## Index

Page numbers in italics indicate illustrations; those followed by (t) indicate tables.

Abbreviations, 458-459 Abortion, viability and, 7 Acetylcysteine (Mucomyst), 276 Acid-base balance, during transport, 388-390 Acidosis, metabolic, 229 postoperative, 299 values in, 299(t) respiratory, 229 values in, 229(t) Admission, nursing procedures after, 116 procedures for, 108 unexpected, equipment necessary for, 108(t) Adrenergic receptors, selectivity of catecholamines for, 280(t) sites and actions of, 279(t) Aerobic metabolism, 223 Aerophore pulmonaire, 2, 2 Age, effect on lung size of, 433(t) gestational, assessment of, 440(t) in decision to resuscitate, 8 incidence of patent ductus arteriosus and, 292(t) Air embolism, in air leak syndromes, 258, 263-264, 264 postoperative, 303 pulmonary, 255-264. See also Extraneous air syndromes. during transport, 390-394 high frequency ventilation for, 193-196. 193(t) Air transport, of ventilated infants, stabilization for, 390 Airflow, measurement of, 239 monitoring of, effect of secretions in, 240, 240 Airway(s), diameter of, resistance and, 42 humidification and warming of, during intuba-

injury to, chronic pulmonary sequelae of, 405—

management of, during intubation, 97-103

monitoring devices for, in transport, 383

intraoperative, 367-368

obstruction of, air trapping in, 43

surgical management of, 342-356

difficulties in, 358

intubation in, 90

tion, 99

406

Airway(s) (Continued) upper, preoperative evaluation of, 362, 363 structure of, adult vs. neonatal, 359 Airway or tube length, 41 Airway pressure, mean, 61, 62-63. See also Mean airway pressure (MAP) measurement of, 237, 238, 238 monitoring of, effect of secretions in, 240, 240 manometric, during anesthesia, 361, 362 Airway pressure gradient, 30 Airway resistance, effect on distribution of ventilation of, 52-53 in respiratory distress syndrome survivors, 401-403 subnormal, 41 Albumin, for neonatal resuscitation, 83(t), 84 Alimentation. See Feeding; Nutrition. Alkalosis, metabolic, 229 postoperative, 299 values in, 230(t) of hyperventilation, adverse effects of, 49 respiratory, 230 values in, 230(t) Allen's test, 444 Altitude, effect on gas expansion of, 391(t) effect on inspired oxygen concentration of, 391 Alveolar arterial oxygen gradient, 204 as entry criteria for ECMO, 204(t) Alveolar dead space, definition of, 24 Alveoli, changes in, in BPD, 248(t) collapse of, CDP and, 133 Aminophylline, 276 Anaerobic metabolism, 223 Analgesics, sedatives and, 275 Anatomical dead space, definition of, 24 Anesthesia, complications of, 373 in neonatal emergencies, 372(t), 373 increased neonatal risks in, 357 intraoperative management of, 366-371 monitoring during, 367 neonatal pathophysiology and, 360-362 neonatal physiology and, 357-360 postoperative management of, 371-373 regional, neonatal, 371 spinal, 371

termination of, 371

Anesthetics, increased neonatal requirements for, increased neonatal sensitivity to, 357-358 inhalation, 358(t), 364-365 precision vaporizers for, 366, 367 intravenous, 366 neonatal dosages of, 363(t) myocardial depressant effects of, 358 neonatal dosages of, 363(t) pharmacology of, 364-366 Angiocardiography, in diagnosis of PPHN, 290 Antiarrhythmic drugs, 300(t), 457(t) dosages for, 300(t), 457(t) Antihypertensive drugs, dosages for, 303(t), 457(t) Aorta, coarctation of, postoperative syndrome in, Apgar scores, in newborn, evaluation of, 79(t) mild to moderate depression in, resuscitation treatment in, 80-82 severe depression in, resuscitation treatment in, 82 Apnea, episodic, risks of anesthesia in, 361 methylxanthines for, 276(t) of prematurity, CPAP for, 138 primary, emergency treatment for, 80 in asphyxia, 71 secondary, in asphyxia, 71 Arrhythmia(s), 285 after cardiac surgery, 299 drugs for, 300(t), 457(t) dosages of, 300(t), 457(t) Arterial blood gases. See Blood gases. Arterial puncture, intermittent, advantages and disadvantages of, 214(t) Artery, radial, cannulation of, 119, 219, 219 umbilical, catheterization of, 213-216 catheters for, 118-119 Asphyxia, emergency diagnosis and treatment for, 80-86 fetal changes in response to, 71(t) neonatal, causes of, 72(t) effects of, 72(t) physiological changes during, 70-72, 71 Aspiration pneumonitis, CDP and, 140 Assist mode, in volume cycled ventilators, 175 Assisted ventilation. See also Ventilation; Ventilator(s); Ventilator settings. after cardiac surgery, 303-304 as extraordinary measure, 5 blood gas analysis and, 13, 15(t) cardiovascular aspects of, 284-306 case histories in, 409-429 complications of, 23(t), 245-271 control of ventilation during, 29-30 cost-benefit ratio in, 15-16 definition of, 1 developmental outcome in, 406 discontinuance of, decision making in, 9 distribution of perfusion and, 59-60 ethical and legal considerations in, 4–10 failure of, case history of, 425-428 definition of, 426 predictive scoring systems for, 426, 427 for persistent pulmonary hypertension, 290 goals of, 1, 23(t) history of, 1-4 indications for, 11-15 intraoperative management and, 357-375

mortality and morbidity in, 4, 15-16

Assisted ventilation (Continued) nutritional support for, 307-327 physiological principles of, 22-69 pulmonary sequelae of, 397, 398(t) qualifications of staff and equipment for, 10-11, 12(t) respiratory disease following, 398-399, 398(t), 399(t)SEH/IVH and, 328 Asthma, familial, respiratory disease and, 403 Atelectatic disease, CPAP in, 137 initial ventilator settings for, 189 vs. obstructive lung disease, 14(t) Atresia, choanal, resuscitation in, 86 Atrial flutter fibrillation, treatment of, 300(t) Atrial lines, postoperative monitoring of, 295 Atropine, 276 for neonatal resuscitation, 83(t), 457(t) Auditory stimulation, of neonate in NICU, 125, Ayre's T-piece, 3, 3

"Baby Doe" rules, for handicapped infants, 5 Babybird ventilator, 152-153 in transport, 379 Bag(s), resuscitation, 92 use of, 81 Barotrauma, BPD and, 254 Base excess (BE), in newborn cord and arterial blood, 445(t) "Bat-wing" sign, for pneumomediastinum, 262, Beckwith-Wiedemann syndrome, 348 Bifurcation, bronchial, convective exchange in, 26, 27 Bio-Med MVP-10 ventilator, 381(t), 384 fact sheet for, 385 Birthweight, in retinopathy of prematurity, 266 very low, mortality rates in, 8 viability and, 7 Bleeding. See also Hemorrhage. postoperative, causes and treatment of, 301(t) Blood, administration of, 120 oxygen content of, 386-387 shunting of, sampling sites for, 228 whole, for neonatal resuscitation, 83(t), 84 transfusions of, 120 Blood chemistry, normal values for, in low birth weight infants, 451(t) in premature infants, 451(t) in term infants, 450(t) Blood flow, pulmonary, decreased, causes of, 55 increased, causes of, 54 Blood gas sampling, intermittent, 220 advantages and disadvantages of, 214(t) techniques for, 213-223 advantages and disadvantages of, 214(t) umbilical catheterization for, 213-216 Blood gases, 213-232 abnormalities in, interpretation of, 230 analysis of, for assisted ventilation, 13, 15(t) in ventilated neonate, 224-226 capillary, procedure for obtaining, 444 clinical applications of, 226-230 in premature infants, normal values for, 434(t) monitoring of, choice of methods for, 222 during transport, 383

Blood gases (Continued) monitoring of, errors in, 223 in prevention of retinopathy of prematurity, interpretation in, 230 techniques for, 214(t) normal values for, 226(t), 434(t) physiology of, 223-226 stabilization of, ventilator settings for, 163(t) Blood glucose, determinations of, 120-121 Blood loss, intraoperative, replacement of, 370 Blood pressure. See also Pulmonary hypertension. by birth weight, 448 intraoperative monitoring of, 367 mean, and pulse pressure, in newborns, 449 postoperative, in cardiovascular disease, 295 Blood tests, in congenital heart disease, 286–287 postoperative, in cardiovascular disease, 296 Blood transfusions, 120 Blood volume, maintenance of, 387 Bloxsom air lock, 2 Body water, changes in, 309 distribution of, 308 intracellular and extracellular, 308, 309 Bonding, parent-infant, in NICU, 125-126, 126(t) Bourns Bear Cub ventilator, 150 fact sheet for, 151 Bourns LS104-150 ventilator, 176-184 calculation of inspiratory flow rate in, 182, 183 calculation of inspiratory hold time in, 182, 184 electronic logic diagram of, 181 fact sheet for, 179 I:E ratios of, 179 pneumatic flow circuit of, 180 rate controls of, 179 system compliance check of, 177-183, 181 ventilation modes of, 182-183 volume loss calculation of, 182 Bradykinin, effect on fetal circulation of, 54 Brain, circulation to, 332–333, 332, 333 factors affecting integrity of, 335 Brazelton Neonatal Assessment, 126 Breath volume, measurement of, 239 Breathing, synchronous, in airway monitoring, work of, 34, 44 Bronchi, dysplastic changes in, 248(t) Bronchioles, dysplastic changes in, 248(t) Bronchiolitis, in survivors of respiratory distress syndrome, 398 Bronchodilators, for BPD, 255 mucolytic agents and, 276 Bronchopneumonia, in survivors of respiratory distress syndrome, 398 Bronchopulmonary dysplasia (BPD), 246-255 CDP and, 141 clinical course of, 246(t), 248(t)-249(t), 250etiological considerations in, 253-254, 254(t) extracorporeal membrane oxygenation and, 211 incidence of, 250 mortality in, 250 pathology of, 246-247, 246(t), 248(t) radiologic characteristics of, 246(t), 247-250, 249, 250 signs of, 250 stages of, 246(t), 248(t)

Bronchopulmonary dysplasia (Continued)
therapy for, 254–255
vitamin E and, 315
Bronchopulmonary hygiene, during intubation,
99–103
Bronchoscopes, selection of, 342
Bronchoscopy, neonatal, 342–343
indications for, 343(t)
Bronchospasm, in BPD, 252
Bunnell Life Pulse High Frequency Jet ventilator,
194–195
fact sheet for, 195

Caffeine, 277 dosage of, 276(t), 277 for neonatal apnea, 276(t) Caffeine citrate, for neonatal apnea, 276(t) Calcium, recommended daily intake of, 313(t) requirement for, 314 Cannulation, for ECMO, 205, 206, 207 veno-arterial, vs. veno-venous, 205, 206 radial artery, 119, 219, 219 temporal artery, 219, 220 Capillary(ies), blood gas sampling from, 220 advantages and disadvantages of, 214(t) Capillary blood, normal first day values for, 451(t) Capillary blood gases, procedure for obtaining, 444 Capillary sampling, arterialized, advantages and disadvantages of, 214(t) intake requirement for, 313-314 Carbon dioxide, dissociation curves for, 225 end-tidal monitoring of, 222 advantages and disadvantages of, 214(t) oxygen and, transfer of, 201-202 partial pressure of, high, causes of, 227(t) Carbon dioxide tension, in newborn cord and arterial blood, 445(t) Carbon dioxide transport, 224 Cardiac arrest, neonatal, record sheet for, 438 resuscitation in, 84 Cardiac catheterization, in diagnosis of PPHN, Cardiac disease. See Cardiovascular disease and Heart disease. Cardiac eponyms, 295(t) Cardiac massage, external, 84, 85 Cardiac output, decrease of, with CDP, 135 drugs to increase, 279 postoperative, fluid challenges for, 296, 297(t) in cardiac disease, 296 Cardiac rhythm, disturbances in, 285. See also Arrhythmia(s). Cardiac surgery, syndromes following, 302-303 Cardiac tamponade, postoperative, 301 Cardiopulmonary bypass, history of, 200-201 Cardiopulmonary resuscitation (CPR). See Resuscitation. Cardiotonic agents, in newborn, 278-281 Cardiovascular disease. See also Heart disease. neonatal, postoperative care for, 294-296 postoperative monitoring in, 295 postoperative problems in, 296-304 unresolved, postoperative, 302

Cardiovascular system, assisted ventilation and,

changes in, in BPD, 249(t), 251

effects of CDP on, 135-136

284-306

Catecholamines, selectivity of, for adrenergic re- ceptors, 280(t)	Compliance (Continued) lung, due to iatrogenic overexpansion, case his
Catheter(s), central vein, feeding through, 120,	tory of, 428-429
for measuring esophageal pressure, 238	in respiratory distress syndrome survivors, 401
for total parenteral nutrition, 120	local variation in, effect on distribution of ventilation of, 52–53
indwelling, for blood gas sampling, 213-220	measurement of, 239–240
advantages and disadvantages of, 214(t)	specific, 37
peripheral, advantages and disadvantages of,	static, 37
214(t)	rate dependency of, 37
sites for, 218–220	scalar data for, 236
radial artery, 119	ventilator, 174–175
suction, determination of size of, 103(t) umbilical artery, 118–119. See also Umbilical catheterization.	Complications, in assisted ventilation, 245–271 Computers, for monitoring pulmonary function, 234, 235, 236
complications with, 119	Conductance, specific, 40
emergency use of, 83	Congenital heart disease. See Heart disease, con
feeding through, 318	genital.
system for, 215	Congestive heart failure. See Heart failure,
Catheterization, subumbilical cutdown for, 217, 218	congestive.
umbilical, for blood gas sampling, 213–216	Continuous distending pressure (CDP), 128–145
CDP. See Continuous distending pressure.	See also Continuous positive airway pressure (CPAP); Positive end-expiratory pressure
Central nervous system, disorders of, 328–341	(PEEP).
perinatal insults associated with, 329(t)	adverse effects of, 140-141
respiratory patterns in, 286(t)	airway resistance and, 42
hemorrhage of, in assisted ventilation, incidence	clinical applications of, 137-140, 137(t)
of, 245	compliance with, 38
Central vein catheter, feeding through, 120, 318	complications of, 140–141
Cerebrospinal fluid, normal values for, 455(t) Charting, NICU flow sheet for, 115	prevention of, 142 control of ventilation and, 28
routine nursing care and, 113–122	delivery systems for, 128–133
Chemoreflexes, in control of ventilation, 28(t)	advantages and disadvantages of, 134(t)
Chest physiotherapy, during intubation, 97-103	effects of, on cardiovascular system, 135-136
Chest radiography, in followup of pulmonary dis-	on intracranial pressure, 136
orders, 399-400	on pulmonary physiology, 133-135
postoperative, 296	on renal function, 136
Chlorida recommendad della include della control della con	functional residual capacity and, 133
Chloride, recommended daily intake of, 313(t) requirement for, 314	historical overview of, 128
Chlorpromazine, 275	lung compliance and, 38 optimal levels of, 141
Choanal atresia, resuscitation in, 86	physiological aspects of, 133–137
Cicatricial disease, in retinopathy of prematurity,	technical aspects of, 128-133
266, 266(t)	ways of achieving, 43
Circulation. See also Cardiovascular system.	Continuous positive airway pressure (CPAP). See
extracorporeal, physiology of, 201-202	also Continuous distending pressure (CDP);
fetal, in persistent pulmonary hypertension of	Positive end-expiratory pressure (PEEP).
newborn, 287–288, 288 patterns of, vs. adult, 54	airway resistance and, 42
persistent (PFC), 56	and continuous distending pressure, 128 background, effects of raising, 63(t)
pulmonary, decreased, causes of, 55	complications of, prevention of, 142
increased, causes of, 54	delivery systems for, 128-133
Cleft palate, in Pierre Robin syndrome, 350	advantages and disadvantages of, 134(t)
Closing capacity, infant, 432	endotracheal tube for, 129, 130
Closing volume, 35	face chamber for, 131, 131
Coagulation, disseminated intravascular, postoper-	face mask for, 130, 131–132
ative, treatment of, 301(t)	failure of, 141–142
normal values for, 454(t) Coagulation factors, postoperative dilution of,	for apnea of prematurity, 138
treatment of, 301(t)	for congenital heart disease, 138 for cyanosis differentiation, 140
Cole tube, 92, 93	head chamber for, 130, 131
Compliance, 37–39	in diagnosis of heart disease, 287
dynamic, 37	in gastroschisis repairs, 138
measurement of, 239-240	in omphalocele repairs, 138
in respiratory distress syndrome, 242	in respiratory distress syndrome, 137
in premature infants, measurement of, during	intracranial pressure and, 136
assisted ventilation, 243(t)	management of, guidelines for, 141-142
infant respiratory system, 435(t)	role of nurses in, 142

Continuous distending pressure (Continued) nasal prongs for, 130, 132, 133 nasopharyngeal prongs for, 132, 133 renal function and, 136 role of respiratory therapist in, 142 work of breathing and, 45 Contractility, cardiac, inotropic agents for, 297, 298(t), 457(t) postoperative management of, 297 Convection, in ventilation, 23 Copper, recommended daily intake of, 313(t), 315(t)Corticosteroids, 278 Cost-benefit ratio, in assisted ventilation, 15-16 CPAP. See Continuous positive airway pressure. CPR. See Resuscitation. Craniofacial dysmorphology syndromes, 350-351 Cricoid cartilage, adult vs. neonatal, 359 Cyanosis, peripheral vs. central, 285 respiratory distress and, 285 Cylinder, gas, portable, 382(t) Cystic hygroma, 353-354

Dead space, alveolar, definition of, 24 anatomical, definition of, 24 physiological, definition of, 24 Defibrillation, external, 85 Dehydration, rapid, intraoperative, 360 DeLee catheter, for meconium suction, 85 DeLee mucus trap, 94, 95 Delivery, attendance at, 74(t), 75-79 high-risk, requiring full resuscitation team, 74(t) team approach to, 79 in-house, nursing care for, 107-108 moderate-risk, criteria for, 74(t) requiring attendance of clinician, 74(t) resuscitation at, intubation for, 90 Delivery room, neonatal care in, 439 responsibility for, 439 resuscitation equipment in, 76(t) Depression, narcotic, resuscitation in, 86 Dexamethasone, 278 Dextrose, for neonatal resuscitation, 83(t) Diaphragm, respiratory function of, 30, 44, 44 Diaphragmatic hemia, anesthetic management in, high frequency ventilation for, 196, 196(t) results of extracorporeal membrane oxygenation in, 209(t), 210(t) resuscitation in, 86 Diazepam, 275, 457(t) Diffusion, in ventilation, 23 Digoxin, for patent ductus arteriosus, 293, 293(t) Dimethylxanthine (theophylline), 277 Dissociation curves, carbon dioxide, 225 hemoglobin-oxygen, 437 Diuretics, 277-278 dosage of, 297(t), 457(t) for BPD, 254 mechanism of action of, 297(t)

postoperative, in cardiac vascular disease, 296,

297(t)

side effects of, 297(t)

dosage of, 281(t), 457(t)

adrenergic receptors for, 280(t)

Dobutamine, 280-281

Dopamine, 280 adrenergic receptors for, 280(t) dose relationship of, 280(t) dosage of, 281(t), 457(t) for neonatal resuscitation, 83(t) tolazoline and, 273 Down's syndrome, macroglossia in, 350 Drug therapy, 272-283 for persistent pulmonary hypertension, 291 preoperative, 364 Drugs, 272-283 administration of, 116 dosages for, 457(t) for emergency neonatal cart or transport bag, 76(t) for resuscitation, 88 in transport of ventilated infants, 379(t) indications for, 457(t) Dysrhythmias, after cardiac surgery, 299 pathological. See Arrhythmia(s).

Echocardiography, in diagnosis of patent ductus arteriosus, 292 in diagnosis of persistent pulmonary hypertension of newborn, 290 in ECMO, 208 postoperative, 296 Edelin case, viability and, 7 Elastance, lung, 37 Elastic recoil, in ventilation, 32-37, 33 opposing forces of, 35 Electrocardiography, in congenital heart disease, postoperative, in cardiovascular disease, 295 Electrodes, oxygen, indwelling arterial, 221 Electrolytes, management of, in parenteral feeding, 319-321, 321 postoperative, 299 requirement for, 314 system of monitoring, 321 Embolism, air. See Air embolism. Emergency(ies). See also Resuscitation. diagnosis in, for resuscitation, 80 intraoperative management of, 372(t), 373 treatment in, for resuscitation, 80-84 Emergency neonatal cart, drugs for, 76(t) Emphysema, pulmonary interstitial, case history of, 417-420 differential diagnosis of, 418 effect of increased mean airway pressure on, high frequency ventilation for, 196 in air leak syndrome, 255, 256, 259-260 radiographic appearance of, 418, 419 therapy for, 419 Emulsions, lipid, intravenous, 316, 317(t) End-expiratory occlusion, measurement of, 238 Endoscopes, selection of, 342 Endotracheal intubation. See Intubation, endotracheal Endotracheal tube(s), 129, 130 diameter of, resistance and, 42 emergency insertion of, 82 fixation of, 97, 98 for CPAP, 129, 130 advantages and disadvantages of, 134(t)

length of, 41

care following, 104-105

Endotracheal tube(s) (Continued) Extubation (Continued) oral vs. nasal, problems with, 90-91, 91(t) protocol for, 104(t) size of, guidelines for choosing, 92(t) technique of, 104 triple-lumen, for high frequency ventilation, 192 Extubation failure, causes of, 421, 421(t) types of, 92, 93 cardiovascular problems in, 422 Energy, expenditure of, in premature infants, central nervous system problems in, 422 312(t)chest x-rays in, 421 intake of, recommended, for premature infants, upper airway problems in, 422 with congenital vascular ring, case history of, weight gain and, in premature infants, 312(t) 420-422 requirement for, 311-312, 312(t) Eyelid fusion, as gestational age marker, 8 sources of, in venous nutrition, 317(t) nonprotein, effect on gas exchange of, 317(t) Enflurane, adult vs. neonatal dosage for, 358(t) pharmacology of, 365 Face chamber, for CPAP, 131, 131 Enteral feeding, See Feeding, enteral. advantages and disadvantages of, 134(t) Enterocolitis, necrotizing, risk factors for, 123(t) Face mask(s), for anesthesia, 368, 368 signs of, 123(t) for CPAP, 130, 131-132 Entrainment, 26, 27 advantages and disadvantages of, 134(t) Epinephrine, adrenergic receptors for, 280(t) Family involvement, in care of critically ill newdosage of, 457(t) born, 126(t) for neonatal resuscitation, 83(t), 85 Fasting status, preoperative, 364 Equipment. See also Ventilators and other specific Fat, absorption of, 313 items. intake requirement for, 313 for intravenous infusions, 117 Feeding, central venous, advantages and risks of, for intubation, 113(t) 320(t)for monitoring pulmonary function, 233-238, enteral, 318-319, 321-322 234-236 combined with parenteral feeding, 319 for transport of ventilated infants, 378, 378(t), first, 322 379(t), 380, 383 gastrostomy for, 124 for unexpected admission, 108(t) gavage, nursing care in, 123-124 resuscitation, 76(t), 87-88, 92(t) intragastric, 318 sterilization of, 168 advantages and risks of, 320(t) Equipment board, resuscitation, 77-78 continuous, 319 Esophageal pressure, measurement of, 237, 238, intermittent, 318 methods of, 316-319 monitoring of, effect of secretions in, 240, 240 in assisted ventilation, advantages and risks Ethical considerations, in assisted ventilation, 4of, 320(t) oral, nursing care in, 123 Euthanasia, passive, legality of, 9 parenteral, 316-318 Expiratory breath volume, measurement of, 239 combined with enteral feeding, 319 Extracorporeal circulation, physiology of, 201fluid and electrolyte management in, 319-Extracorporeal membrane oxygenation (ECMO), nursing care during, 118(t) 7, 200-212 via central vein catheter, 318 contraindications for, 204, 205(t) via peripheral vein, 316 daily management of, 207-208 via umbilical catheter, 318 diseases treated with, 203 peripheral venous, advantages and risks of, evaluation prior to, 204-205 320(t)followup schedule for, 209(t) components in, 321(t) for persistent pulmonary hypertension, 291 practical recommendations for, 319-322 neurological outcomes of, 211 preoperative, 364 operative procedure for, 205-207 transpyloric, 319 patient selection for, 202-205, 203(t) advantages and risks of, 320(t) criteria in, 203, 203(t) nursing care in, 124 preparations for, 205 FEF<sub>25-75</sub>, in respiratory distress syndrome surviresults of, 209-211, 209(t) vors, 401 at Ochsner Clinic, 210, 210(t) Fell-O'Dwyer apparatus, 2, 2 by diagnosis, 209(t) Fetal heart rate, abnormal patterns in, 74, 75 national, 209, 209(t) Fetal monitoring, acute, during labor, 73-74 technique of, 205-209 interpretation of, 74 weaning from, 208-209 phases of, 73 Extraneous air syndromes (air leaks), 255-264 Fetus, asphyxia and, 70, 71(t) clinical aspects of, 258-264 Fibrillation, atrial, treatment of, 300(t) incidence of, 255-256 ventricular, treatment of, 300(t) pathogenesis of, 256-258 Fibrinolysis, increased, postoperative, 301(t) sites involved in, 259(t) Fistula, tracheoesophageal, anesthetic manage-Extubation, 103-105 ment in, 372(t)

"Flip-flop phenomenon," 55

Flow-interrupters, 192 Flow rate(s), 41 inspiratory, resistance in, 42, 43 low vs. high, 160(t) advantages of, 160(t) side effects of, 160(t) resistance and, 41 ventilator control of, 159-160, 160(t) Flow-volume loops, in pulmonary function testing, 234, 237 Flowmeter, for measurement of airflow, 239 Fluid balance, after cardiac surgery, 299 Fluid intake, daily requirements for, 455(t) Fluid therapy, intraoperative, 369-371 replacement schedule for, 371(t) system of monitoring, 321 Fluids, electrolytes and, management of, in parenteral feeding, 319-321, 321 excessive, BPD and, 254 Followup, in respiratory distress syndrome, 397-Forced expiratory volume (FEV), in respiratory distress syndrome survivors, 401 Forced vital capacity (FVC), in respiratory distress syndrome survivors, 401 Freeman-Sheldon syndrome, 351 Fujiwara ratio, 61 Functional residual capacity (FRC), 33, 35, 432 CDP and, 133 Fundus, changes in, in retinopathy of prematurity, Furosemide, 278, 457(t)

Gas cylinders, portable, characteristics of, 382(t) Gas density, viscosity and, 42 Gas transport, mechanisms of, 23-27 Gas trapping, 46 causes of, 46 signs of, 46 ventilator settings for reducing risk of, 48 Gastroschisis, anesthetic management in, 372(t) repairs of, CPAP and, 138 Gastrostomy, feeding by, 319 nursing care in, 124 Gavage, feeding by, 318 nursing care in, 123-124 Gestational age, assessment of, 440(t) in decision to resuscitate, 8 incidence of patent ductus arteriosus and,

Glossoptosis, in Pierre Robin syndrome, 350 Glucose, administration of, 386 blood, determination of, 120–121 daily requirements for, 455(t) in infant nutrition, 314 infusion of, 386 stabilization of, 386 Gravity, effect of on distribution of participants.

Gravity, effect of, on distribution of perfusion, 57 Growth, intrauterine, maturity and, in classification of newborns, 441(t) water requirements for, 310

Hallermann-Streiff syndrome, 350 Halothane, adult vs. neonatal dosage of, 358(t) pharmacology of, 365

Handicapped infants, extraordinary measures for, Head chamber, for CPAP, 130, 131 advantages and disadvantages of, 134(t) Head's reflex, 28(t) Heart, structural defects in, 287 Heart block, drug dosage for, 300(t) Heart disease. See also Cardiovascular disease. congenital, clinical approach to, 286-287 CPAP for, 138 differential diagnosis of, 286-287 laboratory clues to, 286-287 respiratory patterns in, 286(t) results of extracorporeal membrane oxygenation in, 209(t), 210(t) structural defects in, 287 differential diagnosis of, 284-285 neonatal, 284 incidence of, 285(t) postoperative care for, 294-296 Heart failure, congestive, nutritonal care in, 301(t) without murmur, 285 right-sided, in BPD, 251 Heart massage, 84, 85 Heart murmur, 285 Heart rate(s), after cardiac surgery, 298-299 fetal, deceleration patterns in, 74, 75 in premature and term infants, 455(t) Heat, control of, during transport, 387-388 Heat balance, 387-388 Hemangioma, subglottic, 353 Hematologic problems, after cardiac surgery, 299 Hematologic values, normal, in first fourteen days, 452(t) Hemoglobin, dissociation curve of, oxygen saturation and, 224 fissue oxygenation and, 386-387 Hemoglobin-oxygen dissociation curves, 437 Hemorrhage, central nervous system, in assisted ventilation, incidence of, 245 intraventricular, 329-339. See also Subependymal hemorrhage/intraventricular hemorrhage. postoperative, causes and treatment of, 301(t) subependymal, 329-339. See also Subependymal hemorrhage/intraventricular hemorrhage. Henderson-Hasselbalch equation, 228 Heparin, excess, postoperative, 301(t) Hering-Breuer reflex, 28(t) Hernia, diaphragmatic, anesthetic management in, high frequency ventilation for, 196, 196(t) results of extracorporeal membrane oxygenation in, 209(t), 210(t) resuscitation in, 86 Hiccups, in airway monitoring, 241 High frequency jet ventilators (HFJV), 192 High frequency oscillatory ventilation (HFOV), 192-193 High frequency positive pressure ventilation (HFPPV), 65, 190-192 High frequency ventilation (HFV), 17, 19(t), 190-199. See also Ventilation, high frequency. High frequency ventilators, classification of, 191(t)

Hospitals, levels of perinatal care in, 10-11

Humidification, during intubation, 99

heated, during anesthesia, 367, 368

House officer, resuscitation responsibilities of, 88

transport between, 394 data sheets for, 392, 393

in CPAP therapy, 142

Hyaline membrane disease, effect of increased mean airway pressure in, 63 Hydrocephalus, posthemorrhagic, 336, 337 management of, 336 Hygroma, cystic, 353-354 Hyperalimentation, central venous catheters for, 120 Hypercapnia, hypoventilation and, 48 physiological response to, 28(t) Hyperkalemia, treatment of, 302(t) Hyperoxia, in retinopathy of prematurity, 267 physiological response to, 28(t) Hyperoxia test, in PPHN, 289 Hyperoxia-hyperventilation test, in PPHN, 289 Hypertension, postoperative, drug therapy and dosages for, 303(t) pulmonary. See Pulmonary hypertension and Persistent pulmonary hypertension of newborn (PPHN). Hyperventilation, 49 adverse effects of, 49 in persistent fetal circulation, pulmonary artery pressure response to, 57, 57 rate terminology and, 164, 165(t) Hyperventilation therapy, 165-166 technique of, 165-166 Hypocalcemia, postoperative, 299 Hypocapnia, of hyperventilation, adverse effects of, 49 Hypoglycemia, 386 Hypokalemia, postoperative, 299 Hypothermia, intraoperative, 359 Hypothyroidism, macroglossia in, 349 Hypoventilation, 48 blood gases in, 226, 227(t) causes of, 48 hypercapnia and, 48 in respiratory distress syndrome, case history of, 409-411 Hypovolemia, 387 Hypoxemia, hyperventilation and, 49 physiological response to, 28(t) vicious circle caused by, 55, 56 Hypoxia, causes of, 226, 227(t) relative, in fetus, 55 retinal, in retinopathy of prematurity, 267 shunts as cause of, 13, 15 I:E ratio. See Inspiratory:expiratory (I:E) ratio(s). IMV. See Intermittent mandatory ventilation. INCO Rating System for regional newborn units, 11, 12(t) Incubator(s), 109-111 for neonatal transport, 386

I:E ratio. See Inspiratory:expiratory (I:E) ratio(s). IMV. See Intermittent mandatory ventilation. INCO Rating System for regional newborn units, 11, 12(t) Incubator(s), 109–111 for neonatal transport, 386 Indomethacin, for patent ductus arteriosus, 293 contraindications for, 294, 294(t) dosage for, 294, 294(t), 457(t) Infant Care Review Committees (ICRCs), 6 Infant Hope resuscitator bag, 82 Infections, control of, after cardiac surgery, 302 Infusion(s), intravenous, administration of, 116–117, 117, 118 equipment for, 117 of lipids, 119(t) peripheral, 117–118, 117, 118 Inotropic agents, dosages for, 298(t), 457(t) for cardiac contractility, 297, 298(t)

Inspiration, in spontaneous breathing, 24, 24 with ventilator, 24, 25 Inspiratory breath volume, measurement of, 239 Inspiratory:expiratory (I:E) ratio(s), 158-159, 175 - 176calculation of, 158-159 effect of changes in, 61-62 effect of reversing, 63(t) in volume-cycled ventilators, 173-176 mean airway pressure and, 161 of Bourns LS104-150 ventilator, 179 optimal, 176 "reverse," 176 ventilator control of, 158-159, 159(t) advantages in, 159(t) side effects in, 159(t) Inspiratory flow rate, effect of changes in, 61-62 Inspiratory time, effect of changes in, 61-62 Instrumentation, for monitoring pulmonary function, 233-238, 234-236 Intercostal-phrenic reflex, 28(t) Intermittent mandatory ventilation (IMV), 4, 18, 166, 175 Intermittent positive pressure ventilation (IPPV), BPD and, 253 Interpleural pressure gradient, effect of, on distribution of ventilation, 50, 50 Interstitium, changes in BPD in, 248(t) Intestinal obstruction, anesthetic management in, 372(t)Intracranial abnormalities, ultrasound diagnosis of, Intracranial pressure, effects of CDP on, 136 Intravenous infusion. See Infusion(s), intravenous. Intubation, airway management during, 97-103 complications of, 105 determination of tube placement in, 96-97 endotracheal, 90-97. See also Endotracheal tube(s). airway injury in, sequelae of, 405-406 BPD and, 253 evaluation of, 342 indications for, 90 oral vs. nasal, 90-91 problems in, 91(t) pathophysiology of, 342 route of, 90-91 subglottic stenosis after, 344 equipment for, 91-93, 91(t), 113(t) for gavage feeding, 123 for transpyloric feeding, 124 humidification and warming during, 99 long-term sequelae of, 105 nasotracheal, technique of, 94-97 nursing care for, 111-113 orotracheal, technique of, 93-94, 94 positioning of patient during, 99, 100-102 technique of, 93-97 tracheal, emergency, 85 lodine, recommended daily intake of, 315(t) Iron, recommended daily intake of, 313(t) requirement for, 315 Isoflurane, adult vs. neonatal dosage for, 358(t) pharmacology of, 365 Isolette, 17 Isoproterenol, 281 adrenergic receptors for, 280(t) dosage of, 281(t), 457(t) IVs. See Infusion(s), intravenous.

Jet ventilator, control of ventilation with, 30, 31(t) high frequency, 192

Karen Quinlan case, 9 Kidney, water excretion and, 309

Laboratory monitoring, flow sheet for, 456
Laboratory studies, preoperative, 364
Laerdol resuscitator bag, 82
La Place relationship, 35, 35
Laryngeal atresia, 351
Laryngeal cleft, 353
Laryngeal web, 351
Laryngomalacia (congenital laryngeal stridor), 352, 352
Laryngoscope, blades for, 368, 369
insertion of, 93, 94, 95
Larynx, anomalies of, 351–353

obstructive lesions of, intubation in, 90 Legal considerations, in assisted ventilation, 4–10 Leukocyte values, in term and premature infants, 453(t)

in congenital stridor, 348(t), 351-353

Life preservation, decision making in, 5
Linoleic acid, requirement for, 313
Lipid emulsions, intravenous, 316, 317(t)
Lipids, intake requirement for, 313
intravenous infusion of, 119(t)
Low birth weight infants, assisted ventilation for,

cost-benefit ratios in, 16 minimal intervention protocol for, 122, 122(t) water requirements for, 311(t)

Lower respiratory tract infections, in survivors of respiratory distress syndrome, 398

Lung(s), compliance of. See Compliance, lung. distention of, with high frequency ventilation, 197

distribution of ventilation in, 50–52 iatrogenic overexpansion of, chest x-ray of, 428, 429

poor compliance due to, 428–429 membrane, physiology of, 201 size of, effect of age on, 433(t)

Lung disease. See also Pulmonary disorders. obstructive, 14(t), 38 restrictive, 38

Lung volume(s), full-term vs. premature, 433(t) infant, 432 static, 436(t)

local, effect of, on distribution of perfusion, 59

Macroglossia, 348–350
Magnesium, recommended daily intake of, 313(t)
requirement for, 314
Magnetic resonance imaging (MRI), in diagnosis of
SEH/IVH, 331

Malnutrition, adverse effects of, 307 in BPD, 252

Mandible, congenital defects in, resuscitation in, 86

Mandibulofacial dysostosis (Treacher Collins syndrome), 350

Manometer, emergency use of, 82 in transport ventilator, 378, 382 MAP. See Mean airway pressure. Masks, face. See Face masks. Mast cells, effect on fetal circulation of, 55 Maturity, intrauterine growth and, in classification

of newborns, 441(t)

Maturity rating, in assessment of gestational age,
440(t)

Mean airway pressure (MAP), 61, 62-63

effects of increasing, 63(t) factors influencing, 161

in respiratory distress syndrome, case history of, 410

increase in, effect on oxygenation of, 62, 63, 63(t)

mechanical ventilation and, 161 methods of increasing, 61

Mechanical ventilation. See Assisted ventilation.

Meconium aspiration, 85

Meconium aspiration syndrome, CDP and, 140, 140

results of extracorporeal membrane oxygenation in, 209(t), 210(t)

Mediastinal tubes, postoperative, 296

Medications. See also Drugs. administration of, 116 preoperative, 364

Membrane lung, 201

rated flow through, 202, 202
SciMed Kolobou silicone, 201, 20

SciMed Kolobow silicone, 201, 201
Membrane oxygenator, development of, 200–201

Metabolic acidosis. See Acidosis, metabolic. Metabolic alkalosis. See Alkalosis, metabolic.

Metabolic care, postoperative, 299 Metabolic substrate, maintenance of, 386

Metabolism, aerobic, 223, anaerobic, 223

disorders of, macroglossia due to, 349

Methylxanthines, for neonatal apnea, 276(t) Microcomputers, for monitoring pulmonary function, 234, 235, 236

Micrognathia, in Pierre Robin syndrome, 350 Minerals, requirements for, 314–315, 315(t) trace, recommended daily intake of, 315(t)

Minimal intervention protocol, 122, 122(t)
Minute ventilation, definition of, 24, 29

Möbius syndrome, 350

Mode(s), assist, in Bourns LS104-150 ventilator,

in volume-cycled ventilators, 175

ventilation, in Servo 900C ventilator, 185–186 Monitoring, blood gas, choice of methods for, 222 errors in, 223

during anesthesia, 367 during transport, 379

end-tidal carbon dioxide, 222

advantages and disadvantages of, 214(t)

laboratory, flow sheet for, 456 of fluid and electrolyte therapy, system for, 321

of pulmonary function, 233–244 postoperative, in cardiovascular disease, 295 transcutaneous, advantages and disadvantages

of, 214(t) of blood gas tension, 221

Morbidity, of newborns in assisted ventilation, 16 Morphine, 275

administration of, 275 dosage of, 275, 457(t) Mortality, of newborns in assisted ventilation, 16 Mucolytic agents, bronchodilators and, 276 Mucomyst (acetylcysteine), 276, 457(t) Murmur, heart, 285 Murphy tube, 92, 93 Muscle fiber length, in work of breathing, 44, 44 Muscle relaxants, 273–275 in neonatal anesthesia, 363(t), 365–366 indications for, 274 Muscles, respiratory, function of, 30 in newborn, 32 Myelomeningocele, anesthetic management in, 372(t)

Nalbuphine, 275 Narcan, for neonatal resuscitation, 83(t) Narcotic depression, resuscitation in, 86 Nasal prongs, for CPAP, 130, 132, 133 advantages and disadvantages of, 134(t) Nasogastric tube, postoperative use of, 296 Nasojejunal feeding, nursing care in, 124 Nasopharyngeal prongs, for CPAP, 132, 133 Nasotracheal intubation, depth of tube in, 96, 96, technique of, 94-97 Nasotracheal tube, fixation of, 97, 98 Negative pressure gradient, in inspiration, 24, 24 Neonatal development, nursing care and, 124 Neonatal intensive care unit (NICU), admission to, nursing care during, 108 flow sheet for, 115 INCO Rating System for, 11, 12(t) nursing care in, 107 preparations prior to admission to, 108 Neonatologist, resuscitation responsibilities of, 88 Neurologic defects, extracorporeal membrane oxygenation and, 211 Neurologic disease, 328-341. See also Central nervous system, disorders of, and names of specific disorders. Neurologic dysfunction, after cardiac surgery, 302 Neuromuscular blockade, monitoring of, intraoperative, 367, 368 Neuromuscular maturity, in assessment of gestational age, 440(t) Neutrophil count, in first 60 hours, 453 Newborn, Apgar evaluation of, 79(t) classification of, maturity and intrauterine growth in, 441(t) NICU. See Neonatal intensive care unit. Nitrous oxide, pharmacology of, 365 Norepinephrine, adrenergic receptors for, 280(t) Nurse(s), head, resuscitation responsibilities of, 88

role of, in CPAP therapy, 142

advance preparations in, 107-109

during parenteral feeding, 118(t)

for in-house delivery, 107-108

neonatal development and, 124

routine, charting and, 113-122

imbalance in, intraoperative, 360

Nursing care, 107-127

in NICU, 113-122

in oral feeding, 123

plan for, 114(t)

Nutrition, 307–327 for BPD, 255

flow sheet for, 115

Nutrition (Continued) in congestive heart failure, 301(t) monitoring of, flow sheet for, 456 nursing care and, 122–124 requirements for, 308–316 total parenteral, catheters for, 120 central venous catheters for, 120

Obstructive lung disease, high compliance in, 38 vs. atelectatic disease, 14(t) Occlusion test, for esophageal pressure, 238 Omphalocele, anesthetic management in, 372(t) repairs of, CPAP and, 138 Operating room, warmer for, 360, 360 Ophthalmological evaluation, preoperative, 364 Oral feeding, nursing care in, 123 Orotracheal intubation, depth of tube in, 95 technique of, 93-94, 94 Orotracheal tube, fixation of, 97, 98 Oscillators, in high frequency ventilators, 192, 195 Osteopenia, in BPD, 252 Oxidation, water of, 310 Oximeter, for blood gas sampling, 222 advantages and disadvantages of, 214(t) Oxygen, administration of, for BPD, 254 carbon dioxide and, transfer of, 201-202 concentration of, BPD and, 253 ventilator control of, 149 dissociation curves for, 225 partial pressure (PO2) of, 223 low, causes of, 227(t) role of in retinopathy of prematurity, 267 Oxygen content, of blood, 386–387 Oxygen electrodes, indwelling arterial, 221 Oxygen gradient, alveolar arterial, 204 Oxygen tension, in newborn cord and arterial blood, 445(t) Oxygen therapy, recommendations for, 442-443 Oxygen toxicity, ventilators and, 149 Oxygen transport, 223-224 Oxygenation, arterial, in respiratory distress syndrome survivors, 400-401 effect of altering ventilator settings on, 60-66 extracorporeal membrane, 200-212. See also Extracorporeal membrane oxygenation. role of mean airway pressure in, 63-63, 63 Oxygenator, membrane, development of, 200-201

Pacemaker wires, temporary, monitoring through, 295 Pancuronium, as muscle relaxant, 274 dosage for, 274, 274(t), 457(t) reversal of effects of, 274 Panting, "spike theory" of, 25, 25 Paraboloid front, 26, 26 Parent-infant bonding, in NICU, 125-126, 126(t) Parenteral feeding. See Feeding, parenteral. Patent ductus arteriosus (PDA), anesthetic management in, 372(t) CDP in, 138, 139 clinical findings in, 292, 416(t) diagnosis of, 292-293, 415, 416(t) scoring system for, 293(t) digoxin therapy for, 293, 293(t)

Patent ductus arteriosus (Continued) echocardiographic signs of, 416(t) fluid restriction in, 293 hemodynamics of, 292 incidence of, 291, 292(t) indomethacin for, 293 medical management of, 293-294 pathophysiology of, 292, 415 respiratory distress syndrome and, 291-294 case history of, 414-417 management of, 415-416 surgical management of, 294 PCO<sub>2</sub>, in newborn cord and arterial blood, 445(t) normal values for, 434(t)

Peak inspiratory pressure (PIP), 156 effect of raising, 63(t) high, advantages of, 156(t) side effects of, 156(t) vs. low PIP, 156(t)

low, advantages of, 156(t) side effects of, 156(t) vs. high PIP, 156(t)

mean airway pressure and, 161 ventilator regulation of, 147

PEEP. See Positive end-expiratory pressure. Percussion, during intubation, 99, 100-102

Perfusion, pulmonary, 53-60 control of, 53-57

distribution of, 57-60 assisted ventilation and, 59-60 effect of alveolar gas tensions on, 59 effect of gravity on, 57 effect of local lung volume on, 59 pathophysiological mechanisms affecting,

23(t) zones of, 58, 58

Pericardial tubes, postoperative, 296

Perinatal care, levels of hospital proficiency in,

regionalization of, 10-11 Persistent fetal circulation (PFC), 56

hyperventilation in, pulmonary artery pressure response to, 57, 57

Persistent pulmonary hypertension of newborn (PPHN), 56, 287-291 assisted ventilation in, 39, 196-197, 290

case history of, 411-414 chest x-ray in, 412, 413

circulatory changes at birth in, 288, 288

clinical features of, 166(t) CPAP and PEEP in, 139

cycle of, 203

diagnosis of, 289-290, 412

extracorporeal membrane oxygenation and,

fetal circulation in, 287-288, 288

high frequency ventilation for, 39, 196-197,

intraoperative management in, 362 pathophysiology of, 289, 289, 412

pharmacological management of, 291 physiologic aspects of, 56

pulmonary vasodilators for, 272-273 treatment of, 290-291, 413

pH, 228, 228(t)

in newborn cord and arterial blood, 445(t) low, sodium bicarbonate for, 228 normal values for, 434(t)

Pharmacological adjuncts, 272-283. See also

Pharmacology, of anesthetics, 364-366 Pharynx, abnormalities of, in congenital stridor, 348(t)

suction of, DeLee mucus trap for, 94, 95 Phosphorus, recommended daily intake of, 313(t) requirement for, 314

Physical examination, preoperative, 362 Physical maturity, in assessment of gestational age, 440(t)

Physiological dead sapce, definition of, 24 Physiological principles, of assisted ventilation,

Pierre Robin syndrome, 350

Platelets, venous, normal values for, in low birth weight and term infants, 454(t)

Pneumatic splint, 36

Pneumomediastinum, in air leak syndromes, 258, 262, 263

Pneumonia. See also Bronchopneumonia. in survivors of respiratory distress syndrome, 398

septic, respiratory patterns in, 286(t) with heart failure, respiratory patterns in, 286(t) Pneumonitis, aspiration, CDP and, 140 Pneumopericardium, in air leak syndromes, 256,

256, 257, 261-262, 262

Pneumoperitoneum, in air leak syndromes, 262-263, 263

Pneumoscrotum, in air leak syndromes, 258, 263 Pneumotachograph, 233, 234

airflow measurement with, 239 Pneumothorax, CDP and, 140

in air leak syndromes, 255, 257, 260-261 resuscitation in, 86 signs of, 122(t)

suspected, nursing care for, 121-122 PO<sub>2</sub>, arterial, pre- and postductal, in PPHN, 289 in newborn cord and arterial blood, 445(t) normal values for, 434(t)

Position, body, effect on ventilation distribution of, 50 - 52

for intubation, 99, 100-102

Positive end-expiratory pressure (PEEP), 156-157 background, effects of raising, 63(t) blood pressure changes with, 136 CDP and, 134

compliance with, 38

effect on pulmonary blood flow of, 60

inadvertent, 46

measurement of, 47, 47, 66

ventilator settings for reducing risks of, 48, 66

intracranial pressure and, 136 low vs. high, advantages of, 157(t) side effects of, 157(t)

mean airway pressure and, 161

renal function and, 136

ventilators for, 19

Positive pressure gradient, with ventilator, 24, 25 Positive pressure ventilation, 146-170

effect on pulmonary blood flow of, 60

history of, 2-3

Positron emission tomography (PET), in diagnosis of SEH/IVH, 331

Postanesthetic management, 371-373 Postcoarctectomy syndrome, 302 Postextubation care, 104-105

for, 196, 196(t)

Postoperative syndromes, cardiac surgery and,	Pulmonary insuffi
302–303 Postperfusion syndrome, 302	Pulmonary mech
	Pulmonary physic
Postpericardiotomy syndrome, 302	Pulmonary status
Postresuscitation procedures, 86–87 Potassium, recommended daily intake of, 313(t)	Pulmonary vascu Pulmonary vascu
requirement for, 314	272-273, 27
Preanesthetic checklist for infants, 373(t) Prednisone, 278	Pulmonary vasod Pulmonary venou
Pregnancy. See also Delivery.	Total anoma
high-risk, criteria for identification of, 73(t) resuscitation in, 72–79	Pulmonary ventila Pulse, postoperati
medical conditions related to, high risk and,	295
73(t)	Pulse oximetry, for
moderate-risk, criteria for, 74(t)	advantages a
Preinspiratory volume, 50	Pyloric stenosis, a
Premature infant(s), lung volume in, 433(t) normal blood gas values for, 434(t)	
pulmonary status of, 397	
resistance and compliance in, during assisted ventilation, 243(t)	Quinlan, Karen, 9
Prematurity, apnea of, CPAP for, 138 pulmonary status in, 397	
retinopathy of, 264–268. See also Retinopathy	
of prematurity (ROP).	Radial artery, can
SEH/IVH and, 334	Radiant warmers,
Preoperative evaluation, 362-364	plastic wrap for
Pressure, continuous distending. See Continuous	Radiography, in f
distending pressure (CDP).	syndrome, 39
continuous positive airway. See Continuous	postoperative, 2
positive airway pressure (CPAP).	preoperative, 3
driving, 40 peak inspiratory. See Peak inspiratory pressure	Rate, respiratory.
(PIP).	Reception, of tran
positive end-expiratory. See Positive end-	Recoil, elastic, in Regionalization of
expiratory pressure (PEEP).	Rehabilitation Act
Pressure-volume curves, of chest wall and lung,	Relaxants, muscle
33, 36	Renal function, ef
Pressure-volume loop, 36	respiratory distr
in pulmonary function testing, 234, 237	Renal solute load,
Pressure waveforms, 61, 61	Renal system, pos
Prostaglandins, effect on neonatal circulation of, 54	301
Protein, intake requirement for, 312–313, 313(t)	Renal water excre
Pulmonary air leaks. See Extraneous air syn-	Resistance, 39–41
dromes (air leaks).	airway, 39 in respiratory
Pulmonary artery, pressure in, 166	401–403
Pulmonary care, 90–106	specific, 40
Pulmonary disorders, neonatal, classification of,	subnormal, 4
14(t)	flow, 39
pathophysiological mechanisms in, 23(t)	frictional, 40, 40
respiratory patterns in, 286(t)	in infant respira
Pulmonary Evaluation and Diagnostic System, 234, 236	measurement o effect of hicco
data from, 237	effect of sync
Pulmonary followup, 397–408	in premature
Pulmonary function, monitoring, 233–244 instrumentation for, 233–238, 234–236	tion, 243(t) in respiratory
studies of, in survivors of respiratory distress syndrome, 400-403	nonelastic lung,
Pulmonary hypertension. See also Persistent pul-	pulmonary, 40
monary hypertension of newborn (PPHN).	pulmonary vaso 273(t)
assisted ventilation in, 39	scalar data for,
clinical features of, 166(t)	viscous, 40
etiology of, 412(t)	Respirators. See V
hyperventilation therapy for, 165	Respirator settings
pulmonary artery pressure in, 166	Respiratory diseas
FULL CONTROL OF THE PROPERTY O	dane

iciency index, 427 anics, infant, 435(t) ology, CDP and, 133-135 , of premature infants, 397 lar bed, maturation of, 288 lar resistance, agents reducing, 73(t) lilators, 272-273, 273(t) us return, total anomalous. See lous pulmonary venous return. ation, infant, 436(t) ive, in cardiovascular disease, or blood gas sampling, 222 and disadvantages of, 214(t) anesthetic management in, 372(t)

nulation of, 119, 219, 219 109, 110, 111 , 111, 112 followup of respiratory distress 99-400 296 62-364 See Respiratory rate(s). asported infants, 394 ventilation, 32, 33, 33 f perinatal care, 10-11 of 1973, interpretation of, 5 e. See Muscle relaxants. fects of CDP on, 136 ress syndrome and, 310 sources of, 310 stoperative problems in, 299etion, 309 distress syndrome survivors, 0 tory system, 435(t) f, 240-243 ups on, 241 bronous breathing on, 241 infants, during assisted ventiladistress syndrome, 242 cular, agents reducing, 272-273, 236 Ventilator(s). See Ventilator settings. se. See also Pulmonary disor-

familial asthma and, 403

Respiratory disease (Continued) in respiratory distress syndrome survivors, 397-399, 398(t) familial factors in, 403-404 Respiratory distress, cyanosis and, 285 signs of, 111, 113(t) Respiratory distress syndrome, CDP and, 137-138 definition of, 32 distending pressure in, 137-138 effect of changes in ventilator settings on, 64 effect of increased mean airway pressure on, 64 followup and outcome of, 397-408 high frequency ventilation for, 196-197, 196 hypoventilation in, 226 case history of, 409-411 initial ventilator settings for, 162(t), 163(t) intraoperative management in, 361 long-term prognosis in, 404-405 patent ductus arteriosus and, 291-294 case history of, 414-417 pressure-volume curves in, 34 protocol for initiation of mechanical ventilation in, 162(t) pulmonary function monitoring in, 242(t), 242 pulmonary sequelae of, 397, 398(t), 398-399 radiographic followup in, 398-400 respiratory patterns in, 286(t) results of extracorporeal membrane oxygenation in, 209(t), 210(t) time constants in, 47 ventilator management in, 164, 164 ventilator settings in, 242(t) Respiratory failure, acute, results of extracorporeal membrane oxygenation in, 209(t), 210(t) causes of, 11-15, 13(t) definition of, 161-162 diagnosis of, 13 retractions in, 161 Respiratory patterns, in specific disease processes, 286(t) Respiratory rate(s), effect of changes in, 64-66 slow vs. rapid, 158(t) advantages of, 158(t) side effects of, 158(t) ventilator control of, 157-158 Respiratory stimulants, 276-277 Respiratory syncytial virus, sequelae of, 404 Respiratory system, dimensions of, growth changes in, 432(t) problems in, after cardiac surgery, 303-304 structure of, 30-32 limitations in newborn of, 32 Respiratory therapist, role of, in CPAP therapy, Respiratory therapy, in ECMO, 208 prior to transport, 388-390 Rest volume, 35, 50 Restrictive lung disease, reduced lung compliance in, 38 Resuscitation, 77-89 aims of, 70 anticipation of, 72-74 biochemical, 82 course of action in, 88 decision making in, 8 definition of, 70 diagnosis in, 80 drugs used for, 83(t), 87-88

Resuscitation (Continued) equipment for, 76(t), 87-88, 92(t) in transport, 383 initiation of, 87 intubation for, 90. See also Intubation. method of, 72-79 outline of steps in, 81 personnel for, 75-79, 87, 88 responsibilities of, 88 physiological changes during, 70-72, 71 preparation for, 74-75 procedures following, 86-87 protocol for, 87-88 response to, 79-86 evaluation of, 79-80 special problems in, 84-86 volume expansion following, 82 Resuscitators, neonatal manual, types and characteristics of, 92(t) Resuscitator bags, 81 Retina, changes in, in retinopathy of prematurity, 265, 265 Retinopathy of prematurity (ROP), 264-268 classification of, 265-266, 265, 266(t) etiology of, 266-267 incidence of, 266 intraoperative management of, 361-362 long-term outcomes of, 267(t) pathology of, 264-265 prevention of, 268 staging of, 266 treatment of, 267-268 vitamin E in prevention of, 316 zonal location of, 265, 265 Retrolental fibroplasia (RLF), 264-268. See also Retinopathy of prematurity (ROP). "Right to life," in decision making, 5

Sampling, blood gas, 213-223 Sechrist ventilator, 154-155 Sedatives, analgesics and, 275 Sensory-motor facilitation, 124-125 Sensory stimulation, of neonate in NICU, 124-125, 126 Servo 900C ventilator, 184-188, 186 displays and ancillary equipment for, 186-188 fact sheet for, 187 flow diagram of, 188 flow patterns and volumes of, 185 ventilation modes of, 185-186 Shock, neonatal, resuscitation in, 86 Shunt(s), extrapulmonary, blood gases in, 226 in respiratory failure, assessment of, 15 intracardiac, 13 Shunting, intrapulmonary, 59 sampling sites for, 228 Siggard-Andersen alignment nomogram, 446 Silverman-Andersen retraction score, 13, 14 Sleep, rapid eye movement (REM), control of ventilation during, 27, 28(t) Sodium, recommended daily intake of, 313(t) requirement for, 314 Sodium bicarbonate, administration of, for abnormal blood gases, 227 for neonatal resuscitation, 83, 83(t), 457(t) "Spike theory," of high frequency ventilation, 24,

"Spinnaker sail sign," for pneumomediastinum, Sterilization, of ventilation equipment, 168 Steroids, 278 for BPD, 255 Stimulants, respiratory, 276-277 Stimulation, sensory, of neonate in NICU, 124-125, 126 Stool water loss, 310 Stridor, congenital, differential diagnosis of, 348(t) laryngeal, congenital, 352, 352 lesions resulting in, 349 Subependymal hemorrhage/intraventricular hemorrhage (SEH/IVH), 329-339 anatomy of, 332-333, 332, 333 diagnosis of, 329-332 incidence of, 329 long-term prognosis for, 338-339, 338(t) mortality in, 329 neuropathology of, 332-333 pathogenesis of, 333-335 posthemorrhagic hydrocephalus in, 336, 337 prevention of, 335-336, 335(t) risk factors for, 334 short-term prognosis for, 336-338 ultrasound appearance of, 330-332 Subglottic hemangioma, 353 Subglottic stenosis, acquired, 352-353 congenital, 352 Succinylcholine, as intraoperative muscle relaxant, Suction catheter, determination of size of, 103(t)

Suctioning, during intubation, 102–103
Surface tension, lung elastic recoil and, 35, 36
Surfactant, exogenous replacement of, 36
surface tension due to, 36
Surgeon, pediatric, as consultant, 343–348
as diagnostician and therapist, 348–356
Surgery, management of airway with, 342–356

Surgery, management of airway with, 342–356 preoperative evaluation and, 362–364 Sympathomimetic amines, 279

Tachycardia, supraventricular, drugs and dosages for, 300(t) ventricular, drugs and dosages for, 300(t)

Tachypnea, cyanosis and, 285Tactile stimulation, of neonate in NICU, 125, 126

Temperature, ambient, control of, 109-111 water loss and, 308

in CPAP therapy, 142 maintenance of, during transport, 387–388 postoperative, in cardiovascular disease, 295 surface measurement probe for, erroneous

readings of, 110, 111

Temperature homeostasis, measures for, 109–111 Temporal artery cannulation, 219, 220

Theophylline, 277

adverse effects of, 276(t) dosage of, 276(t)

Thermal instability, intraoperative, 359–360 Thermal neutral environment (TNE), 109

Thiazides, 278

Thoracic gas volume (TGV), 35

in respiratory distress syndrome survivors, 401

Thorazine, 275

Thrombocytopenia, postoperative, treatment of, 301(t)

Thyroid cartilage, adult vs. neonatal, 359 Tidal volume, definition of, 24

Time constants, of respiratory system, 45

Tolazoline, administration of, 273 adverse effects of, 273, 273(t)

as pulmonary vasodilator, 272-273

dosage of, 273, 457(t)

for persistent pulmonary hypertension, 291

Tongue, abnormalities of, in congenital stridor, 348(t)

congenital defects in, resuscitation in, 86 enlarged, 348-350

Total anomalous pulmonary venous return (TAPVR), case history of, 423–425

chest x-rays in, 424 Trachea, anomalies of, 353–356

in congenital stridor, 348(t), 353–356

collapse of, in tracheomalacia, 355 emergency intubation of, 85

normal, 343

obstructive lesions of, intubation in, 90 saline lavage of, for meconium removal, 86 stenosis of, 355

vascular rings of, 354

Tracheitis, necrotizing, with high frequency ventilation, 198, 198

Tracheobronchitis, necrotizing, 355-356

Tracheoesophageal fistula, anesthetic management in, 372(t)

Tracheomalacia, 354

collapse of trachea in, 355

Tracheostomy, 343-348

incision for, 344, 345

procedure for, 343, 344-347

tubes for, 346, 346

comparative table of, 347(t)

Transcutaneous monitoring, of blood gases, 221 of blood gas tension, advantages and disadvantages of, 214(t)

Transducers, for monitoring pulmonary function, 234, 235

Transfer, interhospital, of critically ill infants, 394 data sheets for, 392, 393

Transfusions, blood, 120

Transport, in utero, 376–377 anticipation of, 376–377

of ventilated infants, 376–396

acid-base balance during, 388-390

by airplane, 390

communications about, 377, 377

drugs used in, 379(t)

equipment for, 378, 378(t), 379(t), 380, 382 evaluation and stabilization in, 383-394

interhospital, 394

data sheets for, 392, 393

organized service for, 377–383

patient data for, 447(t) personnel for, 377–378

reception of, 394

respiratory therapy prior to, 388-390 temperature control during, 387-388

Transport bag, drugs for, 76(t)

Transport box, 380

Transport team, 378 Transport vehicle, 383

Transpyloric feeding, nursing care in, 124

Treacher Collins syndrome, 350

Trigeminal-cutaneous reflex, 28(t) Triglycerides, in infant formulas, 313 Trimethylxanthine (caffeine), 277
Tube(s), endotracheal. See Endotracheal tube(s).
nasotracheal, depth of, 96, 96, 97
orotracheal, depth of, 95
tracheostomy, 346, 346
comparative table of, 347(t)

Ultrasonography, in diagnosis of SEH/IVH, 330–332
Umbilical catheter(s), 118–119
emergency use of, 83
parenteral feeding through, 318
postoperative use of, 296
Umbilical catheterization, 213–216
complications in, 218
system for, 215
taping for, 215, 217
technique of, 213–218, 216, 217
Urine, intraoperative monitoring of, 370
water excretion in, 309
Uterine contractions, fetal heart rate changes associated with, 74, 75

Vaporizers, precision, for inhalation anesthetics, 366, 367
Vascular rings, tracheal, 354
extubation failure in, case history of, 420–422
Vasodilators, pulmonary, 272–273, 273(t)

Vasodilators, pulmonary, 272–273, 273(t)
postoperative use of, 297, 298(t)
Vein, peripheral, feeding through, 316
energy sources in, 317(t)
Ventilation, acute patient deterioration during,

algorithm for management of, 169 danger signs of, 121(t) differential diagnosis in, 169, 169 assisted. See Assisted ventilation. control of, 27–30

during conventional mechanical ventilation, 29 during high-frequency ventilation, 30, 31(t) during spontaneous breathing, 27, 28(t) degree of, 48–49

high frequency, 17, 19(t), 190–199 classification of, 190–193 clinical applications of, 193–197 complications of, 197–199 control of, 30, 31(t) oscillatory (HFOV), 192–193 problems with, 197–199 rates of, minute volume effect of, 191

distribution of, 49-53

forces opposing, 33-48

"spike theory" of, 24, 25 intermittent mandatory, 4, 18, 166, 175 intraoperative, depression in, 358–359

equipment for, 369, 370 management of, 369, 370 mechanics of, 30–48 minute, 24, 29

pathophysiological mechanisms affecting, 23(t) physiological principles of, 23–53 positive pressure, 146–170. See also Positive

pressure ventilation. procedure for initiating, 149–161 Ventilation (Continued)
pulmonary, infant, 436(t)
transport during, 376–396
volume, inauguration of, 188–189
wasted, definition of, 24
Ventilation perfusion ratio, abnormal

Ventilation-perfusion ratio, abnormal, 226, 227(t) Ventilator(s), assist mode in, 175

assistor-controller, 18 Babybird, 152

fact sheet on, 153 Bio-Med MVP-10, 384 fact sheet on, 385

Bourns Bear Cub, 150 fact sheet on, 151

Bourns LS104–150, 176–184, 178, 180, 181, 182. See also Bourns LS104–150 ventilator. Bunnell Life Pulse High Frequency Jet, 194–

Bunnell Life Pulse High Frequency Jet, 194– 195 classification of, 17–19, 18(t), 19(t), 190–193

comparison of features of, 381(t) compliance of, 174–175

complications with, trouble-shooting for, 168– 169

controls on, 149, 150–155
drive mechanisms of, 172–173, 173
indirect double circuit, 173, 174
rotary, 173, 173

single circuit, 172, 173 flow-limited, 172

high frequency (HFV), 17, 19(t), 165 classification of, 191(t) complications with, 197–199

rates of, minute volume effects of, 191

high frequency jet (HFJV), 192 I:E ratios in, 158–159, 159(t) IMV control, 175

in transport of ventilated infants, 378–386 management of, 162–166

negative pressure, advantages and disadvantages of, 17(t)

oxygen toxicity and, 149 portable handheld, 384

positive pressure, advantages of, 147 basic design of, 147–148, 147 classification of, 17, 146

cycling in, 17, 18, 19(t), 148-149 design principles of, 146-149 endotracheal intubation in, 90

pressure-cycled, 17, 18 advantages of, 147

pressure-limiting devices for, 172

rates of, terminology for, 164-165, 165(t) respiratory rate of. See Respiratory rate(s).

Sechrist, 154 fact sheet on, 155

Servo 900C, 184–188. See also Servo 900C ventilator.

set-up of, 149–161 first steps in, 149 sterilization of, 168 tidal volume of form

tidal volume of, formula for, 174 time-cycled, 17, 18, 172

time-cycled, 17, 18, 172 transport, 376–396

trouble-shooting for problems in, 168–169 types of, 17–19, 18(t), 19(t)

volume-cycled, 17, 18, 171–189 design and operation of, 171–174 I:E ratios in, 173–176

initial settings of, for atelectatic disease, 189

Ventilation (Continued) initial settings of, physics of, 174-176 rate control in, 173-174 setting up of, 188-189 waveforms of, 176 weaning from, 189 vs. pressure-cycled ventilator, 146 volume-limited, 172 volume losses in, 174-175 waveforms of, 148, 148, 160-161, 176 advantages of, 160(t) side effects of, 160(t) Ventilator settings, effects of altering, 60-66, 63(t) for Bourns LS104-150 ventilator, 176-183 for correction of blood gases, 163(t) for persistent pulmonary hypertension, 290 for reducing risk of gas trapping, 48 for reducing risk of inadvertent PEEP, 48 for respiratory distress syndrome, 242(t) for Servo 900C ventilator, 184-188 for weaning, 167-168 high frequency, 190 mode adjustment. See under Mode(s). Ventricular afterload, postoperative, 297 load-altering agents for, 298(t) Ventricular hypertrophy, left, in BPD, 251 Viability, abortion and, 7 assisted ventilation and, 7-8 Edelin case and, 7 lower limits of, 7 Vibration, in chest physiotherapy, 100-102, 102 Viscosity, gas density and, 42 Viscous resistance, in newborn, 33 Viscous shear, 25, 26 Visual stimulation, of neonate in NICU, 125 Vital capacity, infant, 432 Vitamin E, and retinopathy of prematurity, 268 intake requirements for, 315, 315(t) Vitamins, recommended daily intake of, 315(t) requirements for, 315-316, 315(t) Vocal cord paralysis, congenital, 351-352 Volume, closing, 35 tidal, definition of, 24 Volume ventilators. See Ventilator(s), volume-cyWarmer(s), operating room, 360, 360 radiant, 109, 110, 111 plastic wrap for, 111, 112 Warming, of airway, during intubation, 99 Water, body, changes in, 309 distribution of, 308 intracellular and extracellular, 308, 309 of oxidation, 310 renal excretion of, 309 requirement for, 308-311 growth and, 310 in low birth weight infants, 311(t) Water loss, insensible, 308 factors influencing, 309(t) methods of decreasing, 309 stool, 310 Waveforms, in mechanical ventilation, 160-161 advantages of, 160(t) side effects of, 160(t) of volume ventilators, 176 pressure, 61, 61 Weaning, 166-168 clinical signs during, 167 definition of, 166 drug enhancement of, 168 from ECMO, 208-209 from volume-cycled ventilators, 189 tests before, 167(t) transitional phase in, 166-168 ventilator settings during, 167-168 Work of breathing, 34, 44

Xanthines, as bronchodilators, 276 effect of on ventilation, 29 for neonatal apnea, 276(t)

Zinc, recommended daily intake of, 313(t), 315(t) Zones, perfusion, 58, 58