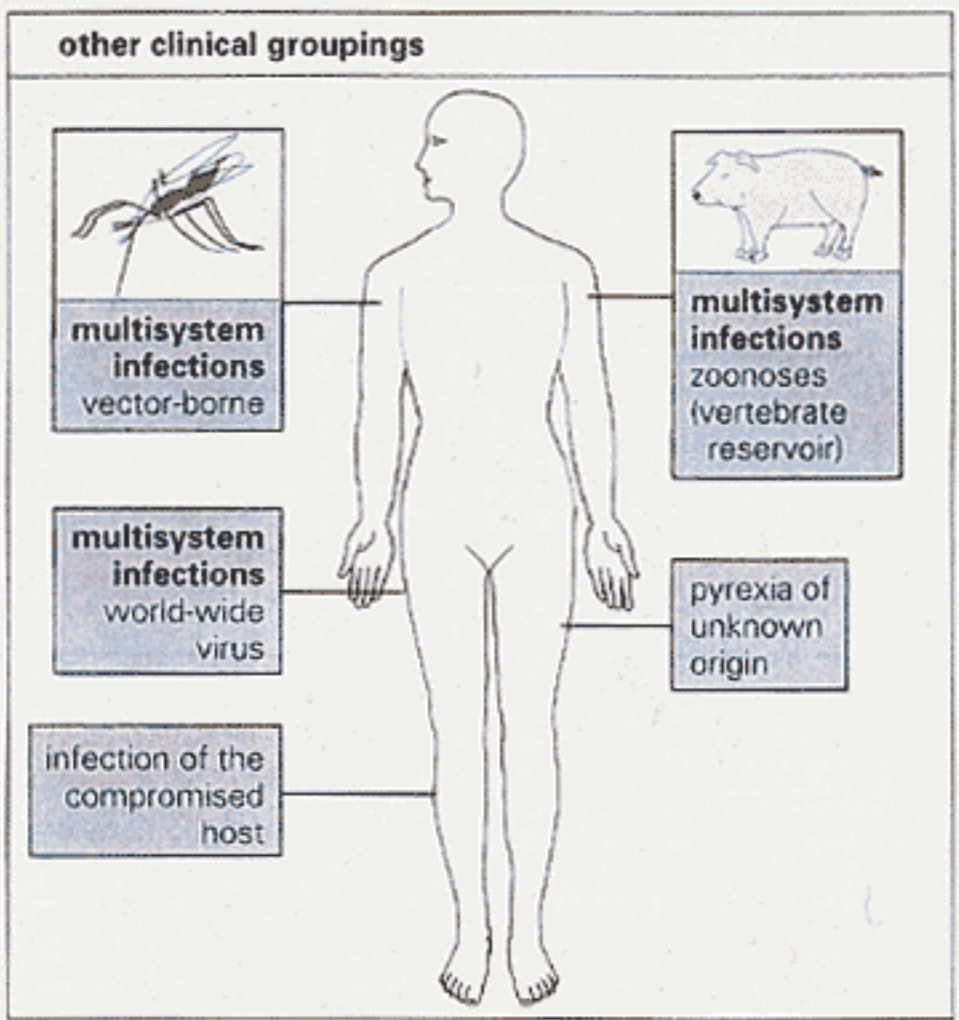


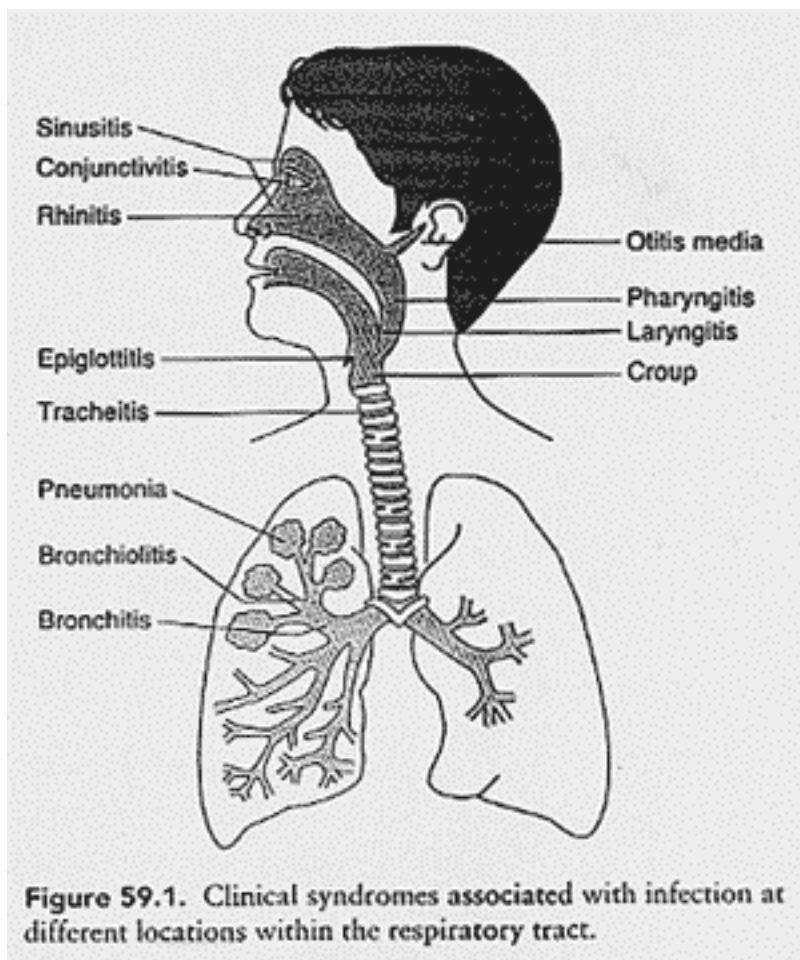
13a-1



13a-2

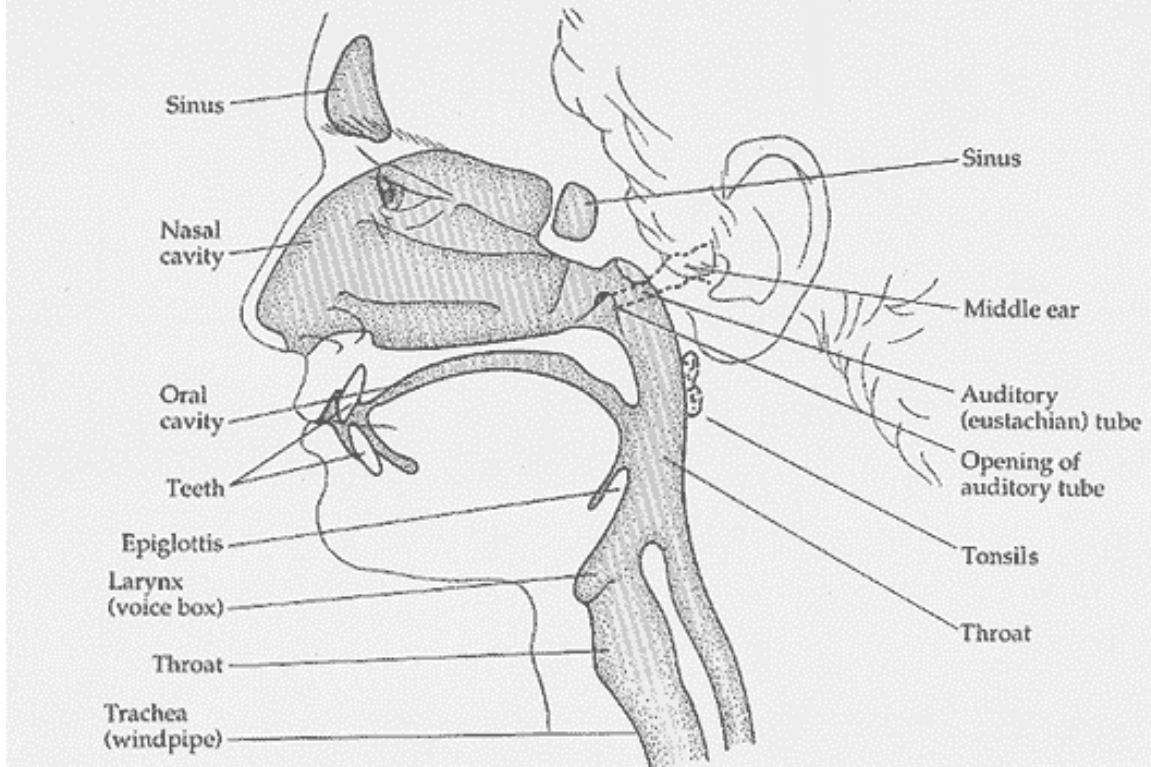
anatomy	clinical picture	microorganisms (areas affected)					
	rhinitis (sinusitis etc.) pharyngitis laryngitis tracheitis bronchitis bronchiolitis pneumonia	rhinovirus 	parainfluenza viruses 	<i>Haemophilus influenzae</i> * 	influenza virus 	pertussis 	respiratory syncytial virus

13b



13c

Structures of the upper respiratory system (Figure 24.1)



13d

VIRUSES CAUSING COMMON COLDS			
virus	types involved	attachment mechanism	disease
rhinoviruses (>100 types)*	several at any given time in the community	capsid protein binds to ICAM-1 type molecule on cell**	common cold
coxsackie virus A (24 types)	especially A21	capsid protein binds to ICAM-1 type molecule on cell**	common cold; also oropharyngeal vesicles (herpanginal and hand, foot and mouth disease (A16)
influenza viruses	several	hemagglutinin binds to neuraminic acid-containing glycoprotein on cell	may also invade lower respiratory tract
parainfluenza virus (4 types)	1,2,3,4	viral envelope protein binds to glycoside on cell	may also invade larynx
respiratory syncytial virus	(1 type)	—	may also invade lower respiratory tract
coronaviruses (several types)	all	viral envelope protein binds to glycoprotein receptors on cell	common cold
adenovirus (41 types)	5-10 types	penton fiber binds to cell receptor	mainly pharyngitis; also conjunctivitis, bronchitis
echoviruses (34 types)	11, 20	—	common cold

* a given type shows little or no neutralization by antibody against other types
 ** ICAM-1: intercellular adhesion molecule expressed on a wide variety of normal cells; member of immunoglobulin superfamily, coded on chromosome 19

13e

VIRAL PNEUMONIA

virus	clinical condition	comments
influenza A or B	primary viral pneumonia or pneumonia associated with secondary bacterial infection	pandemics (type A) and epidemics (type A or B); increased susceptibility in elderly or in certain chronic diseases
parainfluenza (types 1–4)	croup, pneumonia in children less than five years of age; upper respiratory illness (often subclinical) in older children and adults	antivirals and vaccines not available
measles	secondary bacterial pneumonia common; primary viral (giant cell) pneumonia in those with immunodeficiency	adult infection rare but severe; King and Queen of Hawaii both died of measles when they visited London in 1824
respiratory syncytial virus	pneumonitis pneumonia (infants); common cold syndrome (adults)	peak mortality in 3–4-month-old infants; secondary bacterial infection rare
adenovirus	pharyngoconjunctival fever, pharyngitis, atypical pneumonia (military recruits)	no antivirals; vaccines not generally available
cytomegalovirus	interstitial pneumonia	in immunodeficient patients (e.g. AIDS)
varicella-zoster virus	pneumonia in young adults suffering primary infection	uncommon; recognized 1–6 days after rash; lung lesions may eventually calcify

RESPIRATORY INVADERS – PROFESSIONAL OR SECONDARY		
type	requirement	examples
professional invaders (infect healthy respiratory tract)	<p>adhesion to normal mucosa (in spite of mucociliary system)</p> <p>ability to interfere with cilia</p> <p>ability to resist destruction in alveolar macrophage</p> <p>ability to damage local (mucosal, submucosal) tissues</p>	<p>respiratory viruses (influenza, rhinoviruses)</p> <p><i>Streptococcus pyogenes</i> (throat)</p> <p><i>Strep. pneumoniae</i></p> <p><i>Mycoplasma pneumoniae</i></p> <p>chlamydia (psittacosis, chlamydial conjunctivitis and pneumonia, trachoma)</p> <p><i>Bordetella pertussis</i>, <i>M. pneumoniae</i></p> <p><i>Strep. pneumoniae</i> (pneumolysin)</p> <p><i>Legionella</i>, <i>Mycobacterium tuberculosis</i></p> <p><i>Corynebacterium diphtheriae</i> (toxin)</p> <p><i>Strep. pneumoniae</i> (pneumolysin)</p>
secondary invaders (infect when host defenses impaired)	<p>inhal infection and damage by respiratory virus (e.g. influenza virus)</p> <p>local defenses impaired (e.g. cystic fibrosis)</p> <p>chronic bronchitis</p> <p>local foreign body or tumor</p> <p>depressed immune responses (e.g. AIDS, neoplastic disease)</p> <p>depressed resistance (e.g. elderly, alcoholism, renal or hepatic disease)</p>	<p><i>Staphylococcus aureus</i>; <i>Strep. pneumoniae</i></p> <p>pneumonia complicating influenza</p> <p><i>Staph. aureus</i>, <i>Pseudomonas</i></p> <p><i>Haemophilus influenzae</i>, <i>Strep. pneumoniae</i></p> <p><i>Pneumocystis carinii</i>, cytomegalovirus, <i>M. tuberculosis</i></p> <p><i>Strep. pneumoniae</i>, <i>Staph. aureus</i>, <i>H. influenzae</i></p>

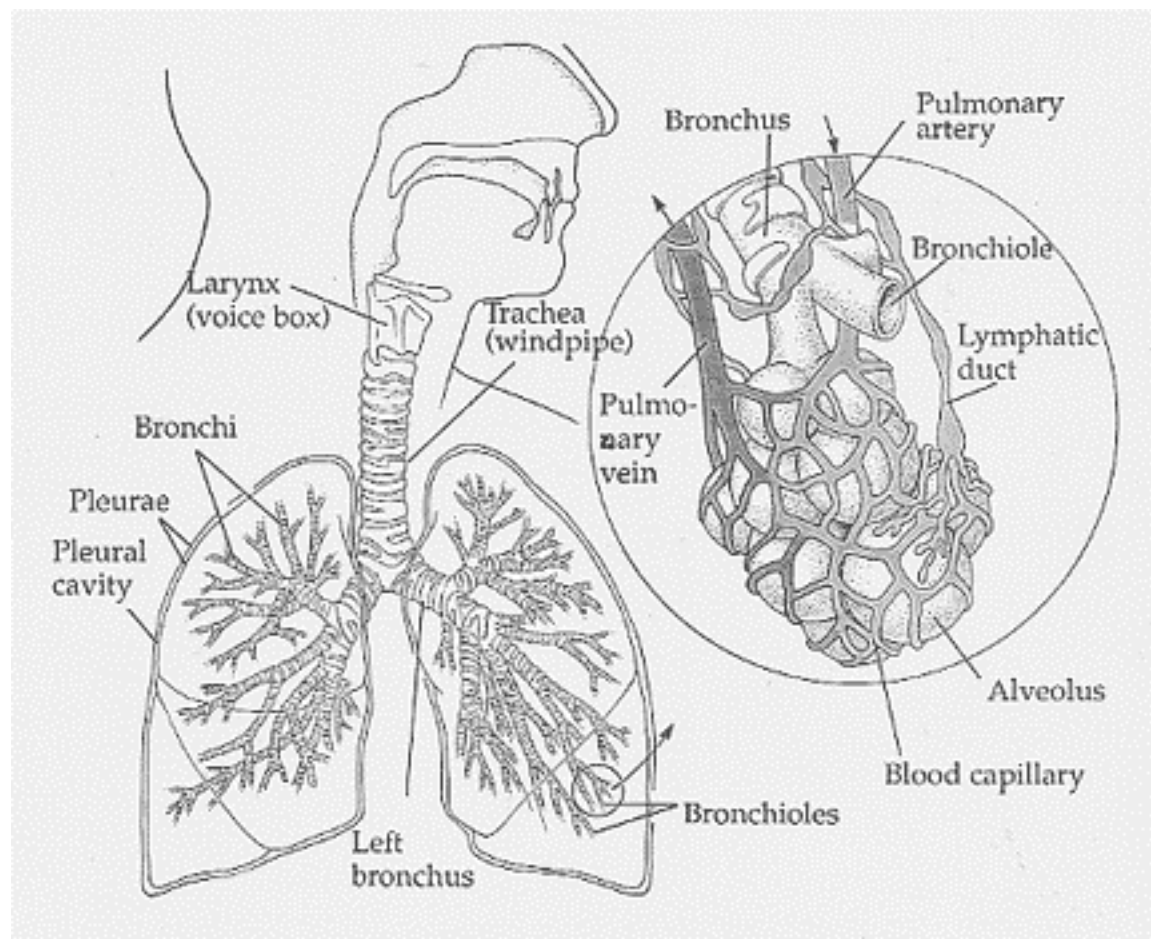
Fig. 18.4 The two types of respiratory invader.

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Fig. 18.5 Common cold viruses and their mechanisms of attachment.



13h