Index

Acepromazine, 136, 137t drug combinations with, 140-41, 140t, 141t equine preanesthetic sedative with, 363 geriatric patients premedication with, 277-78, 280t induction with, 149 pediatric patients premedication with, 269, 270t Acetaminophen, 352 Acupuncture, pain management with, 353-54 Acute pain, 326 Adaptive pain, management of, 347-50 alpha-2 agonists for, 347-49 local anesthetics for, 349-50, 350f NMDA receptor antagonists for, 348-49 nonsteroidal antiinflammatory drugs for, 347 opioids for, 348, 349f, 349t tramadol for, 348 Addison's disease. See Hypoadrenocorticism ADH. See Antidiuretic hormone Adjunctive analgesics drugs, 16 Adjustable pressure limiting valve (APL valve), 7 ADT. See Advanced diagnostic testing Advanced diagnostic testing (ADT), 21blood glucose, 22 BUN serum test, 22, 249 complete blood count, 22 complications with, 168 creatinine serum test, 22, 249 full chemistry profile, 22 packed cell volume, 22 total plasma protein, 22 urine specific gravity, 22 Advance life support, cardiopulmonary/cerebral resuscitation with, 178 Afferent nerve fibers, 327–28, 328t A-fib. See Atrial fibrillation Afterload, 5 Agent dose calculation, 30–31, 31t Agent strength percent solution calculations, 30 Airway maintenance, 57-70 cleaning and sterilization with, 67-70 complications with, 67, 68t endotracheal tubes v. facemask for, 58t extubation for, 66-67, 67t three-way stopcock with, 66, 67t

intubation for, 63-66, 63f assistant holds head for, 63, 63f cuff inflation guidelines with, 65t guidelines for success with, 63t laryngospasm with, 64t placement confirmation with, 66t tube tie with, 66t intubation supplies for, 61-63 laryngoscopes, 61-62, 62f stylet and guide tubes, 62-63, 62f selecting appropriate tube for, 60-61 special endotracheal tubes for, 58-59, 59f tube design for, 59-60, 60f tube storage with, 67-70, 69f types of endotracheal tubes for, 57-58, 58f Airway management, cardiopulmonary/cerebral resuscitation with, 175 Airway obstruction anesthesia complicated by, 170-71 capnograph showing, 117f Alanine aminotransferase (ALT), 22 Albumin, 124-25 Alfaxalone, pediatric patients induction with, 270t, 271 Alkaline phosphatase serum tests, 22 Alpha-2 agonists, 137-38 adaptive pain management with, 347-48 cardiovascular effects from, 215t liver disease pharmacology with, 259-60 pediatric patients premedication with, 269 renal disease anesthesia with, 251, 253t ALT. See Alanine aminotransferase Alveolar-capillary membrane, 8 Alveolar ventilation, 8, 9 Alveoli, 7, 8f Amantadine, pain management with, 352 American Society of Anesthesiologists (ASA), 20 status, 20-21, 21f Amidate. See Etomidate Aminotransferases, 22 Analgesics, 16 recovering patient with, 165 Anatomic dead space, 9, 10f, 113 Anesthesia equipment, 71-84 anesthetic delivery, 73-75, 74f, 75f

blood pressure monitoring, 119-20 breathing systems, 80-84, 81f, 82f fresh gas flow rates, 83 low-flow circle, 83-84 nonrebreathing, 81-83, 82f rebreathing, 80-81, 81f reservoir bag, 83 selection of, 84 semiclosed circle, 84 carbon dioxide removal, 75-76 APL valve, 76, 168 carbon dioxide absorber canister, 75, 168 one-way valves, 75-76 complications with, 168 correcting problems in, 80 end-tidal carbon dioxide monitoring, 119-20 functional components, 71-76, 72f, 74f, 75f oxygen delivery, 71-73, 72f performing pressure test for, 78–79 troubleshooting after procedure with, 80 troubleshooting before procedure with, 77-78 breathing bags/circuit, 78 breathing system, 77 one-way valves, 77 oxygen supply, 77 sodalime canister, 77-78 WAG tubing/connections, 78 troubleshooting during procedure with, 79, 79f vaporizers, 73-75, 74f, 75f complications with, 168 waste anesthetic gas removal, 76-77, 76f active system, 76-77, 76f passive system, 76 Anesthesiologist Society of America (ASA) heart disease patients classified by, 207t physical status scale from, 85 Anesthetic depth monitoring, 101–3, 101f–103f Capillary Refill Time in, 101-2, 102f corneal reflex in, 101, 101f esophageal stethoscope in, 102-3, 103f jaw tone in, 101, 102f mucus membrane color in, 101 palpation of arteries in, 102, 102f palpebral reflex in, 101 position of eye in, 101 swallowing reflex in, 101 withdrawal reflex in, 101, 101f Anesthetic record, 35-37, 36f automated, 37 handwritten monitoring grid, 37 information included in, 35 legal document, 37 Antibiotics, 16 Anticholinergics, 136 cardiovascular effects from, 215t

pediatric patients premedication with, 269, 270t renal disease anesthesia with, 251, 253t Antidiuretic hormone (ADH), 248-49 Aortic stenosis, 212, 214t APC. See Atrial fibrillation premature complex APL valve. See Adjustable pressure limiting valve Apnea, anesthesia complicated by, 170 Arrhythmias, 5, 88 anesthesia complicated by, 173 supraventricular, 213, 217t Arterial blood gases, 24 ASA. See Anesthesiologist Society of America Aspartate aminotransferase (AST), 22 Aspiration, anesthesia complicated by, 169-70 AST. See Aspartate aminotransferase Atelectasis, 8, 189 Atipamezole, cardiopulmonary/cerebral resuscitation with, 180t Atracurium, neuromuscular blockade with, 199 Atrial fibrillation (A-fib), 91 Atrial fibrillation premature complex (APC), 91, 213 Atrial standstill, 217 Atrioventricular block (AV block), 4, 89-90, 89f 1st degree, 89, 216, 217t 2nd degree, 89, 89f, 216, 217t 3rd degree, 90, 216-17, 217t Atrioventricular node (AV node), 3 Atropine, 136, 137t cardiopulmonary/cerebral resuscitation with, 178-79, 180t equine preanesthetic sedative with, 363 geriatric doses for, 280t pediatric doses for, 270t Auriculopalpebral nerve block, 374 AV block. See Atrioventricular block AV node. See Atrioventricular node BAG (butorphanol, acepromazine, glycopyrrolate), 140-41, 140f Bain Coaxial system, 82, 82f Bandage placement, 164 Barbiturates cerebral blood flow with injectable, 222 induction with, 147-49 liver disease pharmacology with, 260 renal disease anesthesia with, 252, 253t Base deficit, 93 Base excess (BE), 93

Basic minimum database (BMD), 21 BE. See Base excess Benzodiazepines, 136-37 cardiovascular effects from, 215t cerebral blood flow with injectable, 222 geriatric patients premedication with, 277, 280t induction with, 144-45

liver disease pharmacology with, 259-60 pediatric patients premedication with, 269, 270t renal disease anesthesia with, 251, 253t Bicarbonate level (HCO₃), 93 Blood gas analysis, 91-93 components of, 92-93 base excess/base deficit, 93 bicarbonate level, 93 end-tidal carbon dioxide, 92 oxygen saturation, 92-93 partial pressure of carbon dioxide, 92 partial pressure of oxygen, 92 pH, 92 errors in sampling with, 93 physiology with, 92 sample collection for, 93 Blood glucose, 22 Blood pressure, 5–7 diastolic, 5, 106, 107t direct (invasive) monitoring of, 107-10, 109f arterial catheter used for, 108 selecting catheter site for, 108 troubleshooting, 109-10 waveform interpretation for, 108, 109f factors determining, 106, 106f cardiac output as, 106, 106f heart rate as, 106, 106f stroke volume as, 106, 106f total peripheral resistance as, 106 indirect (noninvasive) monitoring of, 110-12, 111f cuff selection for, 110, 111f Doppler ultrasonography for, 111 oscillometric methods for, 111 photoplethysmographic methods for, 111 Ravi-Ricci return-to-flow principle with, 111, 112 maintenance of monitoring equipment for, 119-20 mean, 5 monitoring of, 105–12 normal values for, 106, 107t systolic, 5, 6, 106, 107t Blood products, 130-32, 131f, 132f cryoprecipitate, 130 fresh frozen plasma, 130 human immunoglobulin, 130-31, 132f packed red blood cells, 130 whole blood, 130, 130f Blood typing, 131–32, 132f cats, 132, 132f Blood urea nitrogen (BUN), 22, 249 Blunt force trauma, 296 BMD. See Basic minimum database BMG (butorphanol, midazolam, glycopyrrolate), 140f Body temperature hyperthermia and, 99-100

hypothermia and, 98-99 monitoring of, 97-101 normal, 98 recovering patient's, 163 heating elements for, 163, 163f Brachycephalic breeds, 231–32, 231f, 232f Bradyarrhythmias, 216, 217t Bradycardia, sinus, 88-89 Breathing, cardiopulmonary/cerebral resuscitation with, 175 - 76Breathing systems, 80-84, 81f, 82f fresh gas flow rates, 83 low-flow circle, 83-84 nonrebreathing, 81-83, 82f rebreathing, 80-81, 81f reservoir bag, 83 selection of, 84 semiclosed circle, 84 Bronchi, 7 Bronchioles, 7 Buccal mucosal bleeding time, 23 BUN. See Blood urea nitrogen BUN serum test, 22, 249 Buprenorphine, 139 pediatric doses for, 270t Burn injuries, 295–96, 296f Butorphanol, 137t drug combinations with, 140, 140t, 141t equine preanesthetic sedative with, 363-64 geriatric doses for, 280t Butyrophenones, 136, 137t cerebral blood flow with injectable, 222 Calcium gluconate, cardiopulmonary/cerebral resuscitation with, 180t Capillaries, 8 Capillary Refill Time (CRT), 101–2, 102f Capnograph, 113, 115f–118f, 119t airway obstruction in, 117f artifacts due to strong heart beat in, 117f changes in, 119t CO₂ rebreathing in, 117f hyperventilation in, 116f hypoventilation in, 115f normal, 115f spontaneous breaths during mechanical ventilation in, 116f Capnography, 112–13 Capnometer, 113-14 Carbon dioxide removal equipment, 75–76 APL valve, 76, 168 carbon dioxide absorber canister, 75, 168 one-way valves, 75-76 Cardiac disease patients, 205–17 aortic stenosis with, 212, 214t

atrial premature contractions with, 213 atrial standstill with, 217 AV block, 1st degree with, 216, 217t AV block, 2nd degree with, 216, 217t AV block, 3rd degree with, 216-17, 217t bradyarrhythmias with, 216, 217t classification of, 206-7, 207t dilated cardiomyopathy with, 208-9, 214t heart failure with, 207-8, 208f heartworm disease with, 212-13, 214t hypertrophic cardiomyopathy with, 209-10, 214t measures to optimize outcome for, 205-6 balanced anesthesia, 205-6 IV fluid support, 206 perioperative blood work evaluation, 206 premedications, 205 preoxygenation, 206 reduce stress, 205 ventilatory support, 206 mitral regurgitation with, 210f mitral valve insufficiency with, 210, 210f, 214t patent ductus arteriosus with, 214t patent ductus arterious with, 210-11 perianesthetic arrhythmias with, 213-16 pulmonic stenosis with, 211-12, 214t subaortic stenosis with, 210f supraventricular arrhythmias with, 213, 217t ventricular premature contractions with, 213, 217t ventricular tachycardia with, 217t Cardiac output, 106, 106f capnography for, 112 Cardiogenic shock, fluid therapy contraindicated for, 130 Cardiopulmonary arrest (CPA), 174-75 equipment for, 175-76 reasons for, 175 signs of, 174-75 Cardiopulmonary/cerebral resuscitation (CPCR), 175 - 78advance life support with, 178 airway management in, 175 breathing in, 175-76 circulation in, 176-78 complications with, 183-84 defibrillation with, 181-82 drugs used with, 178-79, 180t atipamezole, 180t atropine, 178-79, 180t calcium gluconate, 180t dobutamine, 180t dopamine, 180t epinephrine, 179, 180t flumazenil, 180t furosemide, 180t glycopyrrolate, 178-79, 180t

lidocaine, 179, 180t naloxone, 180t sodium bicarbonate, 180t vasopressin, 179, 180t electrocardiography as monitor during, 181 fluid therapy with, 182 open chest, 178-84 prolonged life support with, 182-83 routes of drugs administration during, 179-81 central venous, 179 intracardiac, 181 intralingual, 181 intraosseous, 179 intratracheal, 179-81 peripheral venous, 179 Cardiovascular drugs, 16 Cardiovascular system, 3-7 afterload with, 5 anatomy/physiology for, 3-4 anesthesia complication of, 172-74 anesthetic agents effects on, 215t arrhythmias with, 5 atrioventricular node of, 3 blood pressure with, 5-7 cardiac cycle of, 4 contractility with, 5 determining heart rate from ECG, 4-7 electrical activity of, 4 AV conduction block, 4 electrocardiogram, 4 P-R interval, 4 P wave, 4 QRS complex, 4 Q-T interval, 4 T wave, 4 equine anesthesia and effects on, 360 preanesthetic workup exam for, 17-18, 25f sino-atrial node of, 3 volume status with, 7 Cataract removal, 202 Catheterization, 49-55 arterial catheter for, 51, 51f, 108 blood pressure monitoring with, 108 care for, 54-55 catheter placement/stabilization for, 51-52, 52f, 53f catheter size/type for, 49-50, 50f multilumen, 49-50, 50f through needle, 49 over needle, 49 choosing correct catheter for, 50 double lumen catheter for, 50-51, 50f prepping site for, 52-54, 52f-54f quadruple lumen catheter for, 50-51 single lumen central catheter for, 50, 54f supplies for, 53-54

triple lumen catheter for, 50-51 troubleshooting, 54 urinary, recovering patient with, 164-65 vascular access ports for, 50 venous catheter for, 51 Cats blood typing with, 132, 132f intravenous potassium supplementation for, 129t laryngospasm in, 64t PRBC for, 133f selecting appropriate tube for intubation of, 61 signs of acute pain in, 335f Caudal block, 375 CBC. See Complete blood count Central venous pressure (CVP), 7 Cerebral blood flow, 219-20 injectable anesthetics for, 221-23 Cesarean section techniques, 283-90 anesthetic drug selection for, 284-88, 287t induction agents, 285-86, 287t maintenance agents, 286-88, 287t preanesthetic agents, 284-85, 287t anesthetic technique for, 288-89, 288f resuscitation of newborn with, 289-90, 289f, 2.90f Chamber, inhalant induction procedures using, 143-44, 144fChemistry profile, 22 Chemotherapy drugs, 16 Chronic pain, 326 Cisatracurium, cerebral blood flow with injectable, 222-23 Coagulation profile, 22 Colloids, 124 Complete blood count (CBC), 22 Compliance, 189 Complications, 167-84 cardiopulmonary arrest, 174-75 equipment for, 175-76 reasons for, 175 signs of, 174-75 cardiopulmonary/cerebral resuscitation, 183-84 glucose, 184 hyperthermia, 183-84 cardiovascular, 172-74 arrhythmias, 173 hypertension, 173 hypotension, 172 tachycardia, 173 ventricular fibrillation, 173-74 ventricular premature complexes, 173-74 ventricular tachycardia, 173-74 equipment, 168-69 APL valve complications, 168 carbon dioxide absorber exhaustion, 168

endotracheal tube complications, 67, 68t, 168 vaporizer complications, 168 ferrets, rodents, and rabbits with, 322 human error as cause of, 167 physiologic, 169-72 airway obstruction, 170-71 apnea, 170 aspiration, 169-70 excitation, 169 hyperventilation, 172 hypoventilation, 171 hypoxemia, 172 hypoxia, 172 laryngospasm, 171 prolonged recovery from anesthesia, 184 Conjunctival flap, 202 positioning for, 203f Constant rate infusion (CRI), 33 Contractility, 5 Controlled substances, record keeping for, 37-39, 39f Controlled ventilation, 189 Corneal reflex, 101, 101f Cornual nerve block, 374-75, 375f COX inhibition. See Cyclooxygenase inhibition CPA. See Cardiopulmonary arrest CPCR. See Cardiopulmonary/cerebral resuscitation Creatinine serum test, 22, 249 CRI. See Constant rate infusion CRT. See Capillary Refill Time Cryoprecipitate, 130 Crystalloids, 124 Cushing reflex, 220-21 Cushing's disease. See Hyperadrenocorticism CVP. See Central venous pressure Cyclohexamines, induction with, 145–46 Cyclooxygenase inhibition (COX inhibition), renal disease anesthesia with, 254, 254t DABP. See Direct arterial blood pressure monitoring DACVA. See Diplomates of the American College of Veterinary Anesthesiologists Dead space ventilation, 9, 10f Defibrillation, cardiopulmonary/cerebral resuscitation with, 181-82 Dehydration clinical signs for, 126t replacement requirement calculation for, 126f Demerol. See Meperidine Desaturation, 10, 233-34 Desflurane, 158 inhalant anesthetics for ICP with, 223 minimum alveolar concentration of, 154t vaporization pressure of, 155t Detomidine, equine preanesthetic sedative with, 362

Dexmedetomidine. See Medetomidine

Dextran, 125 Diabetes mellitus, 239-40 Diagnostics imaging, 24 radiography, 24 ultrasound, 24 Diastolic blood pressure, 5, 106, 107t Diazepam (Valium), 136-37, 137t cerebral blood flow with injectable, 222 equine preanesthetic sedative with, 363 geriatric doses for, 280t induction with, 144-45, 147t, 149, 150t liver disease pharmacology with, 260 Dilated cardiomyopathy, 208-9, 214t Diplomates of the American College of Veterinary Anesthesiologists (DACVA), monitoring guidelines from, 85 Diprivan. See Propofol Direct arterial blood pressure monitoring (DABP), 107-10, 109f arterial catheter used for, 108 selecting catheter site for, 108 troubleshooting, 109-10 inaccurate readings, 110 sudden change in pressure, 110 waveform amplification, 110 waveform dampening/loss, 109-10 waveform not visible, 110 waveform interpretation for, 108, 109f Dissociative drugs, 138–39 cardiovascular effects from, 215t liver disease pharmacology with, 260-61 Dobutamine, cardiopulmonary/cerebral resuscitation with, 180t Dogs blood typing with, 132, 132f intravenous potassium supplementation for, 129t larvnx of, 64f PRBC for, 133f selecting appropriate tube for intubation of, 61 signs of acute pain in, 335f Dopamine, cardiopulmonary/cerebral resuscitation with, 180t Doppler ultrasonography, 111 Dorsal horn anatomy of, 328-29, 329f neurochemistry of, 329-30 Dose calculation, 30-31, 31t Drug calculation, 31-32 ECG. See Electrocardiogram Elastic recoil. 8 Electrocardiogram (ECG), 4, 24 applications for monitoring of, 86 arrhythmia in, 88 atrial fibrillation in, 91

atrial fibrillation premature complex in, 91

atrioventricular block in, 89-90, 89f cardiopulmonary/cerebral resuscitation monitored with, 181 determining heart rate from, 4–7 hyperkalemia indicated by, 129 inaccurate data with, 87 interpreting data from, 87 monitoring information from, 86 P wave, 86 QRS complex, 86 T wave, 86, 87f monitoring process for, 86-87 monitoring with, 86-91 physiology with, 86 sinus bradycardia in, 88-89 sinus tachycardia in, 88, 88f ventricular fibrillation in, 91 ventricular premature contraction in, 90 ventricular tachycardia in, 90-91, 90f Electrolyte abnormalities, 127-30 hypochloremia/hyperchloremia, 127 hypokalemia/hyperkalemia, 128-30, 129t hyponatremia/hypernatremia, 127-28, 128f Electroretinogram (ERG), anesthesia for, 201 Emergencies, 167-84. See also Complications; Trauma patients cardiopulmonary arrest, 174-75 equipment for, 175-76 reasons for, 175 signs of, 174-75 cardiopulmonary/cerebral resuscitation, 175-78 advance life support with, 178 airway management in, 175 breathing in, 175-76 circulation in, 176-78 complications with, 183-84 defibrillation with, 181–82 drugs used with, 178-79, 180t electrocardiography as monitor during, 181 fluid therapy with, 182 open chest, 178-84 prolonged life support with, 182-83 routes of drugs administration during, 179-81 crash protocols, 174-75 equipment for, 174-75 ferrets, rodents, and rabbits in, 322 nontrauma, 301-10 foreign bodies/obstructions, 305-7 gastric dilatation-volvulus, 303-5, 304f intervertebral disk disease, 307-9, 308f, 309f pyometra, 310 shock, 301-3 urethral obstruction, 309-10 Endocrine diseases, 239-43 diabetes mellitus, 239-40

hyperadrenocorticism (Cushing's disease), 241-42, 241f hyperthyroidism, 242-43 hypoadrenocorticism (Addison's disease), 242 hypothyroidism, 243 insulinoma, 240 Endocrine system preanesthetic workup exam for, 20, 25f testing for, 24 Endotracheal tubes, 57-70 cleaning and sterilization of, 67-70 complications with, 67, 68t, 168 design for, 59-60, 60f extubation with, 66-67, 67t patient recovery and, 165-66 three-way stopcock with, 66, 67t facemask v., 58t intubation with, 63-66, 63f assistant holds head for, 63, 63f cuff inflation guidelines with, 65t guidelines for success with, 63t laryngospasm with, 64t placement confirmation with, 66t tube tie with, 66t proper/improper lengths of, 114f selecting appropriate tube for, 60-61 special, 58-59, 59f storage of, 67-70, 69f supplies for intubation with, 61-63 laryngoscopes, 61-62, 62f stylet and guide tubes, 62-63, 62f types of, 57-58, 58f End-tidal carbon dioxide (ETC0₂), 92 anatomic dead space with, 113 capnograph for monitoring of, 113, 115f-118f, 119t airway obstruction in, 117f artifacts due to strong heart beat in, 117f CO₂ rebreathing in, 117f hyperventilation in, 116f hypoventilation in, 115f normal, 115f spontaneous breaths during mechanical ventilation in, 116f capnometer for monitoring of, 113-14 causes for change in, 119t equine anesthesia maintenance with, 369 mainstream (nondiverting) monitor for, 114 maintenance of monitoring equipment for, 119-20 mechanical dead space with, 113 monitoring of, 113-20 monitor types for, 113-14 primary methods for monitoring of, 113 infrared light absorption, 113 mass spectroscopy, 113 sidestream (diverting) monitor for, 114-19

Enucleation, 202 Epidural block, 377–78 Epinephrine, cardiopulmonary/cerebral resuscitation with, 179, 180t Equine anesthesia, 357-71 cardiovascular effects with drugs for, 360 different circumstances with drugs for, 359-60 dose range with drugs for, 359 five phases of, 360 induction phase, 360 maintenance phase, 360 postanesthetic phase, 360 preanesthetic phase, 360 recovery phase, 360 four pillars of, 359-60 assessment, 358, 358f familiarity, 358-59 planning, 359 readiness, 358, 359f individual differences with drugs for, 359 induction phase of, 364-65 guaifenesin, 364 ketamine, 364-65 tolazoline-zolazepam, 365 maintenance phase of, 365-70 balanced anesthesia in, 366 end-tidal CO₂ in, 369 hypotension treatment for, 367-68 inhalant anesthetics for, 365 monitoring in, 366-67 padding/positioning in, 366, 366f pulse oximetry in, 369 respiration in, 368-69 TIVA in, 365-66 ventilation in, 369 postanesthetic phase in, 371 preanesthetic phase of, 360-64 emptying GI tract in, 361 laboratory results in, 361 patient physical examination in, 360-61 sedative in, 360-64 preanesthetic sedative for, 362-64 acepromazine, 363 atropine, 363 butorphanol, 363-64 detomidine, 362 diazepam, 363 medetomidine (Dexmedetomidine), 363 morphine, 364 xylazine, 362 recovery phase of, 370-71 anesthetic agent elimination in, 370 antagonists in, 370-71 oxygenation in, 371 patent airway in, 371 sedation in, 370

Equipment. See Anesthesia equipment ERG. See Electroretinogram Esophageal stethoscope, 102-3, 103f ETC02. See End-tidal carbon dioxide Etomidate (Amidate) cardiovascular effects from, 215t cerebral blood flow with injectable, 222 induction with, 147, 147t, 150t liver disease pharmacology with, 260 pediatric patients induction with, 270t, 271 Excel worksheet drug calculation with, 31–32 fluid calculation with, 32, 32t Excitation, anesthesia complicated by, 169 Extraocular procedures, anesthesia for, 201 Extubation, 66-67, 67t patient recovery and, 165-66 three-way stopcock with, 66, 67t Fentanyl, 137t, 139 induction for respiratory-challenged patients with, 231t induction with, 149, 150t Ferrets, 313-17 anesthesia induction, care and support for, 314-15 anesthesia preparation for, 313-14 anesthesia recovery with, 316 emergency considerations for, 322 fluid therapy plan for, 316 monitoring during anesthesia for, 316 FFP. See Fresh frozen plasma Fluid calculation, 32, 32t Fluid drip rates calculation, 31-32 Fluids classifications of, 124-25 albumin, 124-25 colloids, 124 crystalloids, 124 dextran, 125 hetastarch, 125 transcellular, 123 Fluid therapy, 123-34 cardiogenic shock with, 130 cardiopulmonary/cerebral resuscitation with, 182 electrolyte abnormalities requiring, 127-30 hypochloremia/hyperchloremia, 127 hypokalemia/hyperkalemia, 128-30, 129t hyponatremia/hypernatremia, 127-28, 128f ferrets, plan for, 316 hydration deficit replacement requirement calculation for, 126f hypovolemic shock requiring, 129 long-term, 126 maintenance, 125-26 obstructive shock with, 130

replacement, 126-27, 126f, 126t resuscitation, 127 types of, 125-27 Flumazenil cardiopulmonary/cerebral resuscitation with, 180t geriatric doses for, 280t pediatric doses for, 270t Foreign bodies/obstructions, 305-7 FRC. See Functional residual capacity Fresh frozen plasma (FFP), 130 Functional residual capacity (FRC), 9, 189 Furosemide, cardiopulmonary/cerebral resuscitation with, 180t Gabapentin, pain management with, 352 Gag reflex, 160 Gastric dilatation-volvulus (GDV), 303-5, 304f Gastrointestinal system, preanesthetic workup exam for, 19,25f GDV. See Gastric dilatation-volvulus Geriatric patients, 275-81 induction for, 278-79, 280t alfaxalone, 279, 280t etomidate, 278-79, 280t ketamine, 279, 280t propofol, 278, 280t maintenance for, 279 monitoring for, 279-81, 280f physiology of, 275-76 preanesthesia preparation for, 276 premedication for, 276-78 acepromazine, 277-78, 280t alpha-2 agonists, 278 anticholinergics, 278, 280t benzodiazepine, 277, 280t opioids, 277, 280t recovery for, 281 GFR. See Glomerular filtration rate Glomerular filtration rate (GFR), 249 Glycopyrrolate, 136, 137t cardiopulmonary/cerebral resuscitation with, 178-79, 180t drug combinations with, 140, 140t, 141t geriatric doses for, 280t pediatric doses for, 270t Guaifenesin, equine induction phase with, 364 HAG (hydromorphone, acepromazine, glycopyrrolate), 141 Halothane, 156-57 cardiovascular effects from, 215t inhalant anesthetics for ICP with, 223 minimum alveolar concentration of, 154t vaporization pressure of, 155t HCO₃. See Bicarbonate level

Head trauma, 219-24 MRI of, 220f Heart. See also Cardiovascular system anatomy/physiology of, 3-4 atrioventricular node of, 3 cardiac cycle of, 4 ECG-determining rate of, 4-7 mitral valve, 4 murmurs, 4 normal blood flow through, 208f sino-atrial node of, 3 tricuspid valve, 4 volume status with, 7 Heart failure, 207-8, 208f Heart rate, 106, 106f Heartworm disease, 212-13, 214t Hepatic system, preanesthetic workup exam for, 19, 25f Hetastarch, 125 Hoffman elimination, 199 Human immunoglobulin (IGg), 130-31, 132f Hyaluronic acid, 353 Hydromorphone, 137t, 139 drug combinations with, 140t, 141, 141t induction for respiratory-challenged patients with, 231t induction with, 149, 150t Hyperadrenocorticism (Cushing's disease), 241-42, 241f Hypercarbia, 10 Hypertension, anesthesia complicated by, 173 Hyperthermia, 99-100 causes of, 100 malignant, 100 treatment of, 100 Hyperthyroidism, 242-43 Hypertrophic cardiomyopathy, 209-10, 214t Hyperventilation, 188 anesthesia complicated by, 172 capnograph showing, 116f Hypoadrenocorticism (Addison's disease), 242 Hypocapnia, 188 Hypochloremia/hyperchloremia, 127 cause of, 127 treatment of, 128, 128f Hypokalemia/hyperkalemia, 128-30, 129t clinical signs of, 128-29 ECG changes indicating, 129 treatment of, 129, 129t Hyponatremia/hypernatremia, 127-28, 128f clinical signs of, 127-28 fluid rate calculation for correction of, 128f treatment of, 128, 128f Hypotension anesthesia complicated by, 172 treatment for equine with, 367-68

Hypothermia, 98-99 active patient warming for, 99 monitoring body temperature with, 98 prevention of, 98-99 Hypothyroidism, 243 Hypoventilation, 188–89 anesthesia complicated by, 171 capnograph showing, 115f Hypovolemic shock, 129 Hypoxemia, 10, 189 anesthesia complicated by, 172 Hypoxia, anesthesia complicated by, 172 ICP. See Intercranial pressure IGg. See Human immunoglobulin Induction drugs, 143-50 inhalant induction procedures for, 143-44, 144f chamber, 143-44, 144f mask, 143, 144f injectable induction agents, 144-47, 147t acepromazine, 149 barbiturates, 147-49 benzodiazepines, 144-45 cyclohexamines, 145-46 diazepam, 144-45, 147t, 149, 150t etomidate, 147, 147t, 150t fentanyl, 149, 150t hydromorphone, 149, 150t ketamine (ketaset, vetalar, ketalean), 145, 147t, 150t meperidine, 149 methylated oxybarbiturate (methohexital), 148-49 midazolam (versed), 145, 147t, 149, 150t morphine, 149 neuroleptanalgesia, 149-50 opioids, 149 oxymorphone, 149, 150t propofol, 146-47, 147t, 150t thiobarbiturate (thiopental), 148-49 tiletamine (Telazol), 145-46, 147t, 150t zolazepam, 145, 147t, 150t Infrared light absorption, 113 Inhalant anesthetics, 153–58 characteristics of ideal, 153-54 desflurane, 158 minimum alveolar concentration of, 154t vaporization pressure of, 155t halothane, 156-57 minimum alveolar concentration of, 154t vaporization pressure of, 155t history, 153 induction procedures with, 143-44, 144f

isoflurane, 157 minimum alveolar concentration of, 154t vaporization pressure of, 155t mechanism of action for, 154 minimum alveolar concentration for, 154-55, 154t desflurane, 154t halothane, 154t isoflurane, 154t nitrous oxide, 154t sevoflurane, 154t nitrous oxide, 156 minimum alveolar concentration of, 156 pharmacokinetics of, 154 sevoflurane, 157-58, 157f minimum alveolar concentration of, 154t vaporization pressure of, 155t solubility coefficient of, 155, 155t vaporization pressure of, 155, 155t desflurane, 155t halothane, 155t isoflurane, 155t sevoflurane, 155t Inspiratory to Expiratory Ratio (I:E ratio), 190, 190f, 191 Insulin, 17 Insulinoma, 240 Integument system, preanesthetic workup exam for, 19-20.25f Intercranial pressure (ICP), 219-24 anesthetic agents effect on, 221 anesthetics management for, 223-24 autoregulation with, 219-20 cerebral blood flow with, 219-20 CO₂ and O₂'s effect on, 221 Cushing reflex with, 220–21 factors causing increase in, 221 inhalant anesthetics for, 223 desflurane, 223 halothane, 223 isoflurane, 223 nitrous oxide, 223 sevoflurane, 223 injectable anesthetics for, 221-23 barbiturates, 222 benzodiazepine, 222 butyrophenone, 222 cisatracurium, 222-23 diazepam, 222 etomidate, 222 ketamine, 222 lidocaine, 222 midazolam, 222 phenothiazine, 222 propofol, 222 vecuronium, 222-23 recovery for anesthetics used for, 224

Intermittent positive pressure ventilation, 188 Interstitial edema, 123 Interstitium, 123 Intervertebral disk disease (IVDD), 307-9, 308f, 309f Intracellular compartment, 123 Intraocular pressure (IP), determinants of, 195–96, 196t Intraocular procedures anesthesia for, 202 positioning for, 202-3, 203f Intravenous access, 49–55 arterial catheter for, 51, 51f cardiac disease patient outcome with, 206 care for, 54-55 catheter placement/stabilization for, 51-52, 52f, 53f catheter size/type for, 49-50, 50f multilumen, 49-50, 50f through needle, 49 over needle, 49 choosing correct catheter for, 50 double lumen catheter for, 50-51, 50f prepping site for, 52-54, 52f-54f quadruple lumen catheter for, 50-51 single lumen central catheter for, 50, 54f supplies for, 53-54 triple lumen catheter for, 50-51 troubleshooting, 54 vascular access ports for, 50 venous catheter for, 51 Intubation, 63–66, 63f assistant holds head for, 63, 63f cuff inflation guidelines with, 65t guidelines for success with, 63t laryngospasm with, 64t placement confirmation with, 66t tube tie with, 66t IP. See Intraocular pressure Isoflurane, 157 cardiovascular effects from, 215t inhalant anesthetics for ICP with, 223 minimum alveolar concentration of, 154t vaporization pressure of, 155t IVDD. See Intervertebral disk disease IV fluids. See also Intravenous access administering agent by adding to, 33 Jaw tone, 101, 102f IGA. See Juxtaglomerular apparatus Juxtaglomerular apparatus (JGA), 246-47, 248f KBAG (ketamine + BAG), 141, 141f Ketalean. See Ketamine Ketamine (Ketaset, Vetalar, Ketalean), 137t, 138-39 cerebral blood flow with injectable, 222 drug combinations with, 141, 141t

equine induction phase with, 364-65

induction for respiratory-challenged patients with, 230t, 231t induction with, 145, 147t, 150t IV fluids with administration of, 33 pediatric patients induction with, 270, 270t Ketaset. See Ketamine KHAG (ketamine, hydromorphone, acepromazine, glycopyrrolate), 141, 141f Kitty Magic, 141-42, 141t Laryngoscopes, 61-62, 62f Laryngospasm, 64t anesthesia complicated by, 171 Lasix, percent solution calculations, 30 Lidocaine cardiopulmonary/cerebral resuscitation with, 179, 180t cardiovascular effects from, 215t cerebral blood flow with injectable, 222 induction for respiratory-challenged patients with, 230t, 231t IV fluids with administration of, 33 liver disease pharmacology with, 261 percent solution calculations, 30 Liver, anatomy of, 257, 258f Liver disease, 257-64 blood work to consider before anesthesia for, 257-58, 259t conditions that affect liver, 261-64, 262f, 263f drug protocol design for, 264 pharmacology for, 258-61 alpha-2 agonists, 259-60 barbiturates, 260 benzodiazepine, 259-60 diazepam, 260 dissociative drugs, 260-61 etomidate, 260 lidocaine, 261 nonsteroidal antiinflammatory drugs, 261 opioids, 260 phenothiazine, 259 propofol, 260 Low-flow circle system, 83-84 MAC. See Minimum alveolar concentration Mainstream (nondiverting) monitor, 114 MAP. See Mean arterial pressure Mapleson system, 81 Mask, inhalant induction procedures using, 143, 144f Mass spectroscopy, 113 Mathematics, 29-34 administering agent by adding to IV fluids, 33 agent dose calculation, 30-31, 31t agent strength percent solution calculations, 30 constant rate infusion, 33 Excel worksheet for drug calculation, 31-32

Excel worksheet for fluid calculation, 32, 32t fluid drip rates calculation, 31–32 metric system, 29-30, 29t, 30t percentages, 30 Mean arterial pressure (MAP), 5, 6 equation for, 106 Mechanical dead space, 10, 113 Medetomidine (Dexmedetomidine), 137t, 138 equine preanesthetic sedative with, 363 Meperidine (Demerol), induction with, 149 Methadone, 137t, 139 pediatric doses for, 270t Methohexital. See Methylated oxybarbiturate Methylated oxybarbiturate (Methohexital), induction with, 148–49 Metric system, 29-30, 29t, 30t Midazolam (Versed), 136-37, 137t cerebral blood flow with injectable, 222 drug combinations with, 140t geriatric doses for, 280t induction with, 145, 147t, 149, 150t pediatric doses for, 270t Minimum alveolar concentration (MAC), 154–55, 154t desflurane, 154t halothane, 154t isoflurane, 154t nitrous oxide, 154t sevoflurane, 154t Minute volume, 9 Mitral regurgitation, 210f Mitral valve, 4 Mitral valve insufficiency, 210, 210f, 214t MM. See Mucus membrane color Modified Jackson Rees system, 82 Monitoring, 85-120 anesthesia of ferrets, 316 anesthetic depth, 101-3, 101f-103f Capillary Refill Time in, 101-2, 102f corneal reflex in, 101, 101f esophageal stethoscope in, 102-3, 103f jaw tone in, 101, 102f mucus membrane color in, 101 palpation of arteries in, 102, 102f palpebral reflex in, 101 position of eye in, 101 swallowing reflex in, 101 withdrawal reflex in, 101, 101f ASA physical status scale, 85 blood gas analysis, 91-93 components of, 92-93 errors in sampling with, 93 physiology with, 92 sample collection for, 93 blood pressure, 105–12 direct (invasive) monitoring of, 107-10, 109f factors determining, 106, 106f

indirect (noninvasive) monitoring of, 110-12, 111f normal values for, 106, 107t body temperature, 97-101 hyperthermia and, 99-100 hypothermia and, 98-99 normal, 98 capnography for, 112-13 DACVA guidelines for, 85 electrocardiogram, 86-91 applications for monitoring of, 86 arrhythmia in, 88 atrial fibrillation in, 91 atrial fibrillation premature complex in, 91 atrioventricular block in, 89-90, 89f cardiopulmonary/cerebral resuscitation with, 181 inaccurate data with, 87 interpreting data from, 87 monitoring information from, 86 monitoring process for, 86-87 physiology with, 86 sinus bradycardia in, 88-89 sinus tachycardia in, 88, 88f ventricular fibrillation in, 91 ventricular premature contraction in, 90 ventricular tachycardia in, 90-91, 90f end-tidal carbon dioxide, 113-20 capnograph for, 113, 115f-118f, 119t capnometer for, 113-14 causes for change in, 119t mainstream (nondiverting) monitor for, 114 maintenance of monitoring equipment for, 119-20 monitor types for, 113-14 primary methods for, 113 sidestream (diverting) monitor for, 114-19 equine anesthesia, 366-67 hands-on, 101-3 neuromuscular blockade, 200-201, 200f patient recovery, 162-63, 163f pediatric patients, 272-73, 273f pulse oximetry, 95–97 factors influencing accuracy of, 96 interpretation of data from, 97 patient assessment/treatment of decreased SpO₂ with, 97 physiology with, 95-96 types of, 96, 96f working of, 95-96 record grid for, 37 Morphine, 137t, 139 drug combinations with, 140t, 141, 141t equine preanesthetic sedative with, 364 induction for respiratory-challenged patients with, 230t

induction with, 149 IV fluids with administration of, 33 pediatric doses for, 270t Mucus membrane color (MM), 101 Murmurs, 4 Naloxone, 139 cardiopulmonary/cerebral resuscitation with, 180t geriatric doses for, 280t pediatric doses for, 270t Nerve stimulator, 200, 200f Nervous system, preanesthetic workup exam for, 19, 25f Neuroleptanalgesia, induction with, 149-50 Neuromuscular blockade (NMB), 198-201 drugs specific for, 199-200 atracurium, 199 monitoring of, 200-201, 200f nerve stimulator for, 200, 200f neuromuscular junction with, 199 reversal of, 201 types of, 199 depolarizing, 199 nondepolarizing, 199 use with ophthalmic procedures of, 198-99 ventilation with, 200 Neuropathic pain, 327 Nitrous oxide, 156 inhalant anesthetics for ICP with, 223 minimum alveolar concentration of, 156 renal disease anesthesia with, 252, 253t NMB. See Neuromuscular blockade NMDA receptor antagonists, adaptive pain management with. 348-49 Nonrebreathing system, 81–83, 82f Bain Coaxial system, 82, 82f flow rates for, 84 high pressure alarm for, 82 Mapleson system, 81 Modified Jackson Rees system, 82 Nonsteroidal antiinflammatory drugs (NSAID), 16 adaptive pain management with, 347 liver disease pharmacology with, 261 pain management with, 352 renal disease anesthesia with, 252-54, 253t Nontrauma emergency patients, 301-10 foreign bodies/obstructions, 305-7 gastric dilatation-volvulus, 303-5, 304f intervertebral disk disease, 307-9, 308f, 309f pyometra, 310 shock, 301-3 urethral obstruction, 309-10 NSAID. See Nonsteroidal antiinflammatory drugs Numorphan. See Oxymorphone

O'BAG (Old dog BAG), 140, 140f Obstructive shock, 130 OCR. See Oculocardiac reflex Ocular procedures anesthesia for, 202 positioning for, 202-3, 203f recovery from procedures for, 203 Ocular trauma, 294 Oculocardiac reflex (OCR), 196 Ophthalmology patients, 195-203 anesthesia for electroretinogram with, 201 anesthesia for extraocular procedures for, 201 anesthesia for ocular/intraocular procedures for, 2.02 cataract removal, 202 conjunctival flap, 202 enucleation, 202 general considerations for, 195 induction/maintenance of anesthesia for, 197 intraocular pressure determinants with, 195-96, 196t local blocks for, 198 local infiltration of anesthetic with, 198 retrobulbar block, 198 neuromuscular blockade for, 198-201 drugs specific for, 199-200 monitoring of, 200-201, 200f neuromuscular junction with, 199 reversal of, 201 types of, 199 use with ophthalmic procedures of, 198-99 ventilation with, 200 oculocardiac reflex with, 196 positioning for procedures for, 202-3, 203f premedication for, 196-97 recovery from procedures for, 203 Opioids, 139-40 adaptive pain management with, 348, 349f, 349t cardiovascular effects from, 215t induction with, 149 liver disease pharmacology with, 260 pain management with, 352 pediatric patients premedication with, 268-69, 270t renal disease anesthesia with, 251, 253t Organophosphates, 17 Oscillometric methods, 111 Oxygen delivery equipment, 71–73, 72f compressed gas cylinder, 71 flowmeter, 72-73, 72f oxygen concentrator, 71 regulator, 71, 72f troubleshooting, 77 Oxygen saturation (SaO₂), 92-93 Oxymorphone (Numorphan), 137t, 139 drug combinations with, 140t, 141, 141t geriatric doses for, 280t induction for respiratory-challenged patients with, 231t

induction with, 149, 150t pediatric doses for, 270t Packed cell volume (PCV), 22 Packed red blood cells (PRBC), 130 cat/dog, 133f PaCO₂. See Partial pressure of carbon dioxide Pain, 325-55 adjunct therapies for, 353-54 acupuncture, 353-54 therapeutic laser, 354, 354f weight loss, 354 assessment of, 333-43 age differences for, 336 behavioral signs for, 334-36, 337f breed differences for, 335 chronic pain in, 342-43, 342f frequency of, 338-39 general acute, 337-39, 337f individual characteristics for, 336 painful conditions/procedures in, 339 pain scoring systems for, 339-42, 340, 341f role of technician in, 334 species differences for, 334–35, 335f classification of, 325-27, 346 acute v. chronic, 326, 346 adaptive v. maladaptive, 346 physiologic v. pathologic, 325-26 referred v. neuropathic, 327 somatic v. visceral, 326-27 gate control theory of, 330-31, 330f glucosamine-containing supplements for, 353 hyaluronic acid for, 353 joint/cartilage structure modifiers for, 353 management of adaptive, 347-50 alpha-2 agonists, 347-50 local anesthetics, 349-50, 350f NMDA receptor antagonists, 348-49 nonsteroidal antiinflammatory drugs, 347 opioids, 348, 349f, 349t tramadol, 348 management of maladaptive, 350-53 management strategies for, 345-55 central neuronal hypersensitization in, 345-46 designing optimal, 345-46, 346t multimodal analgesia for, 345, 346t preemptive analgesia in, 346 neuroendocrine signs of, 336-37 pathways, 329-30, 327f afferent nerve fibers, 327-28, 328t ascending spinal tracts with, 330 dorsal horn neurochemistry with, 329-30 spinal cord dorsal horn anatomy with, 328-29, 329f

pharmaceuticals for, 352-53 acetaminophen, 352 amantadine, 352 gabapentin, 352 nonsteroidal antiinflammatory drugs, 352 opioids, 352 tramadol, 352-53 physical therapy for, 354-55, 355f physiologic signs of, 336-37 polysulfated glycosaminoglycans for, 353 postsurgical, 351f regenerative stem sell therapy for, 355 Palpation of arteries, 102, 102f Palpebral reflex, 101 PaO₂. See Partial pressure of oxygen Partial pressure of carbon dioxide (PaCO₂), 92 Partial pressure of oxygen (PaO₂), 92 Patent ductus arteriosus (PDA), 210-11, 214t Pathologic pain, 325-26 Patient recovery, 159-66 analgesia for, 165 anesthesia recovery with, 224 bandage placement with, 164 bedding for, 166 body temperature with, 163 heating elements for, 163, 163f endotracheal tube extubation for, 165-66 ferrets in, 316 geriatric patients in, 281 monitoring patient during, 162-63, 163f nasal oxygen placement with, 163-64 procedures overview for, 159-61 prolonged recovery from anesthesia, 184 rabbits in, 319 recovery room with, 161-62, 162f regurgitation during, 165 removing monitoring equipment with, 162 rodents in, 319 tracheostomy patient, 164 tranquilization for, 165 transferring recovering patient with, 162 urinary catheter management in, 164-65 PCV. See Packed cell volume PDA. See Patent ductus arteriosus Peak Inspiratory Pressure (PIP), 189–90 Pediatric patients, 267-73 induction for, 269-72, 270t alfaxalone, 270t, 271 etomidate, 270t, 271 inhalation agents for, 271, 271f ketamine, 270, 270t propofol, 269, 270t maintenance for, 271-72 monitoring for, 272-73, 273f physiology with, 267-68 postanesthesia for, 273

preanesthesia preparation for, 268, 268f premedication for, 268-69, 270t acepromazine, 269, 270t alpha-2 agonists, 269 anticholinergics, 269, 270t benzodiazepine, 269, 270t opioids, 268-69, 270t thermoregulation for, 272 PEEP. See Positive end expiratory pressure Percentage calculations, 30 Percent solution calculations agent strength, 30 preparing, 32 Perfusion pressure, renal system, 246 Perianesthetic arrhythmias, 213-16 pH, 92 Phenobarbital, 16-17 Phenothiazines, 136 cardiovascular effects from, 215t cerebral blood flow with injectable, 222 liver disease pharmacology with, 259 renal disease anesthesia with, 251, 253t Photoplethysmographic methods, 111 Physical therapy, pain management with, 356-57, 355f Physiologic pain, 325–26 PIP. See Peak Inspiratory Pressure Platelet count, 23 Polysulfated glycosaminoglycans (PSGAG), 353 Position of eye, 101 Positive end expiratory pressure (PEEP), 9, 190 Positive pressure ventilation (PPV), 9 PPV. See Positive pressure ventilation PRBC. See Packed red blood cells Preanesthetic preparation, 41-48 check equipment/monitor setup in, 41 check vaporizer in, 42 crash cart made available in, 44 endotracheal tube chosen for, 43 IV supplies preparation, 43-45 premedication/induction agent labeling in, 43 preparation for induction in, 43, 43f pressure check anesthesia machine in, 41, 42f squeeze out rebreathing bag in, 41, 42f surgery room setup in, 45 OR table setup in, 46-47, 46f thermoregulatory support preparation in, 46 Preanesthetic workup, 13-26, 14f ASA status, 20-21, 21f current medication knowledge in, 16-17 adjunctive analgesics drugs, 16 analgesics, 16 antibiotics, 16 cardiovascular drugs, 16 chemotherapy drugs, 16 insulin, 17

nonsteroidal antiinflammatory drugs, 16 organophosphates, 17 phenobarbital, 16-17 diagnostics, 21-22 ALT, AST, and alkaline phosphatase serum tests, 22 arterial blood gases, 24 basic minimum database, 21 blood glucose, 22 Buccal mucosal bleeding time, 23 BUN serum test, 22, 249 coagulation profile, 22 complete blood count, 22 creatinine serum test, 22, 249 electrocardiogram, 24 endocrine testing, 24 full chemistry profile, 22 full urinalysis, 23-24 packed cell volume, 22 platelet count, 23 thrombocytopenic count, 23 total plasma protein, 22 urine specific gravity, 22 diagnostics imaging, 24 radiography, 24 ultrasound, 24 flow chart for, 14f influencing factors with, 13-16 physical exam in, 17-20 cardiovascular system, 17-18, 25f endocrine system, 20, 25f gastrointestinal system, 19, 25f hepatic system, 19, 25f integument system, 19-20, 25f nervous system, 19, 25f overall body condition, 20, 20f renal system, 18, 25f respiratory system, 18, 25f SOAP for, 24, 26f Preemptive analgesia, 348 Pregnancy. See also Cesarean section techniques physiological alterations in, 283-84 Premature ventricular contraction. See Ventricular premature contraction Premedication drugs, 135–42 acepromazine, 136, 137t alpha-2 agonists, 137-38 anticholinergics, 136 atropine, 136, 137t benzodiazepines, 136-37 buprenorphine, 139 butorphanol, 137t butyrophenones, 136, 137t combination does, 140-42 BAG (butorphanol, acepromazine, glycopyrrolate), 140-41, 140f

BMG (butorphanol, midazolam, glycopyrrolate), 140f HAG, 141 KBAG, 141, 141f KHAG, 141, 141f Kitty Magic, 141–42 O'BAG, 140, 140f dexmedetomidine, 137t, 138 diazepam, 136-37, 137t dissociative drugs, 138-39 fentanyl, 137t, 139 glycopyrrolate, 136, 137t hydromorphone, 137t, 139 ketamine, 137t, 138-39 medetomidine, 137t, 138 methadone, 137t, 139 midazolam, 136-37, 137t morphine, 137t, 139 naloxone, 139 opioids, 139-40 oxymorphone, 137t, 139 phenothiazines, 136 protocol for, 136 tiletamine, 138 tiletamine (Telazol), 137 tranquilizers, 136-37 xylazine, 137t, 138 zolazepam, 136-37 Preoperative evaluation from, 36f Pressure cycled ventilator, 191 P-R interval, 4 Prolonged life support, cardiopulmonary/cerebral resuscitation with, 182-83 Propofol (Diprivan, Rapinovet) cardiovascular effects from, 215t cerebral blood flow with injectable, 2.2.2 induction with, 146-47, 147t, 150t liver disease pharmacology with, 260 pediatric patients induction with, 269, 270t renal disease anesthesia with, 252, 253t PSGAG. See Polysulfated glycosaminoglycans Pulmonic stenosis, 211–12, 214t Pulse oximetry equine anesthesia maintenance with, 369 factors influencing accuracy of, 96 interpretation of data from, 97 monitoring with, 95–97 patient assessment/treatment of decreased SpO₂ with, 97 physiology with, 95–96 types of, 96 reflectance probe, 96 transmittance probe, 96, 96f working of, 95–96

PVC. See Ventricular premature contraction P wave, 4, 86 Pyometra, 310 QRS complex, 4, 86 Q-T interval, 4 Rabbits, 319-22 anesthesia induction, care and support for, 320-22, 322f anesthesia preparation for, 319-20 anesthesia recovery with, 322 emergency considerations for, 322 signs of acute pain in, 335f Radiography, 24 Rapinovet. See Propofol Ravi-Ricci return-to-flow principle, 111, 112 Rebreathing system, 80-81, 81f pediatric circles in, 81 standard adult circles in, 81 Record keeping, 35–39 anesthetic record, 35-37, 36f automated, 37 handwritten monitoring grid, 37 information included in, 35 legal document, 37 controlled substances, 37-39, 39f preoperative evaluation from, 36f Reexpansion pulmonary edema (RPE), 190 Referred pain, 329 Reflectance probe, 96 Regenerative stem sell therapy (RSCT), 355 Regurgitation, recovering patient with, 165 Renal disease, 245-54 anesthesia for, 250-54, 253t, 254t alpha-2 agonists, 251, 253t anticholinergics, 251, 253t barbiturates, 252, 253t benzodiazepine, 251, 253t COX inhibition, 254, 254t nitrous oxide, 252, 253t nonsteroidal antiinflammatory drugs (NSAID), 252-54, 253t opioids, 251, 253t phenothiazine, 251, 253t propofol, 252, 253t Renal system acid-base balance in, 249 anatomy of, 245-46, 246f antidiuretic hormone in, 248-49 autoregulation in, 246 blood flow of, 246 juxtaglomerular apparatus in, 246-47, 248f perfusion pressure in, 246 preanesthetic workup exam for, 18, 25f

renal function tests for, 249-50, 250t blood urea nitrogen, 249 glomerular filtration rate, 249 serum creatinine, 22, 249 renin-angiotensin system, 246-48, 247f, 248f Renin-angiotensin system, 246-48, 247f, 248f Replacement fluid therapy, 126-27, 126f, 126t Resistance, 189 Respiratory-challenged patients, 227-36 brachycephalic breeds' concern with, 231-32, 231f, 2.32f desaturation with, 233-34 induction for, 229-30, 230t, 231t fentanyl, 231t hydromorphone, 231t ketamine, 230t, 231t lidocaine, 230t, 231t morphine, 230t oxymorphone, 231t intrathoracic surgery for, 232-33 premedication for, 228-29 recovery/postop analgesia for, 234-36, 235t-236t, 236f wound soaker protocol for, 235t-236t, 236f Respiratory rate, 188 Respiratory system, 7-11 anatomic dead space of, 9, 10f anatomy of, 7-11, 8f, 10f alveolar-capillary membrane, 8 alveoli, 7, 8f bronchi, 7 bronchioles, 7 capillaries, 8 dead space ventilation of, 9, 10f positive end expiratory pressure of, 9 positive pressure ventilation of, 9 preanesthetic workup exam for, 18, 25f Resuscitation fluid therapy, 127 Retrobulbar block, 198 Rodents, 317-19 anesthesia induction, care and support for, 318–19, 319f anesthesia preparation for, 317-18 anesthesia recovery with, 319 emergency considerations for, 322 signs of acute pain in, 335f RPE. See Reexpansion pulmonary edema RSCT. See Regenerative stem sell therapy Ruminant anesthesia, 373-84 intravenous regional anesthesia for, 376-77 digital blocks in cattle, 377 peroneal/tibial nerve blocks, 377 local analgesia/nerve blocks for, 374-76 auriculopalpebral nerve block, 374 caudal block, 375

cornual nerve block, 374-75, 375f epidural block, 375-76 preanesthetic preparation for, 378-84, 379t, 380f, 384f sedatives/sedation agents for, 377-78 SA node. See Sino-atrial node SaO₂. See Oxygen saturation SCr. See Serum creatinine Sedation drugs, 135-42. See also Premedication drugs Semiclosed circle systems, 84 Serum creatinine (SCr), 22, 249 Sevoflurane, 157-58, 157f cardiovascular effects from, 215t inhalant anesthetics for ICP with, 223 minimum alveolar concentration of, 154t vaporization pressure of, 155t Shock, 301-3 cardiogenic, 130 hypovolemic, 130 obstructive, 130 Sidestream (diverting) monitor, 114-19 Sino-atrial node (SA node), 3 Sinus bradycardia, 88-89 Sinus tachycardia, 88, 88f Smoke inhalation, 295-96, 296f SOAP, 24, 26f Sodium bicarbonate, cardiopulmonary/cerebral resuscitation with, 180t Solubility coefficient, 155, 155t Somatic pain, 328-29 Stroke volume, 106, 106f Stylet and guide tubes, 62-63, 62f Subaortic stenosis, 210f Supraventricular arrhythmias (SVT), 213, 217t SVT. See Supraventricular arrhythmias Swallowing reflex, 101 Systemic vascular resistance, 6 Systolic blood pressure, 5, 6, 106, 107t Tachycardia anesthesia complicated by, 173 sinus, 88, 88f ventricular, 90-91, 90f, 173-74 Telazol. See Tiletamine Therapeutic laser, pain management with, 354, 354f Thiobarbiturate (Thiopental) cardiovascular effects from, 215t induction with, 148-49 Thiopental. See Thiobarbiturate Thoracic trauma, 295 Thoracotomies, 227-36 brachycephalic breeds' concern with, 231-32, 231f, 232f desaturation with, 233-34

induction for, 229-30, 230t, 231t fentanyl, 231t hydromorphone, 231t ketamine, 230t, 231t lidocaine, 230t, 231t morphine, 230t oxymorphone, 231t premedication for, 228-29 recovery/postop analgesia for, 234-36, 235t-236t, 236f wound soaker protocol for, 233t-234t, 234f Thrombocytopenic count, 23 Tidal volume, 9, 188 Tiletamine (Telazol), 137, 138 induction with, 145-46, 147t, 150t Time cycled ventilator, 191-92, 192f TIVA. See Total Intravenous Anesthesia Tolazoline-zolazepam, equine induction phase with, 365 Total Intravenous Anesthesia (TIVA), 365-66 Total peripheral resistance, 106 Total plasma protein, 22 Tracheal trauma, 294, 294f Tracheostomy, patient recovery with, 164 Tramadol adaptive pain management with, 350 pain management with, 352-53 Tranquilization, recovering patient with, 165 Tranquilizers, 136-37 Transcellular fluid, 123 Transfusions, 133-34, 133f Transmittance probe, 96, 96f Trauma patients, 293-300 case report for, 297-300, 298t induction agents for, 296-97, 297t types of trauma for, 294-96, 294f, 296f blunt force trauma, 296 burn injuries/smoke inhalation, 295-96, 296f ocular trauma, 294 thoracic trauma, 295 tracheal trauma, 294, 294f Tricuspid valve, 4 T wave, 4, 86, 87f Ultrasonography, 24 Doppler, 111 Urethral obstruction, 309-10 Urinalysis, 23-24 Urinary catheter, recovering patient with, 164-65 Urine specific gravity (USG), 22 USG. See Urine specific gravity Valium. See Diazepam Vaporization pressure, 155, 155t desflurane, 155t

halothane, 155t

isoflurane, 155t sevoflurane, 155t Vaporizers, 73-75, 74f, 75f complications with, 168 Vasopressin, cardiopulmonary/cerebral resuscitation with, 179, 180t Vecuronium, cerebral blood flow with injectable, 222 - 23Ventilation, 8 cardiac disease patient outcome with, 206 common terms with, 188-91 atelectasis, 8, 189 compliance, 189 functional residual capacity, 189 hyperventilation, 116f, 172, 188 hypocapnia, 188 hypoventilation, 115f, 171, 188-89 hypoxemia, 10, 172, 189 intermittent positive pressure ventilation, 188 resistance, 189 respiratory rate, 188 tidal volume, 9, 188 V/Q mismatch, 189 discontinuing support for, 194 equine anesthesia with, 371 equipment definitions with, 189–91 controlled ventilation, 189 inspiratory to Expiratory Ratio (I:E ratio), 190, 190f, 191 peak Inspiratory Pressure (PIP), 189-90 positive end expiratory pressure (PEEP), 9, 190 reexpansion pulmonary edema (RPE), 190 evaluation of efficiency with, 194 goals of, 187 manual v. mechanical, 187-88 presetting, 192-94 pressure testing for, 192–94

setup for, 192-94 techniques in small animal patients, 187-94 types of, 191-92 pressure cycled, 191 time cycled, 191-92, 192f volume cycled, 191, 191f Ventricular fibrillation (V-fib), 91 anesthesia complicated by, 173-74 Ventricular premature contraction (VPC), 90, 213, 217t anesthesia complicated by, 173-74 Ventricular tachycardia (V-tach), 90-91, 90f, 217t anesthesia complicated by, 173-74 Versed. See Midazolam Vetalar. See Ketamine Vetalar, Ketalean. See Ketamine V-fib. See Ventricular fibrillation Visceral pain, 326-27 Volume cycled ventilator, 191, 191f VPC. See Ventricular premature contraction V/Q mismatch, 189 V-tach. See Ventricular tachycardia

WAG. *See* Waste anesthetic gas
Waste anesthetic gas (WAG) active system for, 76–77, 76f passive system for, 76 removal equipment, 76–77, 76f troubleshooting, 78
Weight loss, pain management with, 356
Whole blood, 130, 130f
Withdrawal reflex, 101, 101f

Xylazine, 137t, 138 equine preanesthetic sedative with, 362

Zolazepam, 136–37 induction with, 145, 147t, 150t