



Stedman's **Medical Dictionary** **for the Health** **Professions and** **Nursing**

ILLUSTRATED
SEVENTH EDITION



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The authors, editors, and publishers have exerted every effort to ensure that drug selection and dosage set forth in this text are in accordance with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new or infrequently employed drug.

Some drugs and medical devices presented in this publication have Food and Drug Administration (FDA) clearance for limited use in restricted research settings. It is the responsibility of the health care provider to ascertain the FDA status of each drug or device planned for use in their clinical practice.

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CONTENTS

Stedman's Medical Dictionary for the Health Professions and Nursing

at a Glance	inside front cover
A Message from the Publisher	iv
Consultants in the Health Professions and Nursing	vii
Consultants to the Stedman's Dictionaries	xi
Illustration Index	xvii
Illustration Sources	xxix
Artwork Credits	xlii
A-Z Vocabulary	1
Anatomical Chart Company Anatomy Atlas	A1
Image Insert	B1
Contents to the Appendices	APP 1

A Message from the Publisher

It is with the long-standing tradition of excellence synonymous with the Stedman's name that we proudly present this new edition of *Stedman's Medical Dictionary for the Health Professions and Nursing, Illustrated, 7th Edition*. From the first edition of *Dunglison's New Dictionary of Medical Science and Literature* in 1833, the historic work from which the Stedman's family of dictionaries ultimately evolved, we have continued our focus to provide our readers with comprehensive, highly-vetted, accurate content both in print and electronically, and organized in the most accessible manner.

With the previous edition of *Stedman's Medical Dictionary for the Health Professions and Nursing*, adding more than 4,000 terms and increasing the number of reviewers to nearly 50 discipline specialists provided a high degree of accuracy regarding multi-disciplinary content and current usage. Extending our consultant board ensured that we continued to provide students, educators, and practitioners access to the core language of medicine, health professions, and nursing to meet the needs of our readers.

This new edition features more than 56,000 terms and approximately 1,000 illustrations. We have undertaken a meticulous review of every image, soliciting feedback and improvements to enhance and finely hone the usefulness to our readers by utilizing our expert team of consultants. Selection and definitions of terms also were reviewed by our team of more than 70 health care consultants—with nearly half from nursing—to ensure that we have provided well-rounded definitions for the core medical terminology encountered by all health professionals. The significant increase in the number of health care specialists that comprise our expert team serves to confirm the accuracy of the content and they have worked tirelessly to ensure our readers can confidently use this resource. A complete listing of our consultants can be found on page vii. We have also continued our efforts to recognize our international readers by including international content in our appendices and providing British spellings for appropriate terms.

Exciting Online Additions

In addition to the revision of our print version of *Stedman's Medical Dictionary for the Health Professions and Nursing, 7th Edition*, we are proud to announce the launch of  . The website includes five content sets from the Stedman's family of dictionaries: *Stedman's Medical Dictionary*, *Stedman's Abbreviations, Acronyms and Symbols*, *Stedman's Medical Dictionary for the Health Professions and Nursing*, *Stedman's Medical Dictionary for the Dental Professions*, and *Stedman's Pocket Medical Dictionary*. As a valued reader of this print edition, we are pleased to offer you a FREE one-year subscription to *Stedman's Medical Dictionary for the Health Professions and Nursing*, providing access to the essential information you want, when you want it. With robust multi-media content, this site includes more than 56,000 terms, more than 5,600 illustrations, more than 48,000 audio pronunciations, and nearly 50 videos. “My Stedman's” allows users to customize their content by adding new terms, writing notes, saving often-reviewed visuals, and including links to outside content for quick and easy access. We are committed to serving the needs of our readers by creating content, highly sought-after delivery methods, and the tools that give you the flexibility to access the information as readily as you need it.

Stedman's Plus Medical/Pharmaceutical Spellchecker

We are also pleased to include in this new edition of *Stedman's Medical Dictionary for the Health Professions and Nursing, 7th Edition*, the most up-to-date edition of our *Stedman's Plus Medical/Pharmaceutical Spellchecker*. *Stedman's Plus Medical/Pharmaceutical Spellchecker* has been providing medical, pharmaceutical, and bioscience terms to medical language specialists for nearly 20 years. Since *Stedman's Plus Medical/Pharmaceutical Spellchecker* provides authoritative content in both medical and pharmaceutical terminology, it's no wonder health care professionals rely on *Stedman's Plus* for the most comprehensive and cutting-edge medical spellchecking available. *Stedman's Plus* seamlessly loads into most major word processing programs and you'll have the confidence of knowing that nearly half a million Stedman's terms are working behind the scenes to spellcheck all of your documentation. Sold traditionally for \$99.95, it is included FREE on our CD-ROM—a true value for our readers.

Acknowledgements

As always, we at Lippincott Williams & Wilkins are grateful to all of our consultants from the medical, nursing, and health professions for their help in reviewing, writing, and revising the thousands of entries in this dictionary. Without them, none of the terminology presented here would be relevant or useful. We are also indebted to the many reviewers who assisted us in making critical decisions about the presentation of the dictionary, the dictionary entries themselves, and the content presented in this new edition. Finally, we continue to be thankful to have Dr. John H. Dirckx as a long-standing member of our dictionary team. His expertise, love of language, and consistent availability to consult with us cannot be replaced.

The development of this new edition has greatly benefited from the experience and expertise of Raymond Lukens, Chief Copyeditor, whose patience, dedication, and hard work have given this edition an unparalleled level of quality. Our thanks also go out to Susan Caldwell for her assistance and quality work in helping us prepare the art program. We are indebted to our colleagues at Lippincott Williams & Wilkins, including Amy Burroughs, Product Manager; Margie Orzech, Manufacturing Coordinator; and Doug Smock and Jennifer Clements, Art Program Consultants. Without the Lippincott Williams & Wilkins team's commitment to our readers and to the quality expected of Stedman's publications, this new edition would not have been possible. Finally, we must thank you, the reader. We have appreciated all of the input we have received from previous editions and thank you for your continued support of our dictionary.

Your Medical Words Publisher

We strive to provide our readers—students, educators, and practitioners—with the most up-to-date and accurate medical language references. We, as always, welcome any suggestions you may have for improvements, changes, corrections, and additions—whatever makes it possible for this Stedman's product to serve you better.

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Illustrations Index

The Illustrations Index provides a quick way to find any image in *Stedman's Health Professions & Nursing Dictionary*. The page number accompanying each term listed below tells you where an illustration related to that term is found. A page number preceded by the letter *A* indicates that the image can be found in the first color insert, the 40-page anatomic atlas. A page number preceded by the letter *B* indicates that the image can be found in the second color insert, a 32-page section dedicated to diagnostic medicine, imaging techniques, and condition images. When you look up a word in the A to Z section, you can tell it is illustrated—either at the word itself or in the inserts or appendices—if it is accompanied by this symbol:

abdominal regions **3**
abdominal viscera **A11–12**
abduction **APP 109**
acanthosis nigricans **10**
accommodative convergence **13**
Achilles tendon **16**
achondroplasia **B30**
acne **20, B9**
acrodermatitis **22**
actinic granuloma **24**
actinic keratoses **25**
adduction **APP 109**
adductor hallucis muscle **33**
adductor magnus muscle **33**
adenocarcinoma **B14**
adenocarcinoma, ulcerated **B16**
adenovirus, bronchitis due to **B6**
Adson forceps **41**
adult respiratory distress syndrome **B18**
air-fluidized bed **52**
airway (adult vs. child) **B32**
alarm reaction **54**
algorithm (decision tree) **58**
alopecia areata **64**
alveolar abscess **67**
Alzheimer disease **B23**
Ambu bag **71**
ameloblastoma **B15**
amniocentesis **77**
amnion **B1**
amyloidosis **82**
anatomic position **APP 111**
androgenic alopecia **89**
anesthetic **91**
aneurysm **92**
angioedema **94**
angiogram, magnetic resonance **B22**
angiogram, normal intravenous fluorescein
B26
angular cheilosis **97**
anisocytosis **B3**
ankle joint **99**
ankylosing spondylitis **B24**
anterior **APP 108**
anteroposterior projection **APP 115**
anthracosilicosis **108**
antibody **110**
antral fold, abnormal **B16**
aortic valve **119**
Apgar score **120**
Aphthous ulcer **121**
apical granuloma **122**
apical periodontal cyst **122**
apical pulse **123**
arachnid bite reaction **B8**
arm **132**
arterial blood **137**
arterial system **A22**
arteriography **141**
arteriole **141**
Ascaris **147**
Aspergillus fumigatus **B5**

asthma **153**
astrocytoma **B31**
atherectomy **155**
atherosclerosis **156**
atlas **157**
atopic dermatitis **159**
attrition **B15**
auditory ossicles **165**
auscultation **166**
autonomic division of nervous system **171**
avulsion fracture **B25**
axial projection APP **116**
bacteria **181, B4**
Bancroftian filariasis (elephantiasis) **B8**
barium enema **188**
Barton fracture **B25**
basal cell carcinoma **191, B14**
basophil **B2**
bathing trunks nevus **196**
beach chair position **B29**
Becker nevus **198**
berry aneurysm **204**
biopsy **215**
bites, stings, and infestations **B8**
bitewing radiograph **219**
black tongue **221**
bladder stones **B20**
blastocyst **222, B1**
blastomycosis **B20**
bleb **B8**
blepharitis **B27**
blood **B2**
blood cell development **B2**
blood cells **B2**
blood pressure **227**
body mass index APP **496**
body movement APP **109–110**
body part terminology (radiographic
positioning) APP **108**
bomb calorimeter **231**
bone **231**
bones and joints, disorders associated with
B24
bone fractures **B25**
bone scan **B23**
bony blastomycosis **B20**
Borrelia **B4**
brachial plexus **237**
brain **240**
breast **242**
breast cancer **B19**
breast carcinoma, classic **B19**
breast self-examination **243**
breast, normal **B19**
breath sounds **243**
breech fetus **B21**
Brodmann areas **246**
bronchiectasis, posttuberculous **B5**
bronchiolar carcinoma **247**
bronchiolitis **B6**
bronchoscopy **B16**
bronchus **250, B16**
Brudzinski sign **251**
bulla **B10**
bullous impetigo **B4**
bullous pemphigoid **256**
bunion **B24**
burn **258**
burrows **B13**
bursitis **B24**
café au lait spot **B10**
calcaneus **262**
calcinosis **263**
canalicular stage of lung development **268**
cancers, childhood **B31**
Candida albicans **B5**
candidiasis **269**
capillary bed **271**
carcinoma **276, B14**
cardiac assessment **277**
cardiomyopathy **280**
cardioverter **281**

caries **282, B15**
carina **B16**
carotid pulse **284**
carpal bones **284**
carpal tunnel syndrome **285, B24**
cartilage **286**
cataract **289, B27**
cellulitis **297, B9**
central venous pressure **300**
centrilobular emphysema **302**
cephalometry **303**
cerebral cortex **305**
cerebral hemispheres **A5**
cerebral hemorrhage **306**
cerumen **B28**
cervical vertebrae **309**
Chédiak-Higashi syndrome **B12**
cheilitis **B15**
chemotherapy **316**
cherry angiomas **316, B13**
chickenpox **B30**
childhood conditions **B30**
chlamydia **320**
cholelithiasis **324**
cholesteatoma **B28**
chronic desquamative gingivitis **334**
chronic lymphocytic leukemia **B31**
cirrhosis **341**
cleft lip (bilateral) **B30**
cleft palate **B30**
clubbing **351**
Cobb method of measuring scoliosis **354**
cochlea **356**
cochlear implant **357**
coeur en sabot **359**
cold sore (recurrent herpes simplex) **B15**
cold urticaria **360**
colitis **B17**
coloboma iridis **363**
colon polypectomy **B17**
colonoscope **B17**
colonoscopy **B17**
colostomy **365**
comedones **B13**
comminuted fracture **368**
communinating hydrocephalus **370**
compression fracture **B20**
computed tomography **B20**
condom **380**
congenital nevus **383**
conjunctivitis **B27**
contact dermatitis **388, B9**
corneal foreign body **B27**
corneal ulcer **B27**
corneal ulcer (caused by *Candida albicans* infection) **B5**
corneal ulcer (caused by *Fusarium*) **B5**
coronal plane **APP 107**
coronary arteries **398**
cotton-wool spots **B26**
cradle cap **B30**
cranial nerves **409**
cricothyrotomy **413**
Crohn disease **415**
croup **B30**
crura of the diaphragm **418**
crusts (streptococcal impetigo) **B11**
cryptococcosis, disseminated **B5**
Cryptococcus neoformans **B5**
CT scan, orbital **B20**
CT, three-dimensional **B20**
cutaneous larva migrans caused by hookworm infection **B7**
cutaneous leishmaniasis **427**
cutis rhomboidalis nuchae **427**
cyst **B7**
cytomegalovirus **B6**
dacyrocytes **B3**
Dane particles **B6**
Darier disease **B12**
deciduous dentition **444**

decubitus position **B29, APP 114**
decubitus ulcer **446**
dehiscence **450**
deltoid muscle **453**
dental implants **457**
dentigerous cyst **B15**
dentition **459**
dermatitis **463, B9**
dermatofibroma **464**
dermatomes **465**
dermatomyositis **465**
developmental milestones **471**
diabetic retinopathy **474**
diaphragm **476**
digestive system **A26**
disc anatomy, vertebral and invertebral **A6**
discoid lupus erythematosus **489**
dislocations **491**
distal **APP 108**
diverticulitis of colon **496**
diverticulosis **496, B17**
DNA **498**
Doppler flow sonogram **B21**
Doppler ultrasonography **501**
dorsal decubitus position **APP 114**
dorsal recumbent position **B29**
drusen **B26**
dry gangrene **508**
duodenum **512**
dwarfism **B30**
dystrophia unguium **519**
ear **521, B28**
ecchymosis **523**
echocardiogram **B21**
ectodermal dysplasia **825, B12**
ectopic pregnancy **526**
elbow joint **533**
electrocardiography **534**
electroencephalography **536**
elephantiasis **539, B8**
elliptocytes **B3**
embolism **541**
embryo **B1, B21**
embryology **B1**
emergency medicine **B32**
emphysema **545**
endometriosis **553**
endophthalmitis, candidal **B26**
endoscopy **B16, B17**
endosteal implants **554**
Entamoeba coli **B7**
Entamoeba histolytica **557**
Enterobius **558**
enterostomy **561**
eosinophil **B2**
epidermolysis bullosa **567**
epidural anesthesia **568**
episcleritis **B27**
epithelium **572**
erect (standing) position **B29**
erector spinae muscles **575**
erosion **B15**
erysipelas **577**
erythema calicum **578**
erythema nodosum **578**
erythrocyte **580**
erythrocytes, abnormalities of **B3**
erythroderma **580**
erythromelalgia **581**
Escherichia coli, cyst of **B7**
esophageal obturator airway **583**
esophageal varices **B16**
esophagogastroduodenoscopy **B16**
eversion **APP 110**
excision biopsy **215**
excoriation **B11**
exfoliative dermatitis **596**
exostosis **598, B28**
extension **APP 109**
extensor digitorum brevis muscle **601**
extensor digitorum longus muscle **601**
extensor digitorum muscle **602**

extensor retinaculum **602**
external oblique muscle **604**
eye **608**, **B26**
eye, disorders and injuries to **B27**
facial bones **610**
facial nerve **611**
fascia **618**
fatigue fracture **B25**
female urogenital system **A14**
femur **624**
fetus, 11-week **B1**
fetus, 18-week **628**
fibroadenoma **B19**
filum terminale **636**
finger **636**
fissure **B11**
flexion **APP 109**
flexor digiti minimi brevis muscle
of hand **643**
flexor digitorum brevis muscle **643**
flexor digitorum profundus muscle **644**
flexor digitorum superficialis muscle **644**
flow rates for IV drips **B32**
Foley catheter **650**
folliculitis **B4**
forearm **655**
Fowler position **B29**
fracture **659**
Frankfurt horizontal plane **661**
frontal plane **APP 107**
fundus, normal **B26**
fungi and fungal infections **B5**
furuncle **B10**
Fusarium solani **B5**
Galeazzi fracture **B25**
gallbladder carcinoma **B21**
gamma camera **B23**
ganglion **678**
gangrene **679**
Gardner-Wells tongs **680**
gastric bypass **681**
gastric ulcer **682**
gemination **687**
geographic tongue **B15**
Giardia lamblia, trophozoite of **B7**
Glasgow Coma Scale **APP 184**
glaucoma **699**
glaucomatous cupping of disc **B26**
glenohumeral joint **699**
gluteus maximus muscle **706**
gluteus medius muscle **706**
Goldenhar syndrome **710**
Golgi tendon organ **711**
gonococcmemia, disseminated **B4**
gonorrhea **B4**
gout **B24**
gouty tophus **715**
graft-versus-host disease **716**
granuloma **719**, **B14**
grasp patterns **721**
greenstick fracture **724**
gustation **729**
gynecomastia **731**
Haemophilus influenzae **B4**
Haemophilus influenzae meningitis **B4**
hairy tongue **B15**
hamstring **741**
head **A4**
hangman's fracture **B25**
hearing aid **749**
heart **749**
Hegar sign **751**
Heimlich maneuver **751**
Heinz bodies **B3**
hemangioendothelioma **754**
hematoma **756**
hemolytic anemia **763**, **B3**
hemorrhagic cystitis **765**
Henoch-Schönlein syndrome **767**
hepatic diverticulum **768**
hepatitis A virus **B6**
hepatitis B virus **B6**

herniated disc 774
herpes simplex 775, B15
herpes zoster 775, B6, B9
herpetic whitlow 776
hiatal hernia 781
high Fowler position B29
Hodgkin disease B31
hookworm B7
hot tub folliculitis B4
human blastocyst, 107-cell B1
human embryo, 18-day B1
human embryo, 28-somite B1
human embryo, 3-week B1
human embryo, 7-week B1
human embryos, 22-day and 23-day B1
human immunodeficiency virus (HIV) 799,
 B6
 hydatid cyst 804
 hydrocephalus 805
 hydronephrosis 807
 hyperopia 816
 hyperpigmentation 818
 hyperplasia 818
 hyperplastic polyp 818
 hypertrophy 821
 hyphema 822, B27
 hypochromic anemia B3
 hypodontia 825
 hypopigmentation 829
 hypothenar eminence 831
 ichthyosis vulgaris 836
 ileostomy 840
 iliotibial tract 842
 ilium 842
 impetigo 846
 incentive spirometer 849
 incision 850
 incision biopsy 215
 inflammation 862
 infraspinatus muscle 864
 inguinal hernia 866
 inguinal ligament 866
 injection 868
 innervation of the hand and wrist 869
 insulin pump 873
 internal oblique muscle 881
 interstitial cystitis 885
 interstitial lung disease B18
 intestine 888
 intracranial pressure 890
 intravenous 892
 inversion APP 110
 islets of Langerhans 902
 Isospora belli, immature oocyst of B7
 jack-knife prone position B29
 jaundice 910
 jellyfish sting B8
 joint 912
 Kaposi sarcoma 916, B14
 keloid B11
 keratoacanthoma B14
 keratocyte 920
 keratoses, seborrheic B14
 keratosis follicularis 921
 kidney 923
 kidney position B29
 Klippel-Feil syndrome 926
 knee joint 927
 knee ligaments, tendons, and menisci 969
 knee-chest position B29
 kyphoscoliosis 931
 Langerhans cell histiocytosis 940
 laparoscopic cholecystectomy 941
 laryngeal mask 942
 larynx 944
 lateral decubitus position APP 114
 lateral position APP 108
 lateral projection APP 115
 latissimus dorsi muscle 949
 Le Fort classification of facial fractures 952
 left anterior oblique position APP 113
 left posterior oblique position APP 113

Legg-Calvé-Perthes disease **954**
lentigo maligna melanoma **B14**
leprosy **957**
lesion **959**
lesions, primary **B10**
lesions, secondary **B11**
leukoplakia **964**
lichen planus **968**
lichenification **B11**
ligament **969**
limbic system **972**
linea nigra **B9**
liposarcoma **977**
lithotomy position **B29**
livedo reticularis **980**
longitudinal plane **APP 107**
lumbar puncture **990**
lumbrical muscles of hand **991**
Lund-Browder chart **992**
lungs and respiratory anatomy **993, A25**
lung collapse **B18**
Lyme disease, (*Borrelia* infection) **B4**
lymph node **997**
lymphatic system **A24**
lymphocyte **B2**
lymphocytic leukemia **B31**
lymphoma, cutaneous **B14**
lymphoma, metastatic to scalp **B14**
macrocytosis **B3**
macula, normal **B26**
macules **B10**
magnetic resonance angiograph **B22**
magnetic resonance imaging, knee **B22**
male urogenital system **A13**
malignant melanoma, nodular **B14**
mammogram **B19**
mammography **B19**
Marfan syndrome **1016**
mastication **1020**
mastoiditis **1021**
maxilla **1024**
measles **B30**
mechanical ventilation criteria **APP 248**
Meckel diverticulum **1028**
medial **APP 108**
medial meniscus **1030**
median nerve **1031**
median plane **APP 107**
melanoma **1040**
melasma **1041**
meningitis, *Haemophilus influenzae* **B4**
meninges **1044**
metacarpophalangeal joint **1055**
metanephric diverticulum **1057**
metered dose inhaler **1059**
microcytic, hypochromic anemia **B3**
microcytosis **B3**
microfilaria **B7**
Microsporum canis **B5**
microtubules **1068**
midsagittal plane **APP 107**
milia **B13**
mitochondrion **1076**
Möbius syndrome **1079**
molar tooth **1081**
molluscum contagiosum **B6**
monocyte **B2**
Monteggia fracture **B25**
morula **B1**
mouth **1092**
mouth, disorders associated with **B15**
MR angiogram **B22**
MRI machine **B22**
mucocele **1097**
multifidus muscle **1097**
multifocal duct carcinoma **B19**
multiple myeloma **1099**
multiple pregnancy **1100**
multiple sclerosis, magnetic resonance images **B22**
mumps **B30**
muscle **1102**

muscles of head **1103**
muscular anatomy of head and neck **A4**
muscular and skeletal anatomy of ankle and foot **A16**
muscular and skeletal anatomy of wrist and hand **A8**
muscular system **A19, A20**
Mycobacterium marinum **1114**
mycosis fungoides **1115**
myelogram, CT **B20**
myopia **1122**
myositis ossificans **1123**
nail and hair disorders **B12**
nasal cannula **1128**
nasal cavity **1128**
nasopharyngeal airway, inserting **B32**
neck **A4**
necrosis **1134**
needle biopsy **215**
Neisseria gonorrhoeae **B4**
nematode **B7**
neoplasia **B14**
nephrolithiasis **1139**
nervous system of pelvis and lower limb **A15**
nervous system of thorax and upper limb **A7**
neural fold **B1**
neuroblastoma **B31**
neuroglia **1149**
neuron **1152**
neutrophil **B2**
nevus **1156**
nits (egg cases attached to hairs) **B8**
non-Hodgkin lymphoma **B31**
normal tympanic membrane **B28**
nuclear medicine **B23**
nummular eczema **1174**
nutrient absorption **1176**
nystagmus **1177**
oat cell carcinoma **1178**
oblique position **APP 112**
oblique projection **APP 116**
obstetric sonography **B21**
obturator externus muscle **1181**
obturator internus muscle **1182**
olfaction **1190**
onycholysis in psoriasis **B12**
onychomycosis **B12**
onychoschizia **B12**
oocyte, sperms binding to **B1**
ophthalmology **B26**
ophthalmoscope **B26**
oral airway, inserting **B32**
orbicularis muscle **1204**
orbit **1205**
orbital cellulitis **B9**
oropharyngeal tube **1209**
osteoarthritis **1215**
osteosarcoma **B31**
otitis externa **1219, B28**
otitis media **1219, B28**
otomycosis **B28**
otoscope **B28**
otoscope, doctor examining patient using **B28**
otoscopy **B28**
Paget disease **1231**
pain scales **1231**
palmar interosseous muscle **1235**
palpation technique **1235**
pancreas **1236**
pancreas, stages in development **1237**
pannus **1239**
panoramic radiograph **1239**
PA projection **APP 115**
papules **B10**
parasites and parasitic infections **B7**
paronychia, chronic **1253, B12**
patch (café au lait spot) **B10**
pectoral region **1261**
pelvic diaphragm **1264**
pelvic girdle **1265**
pemphigus vulgaris **1266**

peptic ulcer **1268**
percussion **1270**
percutaneous endoscopic gastrostomy
 tube **1270**
percutaneous transluminal angioplasty **1270**
perforation **B28**
perfusion scan **B23**
periodontitis **1277**
peritonitis **1280**
permanent dentition **1281**
phagocyte **1287**
pharyngitis **1291**
Philadelphia chromosome **1293**
photodermatitis **1299**
pinch **1309**
pitting edema **1311**
placenta **1313**
planes (anatomic) **APP 107**
plantar warts **1316**
plaque **B10**
Plasmodium vivax **B7**
platysma muscle **1320**
Pneumocystis jiroveci pneumonia **B5**
pneumonia **1326**, **B5**
poikilocytosis **B3**
polio **B6**
polyp **1335**
polypectomy (colon) **B17**
popliteal artery **B21**
popliteal fossa **1338**
popliteus muscle **1339**
positioning terminology (radiography) **APP**
 111–114
positions, surgical **B29**
positron emission tomography (PET) **B23**
posterior **APP 108**
posteroanterior projection **APP 115**
postural drainage **1350**
Pott fracture **B25**
pregnancy **1357**
primitive node **B1**
prolapse of umbilical cord **1373**
pronation **APP 110**
pronator quadratus muscle **1375**
prone position **B29**, **APP 112**
Proteus syndrome **1382**
proximal **APP 108**
Pseudomonas aeruginosa **B4**
pseudopelade **1389**
psoriasis **1391**, **B9**
psoriatic arthritis **1391**
Pthirus pubis infestation **B8**
pubic bone **1396**
pulmonary circulation **1399**
pulmonary emphysema **1399**
pulses, peripheral **1401**
punch biopsy **215**
purpura **B13**
pustules **B10**
pyelonephritis **1407**
pyoderma gangrenosum **1409**
pyogenic granuloma **B14**
quadrants **1414**
quadratus lumborum muscle **1414**
quadratus plantae muscle **1414**
quadriceps **1415**
radiographic anatomy and positioning **APP**
 106–116
radiographic projections **APP 115–116**
radiography **B18**
radiolucent **1424**
Raynaud phenomenon **B9**
rectus abdominis muscle **1436**
recumbent position **B29**
Refsum disease **1441**
respiration **1452**
respiratory diverticulum **1453**
respiratory system **A25**
restoration **1455**
retina **1458**
retinal detachment **B26**
retinoblastoma **B27**, **B31**

retinopathy, diabetic **B26**
rhabdomyosarcoma **B31**
rheumatoid arthritis **1465, B24**
rheumatoid nodules **1466**
rhythm **1470**
rib **1471**
right anterior oblique position **APP 113**
right posterior oblique position **APP 113**
rigidity **1474**
rotatores muscles **1480**
rouleaux **B3**
rubella **B30**
rule of nines **1483**
ruptured globe **B27**
sacral foramen **1487**
sacrum **1488**
saddle joint **1489**
sagittal plane **APP 107**
sarcoidosis **1495**
scabies **1497, B8**
scabies mite **B8**
scapula **1499**
scar **B11**
sciatic nerve **1504**
scirrhous carcinoma **B19**
scleroderma **1506, B9**
scolex **B7**
scoliosis **1508, B24**
seborrheic dermatitis **1511, B9**
seborrheic keratoses **1511, B14**
secondary syphilis **1514**
serratus anterior muscle **1528**
shingles **1534**
shingles, disseminated **B9**
shoulder girdle **1536**
shoulder joint **1536**
sickle cell anemia **B3**
Sims position **B29**
sitting position **B29**
skeletal anatomy **A17–A18**
skeletal muscle **1546**
skeleton **1546**
skin **1547**
skin conditions, common **B9**
skinfold measurement **1548**
skin tag **1548**
skull **A1–3**
Smith fracture **B25**
soft palate **1554**
soleus muscle **1555**
somite **B1**
sonogram, two-dimensional **B21**
sonography **B21**
sphygmomanometer **1568**
spider angioma **B13**
spina bifida **1569**
spinal and cranial nerves **A21**
spinal cord, CT myelogram of transverse
 section of **B20**
spiral fracture, long **B25**
spiral organ **1573**
spirometry **1573**
splenius capitis muscle **1575**
splenomegaly **1576**
spondylolisthesis **1578**
spondylosis **1578**
spondylosis **1578**
squamous cell carcinoma **1582, B14**
staghorn calculus **1583**
Staphylococcus aureus **B4**
stasis dermatitis **1587**
stent **1590**
sting **B8**
strabismus **1597**
strawberry hemangioma **B30**
streptococci **B4**
striae gravidarum, linea nigra and **B9**
subcostal plane **APP 107**
subdural hematoma **1609**
subscapularis muscle **1612**
superior **APP 108**
supination **APP 110**

supinator muscle **1624**
supine position **B29**, APP **111**
surface biopsy **215**
swallow **1631**
symbols APP **40–48**
sympathetic trunk **1634**
synapse **1636**
syphilis **1641**
syringe **1641**
Taenia saginata **1648**, **B7**
talipes cavus **1646**
talipes planus **1646**
tangential projection APP **116**
tapeworm **1648**
telangiectases **B13**
temperature **1655**
temporalis muscle **1656**
temporomandibular joint **1657**
teratoma **1662**
thalassemia **1667**
thoracic cage **1673**
thoracolumbar fascia **1675**
thoracoscopes **B17**
thoracoscopy **B17**
thorax, viscera of **A9**
thromboangiitis obliterans **1677**
thrombus **1679**
thrush **B15**
tibialis anterior muscle **1683**
tick bite **B8**
tinea **1685**
tinea capitis **1685**, **B5**
tinea capitis (black dot type) **B5**
tinea capitis (gray patch type) **B5**
tinea corporis **1685**, **B8**
tinea pedis **1685**, **B9**
tinea versicolor **1685**
tonsil **1690**
tooth **1692**
tophaceous gout **1692**
toxic epidermal necrolysis **1695**
Toxicodendron **1696**
trachea **B16**
tracheostomy **1699**
transcutaneous electrical nerve stimulation (TENS) **1702**
transverse plane APP **107**
transversus abdominis muscle **1709**
trapezius muscle **1710**
trauma, ruptured globe from blunt **B27**
trematode **B7**
triceps brachii muscle **1715**
Trichinella spiralis, adult female worm of **B7**
trichobezoar **1716**
Trichophyton tonsurans **B5**
Trichuris trichiura **1719**
trichotillomania **B12**
trophozoite **B7**
Trousseau sign **1725**
tuberculin test **1728**
tumor **B10**
tympanic membrane **B28**
tympanic thermometer **1735**
tympanogram **1735**
tympanosclerosis **B28**
ulcerative colitis **1739**, **B17**
ulcers **1739**, **B11**
umbilical cord **1742**, **B1**
upper gastrointestinal series **1748**
urinary system **A27**
urogram **1754**
urticaria (hives) **B9**
uterus **1758**
valves, venous **1763**
varicella (chicken pox) **B30**
varicosis **1765**
vascular and specialized primary lesions **B13**
vasectomy **1767**
vastus lateralis muscle **1770**
venipuncture **1773**
venous system **A23**
ventilation scan **B23**

ventral decubitus position **APP 114**
ventricles of the brain **1775**
ventriculoperitoneal shunt **1777**
Venturi mask **1777**
verruca **1779**
vertebral and invertebral disc anatomy **A6**
vertebral column **1781**
vertical banded gastroplasty **1782**
vesicles (in pemphigus) **B10**
viruses and viral infections **B6**
viscera of thorax **A9**
vision **1792**
vitiligo **1794**
vocal folds **B16**
volvulus **1798**
warts, filiform and common **B9**
wheal **1807**
wheals (urticaria) **B10**
Wilms tumor **B31**
Wilson disease **1809**
wound healing **1813**
Wuchereria bancrofti, microfilaria of **B7**
xanthelasma palpebrarum **1815**
xanthogranuloma **1815**
xerosis **1817**
Yankauer suction catheter **1819**
zoster eruption, mild **B6**
Z-track method **1825**
zygomaticus major muscle **1826**
Zygomycetes **B5**
zygomycosis **B5**
zygote development **B1**

Illustration Sources

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Courtesy of Barker LR, Burton JR, Zieve PD. *Principles of Ambulatory Medicine*. 4th ed. Baltimore, MD: Williams & Wilkins; 1995 (gout).

Courtesy of Baschat A, MD, Center for Advanced Fetal Care, University of Maryland School of Medicine, Baltimore, MD (Doppler flow sonogram).

Courtesy of Bear MF, Connors BW, Parasido, MA. *Neuroscience: Exploring the Brain*. 2nd ed. Balti-

more, MD: Lippincott Williams & Wilkins; 2001 (alarm reaction; mitochondrion and cellular respiration; synapse).

Courtesy of Bear MF, Connors BW, Paradiso MA. *Neuroscience: Exploring the Brain*. 3rd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2006 (placement of EEG electrodes; Brodmann areas).

Courtesy of Beckmann CRB, Ling FW, Laube DW, Smith RP, Barzansky BM, Herbert WN. *Obstetrics and Gynecology*. 4th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2002 (multifocal duct carcinoma; scirrhous carcinoma).

Courtesy of Bennett, J, PhD, National Institutes of Health, Bethesda, MD (brain MRI).

Courtesy of Berg D, Worzala K. *Atlas of Adult Physical Diagnosis*. Philadelphia, PA: Lippincott Williams & Wilkins; 2005 (wheal; tongue; nodular malignant melanoma; photodermatitis).

Courtesy of Bickley LS, Szilagyi P. *Bates' Guide to Physical Examination and History Taking*. 8th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003 (sounds in recording blood pressure; carotid pulse; milestones in normal child development; ecchymosis; macules; pustules; vesicles).

Courtesy of Blackbourne LH. *Advanced Surgical Recall*. 2nd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2004 (jack-knife prone position; kidney position).

Courtesy of Brant WE, Helms CA. *Fundamentals of Diagnostic Radiology*. 2nd ed. Baltimore, MD: Lippincott Williams & Wilkins; 1998 (upper gastrointestinal series; breast cancer; mammography; normal breast).

Courtesy of Brant WE, Helms CA. *Fundamentals of Diagnostic Radiology*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007 (bladder stones; fused PET-CT image of physiologic colon activity; rheumatoid arthritis: shoulder).

Courtesy of Bucholz RW, Heckman JD. *Rockwood & Green's Fractures in Adults*. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001 (dislocations; Klippe-Feil deformity; avulsion fracture, compression fracture, fatigue fracture, hangman's fracture, MR angiography, spiral fracture; comminuted fracture).

Courtesy of Centers for Disease Control and Prevention, Atlanta, GA (bacteria: bacilli; chickenpox; measles; mumps; rubella).

Courtesy of Chung EK. *Visual Diagnosis in Pediatrics*. Philadelphia, PA: Lippincott Williams & Wilkins; 2006 (mastoiditis).

Courtesy of Clay JH, Pounds DM. *Basic Clinical Massage Therapy: Integrating Anatomy and Treatment*. Baltimore, MD: Lippincott Williams & Wilkins; 2003 (achilles tendon; adductor hallucis muscle; adductor magnus muscle; ankle joint; arm; atlas; brachial plexus; calcaneus; carpal bones; cervical vertebrae; crura of the diaphragm; deltoid muscle; diaphragm; elbow joint; erector spinae muscles; extensor digitorum brevis muscle; extensor digitorum longus muscle; extensor digitorum muscle extensor retinaculum; external oblique muscle; facial bones; plantar fascia; femur; flexor digiti minimi brevis muscle of hand; flexor digitorum brevis muscle; flexor digitorum profundus muscle; flexor digitorum superficialis muscle; forearm; glenohumeral joint; gluteus maximus muscle; gluteus medius muscle; hamstring; humerus; hypothenar eminence; iliotibial tract; ilium; infraspinatus muscle; inguinal ligament; internal oblique muscle; latissimus dorsi muscle; lumbrical muscles of hand; maxilla; median nerve; metacarpophalangeal joint; multifidus muscles; muscles of the head; nasal cavity; obturator externus muscle; obturator internus muscle; orbicularis oris muscle; palmar interosseous muscle; pectoral region; pelvic diaphragm; pelvic girdle; platysma muscle; popliteal fossa; popliteus muscle; pronator quadratus muscle; pubic bone; quadratus lumborum muscle; quadratus plantae muscle; quadriceps; rectus abdominis muscle; rib (II-XI); rotatores muscles; sacral foramen; sacrum; scapula; sciatic nerve; serratus anterior muscle; shoulder girdle; shoulder joint; soft palate; soleus muscle; splenius capitis muscle; subscapularis muscle; supinator muscle; temporalis muscle; thoracic cage; thoracolumbar fascia; thyroid; tibialis anterior muscle; transversus abdominis muscle; trapezius muscle; triceps brachii muscle; vastus lateralis muscle; vertebral column; zygomaticus major muscle).

Courtesy of Cohen BJ. *Medical Terminology*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003 (osteoarthritis; volvulus of the sigmoid colon; greenstick fracture; percutaneous endoscopic gastrostomy tube).

Courtesy of Cohen BJ, Wood DL. *Memmler's The Human Body in Health and Disease*. 9th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2000 (erythrocyte).

Courtesy of Cormack DH. *Essential Histology*. Philadelphia, PA: Lippincott–Raven; 1997 (microtubule).

Courtesy of Crapo JD, Glassroth J, Karlinsky JB, King TE Jr. *Baum's Textbook of Pulmonary Diseases*. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2004 (arteriography; arteriovenous fistula; rheumatoid nodules; lower lung zones; ankylosing spondylitis; *Aspergillus fumigatus* infection; bony blastomycosis; lung collapse; thoracoscopes; emphysema; kyphoscoliosis).

Courtesy of Daffner RH. *Clinical Radiology: The Essentials*. 2nd ed. Baltimore, MD: Williams & Wilkins; 1998 (rheumatoid arthritis; spondylosis; multiple sclerosis; radiography).

Courtesy of Daffner RH. *Clinical Radiology: The Essentials*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007 (emphysema).

Courtesy of Dart RC. *Medical Toxicology*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2004 (right index bleb: snakebite).

Courtesy of Dr. George A. Datto, III (acanthosis nigricans).

Courtesy of Day JA, MD, University of Massachusetts Medical School, Worcester, MA (adult respiratory distress syndrome; interstitial lung disease).

Courtesy of Dean D, Herbener TE. *Cross-Sectional Human Anatomy*. Baltimore, MD: Lippincott Williams & Wilkins; 2000 (3D CT; carpal tunnel syndrome; Pott fracture; gemination).

Courtesy of Dr. Philip Docking, Eatons Hill, QLD, Australia (laryngeal mask; Yankauer suction catheter).

Courtesy of Effeney DJ, Stoney RJ. *Wylie's Atlas of Vascular Surgery: Disorders of the Extremities*. Philadelphia, PA: Lippincott Williams & Wilkins; 1993 (Raynaud phenomenon).

Courtesy of Eisenberg RL. *Clinical Imaging: An Atlas of Differential Diagnosis*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003 (arteriography: Marfan syndrome; *Pneumocystis jiroveci* pneumonia; coeur en sabot; communicating hydrocephalus; hemangiopericytoma).

Courtesy of Elder AD, Elenitsas R, Johnson BL, et al. *Synopsis and Atlas of Lever's Histopathology of the Skin*. Philadelphia, PA: Lippincott Williams & Wilkins; 1999 (purpur).

Courtesy of Engleberg NC, Demody T, DiRita V. *Schaechter's Mechanisms of Microbial Disease*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006 (congenital cytomegalovirus).

Courtesy of Erkonen WE, Smith WL. *Radiology 101: Basics and Fundamentals of Imaging*. Philadelphia, PA: Lippincott Williams & Wilkins, 1998 (intravenous urogram).

Courtesy of Eroschenko VP, PhD. *di Fiore's Atlas of Histology with Functional Correlations*. 9th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2000 (bone).

Courtesy of Farhi DC, et al. *Pathology of Bone Marrow and Blood Cells*. Philadelphia, PA: Lippincott Williams & Wilkins; 2004 (dacyrocytes; elliptocytes).

Courtesy of Feigenbaum H, Armstrong WF, Ryan T. *Feigenbaum's Echocardiography*. 6th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2004 (two-dimensional echocardiography).

Courtesy of Feinsilver SH, Fein A. *A Textbook on Bronchoscopy*. Baltimore, MD: Lippincott Williams & Wilkins; 1995 (bronchus; carina; trachea; vocal folds).

Courtesy of Christine Finck, MD (gynecomastia).

Courtesy of Fleisher GR, Ludwig S, Baskin MN. *Atlas of Pediatric Emergency Medicine*. Philadelphia, PA: Lippincott Williams & Wilkins; 2004 (Legg-Calve-Perthes disease; gonorrhea infection; herpes zoster; pyogenic granuloma; scabies; scabies mite; *Staphylococcus aureus* infection; tick bite; tinea corporis; wheal; hydrocephalus; mucocele).

Courtesy of Gartner LW, Hiatt JL. *Color Atlas of Histology*. 3rd ed. Baltimore, MD: Lippincott Williams & Wilkins; 1999 (neutrophil; eosinophil; basophil; myocyte).

Courtesy of Gartner LP, Hiatt JL. *Color Atlas of Histology*. 4th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2006 (spiral organ of Corti).

Courtesy of General Electric Medical Systems, Milwaukee, WI (meniscal tear; nuclear lung scan, gamma camera).

Courtesy of Gladwin M, Bagby M. *Clinical Aspects of Dental Materials*. 2nd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2004 (restoration).

Courtesy of Gold DH, Weingeist TA. *Color Atlas of the Eye in Systemic Disease*. Baltimore, MD: Lippincott Williams & Wilkins; 2001 (chronic tophaceous gout; Chédiak-Higashi syndrome; orbital tumor; plaque; Wilson disease; eyeball).

Courtesy of Goodheart HP. *A Photo Guide of Common Skin Disorders: Diagnosis and Management*. Baltimore, MD: Lippincott Williams & Wilkins; 1999 (morphoform, nodular, and ulcerated basal cell carcinoma).

Courtesy of Goodheart HP. *Goodheart's Photoguide of Common Skin Disorders*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003 (superficial basal cell carcinoma; alopecia areata; angioedema due to bee sting; sarcoidosis; scleroderma; melasma; bulla; burrows; chronic paronychia; nails; cryptococcosis; excoriation; fissure; furuncle; head lice; jellyfish sting; lichenification; linea nigra and striae gravidarum; Lyme disease; onychoschizia; nails; purpura; spider angioma; telangiectasis; tinea capitis; tinea pedis; warts; hot tub folliculitis; contact dermatitis; allergic contact dermatitis; eczema; syphilis).

Courtesy of Gorbach SL, Bartlett JG, et al. *Infectious Diseases*. Philadelphia, PA: Lippincott Williams & Wilkins; 2004 (periodontitis).

Courtesy of Haines DE, PhD. *Neuroanatomy: An Atlas of Structures, Sections, and Systems*. 6th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2004 (filum terminale; CT myelogram).

Courtesy of Hawke M, MD, Toronto, Canada (acute otitis media; cholesteatoma; normal tympanic membrane; otitis externa; tympanosclerosis).

Courtesy of Hall JC. *Sauer's Manual of Skin Diseases*. 8th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2000 (papules).

Courtesy of Hall JC. *Sauer's Manual of Skin Diseases*. 9th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006 (exfoliative dermatitis; xanthelasma palpebrarum).

Courtesy of Harris JH Jr, Harris WH. *The Radiology of Emergency Medicine*. 3rd ed. Philadelphia, PA: Lippincott-Raven; 2000 (Barton fracture; Galeazzi fracture; Smith fracture).

Courtesy of Harwood-Nuss A, Wolfson AB, et al. *The Clinical Practice of Emergency Medicine*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001 (croup; direct trauma injury; osteosarcoma; Monteggia fracture).

Reprinted with permission from Hertig AT, Rock J, Adams EC. A description of 34 human ova within the first 17 days of development. *American Journal of Anatomy* 98:435, 1956. Courtesy of Carnegie Institution of Washington, Washington, DC (human blastocyst).

Reprinted with permission from Heuser CH. A presomite embryo with a definite chorda canal. *Contributions in Embryology* 23:253, 1932. Courtesy of Carnegie Institution of Washington, Washington, DC (18-day human embryo).

Courtesy of Hoag Memorial Presbyterian Hospital, Bloomington, IN (bone scan).

Courtesy of Hosley JB, Molle-Matthews E. *Lippincott's Pocket Guide to Medical Assisting*. Philadelphia, PA: Lippincott Williams & Wilkins; 1998 (dorsal recumbent position; Fowler position; lithotomy position; prone position; semi-Fowler position; Sims position; sitting position; standing position; supine position).

Courtesy of Dr. Norman Jacobs. From the Centers for Disease Control and Prevention, Atlanta, GA (bacteria: diplococci).

Courtesy of Jernigan JA, et al. Bioterrorism-Related Inhalation Anthrax: The First 10 Cases Reported in the United States. *Emerging Infectious Diseases* 7(6):933–944, 2001 (bacteria).

Courtesy of Kean BH, Sun T, Ellsworth RM. *Color atlas/text of ophthalmic parasitology*. New York: Igaku-Shoin; 1991 (hydatid cyst).

Courtesy of Kelsen DP, Daly JM, Kern SE, Lebin B, Tepper JE. *Gastrointestinal Oncology: Principles and Practice*. Philadelphia, PA: Lippincott Williams & Wilkins; 2002 (barium enema study; endoscopy: adenocarcinoma; gallbladder carcinoma; endoscopy: non-Hodgkin lymphoma).

Courtesy of Koneman EW, Allen SD, Janda WM, Schreckenberger PC, Winn WC Jr. *Color Atlas and Textbook of Diagnostic Microbiology*. 5th ed. Philadelphia, PA: Lippincott; 1997 (*Enterobius vermicularis*).

Courtesy of Koval KJ, Zuckerman JD. *Atlas of Orthopaedic Surgery: A Multimedial Reference*. Philadelphia, PA: Lippincott Williams & Wilkins; 2004 (beach chair position; knee-chest position; lateral decubitus position).

Reprinted with permission from Krumlauf R. Hox genes and pattern formation in the branchial region of the vertebrate head. *Trends in Genetics* 9:106–112, 1993 (human embryo).

Courtesy of Laclette, JP, MD, Instituto de Investigaciones Biomédicas, UNAM, Mexico (cestode).

Courtesy of Langlais RP, Miller CS. *Color Atlas of Common Oral Diseases*. 3rd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2003 (angular cheilosis; ameloblastoma; attrition; bilateral cleft lip; cleft palate; cold sores; dental caries, class II and III; dentigerous cyst; erosion; thrush).

Courtesy of Langland OE, Langlais RP. *Principles of Dental Imaging*. Baltimore, MD: Williams & Wilkins; 1997 (apical granuloma; apical periodontal cyst).

From *LifeART Emergency 3* (CD-ROM). Baltimore, MD: Lippincott Williams & Wilkins; 2000 (rule of nines; adult vs. pediatric airway).

From *LifeART Emergency 4* (CD-ROM). Baltimore, MD: Lippincott Williams & Wilkins; 2001 (oropharyngeal tube; jaw thrust).

From *LifeART Nursing 1* (CD-ROM). Baltimore, MD: Lippincott Williams & Wilkins; 2000 (Brudzinski sign; central venous pressure catheterization; intracranial pressure monitoring; venipuncture).

From *LifeART Nursing 2* (CD-ROM). Baltimore, MD: Lippincott Williams & Wilkins; 2000 (rigidity).

From *LifeART Nursing 3*, (CD-ROM). Baltimore, MD: Lippincott Williams & Wilkins; 2000 (cricothyrotomy; tympanic thermometer; vasectomy).

From *LifeART Super Anatomy 1*, (CD-ROM). Baltimore, MD: Lippincott Williams & Wilkins; 2002 (surgical incisions).

From *LWW's Organism Central* (CD-ROM). Baltimore, MD: Lippincott Williams & Wilkins; 2001 (*Entamoeba histolytica*).

Courtesy of Marks R. *Skin Disease in Old Age*. Philadelphia, PA: JB Lippincott; 1987 (ulcer).

Courtesy of McClatchey KD. *Clinical Laboratory Medicine*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2002 (staphylococci; streptococci; *Aspergillus fumigatus*; *Borrelia*; *Candida albicans*; *Cryptococcus neoformans*; *Fusarium solani*; *Haemophilus influenzae*; *Microsporum canis*; *Neisseria gonorrhoeae*; *Pneumocystis carinii*; *Staphylococcus aureus*; *Trichophyton tonsurans*; Zygomycetes; zygomycosis; *Chlamydia*).

Courtesy of McConnell TH. *The Nature of Disease, Pathology for Health Professions*. Baltimore, MD: Lippincott Williams & Wilkins; 2007 (congestive splenomegaly in cirrhosis).

Courtesy of McKenzie SB, Clare N, Burns C, Larson L, Metz J. *Textbook of Hematology*. 2nd ed. Baltimore, MD: Williams & Wilkins; 1996 (Philadelphia chromosome translocation; hemolytic anemia; anisocytosis; macrocytosis; microcytic, hypochromic anemia; poikilocytosis; rouleaux; sickle cell anemia).

From MediClip Clinical Cardiopulmonary Collection. Baltimore, MD: Lippincott Williams & Wilkins; 2010 (human heart).

Courtesy of Mills SE. *Histology for Pathologists*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007 (oat cell carcinoma).

Courtesy of Mission Hospital Regional Medical Center, Mission Viejo, CA (breech fetus; colon polypectomy; esophageal varices).

Courtesy of Robert H. Mohlenbrock at U.S. Department of Agriculture-Natural Resources Conservation Service Plants Database/Soil Conservation Service. *Southern wetland flora: Field office guide to plant species*. South National Technical Center, Fort Worth, TX; 1991 (poison oak and sumac).

Courtesy of Moore KL, Agur A. *Essential Clinical Anatomy*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2002 (concave/convex).

Courtesy of Moore KL, Dalley AF. *Clinical Oriented Anatomy*. 4th ed. Baltimore, MD: Lippincott Williams & Wilkins; 1999 (swallowing; tracheostomy; Frankfurt horizontal plane).

Courtesy of Dr. P. Motta. From Sadler T. *Langman's Medical Embryology*. 9th ed [image bank]. Baltimore, MD: Lippincott Williams & Wilkins; 2003 (zona pellucida; human heart).

From the National Digestive Diseases Information Clearinghouse. Fact Sheet: *Diverticulosis and Diverticulitis*. National Institutes of Health publication 90–1163. Washington, DC: U.S. Department of Health and Human Services; 1989 (diverticula of colon).

From the National Pressure Ulcer Advisory Panel, Reston, VA (ulcers).

Courtesy of Nettina, SM. *The Lippincott Manual of Nursing Practice*. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001 (Gardner-Wells traction tongs; Venturi mask; lentigo maligna melanoma).

Courtesy of Neville BW, Damm DD, White DK. *Color Atlas of Clinical Oral Pathology*. 2nd ed. Baltimore, MD: Williams & Wilkins, 1998 (leukoplakia; hairy tongue).

Courtesy of Newport Diagnostic Center, Newport Beach, CA (Alzheimer disease).

Courtesy of *Nursing Procedures*. 4th ed. Ambler, PA: Lippincott Williams & Wilkins; 2004 (electrocardiography photo; flow rates for IV drips; nasopharyngeal airway; oropharyngeal airway; air-fluidized bed; esophageal gastric tube airway).

Courtesy of Oatis CA. *Kinesiology: The Mechanics and Pathomechanics of Human Movement*. Baltimore, MD: Lippincott Williams & Wilkins; 2003 (articular cartilage; medial meniscus: top image; pinch patterns; scoliosis).

Courtesy of Olympus Corporation of Tokyo (colonoscope).

Courtesy of Philips Ultrasound, Bothell, WA (obstetrical sonography).

Courtesy of Pillitteri A. *Maternal and Child Nursing*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003 (Ambu bag; male and female condom drawings; meninges; multiple gestation; ventriculoperitoneal shunt; common sites of endometriosis formation).

Courtesy of Pizzo PA, Poplack DG. *Principles and Practice of Pediatric Oncology*. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006 (astrocytoma).

Courtesy of Porth CM. *Pathophysiology Concepts of Altered Health States*. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005 (complement pathways; limbic system).

Courtesy of Potter B, DDS, School of Dentistry, Medical College of Georgia, Augusta, GA (bitewing radiograph; cephalometry; dentition; endosteal implants; molar tooth; radiolucent area; panoramic radiograph).

Courtesy of Pray WS. *Nonprescription Product Therapeutics*. Baltimore, MD: Lippincott Williams & Wilkins; 1999 (androgenic alopecia: female & male pattern).

Courtesy of Premkumar K. *The Massage Connection: Anatomy and Physiology*. Baltimore, MD: Lippincott Williams & Wilkins; 2003 (wound healing).

Courtesy of Premkumar K. *The Massage Connection, Anatomy and Physiology*. 2nd ed. Baltimore, MD: Lippincott Williams and Wilkins; 2004 (Golgi tendon organ; smooth muscle).

Courtesy of Riordan CL, McDonough M, Davidson JM, et al. Noncontact laser Doppler imaging in burn depth analysis of the extremities. *Journal of Burn Care & Rehabilitation* 24:177–86, 2003 (burns).

Courtesy of Robinson HBG, Miller AS. *Colby, Kerr, and Robinson's Color Atlas of Oral Pathology*. Philadelphia, PA: JB Lippincott; 1990 (candidiasis).

Courtesy of Rosdahl DB. *Textbook of Basic Nursing*. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999 (auscultation of the lungs).

Courtesy of Rubin E, Farber JL. *Pathology*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999 (Ascaris; berry aneurysm; cholelithiasis; budding of virions from the plasma membrane of HIV-infected cell; spina bifida with meningocele; adenocarcinoma; adenovirus; bronchiolitis; crust; Cytomegalovirus vs. normal respiratory tract; bancroftian filariasis infestation; fibroadenoma; *Haemophilus influenzae* meningitis; Hepatitis A virus; Hepatitis B virus; keloid; Down syndrome; liposarcoma).

Courtesy of Rubin E, et al. *Rubin's Pathology: Clinicopathologic Foundations of Medicine*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005 (bronchiolar carcinoma; diabetic retinopathy).

Courtesy of Rubin R, Strayer DS, et al. *Rubin's Pathology: Clinicopathologic Foundations of Medicine*. 5th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2008 (endometriosis nodules; subdural hematoma; cerebral hemorrhage; anthracosilicosis; centrilobular emphysema; alcoholic cirrhosis; Crohn disease; panacinar emphysema; gastric ulcer; acute hemorrhagic cystitis; hydronephrosis; hyperplastic polyp; interstitial cystitis; jaundice; Meckel diverticulum; multiple myeloma; Paget disease; chronic pyelonephritis; staghorn calculi; development of subdural hematoma; arterial thrombus; trichobezoar; ulcerative colitis; gallbladder carcinoma; myocardial hypertrophy; cataract; gynecomastia).

Courtesy of Sadler TW, PhD. *Langman's Medical Embryology*. 8th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2000 (histologic development of the lung; liver development in the embryo; metanephric diverticulum; stages in development of the pancreas; respiratory diverticulum).

Courtesy of Sadler T. *Langman's Medical Embryology*. 9th ed [image bank]. Baltimore, MD: Lippincott Williams & Wilkins; 2003 (human blastocyst; fetus; dwarfism; 22/23-day human embryo; fetus; human embryo: 3rd week; zygote and morula).

Courtesy of Salter RD. *Textbook of Disorders and Injuries of the Musculoskeletal System*. 2nd ed. Baltimore, MD: Williams & Wilkins; 1983 (bursitis).

Courtesy of Sanders CV, Nesbitt LT Jr. *The Skin and Infection: A Color Atlas and Text*. Baltimore, MD: Williams & Wilkins; 1995 (Kaposi sarcoma; AIDS; tinea capitis: trichophyton tonsurans infection; toxic epidermal necrolysis; leprosy).

Courtesy of Sauer GC, Hall JC. *Manual of Skin Diseases*. 7th ed. Philadelphia, PA: Lippincott-Raven Publishers; 1996 (acne).

Courtesy of Scheid RC. *Woelfel's Dental Anatomy: Its Relevance to Dentistry*. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007 (chronic desquamative gingivitis).

Courtesy of Scheie Eye Institute, Philadelphia, PA (normal retina; retinal detachment).

Courtesy of Shriners Hospitals for Children, Houston, Texas (Proteus syndrome).

Reprinted with permission from The Skin Cancer Foundation, New York, NY (squamous cell carcinoma).

Reprinted with permission from The Skin Cancer Foundation, New York, NY. *Basal Bell Carcinoma: The Most Common Skin Cancer*. 1986; revised 1999 (basal cell carcinoma).

Courtesy of Smeltzer SC, Bare BG. *Brunner & Suddarth's Textbook of Medical-Surgical Nursing*. 9th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2000 (arterial aneurysm; progression of atherosclerosis; breast self-examination; hives; wounds; gangrene of the toes; Troussseau sign; tuberculin test; thoracoscopy; esophagogastroduodenoscopy; colonoscopy).

Courtesy of Smeltzer SC, Bare BG, Hinkle JL, Cheever KH. *Brunner & Suddarth's Textbook of Medical-Surgical Nursing*. 11th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2008 (anesthetic delivery methods; anatomy of autonomic nervous system; cardiomyopathies that lead to congestive heart failure; implantable cardioverter defibrillator; cochlear implant; injection sites for spinal and epidural anesthesia; insulin pump; intravenous cannulation sites; knee joint; laposcopic cholecystectomy; knee ligaments, tendons, and menisci; pannus; deep peptic ulcer; common GI causes of peritonitis; pharyngitis; oral structures; pitting edema; shingles; anatomic structures of skin; Kaposi sarcoma; electrocardiography strip; impetigo: nostril; color flow duplex image: popliteal artery).

Courtesy of Snell R. *Clinical Anatomy*. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003 (mature placenta; medial meniscus: bottom image; umbilical cord).

Courtesy of Larry Staugger, Oregon State Public Health Laboratory. From the Centers for Disease Control and Prevention, Atlanta, GA (bacteria: bacilli).

Courtesy of Stoelting Co., Wood Dale, IL (Adson forceps).

Reprinted with permission from Streeter GL. Developmental horizons in human embryos: age groups XV, XVI, XVII, and XVIII [the third issue of a survey of the Carnegie Collection]. *Contributions in Embryology* 32:133, 1948. Courtesy of Carnegie Institution of Washington, Washington, DC (28-somite human embryo; yolk sac).

Courtesy of Sun T. *Parasitic Disorders: Pathology, Diagnosis, and Management*. 2nd ed. Baltimore, MD: Lippincott Williams & Wilkins, 1999 (*Entamoeba coli*; *Giardia lamblia*; hookworm; *Isospora belli*; nematode; cestode; trematode; *Taenia saginata*; *Trichinella spiralis*; *Wuchereria bancrofti*; hydatid cyst).

Courtesy of Swischuk LE. *Imaging of the Newborn, Infant, and Young Child*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1997 (Wilms tumor; neuroblastoma).

Courtesy of Tasman W, Jaeger E. *The Wills Eye Hospital Atlas of Clinical Ophthalmology*. 2nd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2001 (mature cataract with complete opacification of lens; Goldenhar syndrome; blepharitis; drusen; *Candida albicans* infection; conjunctivitis; corneal foreign body; corneal ulcer; cotton wool spots; endophthalmitis; episcleritis; *Fusarium* infection; hyphema; keratoacanthoma; milia; normal angiogram; normal macula; orbital cellulites; *Phthirus pubis* infestation; retinoblastoma causing glaucoma; retinoblastoma; rhabdomyosarcoma; tumor; accommodative convergence accommodation ratio; coloboma; diabetic retinopathy; esotropia/exotropia; Mobius syndrome; Refsum disease).

Courtesy of Taylor C, Lillis C, LeMone P. *Fundamentals of Nursing: The Art and Science of Nursing Care*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001 (nasal cannula; lumbar puncture).

Courtesy of Taylor C, Lillis C, LeMone P, Lynn P. *Fundamentals of Nursing: The Art and Science of Nursing Care*. 6th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2008 (stoma; injections; apical pulse; lateral view of female breast; location of lymph nodes of the neck; sphygmomanometer; parts of needle and syringe; transcutaneous electrical nerve stimulation; Z-track method).

Courtesy of Wang F, MD, Orange, CA (perfusion scan, ventilation scan).

Courtesy of Weber J, Kelley J. *Health Assessment in Nursing*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003 (Hegar sign; pain scales; cerumen; bunion; cherry angiomas; patches; scar; shingles: herpes zoster).

Courtesy of Welch Allyn, Inc., Skaneateles Falls, NY (exostosis; glaucoma; ophthalmoscope; otomycosis; otoscope; otoscopy; perforation).

Courtesy of Westheimer R, Lopater S. *Human Sexuality: A Psychosocial Perspective*. Baltimore, MD: Lippincott Williams & Wilkins; 2002 (female condom photograph; uterus).

Courtesy of Willis MC. *Medical Terminology: A Programmed Learning Approach to the Language of Health Care*. Baltimore, MD: Lippincott Williams & Wilkins; 2002 (atherectomy devices; incentive spirometer; 8-week embryo).

Courtesy of Willis MC. *Medical Terminology: The Language of Health Care*. Baltimore, MD: Williams & Wilkins; 1996 (lesions; rhythm).

Courtesy of Winn WC Jr, et al. *Koneman's Color Atlas and Textbook of Diagnostic Microbiology*. 6th ed. Philadelphia, PA: Lippincott; 2005 (Plasmodium vivax).

Courtesy of World Health Organization, Washington, DC (polio).

Courtesy of Yamada T, et al. *Atlas of Gastroenterology*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003 (diverticulosis; ulcerative colitis).

Courtesy of Yochum TR, Rowe LJ. *Essentials of Skeletal Radiology*. 2nd ed. Baltimore, MD: Lippincott Williams & Wilkins; 1996 (myositis ossificans).

Courtesy of Yochum TR, Rowe LJ. *Yochum and Rowe's Essentials of Skeletal Radiology*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2004 (Cobb method).

Artwork Credits

Anatomical Chart Company: all artwork in the anatomy insert, umbilical cord prolapse, tooth anatomy, left kidney and adrenal gland, malignant melanoma, nephrolithiasis, bony orbit, conception, respiration, Lund-Browder chart, blood cell development

Mary Anna Barratt-Dimes, Parkton, MD: tympanogram

Susan Caldwell, Parsonsburg, MD: apgar score, arterial blood gases, normal body temperature by age

Jonathon Clements, Baltimore, MD: hearing aids, male condom photograph

Neil O. Hardy, Westport, CT: ectopic pregnancy, eye, facial nerves, Foley catheter, types of fractures, gastric bypass, glaucoma, gestation, antibody, arteriole, asthma, auditory ossicles, biopsy, segmental bronchi, capillary bed, dental caries, cerebral cortex, coronary arteries, frontal section of ear, embolism, enterostomy tubes, types of epithelium, Heimlich maneuver, invertebral disc herniation, hyperopia, hyphema, ileostomy, indirect inguinal hernia, innervation of the hand and wrist, intestines, pancreas, joints, laryngeal cartilages, Le Fort classification of facial fractures, lungs and respiratory anatomy, metered dose inhaler, mouth, myopia, neuroglia, typical efferent neurons, nutrient absorption, nystagmus, olfaction, otitis externa, otitis media, pancreas, percussion, percutaneous transluminal angioplasty, permanent dentition, polyps, postural drainage, pulmonary circulation, peripheral pulses, quadrants of abdomen, layers of the retina, scoliosis, skeletal muscle, spirometry, spondylolisthesis, vascular stent, talipes cavus and talipes planus, temporomandibular joint, vertical banded gastroplasty, digital clubbing, cochlea, cranial nerves, deciduous dentition, decubitus ulcer, dental implant, dermatomes, DNA, abdominal regions, alveolar abscess, amniocentesis, palpation technique, varicosis, venous valves, ventricles of the brain, vision, electrocardiography, colostomy, heart valves, bronchoscopy, computed tomography, MRI machine, computer monitors, tapeworm

Siri Mills, Munich, Germany: human heart, sympathetic trunk

Barbara Proud, Wilmington, DE: female condom

Michael Schenk, Jackson, MS: bomb calorimeter, carpal tunnel syndrome, finger deformities and fractures, grasp patterns, sliding esophageal and paraesophageal hernias, muscles of mastication, skin-fold measurement sites

Mikki Senkarik, San Antonio, TX: thoracoscopy, esophagogastroduodenoscopy, colonoscopy