see* apnea  
 observation of, 105–6  
 periodic, 4, 12, 410  
 tachypnea, 411  
 TTN, 23, 264
- bronchial blockers, 126–27, 267–68
- bronchogenic cyst, 200, 271
- bronchomalacia *see* tracheomalacia
- bronchopulmonary dysplasia (BPD), 13, 22–23, 27, 59, 102
- bronchopulmonary sequestration, 200, 270–71, 360–61
- bronchoscopes (flexible fiberoptic), 128, 130, 132, 268, 318
- brown adipose tissue, 15, 63, 64
- bupivacaine, 376–77
- burns patients, 140
- caffeine, 413
- calcium, 8  
 hypocalcemia, 82, 149  
 treatment with, 14
- cancer  
 anesthetics' effect on progression, 269–70  
 CNS, 322–23  
 emergency procedures, 329–30  
 hepatoblastoma, 326  
 leukemia, 321–22  
 neuroblastoma, 257, 324–25  
 O<sub>2</sub> therapy and carcinogenesis, 54, 56  
 pheochromocytoma, 257  
 pleuropulmonary blastoma, 328–29  
 renal, 255–56, 325–26  
 retinoblastoma, 325, 345  
 soft tissue sarcomas, 327  
 treatment, 329–30, 345  
*see also* chemotherapy
- “cannot intubate, cannot ventilate”, 130–31
- capnography, 38–40, 157, 184–85, 306, 400  
 compared with transcutaneous CO<sub>2</sub>, 41
- carbon dioxide (CO<sub>2</sub>), 38–42  
 absorbents, 115  
 hypercapnia, 41–42, 73, 158, 184  
 hypocapnia, 42, 194  
 in laparoscopy, 243  
 monitoring  
 capnography, 38–40, 41, 157, 184–85, 306, 400  
 transcutaneous (PtcCO<sub>2</sub>), 40–41  
 in pregnancy, 355  
 target PaCO<sub>2</sub> levels, 41–42, 157
- carbon monoxide (CO), 115, 184
- cardiac arrest, 100–1, 313
- cardiac catheterization, 284–85, 290, 303
- cardiac murmurs, 3, 103, 106
- cardiac output (CO)  
 in the neonate, 1–2, 34  
 monitoring, 150  
 and pharmacokinetics, 110, 115  
 in pregnancy, 354–55
- cardiac transplantation, 316
- cardiomyopathy, 314–15  
 dilated, 315  
 hypertrophic, 315  
 restrictive, 315–16
- cardiopulmonary bypass (CPB), 66–67, 176–77, 282
- cardiopulmonary resuscitation *see* resuscitation
- cardiovascular system  
 and anesthetics, 113, 115, 172
- arrhythmias, 179, 222, 307  
 Ebstein's anomaly, 293  
 fetal, 357  
 long QT syndrome, 225
- cardiac medications, 113, 305
- congenital abnormalities *see* congenital heart disease
- monitoring, 2, 16, 150, 178–83, 306
- myocardial infarction (adult), 54
- physiology  
 fetal, 1, 32–33, 356  
 neonatal, 1–2, 33, 34–35, 179  
 in pregnancy, 354–55
- preoperative assessment, 3, 103, 106
- preterm neonates, 13–14, 21
- shared, in conjoined twins, 348, 352
- Carpenter syndrome, 81
- case reports, 432, 434
- case-control studies, 432, 433
- cataracts, congenital, 7
- catecholamines  
 ductus arteriosus closure, 33  
 in pheochromocytoma, 257  
 resuscitation with epinephrine, 70, 413  
 sympathetic nervous system, 34
- catheterization  
 arterial lines, 179–82, 195  
 CVCs, 149, 151, 182–83, 282, 318  
 peripheral veins, 150–51  
 PICCs, 149, 342  
 pulmonary artery, 183  
 umbilical vessels, 70, 151, 181–82
- caudal block, 261, 388–91
- causation in research studies, 429–31
- CBF *see* cerebral blood flow
- CDH *see* congenital diaphragmatic hernia
- central core disease, 79, 86, 92
- central nervous system *see* brain;  
 spinal cord
- central venous catheters (CVCs), 149, 151, 182–83, 282  
 PICCs, 149, 342  
 in single ventricle patients, 318
- central venous pressure (CVP), 149–50, 183
- centronuclear myopathy, 93
- cerebral angiography, 344–45
- cerebral blood flow (CBF), 193  
 autoregulation, 36, 193–94  
 and hypocapnia, 42, 194  
 monitoring, 177
- cerebral palsy, 55
- cerebral perfusion pressure (CPP), 175, 192
- cerebrospinal fluid (CSF), 192–93, 197
- cervical conditions *see* neck
- Cesarean sections, 7, 23, 54–55, 264
- CHAOS syndrome, 359–60
- CHARGE syndrome, 77, 83–84, 104
- CHD *see* congenital heart disease
- chemotherapy, 329  
 CNS tumors, 323  
 leukemia, 322  
 neuroblastoma, 324  
 retinoblastoma, 325, 345  
 teratoma, 328  
 Wilms tumor, 325
- chest wall compliance, 124, 265
- childbirth  
 Cesarean sections, 7, 23, 54–55, 264  
 O<sub>2</sub> therapy, 54–55
- chloral hydrate, 401–2
- chloride ions, 141–42, 244
- chlorohexidine, 7
- chloroprocaine, 377
- choanal atresia, 83, 104, 199
- cholesteatoma, 204–5
- choroid plexus tumors, 323
- chromosomal abnormalities, 76–84  
*see also* CHARGE syndrome;  
 DiGeorge syndrome; Down syndrome; Williams syndrome
- circadian rhythm disruption, 56
- circulation, fetal, 1, 32–33
- circumcision, 258–60, 386–87
- cisatracurium, 121, 336
- citrate, in stored blood, 149
- clear cell sarcoma, renal, 256, 326
- clearance of drugs, 110–12  
 hepatic function, 5, 111–12, 118, 336, 370, 371  
 population pharmacokinetic modeling, 113–14  
 renal function, 110–11, 370
- cleft lip/palate, 203, 204, 211–12, 214–17  
*see also* Robin sequence
- clinical examination, preoperative, 105–6, 304–5
- clinical research *see* research
- cloacal exstrophy, 257–58
- clonidine, 376, 377
- CLOVES syndrome, 342

## Index

- coagulation  
 coagulopathies, 147–48  
 liver disease/transplantation, 333, 337  
 neonatal, 4–5  
 platelets, 5, 146–47  
 preoperative, 106  
 preterm neonates, 14  
 and regional anesthesia, 383  
 and sclerotherapy, 343
- Code of Federal Regulations research categories, 427
- codeine, 370
- cognitive impairment  
 and anesthesia/surgery, 165–66, 196, 419–21, 423  
 in preterm infants, 419  
 and sedation, 399
- cohort studies, 432, 433
- colloids, 140–41
- colon *see* bowel conditions
- colorimetric capnography, 40
- complete atrioventricular canal (CAVC), 285, 310–11, 318–19
- computed tomography (CT), 342
- conductive heat loss, 64
- congenital abnormalities, 76–82  
*see also specific conditions*
- congenital adrenal hyperplasia, 8, 78, 258
- congenital cystic adenomatoid malformation (CCAM), 200–1, 270, 360–61
- congenital diaphragmatic hernia (CDH), 271–73, 276–78  
 anesthetic considerations, 273, 278  
 diagnosis, 104, 276  
 epidemiology, 276  
 fetal interventions, 272, 277–78, 361  
 immediate treatment, 73, 276–77  
 nature of the defect, 272, 276  
 outcomes, 272, 278  
 surgical repair, 272–73, 277  
 ventilation, 59, 157, 276–77, 278
- congenital heart disease (CHD), 3, 21–22, 280–99  
 airway involvement, 200  
 pulmonary artery slings, 299  
 ToF absent PV, 299  
 vascular rings, 299  
 anesthetic considerations (general), 280–82, 303–7  
 associated syndromes, 77, 83, 219, 281–82, 303–4, 314  
 blood transfusions, 144, 282  
 classification, 283, 303  
 decreased pulmonary flow  
 critical pulmonary stenosis, 289–90, 358–59  
 Ebstein's anomaly, 293  
 pulmonary atresia intact ventricular septum, 290  
 pulmonary atresia with VSD, 290–91  
 Tetralogy of Fallot, 291–92, 309–10, 319  
 decreased systemic flow  
 aortic coarctation, 287–88, 308–9  
 critical aortic stenosis, 288, 358  
 interrupted aortic arch, 288–89  
 definitive vs. palliative procedures, 302–3  
 diagnosis, 3, 103, 280  
 fetal surgery, 357–59, 362–63  
 left-to-right shunts, 283  
 ALCAPA, 287  
 aortopulmonary window, 286  
 ASD, 283–84, 309  
 AVSD, 285, 310–11, 318–19  
 PDA *see* patent ductus arteriosus  
 truncus arteriosus, 285–86  
 VSD, 284–85, 291, 307–8  
 mixing lesions/single ventricle  
 HLHS, 294–96, 312–13, 317–18  
 impaired pulmonary flow, 297  
 mitral stenosis, 289  
 noncardiac surgery, 311–12, 317–18  
 TGA, 293–94, 311  
 tricuspid atresia, 296–97  
 monitoring, 41, 180–81, 184, 306  
 noncardiac surgery, 302  
 day cases, 408  
 general preoperative procedures, 302–7  
 specific conditions, 307–19  
 outcomes of surgery, 421–23  
 neurodevelopmental, 282–83, 420, 423  
 preterm infants, 14  
 pulmonary venous obstruction  
 pulmonary vein stenosis, 298  
 TAPVR, 161, 297–98  
 table of abbreviations, 82
- congenital lobar emphysema, 271
- congenital pigmented nevus, 226
- congestive heart failure (CHF), 2, 308
- conjoined twins  
 anesthetic considerations, 350–53  
 classification, 347  
 postoperative care, 353  
 preoperative stage, 347–49  
 separation, 349–50
- connective tissue disorders, 79, 83, 91–92
- consent, 16, 100, 167, 348  
 entry into clinical trials, 427
- controlled clinical trials, 432, 433, 434–35
- convective heat loss, 64
- co-oximeters, 57
- coronary artery abnormalities  
 ALCAPA, 287  
 RV dependent coronary circulation, 290  
 ToF, 292  
 coronary sinus ASD, 283
- corticosteroids  
 antenatal, promotion of lung maturation, 22, 264  
 for leukemia, 322, 329  
 for PONV, 208
- cotinine, 101
- CPAP (continuous positive airway pressure), 13, 23, 72
- CPP (cerebral perfusion pressure), 175, 192
- craniectomy  
 blood loss during, 219–20, 223–24  
 endoscopic strip assisted, 220, 223, 224  
 open, 220, 223–24  
 VAE, 196, 224
- craniofacial disorders, 203  
 cleft lip/palate, 203, 204, 211–12, 214–17  
 craniosynostosis, 81, 88, 203, 217–25, 226  
 difficult airways, 81, 129, 131–32, 203  
 Robin sequence, 81, 88–89, 129, 132, 204, 212–14  
 Treacher Collins syndrome, 81, 89, 129, 203, 213
- craniopagus twins, 347, 352–53
- craniopharyngioma, 323
- cranioplasty, spring-assisted, 220, 223
- creatinine, 6
- cri du chat syndrome, 77
- CRIES scale, 372
- critical aortic stenosis, 288, 358
- critical pulmonary stenosis, 289–90, 358–59
- cross-over studies, 435
- cross-sectional studies, 435
- Crouzon syndrome, 81, 88, 129, 203, 219
- cryoprecipitate, 147
- cumulative incidence, 429
- CVCs *see* central venous catheters
- CVP (central venous pressure), 149–50, 183
- cytotoxicity, 56, 70, 296, 305  
 determination of cause, 3  
 tet spells, 291–92, 310
- cyclopropyl MOC etomidate (CPMM), 173
- cystic fibrosis, 245, 247
- cystic hygroma, 127, 202, 226–28
- cytochrome p450 enzymes, 6, 111–12, 118
- cytomegalovirus-negative blood products, 145
- data mining, 416
- data types, 436
- databases (registries), 415–18
- day surgery, 405–8

- age requirements, 101, 405–6, 408  
 infants with chronic diseases, 408  
 infants with URIs, 406–8  
 postoperative analgesia, 408  
 postoperative apnea risk, 100, 405–6
- deafness *see* ear surgery
- delirium, postanesthesia, 115
- dermoid cyst, 201, 271
- desflurane, 116–17
- desmopressin, 148
- dexamethasone, 208, 322
- dexmedetomidine, 100, 119, 402–3
- dextrose infusions, 17, 46, 48
- diaphragm, 265  
*see also* congenital diaphragmatic hernia
- diaphragmatic spinal muscular atrophy (SMARD), 93
- diazepam, 118
- DiGeorge syndrome (velocardiofacial syndrome), 76–82, 213, 281  
 variant (conotruncal anomaly), 77
- dilated cardiomyopathy, 315
- disinfection, skin, 7
- disorders of sexual development, 78, 258
- distribution (statistics), 436–37
- diuretics, 27, 196, 333
- dopamine, 34
- Doppler sonography  
 transcranial, 177  
 for VAE detection, 224
- dorsalis pedis catheters, 181
- double lumen endotracheal tubes, 267
- Down syndrome (trisomy 21), 76, 105, 129, 181, 318–19, 322
- Downing-Mara type EB, 86
- doxycycline, 343
- drain placement, 28, 341–42
- drug dosage  
 loading dosages, 110  
 pharmacodynamic considerations, 112–13  
 population pharmacokinetic modeling, 113–14  
 scaled modeling, 109–12  
 weaknesses of animal models, 164
- drug history, 305, 399
- drug metabolism, 5, 111–12, 118, 336, 370, 371
- drug resistance, placental, 55
- ductus arteriosus *see* patent ductus arteriosus
- ductus venosus, 5, 32, 33
- duodenal atresia, 246–47, 318–19
- dystroglycanopathies, 91–92
- ear surgery  
 cholesteatoma removal, 204–5  
 cochlear implants, 205  
 monitoring, 177  
 myringotomy, 204
- EB (epidermolysis bullosa), 85–86  
 Ebstein's anomaly, 293
- echocardiography, 150, 183
- ECMO (extracorporeal membrane oxygenation), 161, 277, 278
- Ehlers–Danlos syndrome, 79
- electrocardiography (ECG), 2, 179
- electrocautery, 207, 209
- electroencephalography (EEG), 116, 175–76, 399
- electrolytes, 6, 137–38  
 hypertonic saline, 141–42, 196  
 in liver transplantation, 336–37  
 in neurosurgery, 196  
 postoperative management, 142  
 preterm infants, 15, 102, 138  
*see also* hyperkalemia
- elimination of drugs *see* clearance of drugs
- embolization of cerebral AVMs, 344–45
- embryology  
 brain, 191–92  
 lung, 22, 264
- emergence from anesthesia, 117
- Emery–Dreifuss muscular dystrophy, 92
- emissary veins, 219–20
- encephalopathy  
 hepatic, 333  
 hypoxic–ischemic, 20, 66, 74  
 of prematurity, 12  
 protective effect of xenon, 172
- endocardial cushion defect, 285, 310–11, 318–19
- endocarditis prophylaxis, 305–6
- endoscopic assisted strip craniectomy (ESC), 220, 223, 224
- endotracheal intubation (ETT)  
 airway fire risk during electrocautery, 209  
 cleft palate, 204, 214–16  
 confirmation of correct placement by capnography, 40  
 cuffed vs. uncuffed, 13, 23  
 difficult airways, 128–30  
 “cannot intubate, cannot ventilate”, 130–31  
 double lumen tubes, 267  
 mediastinal masses, 127  
 muscle relaxant use, 128  
 nasal, 131–32, 196  
 neuromuscular junction monitoring before extubation, 178  
 obstructed tubes, 158  
 one-lung ventilation, 126–27, 267–68
- preterm infants, 16–17  
 suspension laryngoscopy, 208–9  
 technique, 125  
 tracheal stenosis caused by, 199–200, 206–7  
 ventilation modes, 23–25  
 vocal cord paralysis, 207
- ependymoma, 323
- epidermolysis bullosa (EB), 85–86
- epidural anesthesia/analgesia  
 caudal block, 261, 388–91  
 CDH repair, 278  
 glucose monitoring, 47  
 maternal, in fetal interventions, 362, 363  
 postoperative, 376–77  
 thoracic/lumbar, 269–70  
 caudal approach, 376, 391–94  
 direct approach, 394–95  
 ultrasound guidance, 382–83, 388, 389–90, 391–95  
 urological surgery, 257–58, 261
- epilepsy, 105, 197
- epinephrine  
 ductus arteriosus closure, 33  
 in resuscitation, 70, 413
- equipose in clinical trials, 426–27
- erythema toxicum neonatorum, 7
- erythrocytes *see* red blood cells
- erythropoietin, 142–43
- esophageal atresia/tracheo-esophageal fistula, 104, 200, 273–74, 319  
 VACTERL syndrome, 87–88
- esophageal monitoring of temperature, 67, 186
- esophageal stethoscopes, 179
- ethics  
 of research, 426–28  
 resuscitation of preterm infants, 29–30  
 separating conjoined twins, 348  
*see also* informed consent
- etomidate analog, 173
- ETT *see* endotracheal intubation
- evaporative heat loss, 15, 63, 64
- evidence pyramid, 432
- evoked potentials (EPs), 177, 205
- EXIT procedure  
 anesthetic considerations, 73, 364  
 CCAM/BPS, 361  
 lymphatic malformations/teratoma, 227, 359
- exomphalos (omphalocele), 25, 235–36
- extracorporeal membrane oxygenation (ECMO), 161, 277, 278
- eye  
 congenital cataracts, 7  
 and craniosynostosis, 220, 222  
 retinoblastoma, 325, 345  
 ROP, 20, 56, 103



## Index

- factor VIII/factor IX treatment, 147
- Fallop's tetralogy (ToF), 291–92, 309–10, 319  
with absent pulmonary valve, 299
- fasting, preoperative, 47, 101, 139, 195, 399–400
- femoral artery catheters, 181
- femoral nerve block, 387
- fentanyl, 17, 119, 375
- fetal endoluminal tracheal occlusion (FETO), 272, 277–78
- fetal interventions, 354–65  
airway obstruction, 359–60  
anesthetic considerations  
fetal, 362–63, 364, 365  
maternal, 362, 363–65  
cardiac, 357–59, 362–63  
CCAM, 360–61  
CDH, 272, 277–78, 361  
hydronephrosis, 254, 354  
maternal physiology, 354–55  
monitoring, 364  
myelomeningocele, 360, 364  
posterior urethral valves, 252–53  
resuscitation, 55, 363  
teratoma, 328, 359, 361  
twin-to-twin transfusion syndrome, 362
- fetal mitochondrial disease, 94
- fetal neurodevelopment, 191–92, 356–57, 369
- fetal physiology, 355–57  
cardiovascular, 1, 32–33, 356  
hemoglobin, 4  
hepatic, 5  
pain, 356–57, 364, 369  
pulmonary, 33  
renal, 138  
respiration, 356
- fever, 62
- fibroblastic tumors, 327
- fire hazards in the operating room (lasers), 207, 209
- fluid management, 138–42  
cardiac patients, 306–7  
colloids, 140–41  
conjoined twins, 351–52  
and contrast agents, 343  
craniosynostosis surgery, 222–23  
gastroschisis, 140, 234  
glucose infusions, 17, 46, 47–48, 138–39, 196–97  
and hyperglycemia, 46, 48  
hypertonic saline, 141–42, 196  
intra-abdominal procedures, 242–43  
liver disease, 332  
monitoring fluid status, 149–50  
myopathy, 95  
neurosurgery, 196–97  
in the NICU, 26–27  
physiology, 6, 15, 137–38  
postoperative, 142
- preterm neonates, 15, 26–27, 137, 139  
*see also* blood transfusion; vascular access
- Fogarty® embolectomy catheter, 126, 268
- fontanelles, 192, 193
- foramen ovale (FO), 1, 33, 359
- forced-air warming devices, 66  
4–2–1 rule, 138
- Fraser syndrome, 129
- Freeman Sheldon syndrome, 80
- frenotomy/frenectomy, 206
- fresh frozen plasma (FFP), 147
- Fukuyama congenital muscular dystrophy, 92
- fundoplication, after HLHS  
palliation, 317–18
- gastrointestinal (GI) tract  
anorectal malformations, 247–48  
duplications, 243  
esophageal abnormalities, 87–88, 104, 200, 273–74, 319  
herniation through abdominal wall *see* gastroschisis; omphalocele  
Hirschsprung's disease, 247  
intestinal atresia, 246–47, 318–19  
intussusception, 248  
malrotation, 246  
meconium ileus, 245–46  
necrotizing enterocolitis, 14, 25, 28, 244–45, 421  
outcomes of surgery, 420–21  
preoperative assessment, 104, 242  
pyloric stenosis, 243–44  
reflux, 14
- gastroschisis, 25, 140, 233–35
- gastrostomy, after HLHS palliation, 317–18
- GBS (group-B Streptococcus), 27–28
- genitalia, ambiguous, 78, 258
- genitourinary system *see* urogenital system
- genomics, effect of hyperoxia, 53, 56
- germ cell tumors, 256–57, 327–28, 359, 361
- glomerular filtration rate (GFR), 6, 110–11, 138
- glossoptosis, 132, 204
- glucose, 45–48  
and anesthetics, 47  
hyperglycemia, 15, 46–47, 48  
hypoglycemia, 7–8, 45–46, 47, 103  
infusions, 17, 46, 47–48, 138–39, 196–97  
in liver transplantation, 337  
monitoring, 47, 140  
preterm neonates, 15, 17, 103
- glycogen storage diseases, 94
- glycolysis, 94
- Goldenhar syndrome, 81, 203, 213, 214, 215
- hamartoma, mesenchymal, 326
- hand deformities, 225–26
- head  
examination, 105, 192, 193  
size of, 192  
trauma, 175
- hearing loss *see* ear surgery
- heart *see* entries at cardiac and cardiovascular system
- heat rash (miliaria), 7
- helium–oxygen mixtures, 127
- hemangioma, 201–3
- hematocrit, 106, 142, 305
- hematology, 4–5  
anemia, 4, 14, 142–43  
complications of cancer treatment, 329  
and cyanosis, 305  
leukemia, 321–22  
liver disease, 333  
preterm neonates, 14–15, 102, 143, 411, 412  
*see also* coagulation
- hemifacial microsomia (Goldenhar syndrome), 81, 203, 213–5
- hemodynamics  
conjoined twins, 348, 352  
fetal, 1, 32–33  
and hypothermia, 64–65  
liver disease/transplantation, 332, 336  
neonatal, 1–2, 33–35  
in pregnancy, 354–55, 356  
*see also* blood pressure; cerebral blood flow
- hemoglobin  
fetal, 4, 14  
hemoglobinopathies  
blood transfusions, 144–45  
sickle cell disease, 144–45  
thalassemia, 145  
O<sub>2</sub> carrying function, 52, 57
- hemolytic disease of the newborn, 25–26
- hemophilia, 147
- hemorrhage, 140  
blood conservation techniques, 223–24  
craniectomy, 219–20, 223–24  
intraventricular, 12, 20, 103  
tonsillectomy, 208  
vascular malformations, 202–3  
*see also* blood transfusion
- hepatic encephalopathy, 333
- hepatic function/disorders *see* liver
- hepatoblastoma, 326
- hepatopertoenterostomy (Kasai procedure), 248
- hepatopulmonary syndrome, 333, 334
- hepatorenal syndrome, 333, 334–35
- Herlitz-type EB, 85–86
- hernia  
inguinal, 16, 237–38, 384–85  
umbilical, 236–37
- herniation of brain contents, 192

- Hespan, 141  
heterotaxy, 281–82  
Hextend, 141  
hierarchy of evidence, 432  
high frequency jet ventilation (HFJV), 24–25, 209  
high frequency oscillatory ventilation (HFOV), 24, 158–61  
HLHS (hypoplastic left heart syndrome), 294–96  
  noncardiac surgery, 312–13, 317–18  
Horner syndrome, 324  
hydrocele, 238  
hydrocephalus, 197, 219  
hydronephrosis, 254–55, 354  
hydrops fetalis, 73–74, 328  
hydroxyethyl starch (HES), 141  
hypercalcemia, 8  
hypercapnia (hypercarbia), 73, 158, 184  
  permissive, 41–42, 157  
hypercyanotic (tet) spells, 291–92, 310  
hyperglycemia, 15, 46–47, 48  
hyperinsulinemia, 7–8, 46  
  Beckwith–Wiedemann syndrome, 78, 84  
hyperkalemia, 140, 146, 148–49, 223, 336–37  
hyperoxia, 13, 17, 51, 53–56, 58–59, 194  
hypertension  
  aortic, 288  
  portal, 332  
  pulmonary *see* pulmonary hypertension  
hyperthermia, 62  
  malignant, 83, 86, 87, 93, 96, 120  
hyperthyroidism, 8  
hypertonic saline, 141–42, 196  
hypertrophic cardiomyopathy, 315  
hyperventilation, 194  
hypocalcemia, 82, 149  
hypocapnia, 42, 194  
hypoglycemia, 7–8, 45–46, 47, 103  
hypokalemia, 102, 337  
hyponatremia, 15, 141–42, 225, 337  
hypoparathyroidism, 8, 281  
hypoplastic left heart syndrome (HLHS), 294–96  
  noncardiac surgery, 312–13, 317–18  
hypospadias, 260–61  
hypotension, 35–36, 160  
  in pregnancy, 355  
hypothalamus, 5, 62  
hypothermia, 63–65, 66  
  defined, 62  
  liver surgery, 337  
  preterm neonates, 15, 73  
  therapeutic, 66–67, 74  
hypothyroidism, 8
- hypotonia, congenital, 91–96  
  anesthetic considerations (and MH), 86, 93, 95–96, 120  
  congenital myopathy, 92–93  
  central core disease, 79, 86, 92  
  glycogen storage diseases, 94  
  mitochondrial diseases, 79, 94–95  
  motor neuron disorders, 93  
  muscular dystrophy, 80, 91–92  
  myasthenia gravis, 93–94  
hypoxia, 4, 15  
  and CBF, 194  
  with normal PaO<sub>2</sub>, 52  
hypoxic pulmonary vasoconstriction (HPV), 33, 265  
hypoxic–ischemic encephalopathy (HIE), 20, 66, 74  
  protective effect of xenon, 172
- ibuprofen, 208, 373–74  
ICP *see* intracranial pressure  
ilioinguinal/iliohypogastric block, 384–85  
imaging  
  biopsies, 342  
  CDH, 276  
  feed and sleep technique, 398  
  mediastinal masses, 127  
  regional anesthesia, 382–83  
  single ventricle conditions, 318  
  tumors, 322, 325  
  *see also* ultrasound  
immunization, preoperative, 101–2  
inborn errors of metabolism  
  mitochondrial diseases, 79, 94–95  
  mucopolysaccharidoses, 78, 84–85, 129  
incidence, 429  
induction of anesthesia  
  CHD surgery, 281, 282  
  conjoined twins, 350  
  intravenous agents, 17, 117–18, 173, 195, 407  
  neurosurgery, 195–96  
  parental presence or absence, 99, 405  
  preterm neonates, 17  
  rapid sequence induction, 196, 242  
  *see also* inhalational anesthetics  
infantile fibrosarcoma, 327  
infections  
  sepsis, 27–28, 103  
  transfusion-related, 148  
  upper respiratory tract, 103–4, 205–6, 406–8  
inferior vena cava (IVC), fetal, 32  
inflammation, 55, 56  
information bias, 431  
informed consent, 16, 100, 167, 348  
  entry into clinical trials, 427  
inguinal hernia, 16, 237–38, 384–85
- inhalational anesthetics  
  adverse effects, 115–16, 407  
  cochlear implant surgery, 205  
  infants with URIs, 407  
  liver transplantation, 336  
  monitoring, 185  
  neurosurgery, 195  
  pharmacokinetics, 114–17  
  in pregnancy, 355, 356, 363  
  preterm neonates, 17  
  xenon, 171–73  
insulin  
  hyperinsulinemia, 7–8, 46  
  Beckwith–Wiedemann syndrome, 78, 84  
  therapy, 15, 47  
intention to treat analysis, 435  
intermittent positive pressure ventilation (IPPV), 24  
intersex disorders (disorders of sexual development), 78, 258  
interventional radiology (IR), 340–45  
intestinal conditions *see* bowel conditions  
intracranial pressure (ICP)  
  increased, 192, 194, 217, 219, 224–25  
  and intracranial compliance, 193  
  monitoring, 175  
intraosseous (IO) lines, 151  
intravenous access *see* vascular access  
intravenous induction of anesthesia, 17, 117–18, 173, 195, 407  
intraventricular hemorrhage (IVH), 12, 20, 103  
intubation *see* endotracheal intubation  
intussusception, 248  
iodine, 7, 8  
irradiation of blood products, 145–46  
isoflurane, 117, 336
- jaundice, 5, 25–26  
  *see also* biliary atresia  
jet ventilation, 24–25, 209  
Jeune syndrome, 80  
joint contractures (arthrogryposis), 80, 86–87  
jugular veins, 150, 182  
juvenile myelomonocytic leukemia (JMML), 322
- Kasai portoenterostomy, 248  
Kearns–Sayre syndrome, 79  
Kerner–Morrison syndrome, 324  
ketamine, 100, 117–18, 401  
  contraindications, 58, 195, 315, 401  
ketorolac, 374  
“keyhole sign”, 253  
kidney  
  elimination of drugs, 110–11, 370  
  hepatorenal syndrome, 333, 334–35

## Index

- kidney (*cont.*)  
 hydronephrosis, 254–55, 354  
 physiology, 5–6, 137–38  
 preterm neonates, 15, 138  
 tumors, 255–56, 325–26
- King Denborough syndrome, 79
- Kleeblattschaedel syndrome, 81
- Klippel Feil syndrome, 87
- laboratory tests, 106
- lactated Ringer's solution, 196
- lactic acidosis, 94
- laparoscopy, 243, 254, 317–18
- Larsen syndrome, 129
- laryngeal mask airways (LMA)  
 (SGA devices), 70, 128–30, 407
- laryngeal papillomatosis, 208–9
- laryngoscopy  
 direct, 125, 318  
 indirect/video-assisted, 128, 130  
 suspension laryngoscopy, 208–9
- laryngospasm, 401, 407
- laryngotracheoplasty, 206–7
- laser surgery, 207, 209
- latex sensitivity, 105
- Leigh syndrome, 79, 95
- leukemia, 321–22
- leukocyte reduction (blood products), 145
- ligamentum arteriosum, 299
- ligamentum flavum, 391
- ligamentum venosum, 5
- limb-girdle muscular dystrophy, 92
- lipid infusions, 139
- liver  
 drug metabolism, 5, 111–12, 118, 336, 370, 371  
 end-stage disease, 332–33  
 fetal, 5  
 jaundice, 5, 25–26  
 physiology, 5, 15  
 preterm neonates, 15  
 transplants, 332–38  
 anesthetic considerations, 334–38  
 tumors, 326–27
- local anesthetics  
 circumcision, 259  
 in epidurals, 355, 376–77  
 neosaxitoxin, 173  
 pharmacology, 376–77, 382, 383  
 in pregnancy, 355
- Logan bows, 216
- long QT syndrome, 225
- lorazepam, 118
- lost to follow-up, 435
- lower limb, femoral nerve block, 387
- lumbar puncture, 322–23
- lung *see* respiratory system
- lupus erythematosus, 78
- lymphangiography, 344
- lymphatic malformations, 127, 202, 226–28  
 EXIT procedures, 227, 359  
 sclerotherapy, 342–44
- MAC (minimum alveolar concentration), 115, 355, 356
- magnetic resonance imaging (MRI), 322, 325, 398
- major aortopulmonary collaterals (MAPCAs), 290–91
- malignant hyperthermia (MH), 83, 86, 87, 93, 96, 120
- malrotation of the bowel, 246
- mandibular distraction  
 osteogenesis, 131–32
- Marfan syndrome, 79
- matched-pair analysis, 435
- mean, arithmetic, 437  
 mean, geometric, 437
- meconium ileus, 245–46
- meconium-stained amniotic fluid, 72
- mediastinal masses, 104, 127–28, 274
- mesoblastic nephroma, 325
- meta-analysis, 432, 433
- metabolic acidosis, 15, 41, 64–65, 141–42, 244
- metabolic alkalosis, 244
- metabolic disorders  
 mitochondrial diseases, 79, 94–95  
 mucopolysaccharidoses, 78, 84–85, 129
- metabolic rate, 109
- methohexital, 117
- methoxycarbonyl carboetomidate, 173
- methoxycarbonyl etomidate, 173
- methyl ethyl ethers, 114–17, 195, 336, 407
- MH (malignant hyperthermia), 83, 86, 87, 93, 96, 120
- microbiome, 7
- microcuff Kimberly Clark tubes, 216
- micrognathia, 214
- midazolam, 12, 100, 118, 400
- milia, 7
- miliaria (heat rash), 7
- minimum alveolar concentration (MAC), 115, 355, 356
- mitochondrial diseases, 79, 94–95
- mitral valve stenosis, 289
- Moebius syndrome, 203
- monitoring, 175–86  
 cardiovascular system, 2, 16, 150, 178–83, 306  
 CNS function, 175–77  
 conjoined twins, 351  
 craniostylosis surgery, 222, 224  
 fetal, 364  
 fluid status, 149–50  
 inhaled anesthetics, 185  
 neuromuscular blockade, 178
- preterm infants, 16
- respiratory, 183–85, 400  
 CO<sub>2</sub>, 38–42, 157, 184–85, 306, 400  
 oxygen, 56–58, 183–84  
 for postoperative apnea, 100, 412  
 during sedation, 175–76, 400  
 temperature, 66–67, 185–86
- Monro–Kellie hypothesis, 192
- morphine, 119, 374–75
- motor neuron disorders, 93
- motor-evoked potentials (MEPs), 177
- mucopolysaccharidoses, 78, 84–85, 129
- Muenke syndrome, 219
- multidisciplinary teams  
 care of conjoined twins, 349  
 in IR, 341  
 in a NICU, 19
- multiminicore disease (MMD), 92–93
- multiple pterygium syndrome, 80
- muscle relaxants  
 bradycardia risk, 413  
 conjoined twins, 350  
 contraindicated in myopathy, 95, 120  
 intubation, 128  
 liver transplantation, 335, 336  
 monitoring, 178  
 pharmacokinetics, 120–21  
 rapid sequence induction, 196  
 reversal agent (sugammadex), 173
- muscle–eye–brain disease, 91–92
- muscular dystrophies, congenital, 80, 91–92
- Mustard procedure, 294, 311
- myasthenia gravis, 93–94
- myelination, 7, 382
- myelomeningocele, 104–5, 192, 197  
 prenatal repair, 360, 364
- myocardial infarction (adult), 54
- myopathy, 91–96  
 anesthetic considerations (and MH), 86, 120  
 central core disease, 79, 86, 92  
 centronuclear, 93  
 glycogen storage diseases, 94  
 mitochondrial disease, 79, 94–95  
 motor neuron disorders, 93  
 multiminicore disease, 92–93  
 muscular dystrophy, 80, 91–92  
 myasthenia gravis, 93–94  
 nemaline, 92
- myotonia congenita, 79
- myotonic dystrophy, 80, 92
- myringotomy, 204
- Nager syndrome, 81
- naloxone, 70–72
- nasal cannulae, 23
- nasal intubation, 131–32, 196
- nasal passage blockage (choanal atresia), 83, 104, 199



- nasogastric tube decompression, 242  
nasopharyngeal monitoring, 67, 185–86  
nausea and vomiting, postoperative (PONV), 205, 208  
near-infrared spectroscopy (NIRS), 176–77, 289  
neck  
  branchial cleft cyst, 201  
  in craniosynostosis, 220  
  cystic hygroma, 202, 226–28  
  examination, 105  
  Klippel Feil syndrome, 87  
  spinal instability, 105  
  thyroglossal duct cyst, 201  
necrotizing enterocolitis (NEC), 14, 25, 28, 244–45, 421  
needle cricothyrotomy, 130–31  
nemaline myopathies, 92  
neonatal abstinence syndrome, 21  
Neonatal Infant Pain Scale (NIPS), 372  
neonatal intensive care unit *see* NICU  
Neonatal Pain Agitation and Sedation Scale (N-PASS), 371, 399  
neosaxitoxin (neoSTX), 173  
nephroblastoma (Wilms tumor), 255–56, 325  
nephroma, mesoblastic, 325  
neural tube defects, 104–5, 192, 197  
  prenatal repair, 360, 364  
neuraxial anesthesia/analgesia  
  caudal block, 261, 388–91  
  CDH repair, 278  
  glucose monitoring, 47  
  inguinal hernia repair, 238  
  maternal, in fetal interventions, 362, 363  
  postoperative, 376–77  
  preterm infants, 17  
  safety, 382, 412  
  thoracic/lumbar, 269–70  
    caudal approach, 376, 391–94  
    direct approach, 394–95  
  ultrasound guidance, 382–83, 388, 389–90, 391–95  
  urological surgery, 257–58, 261  
neuroblastoma, 257, 324–25  
neurocristopathy syndrome, 324  
neurodevelopment, 6–7, 163–64  
  embryology, 191–92  
  pain pathways, 356–57, 369  
  postoperative, 282–83, 419–21, 423  
  preterm infants, 10–12, 419, 421  
  spinal cord, 191–92, 388  
neurologic conditions  
  cervical spine instability, 105  
  with craniosynostosis, 219–20  
  encephalopathy  
    hepatic, 333  
    hypoxic–ischemic, 20, 66, 74, 172  
    of prematurity, 12  
  epilepsy/seizures, 105, 197  
  and glucose-level abnormalities, 45, 46–47  
  hydrocephalus, 197, 219  
  hyperoxia-related, 55  
  hypocapnia-related, 42, 194  
  and hypotension, 36  
  IVH, 12, 20, 103  
  myelomeningocele, 104–5, 192, 197  
    prenatal repair, 360, 364  
  in the NICU, 20–21  
  in preterm neonates, 10–12, 42, 103, 419  
  surgery, 194–97  
  traumatic brain injury, 175  
  neurologic function monitoring, 175–77  
  neuromuscular blockers *see* muscle relaxants  
  neurotoxicity of anesthetics, 10–12  
    animal models, 164–65, 196  
    clinical studies, 165–66  
    and current clinical practice, 166–67  
    neuroprotective effect of xenon, 172  
    sevoflurane, 116  
  neurotransmitters, 112–13  
  nevus, 226  
NICU (neonatal intensive care unit), 19–30  
  admission figures, 19  
  cardiac conditions, 21–22, 28  
  ethics of resuscitation, 29–30  
  fluid management, 26–27  
  gastrointestinal conditions, 25, 28  
  healthcare staff, 19  
  midazolam use, 12, 400  
  neurologic conditions, 20–21  
  postoperative care, 29  
  respiratory conditions, 22–23  
  sepsis, 27–28  
  surgical procedures carried out in, 28–29  
  thermoregulation, 27  
  ventilation modes, 23–25  
Nikaidoh operation, 294  
nitrogen gas, end-tidal monitoring, 185  
nitrous oxide, 117  
  contraindications, 205, 278, 336  
NMDA (N-methyl-d-aspartate) receptors  
  and ketamine, 401  
  and xenon, 171, 172  
nociception  
  fetal, 356–57, 364, 369  
  neonatal, 29, 112–13, 163, 369  
non-invasive positive pressure ventilation (NIPPV), 23  
non-steroidal anti-inflammatory drugs (NSAIDs), 207–8, 373–74  
Noonan syndrome, 78, 84  
norepinephrine, 33, 34  
Norwood procedure, 295–96, 312, 422  
number needed to treat (NNT), 418, 435  
obstructive (sleep) apnea, 207, 217–18, 410, 411  
odds ratio, 435  
oliguria, 150  
omphalocele, 25, 235–36  
one-lung ventilation (OLV), 125–27, 266–68  
ophthalmology *see* eye  
opioids, 374–76, 423  
  and apnea, 370, 411, 412  
  choice of, 216  
  dosage, 369, 374–75  
  in epidurals, 377  
  neonatal abstinence syndrome, 21  
  pharmacokinetics, 119–20, 370, 374, 375  
  preterm neonates, 17, 374  
  tolerance and withdrawal, 375–76  
opsoclonus–myoclonus–ataxia syndrome, 324  
oral cavity examination, 105  
orchiectomy, 256  
oscillometric BP monitors, 179  
osteogenesis imperfecta, 80  
ostium primum (endocardial cushion) defect, 285, 310–11, 318–19  
ostium secundum ASD, 283–84, 309  
otitis media, 204–5  
otolaryngologic conditions, 199–209  
  adenotonsillectomy, 207–8, 408  
  ankyloglossia, 206  
  choanal atresia, 83, 104, 199  
  cysts, 201  
    bronchogenic, 200, 271  
    CCAM, 200–1, 270, 360–61  
  ear conditions, 177, 204–5  
  laryngeal papillomatosis, 208–9  
  pulmonary sequestration, 200, 270–71, 360–61  
  sinusitis, 205–6  
  tracheal stenosis, 199–200, 201, 206–7, 218  
  tracheomalacia, 200, 201  
  vascular malformations, 201–3, 342–44  
  vocal cord paralysis, 207  
*see also* craniofacial disorders  
outcomes, 415–24  
  bowel surgery, 420–21  
  cardiac surgery, 282–83, 420, 421–23  
  in CDH, 272, 278  
  neurodevelopmental, 282–83, 419–21, 423  
  painful procedures, 423  
  in preterm infants, 418–19  
  in research studies, 429  
  risk adjustment, 418  
  use of registry data, 415–18  
outpatient surgery, 405–8  
  age requirements, 101, 405–6, 408  
  infants with chronic diseases, 408  
  infants with URIs, 406–8  
  postoperative analgesia, 408  
  postoperative apnea risk, 100, 405–6

## Index

- oxygen (O<sub>2</sub>)  
 CaO<sub>2</sub> (arterial content), 52  
 cerebral blood flow, 194  
 cerebral metabolic rate (CMRO<sub>2</sub>), 193  
 ductus arteriosus closure, 33  
 in the fetus, 356  
 FiO<sub>2</sub> (fraction of inspired O<sub>2</sub>), 51, 57, 58  
 hypoxia, 4, 15, 52, 194  
 monitoring, 56–58, 183–84  
 oxidative stress, 52–53, 54, 55–56  
 PaO<sub>2</sub> (arterial partial pressure), 51–52, 57–58  
 physiology, 4, 51–52, 265, 356  
 PiO<sub>2</sub> (partial pressure of inspired O<sub>2</sub>), 51  
 saturation, 52, 157  
   rSO<sub>2i</sub> (regional saturation index), 176–77  
   SaO<sub>2</sub> (arterial), 56–57  
   SpO<sub>2</sub> (peripheral), 57–58, 183–84  
   targets, 70, 72–73  
 therapy, 58–59  
   apnea, 58, 413  
   CDH, 59, 157, 277  
   Caesarean sections, 54–55  
   ECMO, 161, 277, 278  
   hazards of hyperoxia, 13, 17, 51, 53–56, 58–59, 194  
   intrauterine resuscitation, 55  
   in myocardial infarction, 54  
   neonatal resuscitation, 58, 69–70, 72–73  
   preterm neonates, 13, 17, 59, 69, 72–73
- pain  
 animal models, 165, 369  
 assessment in neonates, 369–70  
 development of pain pathways, 356–57, 369  
 outcomes of painful surgery, 423  
 perception  
   fetal, 356–57, 364, 369  
   neonatal, 29, 112–13, 163, 369  
 relief *see* analgesia; neuraxial  
   anesthesia/analgesia;  
   peripheral nerve blocks
- pancuronium, 12, 121  
 paracetamol (acetaminophen), 17, 120, 371–73  
 parathyroid hormone (PTH), 8, 281  
 paravertebral block, 385–86  
 parents  
   alleviating anxiety in, 99, 100  
   and ambulatory surgery, 405  
   and clinical trial enrolment, 427  
   obtaining consent, 16, 100, 167, 348, 427  
   present at the operation, 99, 405  
   smoking discouraged, 101  
 passive smoking, 101
- patent ductus arteriosus (PDA), 21, 286–87, 308  
   kept open in certain CHD conditions, 22, 287, 289, 294, 295, 297, 308  
   medical/surgical closure, 28, 286–87  
   physiological closure, 1, 33, 308  
   in preterm infants, 14, 21  
   pulse oximeter placement, 184
- Pearson syndrome, 79  
 PEEP (positive end expiratory pressure), 13  
 Pendelluft, 160  
 penis  
   hypospadias, 260–61  
   phimosis, 258–60  
   regional anesthesia, 386–87
- pentalogy of Cantrell, 81  
 Pepper syndrome, 324  
 periodic breathing, 4, 12, 410  
 peripheral nerve blocks, 382, 383–88  
   auricular branch of vagus nerve, 208  
   TAP, 261, 384
- peripherally inserted central catheters (PICCs), 149, 318, 342  
 periventricular leukomalacia, 12, 42  
 persistent pulmonary hypertension of the newborn (PPHN), 1, 21, 59, 64–65, 157  
 Pfeiffer syndrome, 129, 219  
 PHACES syndrome, 82  
 pharmacodynamics, 109, 112–13  
 pharmacokinetics, 336  
   acetaminophen, 120, 371, 373  
   and cardiac output, 110, 115  
   conjoined twins, 350  
   hepatic metabolism, 5, 111–12, 118, 336, 370, 371  
   inhalational anesthetics, 114–17  
   intravenous induction agents, 117–18  
   local anesthetics, 376–77, 383  
   multidrug resistance in the placenta, 55  
   muscle relaxants, 120–21  
   opioids (and other analgesics), 119–20, 370, 374, 375  
   population pharmacokinetics, 113–14  
   renal metabolism, 110–11, 370  
   scaled modeling, 109–12  
   sedatives, 118–19, 399, 401, 402  
   xenon, 171
- pheochromocytoma, 257  
 phimosis, 258–60  
 phototherapy, 25, 26, 56  
 physical examination, 105–6, 304–5  
 physiology, 1–8  
   cardiovascular, 1–2, 33, 34–35, 179, 354–55, 356  
   fetal *see* fetal physiology  
   fluids and electrolytes, 5–6, 15, 137–38  
   glucose metabolism, 7–8, 15, 45–47  
   hematology, 4–5, 14–15  
   hepatic, 5, 15
- neurologic, 6–7, 163–64, 192–94  
 in pregnancy, 354–55  
 respiration, 3–4, 22, 33–34, 124, 264–65  
   fetal, 356  
   one-lung ventilation, 125–26  
   in pregnancy, 355  
   preterm neonates, 12–13  
   thermoregulation, 5, 62–63
- PICCs (peripherally inserted central catheters), 149, 318, 342  
 Pierre Robin sequence (Robin sequence), 81, 88–89, 129, 132, 204, 212–14  
 pilocytic astrocytoma, 323  
 pituitary gland craniopharyngioma, 323  
 placenta, 55, 356  
 plagiocephaly, 217  
 plastic surgery, 211–28  
   cleft lip/palate, 203, 204, 211–12, 214–17  
   craniosynostosis, 88, 217–25  
   hand deformities, 225–26  
   lymphatic malformations, 202, 226–28  
   nevus removal, 226
- platelets  
 thrombocytopenia, 5, 80  
 transfusion, 146–47, 148
- pleuropulmonary blastoma, 328–29  
 Poland syndrome, 225  
 polycythemia, 4, 305  
 Pompe disease (GSD type II), 94  
 pontocerebellar hypoplasia, 93  
 portal hypertension, 332  
 posterior nuchal translucency, 227  
 posterior tibial artery catheters, 181  
 posterior urethral valves (PUV), 252–53  
 postoperative care/complications  
   ambulatory surgery, 100, 408  
   analgesia *see* analgesia, postoperative  
   apnea, 12, 100, 102, 237, 405–6, 412–13  
   cleft lip/palate surgery, 216–17  
   conjoined twins, 353  
   craniectomy, 225  
   fluid management, 142  
   infections, 54  
   liver transplantation, 338  
   lymphatic malformation surgery, 227–28  
   nausea and vomiting (PONV), 205, 208  
   in the NICU, 29  
   in the radiology department, 341  
   tonsillectomy, 207–8
- post-tetanic twitch pattern, 178  
 potassium  
   hyperkalemia, 140, 146, 148–49, 223, 336–37  
   hypokalemia, 102, 337  
 povidine iodine, 7  
 PPHN (persistent pulmonary hypertension of the newborn), 1, 21, 59, 64–65, 157  
 precordial stethoscopes, 178

- pregnancy, 354–55  
 maternal anesthesia for fetal  
 interventions, 362, 363–65
- Premature Infant Pain Profile (PIPP), 372
- premedication, 16, 100, 281, 350, 400
- prenatal diagnosis  
 CDH, 276  
 CHD, 280  
 Down syndrome, 76  
 hydronephrosis, 254  
 posterior urethral valves, 253  
 tumors, 321
- preoperative care, 99–106  
 cardiovascular assessment, 3, 103, 106  
 in CHD, 281  
 noncardiac surgery, 302–7, 408  
 conjoined twins, 347–49  
 consent procedures, 16, 100, 167, 348, 427  
 discouraging smoking, 101  
 fasting, 47, 101, 139, 195, 399–400  
 fetal interventions, 363, 365  
 GI tract, 104, 242  
 hemoglobinopathies, 144–45  
 immunization, 101–2  
 liver transplants, 334–35  
 neurologic assessment, 104–5  
 in neurosurgery, 194–95  
 physical examination, 105–6, 304–5  
 premedication, 16, 100, 281, 350  
 preterm neonates, 16, 102–3  
 in the radiology department, 340–41  
 respiratory assessment, 102, 103–4, 105–6, 127  
 skin disinfection, 7  
 in thoracic surgery, 268–69
- preterm neonates, 10–17  
 ambulatory surgery, 406  
 analgesia, 17, 369, 373  
 long-term effects of morphine, 374  
 anesthetic considerations  
 (general), 16–17  
 apnea, 12, 410  
 management, 412–13  
 pathophysiology, 410–11  
 birth and survival rates, 10  
 blood pressure, 14, 35  
 blood transfusion, 14–15, 143  
 bradycardia, 410, 411  
 cardiovascular system, 13–14, 21  
 electrolytes, 15, 102, 138  
 ethics of resuscitation, 29–30  
 fluids, 15, 26–27, 137, 139  
 gastric reflux, 14  
 glucose metabolism, 15, 17, 103  
 hematology/anemia, 14–15, 102, 143, 411, 412  
 intubation, 16–17  
 kidney function, 15, 138  
 liver function, 15  
 necrotizing enterocolitis, 14, 25, 28, 244–45, 421  
 neurologic conditions, 10–12, 42, 103  
 O<sub>2</sub> therapy, 13, 17, 59, 69, 72–73  
 opioids, 17, 374  
 and outcomes of surgery, 418–19  
 platelet transfusion, 146  
 preoperative assessment, 16, 102–3  
 respiratory system, 12–13, 22–23, 72–73  
 BPD, 13, 22–23, 27, 59, 102  
 steroid treatment, 22, 264  
 resuscitation, 69, 70, 72–73  
 sedatives, 400, 402  
 thermoregulation, 15, 16, 73, 103
- prevalence, 429
- primary merosin deficiency, 91
- primitive neuroectodermal tumors (PNET), 323
- propofol, 17, 117, 401, 407
- prostaglandins, to keep PDAs open, 22, 308
- Prune Belly syndrome, 82
- psychological care, 99
- pulmonary artery bands, 285
- pulmonary artery catheters, 183, 186
- pulmonary artery slings, 299
- pulmonary atresia  
 intact ventricular septum  
 (PA IVS), 290  
 with VSD, 290–91
- pulmonary hypertension, 313–14  
 in CDH, 59, 277  
 PPHN, 1, 21, 59, 64–65, 157  
 after truncus arteriosus repair, 286
- pulmonary overcirculation, 297
- pulmonary sequestration, 200, 270–71, 360–61
- pulmonary valve  
 absent, in ToF, 299  
 stenosis, 289–90, 358–59
- pulmonary vein stenosis, 298
- pulse oximetry, 57–58, 183–84  
 diagnosis of CHD, 3, 280
- pulse pressure variation (PPV), 150
- pyeloplasty, 254–55
- pyloric stenosis, 243–44
- pyrexia, 62
- quantiles, 437
- radial artery catheters, 180–81
- radiative heat loss, 64
- radiology, interventional, 340–45
- radiotherapy, 323, 325, 329
- radius, deficiency, 225
- random allocation, 435
- randomized controlled trials, 430–35
- rapid sequence induction, 196, 242
- rashes, 7, 85–86
- reactive oxygen species (ROS), 52–53, 54, 55–56
- rectum  
 anorectal malformations, 247–48  
 temperature monitoring, 67, 186
- rectus sheath block, 386
- red blood cells  
 anemia, 4, 142  
 polycythemia, 4, 305
- regional anesthesia/analgesia, 382–95  
 neuraxial *see* neuraxial  
 anesthesia/analgesia
- peripheral nerve blocks, 382, 383–88  
 auricular branch of vagus nerve, 208  
 TAP, 261, 384
- pharmacology, 376–77, 382, 383
- preterm neonates, 17  
 safety, 382, 412
- registry data, 415–18
- relative risk (RR), 418
- remifentanyl, 119
- remimazolam, 173
- renal cell carcinoma, 256
- renal conditions/function *see* kidney
- renin–angiotensin system, 6
- reperfusion syndrome, 336–37
- research, 426–37  
 confounding factors, 417, 431  
 ethics, 426–28  
 registry data, 415–18  
 statistical analysis, 436–37  
 study designs, 428–32  
 study population, 428, 431, 435  
 terminology, 434–36
- respiratory acidosis, 64, 158
- respiratory distress syndrome (RDS), 12–13, 22, 72
- respiratory system  
 anatomical differences in the  
 infant, 125  
 atelectasis, 58  
 BPD/chronic lung disease, 13, 22–23, 27, 59, 102  
 conditions seen in the NICU, 22–23  
 congenital abnormalities affecting, 77  
 congenital lobar emphysema, 271  
 embryology, 22, 264  
 fetal lung, 33  
 and inhalational anesthetics, 115–16, 407  
 in liver disease, 333, 334  
 lung hypoplasia, 41–42  
*see also* congenital  
 diaphragmatic hernia  
 monitoring, 183–85, 400  
 CO<sub>2</sub>, 38–42, 157, 184–85, 306, 400  
 oxygen, 56–58, 183–84  
 for postoperative apnea, 100, 412  
 obstructive lung disease, 42  
 and opioids, 370, 411, 412

## Index

- respiratory system (*cont.*)  
 physiology, 3–4, 22, 33–34, 124, 264–65  
 one-lung ventilation, 125–26  
 in pregnancy, 355  
 preterm neonates, 12–13  
 postoperative apnea, 12, 100, 102, 237, 405–6, 412–13  
 in pregnancy, 355  
 preoperative assessment, 102, 103–4, 105–6, 127  
 preterm neonates, 12–13, 22–23, 102  
 resuscitation, 72–73  
 steroid treatment, 22, 264  
 pulmonary sequestration, 200, 270–71, 360–61  
 RDS, 12–13, 22, 72  
 resuscitation, 69–70, 72–73  
 smoke inhalation, 101  
 TRALI, 149  
 TTN, 23  
 URIs, 103–4, 205–6, 406–8  
*see also* airway management; ventilation
- restrictive cardiomyopathy, 315–16
- resuscitation, 69–74  
 algorithm, 71  
 cardiac output, 40  
 CDH, 73  
 ethics, 29–30  
 fetal, 55, 363  
 fluid replacement, 138, 139  
 hydrops fetalis, 73–74  
 meconium-stained AF cases, 72  
 medication, 70–72  
 O<sub>2</sub> therapy, 58, 69–70, 72–73  
 intrauterine, 55  
 preterm neonates, 69, 70, 72–73  
 TAPVR, 298  
 therapeutic hypothermia, 66–67, 74  
 vascular access, 70
- retinoblastoma, 325, 345
- retinopathy of prematurity (ROP), 20, 56, 103
- retrograde nasotracheal intubation, 132
- retrospective studies, 428–29, 435  
 registry data, 415–18
- rhabdoid tumor, 256, 325–26
- rhabdomyosarcoma, 327
- rhinosinusitis, 205–6
- Ring–Adair–Elwyn (RAE) tubes, 204, 216
- Robin sequence, 81, 88–89, 129, 132, 204, 212–14
- Robinow syndrome, 80
- rocuronium, 121
- Romberg syndrome, 203
- ROP (retinopathy of prematurity), 20, 56, 103
- ropivacaine, 377
- Rusch EZ Blocker, 268
- sacral anatomy, 388–90
- sacrocoxygeal teratoma (SCT), 328, 361
- Saethre Chotzen syndrome, 81, 219
- Sano shunt, 295, 296, 312–13
- sarcoma  
 clear cell renal, 256, 326  
 soft tissue, 327
- scalp veins, access via, 150
- sclerotherapy, 342–44
- sedation/sedatives, 398–402  
 benzodiazepines, 12, 100, 118, 173, 400  
 depth of, 398–99  
 dexmedetomidine, 100, 119, 402–3  
 fasting prior to, 399–400  
 ketamine, 58, 100, 117–18, 195, 401  
 maternal, in fetal interventions, 365  
 monitoring, 175–76, 400  
 premedication, 100, 281, 350  
 presedation evaluation, 398, 399  
 propofol, 17, 117, 401, 407  
 recovery, 400  
 triclofos and chloral hydrate, 401–2
- seizures, 105, 197
- Seldinger technique, 180, 182
- selection bias, 417, 431
- Senning procedure, 294, 311
- sepsis, 27–28, 103
- sevoflurane, 116, 195, 336, 407
- sexual differentiation disorders, 78, 258
- sickle cell disease, 144–45
- Signal Extraction Technology, 58
- Simcyp® software, 114
- single lung ventilation, 125–27, 266–68
- sinus venosus ASD, 283
- sinusitis, 205–6
- situs ambiguous (heterotaxy), 281–82
- skin, 7  
 disinfection, 7  
 disorders, 7, 85–86  
 examination, 105  
 nevus removal, 226  
 temperature monitoring, 67, 186
- small bowel atresia, 246–47, 318–19
- Smith Lemli Opitz syndrome, 79
- smoking by caregivers, 101
- sodium, 6, 137–38  
 hypertonic saline, 141–42, 196  
 hyponatremia, 15, 141–42, 225, 337  
 preterm infants, 15, 138
- sodium tetradecyl sulfate (STS), 343
- soft tissue sarcoma, 327
- somatosensory-evoked potentials (SSEPs), 177
- special care nursery (SCN), 19  
*see also* NICU (neonatal intensive care unit)
- spina bifida (myelomeningocele), 104–5, 192, 197  
 prenatal repair, 360, 364
- spinal anesthesia, 17, 238, 412
- spinal column  
 anatomy, 388–90, 391–92  
 cervical instability, 105  
 cervical vertebral abnormalities, 87, 220  
 monitoring SSEPs during surgery on, 177
- spinal cord  
 compression, 324  
 development, 191–92, 369, 388  
 tumors, 322
- spinal muscular atrophy (SMA), 93
- spinal muscular atrophy with respiratory distress (SMARD), 93
- spring-assisted cranioplasty, 220, 223
- standard deviation, 437
- statistical analysis, 416–18, 436–37
- steroids  
 antenatal, promotion of lung maturation, 22, 264  
 for leukemia, 329  
 for PONV, 208
- stethoscopes, 178–79
- Stickler syndrome, 213
- stranger anxiety, 99–100, 405
- Streptococcus* (GBS), 27–28
- Sturge Weber syndrome, 82
- substance P, 112–13
- succinylcholine, 120, 121  
 bradycardia risk, 413  
 contraindicated in myopathy, 95, 120  
 liver transplantation, 335
- sucrose, as pain relief, 370–71
- sufentanil, 119–20
- sugammadex, 173
- supraglottic airway (SGA) devices (laryngeal mask airways), 70, 128–29, 130, 407
- supraventricular tachycardia (SVT), 179
- surfactant, 3, 12–13, 22, 72, 264
- survival rates in preterm neonates, 10
- suspension laryngoscopy, 208–9
- sympathetic nervous system  
 cardiac innervation, 34  
 thermoregulation, 62, 63
- syndactyly, 225
- systematic reviews, 432, 433
- systolic pressure variation (SPV), 150
- tachypnea, 411  
 TTN, 23, 264
- temperature control *see* thermoregulation
- temporal artery catheters, 181
- teratoma, 257, 327–28  
 fetal interventions, 328, 359, 361
- testicular tumors, 256–57
- tetany (twitch pattern), 178
- tetralogy of Fallot (ToF), 291–92, 309–10, 319  
 with absent pulmonary valve, 299
- thalassemia, 145
- theophylline, 413

- thermometers, 66–67, 185  
 thermoregulation, 62–67  
   heat loss mechanisms, 15, 63–64, 65  
   hypothermia, 62, 63–65, 66  
     in liver surgery, 337  
     preterm neonates, 15, 73  
     therapeutic, 66–67, 74  
 malignant hyperthermia, 83, 86, 87, 93, 96, 120  
 monitoring temperature, 66–67, 185–86  
 in the NICU, 27  
 non-shivering thermogenesis, 15, 63, 64, 236  
 normal body temperature, 62  
 perioperative, 65–66, 73, 195, 222, 236  
 physiology, 5, 62–63  
 preterm neonates, 15, 16, 73, 103  
 thiopental, 117  
 Thomsen disease, 79  
 thoracic surgery, 264–74  
   anesthetic considerations (general), 269–70, 271  
   bronchogenic cyst, 200, 271  
   CCAM, 200–1, 270, 360–61  
   CDH *see* congenital diaphragmatic hernia  
   congenital lobar emphysema, 271  
   mediastinal masses, 104, 127–28, 274  
   preoperative assessment, 268–69  
   pulmonary sequestration, 200, 270–71, 360–61  
   regional anesthesia, 269–70, 376  
     caudal approach, 376, 391–94  
     direct approach, 394–95  
     paravertebral block, 385–86  
   thoracoscopy/VATS, 266  
     one-lung ventilation, 125–27, 266–68  
 thoracotomy, 266  
   *see also* congenital heart disease  
 threshold of viability, 29–30  
 thrombocytopenia, 5, 80  
   platelet transfusions, 146–47, 148  
 thumb hypoplasia, 225–26  
 thyroglossal duct cyst, 201  
 thyroid gland, 7, 8, 63, 127  
 time-cycled pressure-limited ventilation (TCPL), 24  
 Timothy syndrome, 225  
 tissue expanders, 226, 348  
 tissue perfusion monitoring, 41, 289  
 tobacco use by caregivers, 101  
 ToF *see* tetralogy of Fallot  
 tongue  
   glossoptosis, 132, 204  
   lymphatic malformations, 227  
 tongue tie (ankyloglossia), 206  
 tongue–lip adhesion, 131–32  
 tonsillectomy, 207–8, 408  
 total anomalous pulmonary venous return (TAPVR), 161, 297–98  
 total body water (TBW), 15, 137  
 trachea  
   anesthetic considerations (general), 201  
   compression  
     mediastinal masses, 104, 127–28, 274  
     vascular anomalies, 299  
   removal of MSAF, 72  
   stenosis, 199–200, 201, 206–7, 218  
   tracheomalacia, 200, 201  
 tracheo-esophageal fistula/esophageal atresia, 104, 200, 273–74, 319  
   VACTERL syndrome, 87–88  
 train-of-four twitch pattern, 178  
 tranexamic acid (TXA), 223–24  
 transcranial Doppler, 177  
 transesophageal echocardiography (TEE), 150, 183  
 transfusion  
   blood *see* blood transfusion  
   clotting factors, 147–48  
   complications, 148–49  
   platelets, 146–47, 148  
 transfusion-associated graft-versus-host disease (TA-GvHD), 145–46, 281  
 transfusion-related acute lung injury (TRALI), 149  
 transient myeloproliferative disease, 322  
 transient neonatal myasthenia, 7  
 transient tachypnea of the newborn (TTN), 23, 264  
 transplants, heart, 316  
 transplants, liver, 332–38  
   anesthetic considerations, 334–38  
   pathology of end-stage liver disease, 332–33  
 transposition of the great arteries (TGA), 293–94, 311  
 transpulmonary indicator dilution (TID), 150  
 transtentorial herniation, 192  
 transversus abdominis plane (TAP) block, 261, 384  
 traumatic brain injury, 175  
 Treacher Collins syndrome, 81, 89, 129, 203, 213  
 triclofos, 401  
 tricuspid valve  
   atresia, 296–97  
   Ebstein's anomaly, 293  
 trisomy, 77  
   Down syndrome, 76, 105, 129, 181, 318–19, 322  
 truncus arteriosus, 285–86  
 TSH (thyroid stimulating hormone), 8  
 tumor lysis syndrome, 329  
 tumors, 321–30  
   anesthetics' effect on progression, 269–70  
   CNS, 322–23  
   emergency procedures, 329–30  
   germ cell/teratoma, 256–57, 327–28, 359, 361  
   hemangioma, 201–3  
   laryngeal papillomatosis, 208–9  
   leukemia, 321–22  
   liver, 326–27  
   mediastinal masses, 104, 127–28, 274  
   mesenchymal hamartoma, 326  
   neuroblastoma, 257, 324–25  
   O<sub>2</sub> therapy and carcinogenesis, 54, 56  
   pheochromocytoma, 257  
   pleuropulmonary blastoma, 328–29  
   renal, 255–56, 325–26  
   retinoblastoma, 325, 345  
   soft tissue sarcomas, 327  
   treatment, 329–30, 345  
     *see also* chemotherapy  
     vascular, 201–3, 326, 327  
   Turner syndrome, 78  
 twins  
   separation of conjoined twins  
     anesthetic considerations, 350–53  
     classification, 347  
     postoperative care, 353  
     preoperative stage, 347–49  
     surgical procedures, 349–50  
   twin-to-twin transfusion syndrome, 362  
 twitch monitoring, 178  
 tympanic membrane temperature  
   monitoring, 67, 186  
 tympanoplasty, 204–5  
 tympanostomy, 204  
 ultrasound  
   prenatal diagnosis  
     CDH, 276  
     CHD, 280  
   tumors, 321  
   urological abnormalities, 253, 254  
 in the radiology department, 342  
 in regional anesthesia, 382–83  
   neuraxial, 388, 389–90, 391–95  
   peripheral, 384, 385–86  
 transcranial Doppler, 177  
 VAE detection, 224  
   vascular catheter insertion, 180, 182  
 umbilical artery catheters, 70, 151, 181–82  
 umbilical hernia, 236–37  
 umbilical vein catheters, 70, 151  
 Univent endotracheal tubes, 268  
 upper limb  
   brachial plexus block, 387–88  
   hand deformities, 225–26  
 upper respiratory infections (URIs), 103–4, 205–6, 406–8  
 ureteropelvic junction obstruction, 254–55  
 ureterovesical junction obstruction (megaureter), 254  
 uridine diphosphate glucuronyl transferase, 5



## Index

- urine output, 150
- urogenital system, 252–61  
analgesia, 252, 257–58, 259–60, 261, 386–87  
bladder exstrophy, 81, 257–58  
disorders of sexual development, 78, 258  
hydronephrosis, 254–55, 354  
hypospadias, 260–61  
phimosis, 258–60  
posterior urethral valves, 252–53  
tumors, 255  
adrenal, 257, 324–25  
renal, 255–56, 325–26  
testicular, 256–57
- uteroplacental blood flow, 356
- V/Q (ventilation–perfusion) ratio/  
mismatch, 39, 41, 265, 333
- VACTERL syndrome, 87–88
- variables, 429, 436
- variance, 437
- vascular access, 150–51  
arterial catheterization, 179–82, 195  
in CHD, 282, 306  
CVCs, 149, 151, 182–83, 282  
emergency, 70  
peripheral veins, 150–51  
PICCs, 149, 342  
single ventricle patients (after stage I palliation), 318  
umbilical vessels, 70, 151, 181–82
- vascular malformations, 201–3  
angiography, 344–45  
sclerotherapy, 342–44
- vascular rings, 200, 299
- vascular tumors, 201–3, 326, 327
- VATS (video-assisted thoracoscopic surgery), 125–27, 266
- Veau classification (cleft palate), 211
- vecuronium, 121
- vein of Galen malformations, 344
- velocardiofacial syndrome  
(DiGeorge syndrome), 76–82, 77, 213, 281  
variant (conotruncal anomaly), 77
- venous air embolism (VAE), 196, 222, 224
- venous malformations, 202, 203
- ventilation, 23–25, 157–61  
blood gas targets, 41–42, 58–59, 157  
in CDH, 59, 157, 276–77, 278  
in CHD, 282  
ECMO, 161, 277, 278  
EXIT procedure, 73, 364  
invasive  
conventional, 24, 157–58  
HFOV, 24, 158–61  
intermittent apnea, 208–9  
jet ventilation, 24–25, 209  
in liver transplantation, 336, 338  
after needle cricothyrotomy, 131  
neonatal resuscitation, 58, 69–70, 72–73  
non-invasive, 23, 72  
one-lung, 125–27, 266–68  
physiological, 3–4, 33–34  
in pregnancy, 355  
preterm neonates, 12–13, 72–73  
pulmonary abnormalities, 271  
*see also* airway management;  
endotracheal intubation
- ventilation–perfusion (V/Q)  
ratio/mismatch, 39, 41, 265, 333
- ventricular catheters (ICP monitoring), 175
- ventricular septal defect (VSD), 284–85, 307–8  
with pulmonary atresia, 290–91  
in tetralogy of Fallot, 291
- vertebral column *see* spinal column
- video assisted thoracoscopic surgery (VATS), 125–27, 266
- virilization, 8
- vision  
congenital cataracts, 7  
ROP, 20, 56, 103
- vitamin K, 5
- vocal cord paralysis, 207
- voiding cystourethrography, 252
- volume of distribution, 109–10
- Voluven, 141
- volvulus, 246
- von Willebrand disease (vWD), 147–48
- VSD *see* ventricular septal defect
- Walker–Warburg syndrome, 91–92
- washing of blood products, 146
- Werdnig–Hoffman disease (spinal muscular atrophy), 93
- Williams syndrome, 8, 78, 82–83, 314
- Wilms tumor, 255–56, 325
- xenon, 171–73