

16

INFECTIOUS DISEASE

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I. CHIEF COMPLAINT

- A. Chief Complaint:** Use the patient's own words when possible. Chronology is often included: Onset (acute, subacute or chronic), duration (minutes, hours, days, weeks, months or years), and frequency of symptom(s).
- B. Identifying Data:** Obtain patient's name, age, race/ethnic background.
- C. Fever:** Fever is the most common symptom that leads patients and physicians to consider a diagnosis of infection. For this reason, the focus of this section is the work-up of the febrile patient.
1. Fever refers to a pyrogen-mediated elevation of body temperature above the expected normal daily variation. In contrast, hyperthermia is an abnormality of thermoregulation that is not driven by pyrogenic cytokines, and therefore, unlike fever, is not ameliorated by antipyretic medications. For most patients, the temperature at which clinical evaluation of fever is indicated is 38.0°C (100.4°F).
 2. Fever as a clinical symptom/sign of infection is neither sensitive nor specific. The absence of fever does not exclude infection, particularly in an immunocompromised, debilitated, or elderly patient.
 3. Conversely, the presence of fever does not equate to infection because fever can be the initial manifestation of noninfectious maladies, including collagen vascular disease and malignancy.
 4. A variety of terms are used to describe fever in terms of its pattern (e.g., intermittent versus remittent), duration (fever of unknown origin), and unique host characteristics (neutropenic fever). The more commonly used terms are summarized in Table 16-1.
 5. Although specific fever patterns are not pathognomonic, a review of the patient's fever curve may provide diagnostic clues about the etiologic agent. Selected fever patterns and putative etiologic agents are summarized in Table 16-2.
- D. Appropriate Febrile Patient Triage:** The goals of triage are to expedite patient care while minimizing the unnecessary exposure of susceptible staff, patients, and family members.
1. Decide if the patient requires an immediate intervention, such as fluid resuscitation or empiric antibiotic therapy. For example,

Table 16-1. DEFINITION OF TERMS REGARDING FEVER.

TERM	DEFINITION
Fever	Fever is an elevation of temperature above the peak normal daily variation. The normal oral temperature range is 36.0-37.8°C (96.8-100.0°F)
Continuous fever	Persistent elevation of temperature with minimal fluctuations
Intermittent fever	Daily fever spikes with return to normal body temperature
Remittent fever	Fever spikes without return to normal body temperature between spikes
Relapsing fever	Cyclical pattern of alternating fever and normal temperature
Factitious fever	Fever produced artificially by the patient
Fever of unknown origin (FUO), classic definition	Illness of more than three weeks' duration. Documented fevers above 101°F (38.3°C) on several occasions. Lack of specific diagnosis after 1 week of inpatient investigation
Classic FUO, revised definition	As above, but investigation now revised to three hospital days or three outpatient visits
Neutropenic fever	A single oral temperature of >38.3°C (101.0°F) or >38.0°C (100.4°F) over at least 1 hour, in patient with a neutrophil count <500 mm ³ or <1000 mm ³ with predicted decline to less than 500 mm ³

a patient with acute bacterial meningitis should have antibiotics started before further diagnostic testing is completed.

- Determine if empiric isolation precautions are warranted. The clinical syndromes for which empiric isolation precautions are advised by the Centers for Disease Control and Prevention (CDC) are summarized in Table 16-3.

II. HISTORY OF PRESENT ILLNESS

A. Infectious Diseases

- The study of the relationship between a patient, an infectious agent(s), and the environment.
- Once you have completed your initial triage, you are ready to proceed with an orderly, systematic review of the patient's unique susceptibilities and exposures.

Table 16-2. DIAGNOSTIC SIGNIFICANCE OF FEVER PATTERNS.

FEVER	CAUSES
Single fever spike	Manipulation of a colonized or infected mucosal surface, transfusion of blood/ blood products, infusion-related sepsis (contaminated infusate), temperature error, not a systemic infectious disease
Double quotidian fevers (twice daily)	Adult Still's disease, visceral leishmaniasis, miliary tuberculosis, mixed malarial infections, right-sided gonococcal endocarditis
Tertian fevers (every third day)	Malaria (<i>Plasmodium vivax</i>)
Quartan fevers (every fourth day)	Malaria (<i>Plasmodium malariae</i>)
Intermittent fevers	Gram-negative or gram-positive sepsis, abscess (renal, abdominal, pelvic), acute bacterial endocarditis, Kawasaki disease, malaria, miliary tuberculosis, antipyretics, peritonitis, toxic shock syndrome
Remittent fevers	Viral upper respiratory infections, <i>Plasmodium falciparum</i> malaria, acute rheumatic fever, Legionella/Mycoplasma infection, tuberculosis, subacute bacterial endocarditis (SBE)
Continuous or sustained fevers	Central fevers, roseola infantum (HHV6), brucellosis, Kawasaki disease, psittacosis, rocky mountain spotted fever, scarlet fever, subacute bacterial endocarditis, typhoid fever, drug fever
Biphasic (camelback) fever	Colorado tick fever, dengue fever, leptospirosis, brucellosis, lymphocytic choriomeningitis, yellow fever, polio, smallpox, rat-bite-fever (<i>Spirillum minus</i>), Chikungunya fever, African hemorrhagic fevers (Marburg, Ebola, Lassa), Echovirus infection
Relapsing fever	Relapsing fever (<i>Borrelia recurrentis</i>), yellow fever, smallpox, ascending cholangitis, brucellosis, dengue, chronic meningococcemia, malaria, rat-bite-fever

Table reproduced with permission from Cunha BA. Clinical approach to fever. In SL Gorbach, JG Bartlett, NR Blacklow (eds), Infectious Diseases, ed 2. Philadelphia: WB Saunders, 1998;86.

Table 16-3. EMPIRIC ISOLATION PRECAUTIONS*.

NONSPECIFIC SYMPTOMS	POTENTIAL PATHOGENS†	EMPIRIC PRECAUTIONS
Diarrhea Acute diarrhea with a likely infectious cause in an incontinent or diapered patient	Enteric pathogens* <i>Clostridium difficile</i>	Contact Contact
Diarrhea in an adult with a history of recent antibiotic use	<i>Neisseria meningitidis</i>	Droplet
Meningitis Petechial/ecchymotic with fever	<i>Neisseria meningitidis</i>	Droplet
Rash or exanthems Vesicular generalized, etiology unknown	Varicella	Airborne and contact
Maculopapular with coryza and fever	Rubeola (measles)	Airborne
Upper lobe pulmonary infiltrate in an HIV-negative patient or a patient at low risk for HIV infection	<i>Mycobacterium tuberculosis</i>	Airborne
Cough/Fever Pulmonary infiltrate in any lung location in a HIV-infected patient or a patient at high risk for HIV infection	<i>Mycobacterium tuberculosis</i>	Airborne
Paroxysmal or severe persistent cough during periods of pertussis activity	<i>Bordetella pertussis</i>	Droplet
Respiratory infections, particularly bronchiolitis and croup, in infants and young children	Respiratory syncytial or parainfluenza virus	Contact

	History of infection or colonization with multidrug-resistant organisms [§]	Resistant bacteria [§]	Contact
Risk of multidrug-resistant microorganisms	Skin, wound, or urinary tract infection in a patient with a recent hospital or nursing home stay in a facility where multidrug-resistant organisms are prevalent	Resistant bacteria [§]	Contact
	Abscess or draining wound that cannot be covered	<i>Staphylococcus aureus</i> , group A streptococcus	Contact
Skin or Wound Infection			

Infection control professionals are encouraged to modify or adapt this table according to local conditions. To ensure that appropriate empiric precautions are implemented always, hospitals must have systems in place to evaluate patients routinely according to these criteria as part of their preadmission and admission care.

*Patients with the syndromes or conditions listed below may present with atypical signs or symptoms (e.g., pertussis in neonates and adults may not have paroxysmal or severe cough). The clinician's index of suspicion should be guided by the prevalence of specific conditions in the community, as well as clinical judgment.

†The organisms listed under the column "Potential Pathogens" are not intended to represent the complete, or even most likely, diagnoses, but rather possible etiologic agents that require additional precautions beyond Standard Precautions until they can be ruled out.

‡These pathogens include enterohemorrhagic *Escherichia coli* O157:H7, *Shigella*, hepatitis A, and rotavirus.

§Resistant bacteria judged by the infection control program, based on current state, regional, or national recommendations, to be of special clinical or epidemiologic significance.

Reproduced from Garner JS. Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. Infect Control Hosp Epidemiol 1996;17:53-80, and Am J Infect Control 1996;24:24-52.

B. Symptoms

1. May be localized or systemic.
2. It is critical to be thorough in performing the entire history and physical (H&P).

C. Historical Clues That May “Break the Case”: These clues generally fall into two categories: (1) those that delineate potential exposures to infectious agents, and (2) those that describe the patient’s susceptibility to infection (Table 16-4).

D. Important Questions for a Febrile Patient

1. What is the duration and magnitude of fever? This will allow you to answer the important question, “Is this disease process acute or chronic?”
2. When did the fever begin? Quickly ascertain the onset of the fever because some disease processes dictate immediate treatment (e.g., acute bacterial meningitis).
3. Is there a pattern to the fever? (See Tables 16-1 and 16-2.) For some diseases (e.g., malaria), the periodicity of the fever can be a helpful clue. (Fever patterns also provide interesting material for questions during clinical rounds.)
4. Is there a specific part of your body that is bothering you/painful (e.g., determine localized vs. systemic infection)? When examining the febrile patient, evaluate all localizing symptoms so as not to overlook a potential infectious disease emergency, such as an invasive soft tissue infection.
5. Determine whether the patient is immunocompromised (Table 16-5). What is the specific immune defect? Certain host defects are associated with susceptibility to specific organisms or groups of organisms, some of which require immediate therapy. When caring for immunocompromised patients, it is important to remember that infection with more than one agent may occur simultaneously.
6. Has the patient traveled outside the United States recently? The febrile returning traveler should be evaluated expediently for life-threatening infections, such as malaria. A careful travel history is critical in establishing a differential diagnosis that takes into consideration details of travel itinerary, conditions of travel, prior immunizations, antibiotic prophylaxis, and exposure history.
7. Has the patient been hospitalized recently?
8. Has the patient taken any medications that may alter the fever?
9. Does the patient have occupational exposures or hobbies that make him or her susceptible to infection?
10. Has the patient been exposed to animals, raising the possibility of a zoonotic infection (Table 16-6)?

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Table 16-4. HOST FACTORS THAT INFLUENCE EXPOSURE, INFECTION, AND DISEASE.

FACTORS THAT INFLUENCE EXPOSURE TO INFECTIOUS AGENTS	FACTORS THAT INFLUENCE INFECTION AND THE OCCURRENCE AND SEVERITY OF DISEASE FOR THE PATIENT
Animal exposure, including pets	Age at the time of infection
Behavioral factors related to age, drug usage, and alcohol consumption	Alcoholism
Blood or blood product recipient	Anatomic defect
Child day care attendance	Antibiotic resistance (agent)
Closed living quarters: military barracks, dormitories, homeless shelters, facilities for the elderly and mentally handicapped, prisons	Antibiotic use (host)
Food and water consumption	Coexisting noninfectious diseases, especially chronic
Familial exposures	Coexisting infections
Gender	Dosage: amount and virulence of the organism to which the host is exposed
Hospitalization or outpatient medical care	Duration of exposure to the organism
Hygienic practices	Entry portal of organisms and presence of trauma at the site of implantation
Occupation	Gender
Recreational activities, including sports and recreational injecting drug use	Genetic makeup
Sexual activity: heterosexual and homosexual, type and number of persons	Immune state at the time of infection, including immunization status
School attendance	Immunodeficiency (specific or nonspecific): natural, drug induced, or viral (HIV)
Socioeconomic status	Mechanism of disease
Travel, especially to developing countries	production: inflammatory, immunopathologic, or toxic
Vector exposure	Nutritional status
	Receptors for organism on cells needed for attachment or entry of the organism

Table reproduced with permission from Osterholm MT, Hedberg, CW, Moore KA. In Mandell GL, Bennett JE, Dolin R (eds), *Principles and Practice of Infectious Diseases*, ed 5. Philadelphia: Churchill Livingstone, 2000;163.

Table 16-5. CONDITIONS RESULTING FROM IMMUNE DEFECTS AND ASSOCIATED INFECTING ORGANISMS.

DEFECTS	CONDITIONS	ASSOCIATED INFECTING ORGANISMS
Neutropenia	Leukemia, cytotoxic chemotherapy, AIDS, systemic lupus erythematosus (SLE), Felty syndrome, drugs	<i>Escherichia coli</i> <i>Klebsiella pneumoniae</i> <i>Pseudomonas aeruginosa</i> <i>Staphylococcus aureus</i> <i>Staphylococcus epidermidis</i> Streptococci species Yeasts Aspergillus and other fungi
Defective chemotaxis	Diabetes, alcoholism, renal failure, SLE, Hodgkin's disease, trauma, lazy leukocyte syndrome	Staphylococci, streptococci, and yeasts
Defective neutrophil killing	Chronic granulomatous disease, Down syndrome myeloperoxidase deficiency	Catalase-positive bacteria (e.g., <i>S. aureus</i> , <i>E. coli</i> , <i>Candida</i> spp.)
B-lymphocyte defects	Congenital and acquired agammaglobulinemia, burns, enteropathies, myeloma, lymphocytic leukemia	Encapsulated organisms (e.g., <i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , <i>Neisseria</i> spp.; also <i>Salmonella</i> and <i>Campylobacter</i> spp.)
T-lymphocyte defects	Congenital immunodeficiencies, AIDS, lymphoma, sarcoidosis, Epstein-Barr virus (EBV) infection, SLE, cytomegalovirus infection (CMV)	Intracellular infections with bacteria, mycobacteria, viruses, parasites, fungi
Complement components	Congenital absence	Miscellaneous bacterial infections

Reproduced with permission from Zinner SH. Treatment and prevention of infections in immunocompromised hosts. In Gorbach SL, Bartlett JG, Blacklow NR (eds), *Infectious Diseases*, ed 2. Philadelphia: WB Saunders, 1998;1252.

Table 16-6. ANIMAL ASSOCIATIONS AND ZOONOTIC DISEASE RISK.

DISEASE/ ANIMAL	AQUATIC MAMMAL	BIRD	CAT	CATTLE	DOG	FISH	GOATS SHEEP	HORSE	NONHUMAN PRIMATE	RABBIT HARE	RODENT	SNAKES LIZARD	SWINE	WILDLIFE
Anthrax		X	X	X	X		X	X					X	X
Bartonellosis		X												
Brucellosis		X	X	X	X		X	X		X			X	
Campylobacteriosis		X	X	X	X		X		X				X	
Capnocytophaga canimorsus					X									
Cryptosporidiosis			X	X	X	X	X	X					X	X
Erysipiloid	X	X				X							X	
Giardiasis	X							X						
Hanta virus											X			
Hepatitis A								X						
Herpes B								X					X	X
Histoplasmosis														X
Lymphocytic choriomeningitis											X			
Leptospirosis		X	X	X	X		X	X		X	X		X	X
Listeriosis		X		X	X		X		X	X	X		X	X
Mycobacterium spp.				X					X				X	X

Continued

Table 16-6. ANIMAL ASSOCIATIONS AND ZOONOTIC DISEASE RISK—cont'd

DISEASE/ ANIMAL	AQUATIC MAMMAL	BIRD	CAT	CATTLE	DOG	FISH	GOATS SHEEP	HORSE	NONHUMAN PRIMATE	RABBIT HARE	RODENT	SNAKES LIZARD	SWINE	WILDLIFE
ORF						X								
Ornithosis	X													
Pasteurellosis	X	X	X	X									X	
Rat-bite-fever										X	X			X
Plague		X	X	X						X	X			
Q fever		X	X			X				X				
Rabies		X	X	X	X	X	X	X		X	X		X	X
Salmonellosis		X	X	X	X	X	X	X	X	X	X	X	X	X
Streptococcus iniae					X									
Shigellosis							X							
Toxoplasmosis			X							X	X			X
Tularemia		X	X	X	X					X	X		X	
Vibriosis					X	X								
Viral hemorrhagic fever											X			X
Yersiniosis				X	X		X	X	X				X	

Table reproduced with permission from Weinberg AN. Zoonoses. In Mandell GL, Bennett JE, Dolin R (eds), Principles and Practice of Infectious Diseases, ed 5. Philadelphia: Churchill Livingstone, 2000:3242.

III. PAST MEDICAL AND SURGICAL HISTORY

A. Past Medical History

1. What diseases have you had? How were they treated? Certain disease processes and treatments may alter immune function.
2. Do you have any deficiencies? Determine whether they are natural, induced (chemotherapy), or viral (human immunodeficiency virus [HIV]).
3. Have you had a chronic disease process or paralysis?
4. Have you recently been hospitalized or received inpatient medical care? Consider recent outbreaks of hospital-acquired (nosocomial) infections.
 - a. Have you had an infection? Involving the urinary tract, lungs, surgical wound, blood? The most common sites of nosocomial infections are the urinary tract, lung (pneumonia), surgical wound, and bloodstream (sepsis).
 - b. Eliciting a history of recent hospitalization is helpful for both planning the diagnostic evaluation and for selecting empiric therapy.
 - c. Hospital-acquired pathogens are often more drug resistant than community-acquired pathogens (e.g., vancomycin-resistant enterococcus, methicillin-resistant *Staphylococcus* species), and may require a modification of the usual empiric therapy for a given infection.

B. Past Surgical History

1. Have you had any surgical procedures that involved implanting foreign bodies (e.g., mesh, joints, screws/hardware, tooth implants, heart valves, pacemaker, breast implants)?
2. Did you undergo surgery to repair an anatomic defect (natural or acquired)?
3. Have you had a splenectomy?

C. Emergency and Trauma History

1. Have you ever been treated for trauma? Any damage to skin or mucous membranes?
2. Have you had a blood transfusion? The risk of a transfusion-transmitted infection has decreased considerably but has not been eliminated.

D. Childhood History

1. Development.
2. Illnesses (e.g., otitis media, respiratory infections, urinary tract infections [UTIs], seizures, and hospitalizations).
3. Child day care attendance.

E. Occupational History

1. What, if any, organisms or toxins are you exposed to at work?
2. Do you work in close proximity to co-workers (e.g., assess risk of exposure to co-workers)?

F. Travel History

1. Have you traveled within the United States? To foreign countries? Include geographic locations and dates.

2. Did you have a fever during or after your trip? Fever in the returning traveler requires an expedient evaluation to promptly recognize and treat potentially fatal diseases, such as malaria.
3. When taking a travel history, it is important to ask:
 - a. Where did you go? For what duration? When did you return?
 - b. What were the travel conditions (e.g., city versus remote)?
 - c. Did you drink the local water?
 - d. What exposures did you have to insects and animals?
 - e. What types of food and drink did you consume?
 - f. Did you have any sexual contacts? Was protection used?
 - g. Obtain immunization and medication history, including those taken as prophylaxis.
4. Identify diseases that are capable of being transmitted to others, and for which isolation precautions are advised.

G. Animal and Insects Exposure History (See Table 16-6 for detailed list.)

1. What animals and insects have you recently been exposed to (including pets)? Have you been exposed to cats (toxoplasmosis, cat scratch disease) or pigeons (*Chlamydia psittacosis*)?
2. Have you had any reactions to bites or stings (envenomations)?

IV. MEDICATIONS

1. Are you taking any medications? Which ones? Note medications that may alter fever (e.g., nonsteroidal anti-inflammatory drugs [NSAIDs], medications containing NSAIDs, acetaminophen).
2. Have you recently used antibiotics? For what reason? Antibiotics may alter disease manifestation and ability to culture etiologic agent.
3. Have you had any allergic or adverse reactions? Some patients may experience anaphylactic reactions to certain medications (penicillin and derivatives). Note specific agent and type of reaction. For some infections, desensitization may be required.

V. HEALTH MAINTENANCE

A. Prevention

1. What immunizations have you had?
 - a. Childhood immunizations by type and/or age: Diphtheria, pertussis, tetanus, polio, measles, mumps, rubella, varicella, influenza, Hemophilus influenza type b, hepatitis B, meningococcus.
 - b. Adult immunizations by type and/or age: Varicella, influenza, pneumococcus, tetanus-diphtheria toxoid, hepatitis A, hepatitis B, rabies, meningococcus, anthrax, yellow fever, cholera.
2. Hygiene practice: How often do you bathe? Do you brush your teeth daily? How often? How often and when do you wash your hands? How do you control menses (e.g., pads vs. tampons)? If you use tampons, how often do you change them? If a child, inquire about toilet training.

3. Prophylaxis: Do you take antibiotics on a daily basis or for specific procedures (e.g., before dental care in patients)? Ask about prophylactic antibiotic use if patient is immunocompromised (e.g., asplenic patients, HIV-infected patients) or has had surgery involving foreign body placement (e.g., cardiac valve replacement, hip replacement).
 4. Do you use an insect repellent or take other precautions (e.g., covering head/face, tent)?
- B. Diet:** What food and water have you been exposed to recently? What is your usual diet? Evaluate nutritional status.
- C. Exercise/Recreational Activities:** In particular, note environmental exposures and zoonotic risks.
- D. Sleep Patterns**
1. Have there been any changes in your sleep pattern?
 2. Have changes been caused by night sweats?
- E. Social Habits**
1. Do you use alcohol? How much and how often?
 2. Do you use tobacco? What type? How much and for how long?
 3. Do you use illicit or recreational drugs?

VI. FAMILY HISTORY

- A. First-Degree Relatives' Medical History and Three-Generation Genogram:** Look for a history of disease process(es) altering immune function (e.g., severe combined immune deficiency syndrome [SCIDS]).
- B. Familial Exposure:** Inquire about recent, potentially communicable, illnesses in family members.

VII. PSYCHOSOCIAL HISTORY

A. Personal and Social History

1. Where were you born (country and city)?
2. What is your religious affiliation?
3. What is your ethnic background?
4. Socioeconomic status: Describe your current residence. Whom do you live with? What is the physical layout? Note especially close-quarters facilities, such as military barracks, dormitories, homeless shelters, facilities for the elderly and mentally handicapped, and prisons.
5. Are you currently attending school?
6. Are you involved in a social club?

B. Current Illness Effects on Patient

1. Does the patient understand the illness?
2. Is counseling necessary (e.g., risk of transmission to others, any special precautions)?
3. Will the patient be able to continue current occupation?

C. Interpersonal and Sexual History

1. Are you sexually active? More than one partner? Do you use protection? Possible exposure to sexually transmitted disease (STD).

2. Do you now have, or have you had, an STD? Consider the need to report to appropriate authority(ies). Contact partners.

D. Family Support

1. Are family members available to provide any necessary assistance?
2. Consider whether it is necessary to counsel family members.
3. Does the patient require any special needs or arrangements (e.g., wheelchair, supplies for wound care, home health care)?

E. Occupation Aspects of the Illness

1. How will the rehabilitation requirements affect your employment (i.e., tertiary prevention)?
2. Will you be able to take necessary precautions (to protect self and co-workers)?

VIII. REVIEW OF SYSTEMS (Tables 16-7, 16-8, and 16-9)

Table 16-7. GENERAL INFECTIOUS DISEASE SYMPTOMS BY SYSTEM.

SYSTEM	SYMPTOMS
General	Weight loss, fatigue/weakness, chills (frequency, how long do they last?), night sweats, fever, and anorexia/loss of appetite
HEENT	Sinus pain, headache, conjunctivitis, icterus, eyes/ears/nose pain, bleeding or discharge, photophobia, sore throat, difficulty swallowing, drainage in back of throat, dentition
Neck	Any masses, pain on movement, stiffness
Cardiac	Angina, dyspnea, murmur
Respiratory	Cough (productive or nonproductive), hemoptysis, pleurisy, chest pain with or without radiation, shortness of breath
Gastrointestinal	Abdominal pain (location, quality, radiation), change in bowel habits/diarrhea, jaundice
Genitourinary	Flank pain, pain or burning on urination, discharge, hematuria
Obstetrics / gynecologic	Pelvic pain, dyspareunia vaginal discharge, last menstrual period (LMP), contraceptives
Hematopoietic	Anemia, easy bruising, bleeding
Skin	Color change (jaundice), easy bruising, rash
Neurologic	Loss of consciousness, change in mentation
Lymphatic	Neck, axillary, groin masses, drainage
Musculoskeletal	Trauma, pain, stiffness, swelling, backache, tumors/lesions

Table 16-8. NONSPECIFIC SYMPTOMS AND THEIR INFECTIOUS DISEASE CORRELATES.

SYMPTOM	DISEASE
Abdominal pain (localized)	Appendicitis, abscess (peritoneal, subphrenic, of solid organs)
Abdominal pain (diffuse)	Peritonitis, gastroenteritis
Change in mentation	Meningitis (bacterial, fungal, viral, parasitic), anoxia (many etiologies)
Cough	Sinusitis, pharyngitis, bronchitis, pneumonia
Icterus	Many etiologies including hemolysis, liver/ biliary disease, malaria
Joint pain	Septic arthritis
Neck stiffness	Meningitis, osteomyelitis, soft tissue abscess
Pelvic pain	STD, PID
Photophobia	Meningitis
Pleurisy	Pleural effusion, irritation of diaphragm (abscess), pneumonia

Table 16-9. COMMON INFECTIOUS DISEASE SYNDROMES AND THEIR SYMPTOMS.

SYNDROME	SYMPTOMS
Sinusitis	Nasal discharge, cough, sinus pain, fever
Meningitis	Headache, photophobia, neck pain/stiffness, lethargy, fever, nausea, vomiting
Pneumonia	Fever, chills, rigors, headache, malaise, cough (may or may not be productive), hemoptysis, pleuritic chest pain, possible diarrhea, chest/back pain
Gastroenteritis	Fever, nausea, vomiting, variable abdominal pain (localized, diffuse, intermittent, colicky)

IX. PHYSICAL EXAMINATION (Table 16-10)

The physical examination of a patient with a febrile illness is no different from that of any other patient, with one exception: the need for empiric isolation precautions (Table 16-9). Because some infections are contagious, precautions may be needed to protect those who must interact with the patient.

A question that needs to be answered early in the triage of the febrile or infected patient is: "Does this patient have a disease that is

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Table 16-10. FINDINGS OF EXAMINATION AND POSSIBLE DIAGNOSES.

SYSTEM	PHYSICAL EXAMINATION FINDING	POSSIBLE DIAGNOSES
General	Chills	Septic shock (Gram-negative bacteria), localized infection, parasitemia
	Weight loss/emaciation	Undiagnosed abscess (e.g., subphrenic, perirenal, other deep seated), chronic infection (HIV, parasite)
Vital signs		
Pulse	Tachycardia	May be early sign of impending sepsis
Blood pressure	Hypotension	Septic shock
Respiratory rate	Tachypnea	Pneumonia
HEENT		
Eyes	Photophobia	Meningitis (e.g., viral, bacterial, fungal), syphilis
	Icterus	Many etiologies, including liver/biliary disease, hemolysis (malaria)
	Periorbital edema/redness	Periorbital cellulitis
	Injected conjunctivae	Conjunctivitis
	Failure to accommodate/react to light, weak extraocular muscles, ptosis	Botulism
	Corneal ulceration/lesions	Bacterial, viral, parasite (e.g., acanthamoeba)
	Subretinal hemorrhage	Trichinosis

Ears	Injected, immobile tympanic membranes	Otitis media
	Inflamed canal	Otitis externa
	Discharge	Bacterial, fungal, viral infection
	Periphararyngeal/peritonsillar mass	Retropharyngeal/peritonsillar abscess
	Tonsillar exudate	Pharyngitis (e.g., strep throat)
Mouth	Whitish coloration	Thrush
	Induration/edema floor of mouth	Infection of sublingual/submandibular space
	Petechiae, erythema soft palate	Scarlet fever
	Koplik's spots	Measles
	Beefy red tongue	Scarlet fever
	Membrane	Diphtheria
	Gingival edema/bleeding	Gingivitis (e.g., bacterial)
	Sit forward with protrusion of mandible	Epiglottitis
	Fluid in sinus (transillumination)	Sinusitis
	Unilateral pain/swelling with overlying redness	Suppurative parotitis
Face	Bilateral swelling/pain	Viral (e.g., mumps)
	Pain/stiffness in jaw (risus sardonicus)	Tetanus
	Disfigurement	Hansen's disease, Leishmaniasis
	Stiffness (e.g., Kernig's sign, Brudzinski's sign)	Meningitis, submastoid (Bezold's) abscess
	Pain tenderness/mass	Deep infection, osteomyelitis
	Thrombophlebitis jugular vein	Associated with Bezold's abscess
	Rales/rhonchi	Pulmonary edema (septic shock), bronchitis, pneumonia
	Dullness to percussion	Effusion, consolidation (e.g., pneumonia)
	Respiratory obstruction	Mediastinal abscess

Continued

Table 16-10. FINDINGS OF EXAMINATION AND POSSIBLE DIAGNOSES—cont'd

SYSTEM	PHYSICAL EXAMINATION FINDING	POSSIBLE DIAGNOSES
	Bronchophony, pectoriloquy, tracheal deviation	Pneumonia
	Left pleural effusion	Splenic/pancreatic/subphrenic abscess, pneumonia, empyema
	Right pleural effusion	Liver/subphrenic abscess, pneumonia, empyema, amebiasis
	Pain	Pneumonia, empyema, bronchitis
Chest	Friction rub	Pericarditis
Cardiovascular	New onset murmur	Endocarditis
	Decreased heart sounds	Tamponade (pericarditis)
Abdomen	Fluid wave	Peritonitis (e.g., spontaneous bacterial peritonitis [SBP])
	Pain, right lower quadrant (McBurney's point)	Appendicitis, abscess, PID
	Dullness to percussion	Ascites/peritonitis
	Mass, right upper quadrant	Liver abscess (e.g., amoebic, bacterial), echinococcal cyst, PID
	Rigidity	Peritonitis
	Hepatomegaly	Abscess
	Vague, variable, nonlocalized discomfort	Bacterial infection, "food poisoning" (e.g., enterotoxin), protozoal (e.g., Giardia)
	Splenomegaly	Abscess, parasitemia (e.g., malaria, schistosomiasis)
	Lower abdominal pain	Appendicitis, PID

	Distension	Organomegaly (e.g., abscess) some pneumonias, peritoneal effusion
	Rebound	
Flank	Pain	Peritonitis, appendicitis, gastroenteritis
Genitourinary	Perineal pain, tender prostate	Retroperitoneal abscess, pyelonephritis, gastroenteritis
Male	Urethral pain, meatal erythema	Prostatitis
	Testicular pain	STD
	Ulceration(s)	Epididymitis, STD
	Scrotal edema	STD
	Vaginal "fullness"/tenderness	Parasitemia (e.g., filariasis)
Female	Pelvic pain during examination/cervical movement	Retrofascial abscess
	Adnexal mass/fullness	PID
	Vulvar/vaginal/introitus erythema with or without white discoloration	Tuboovarian abscess (TOA)
	Vaginal discharge	Fungal (e.g., Candida)
	Ulceration(s)	Bacterial/fungal disease, STD, PID
	Cyanosis	STD, fungal, viral
Skin	Jaundice	Septic shock, pneumonia
	Redness, tenderness, swelling, heat	Hemolysis (e.g., septic shock), biliary disease (cholangitis), liver disease (e.g., abscess, cyst: amoebic, echinococcal, viral)
	Reddish streaks with lymphadenopathy	Dermal/subcutaneous infection
	Warts, papules	Lymphangitis
		Viral (e.g., HPV)

Continued

Table 16-10. FINDINGS OF EXAMINATION AND POSSIBLE DIAGNOSES—cont'd

SYSTEM	PHYSICAL EXAMINATION FINDING	POSSIBLE DIAGNOSES
	Erythematous lesions	Impetigo, pyoderma, cellulitis
	Ulceration	Viral (e.g., HSV), bacterial (e.g., septic thrombi)
	Petechiae	Endocarditis
	Red rash	Scarlet fever
	Red rash, exfoliative dermatitis	Scalded skin syndrome, toxic shock syndrome
	Erythematous papule—eschar	Anthrax
	Marbling/bronzing of skin	Clostridium
	Petechiae, hemorrhages	Waterhouse-Friderichsen syndrome, DIC associated with sepsis
	Annular lesions	Lyme disease
	Targetoid rash on palms/soles	Syphilis (secondary)
	Maculopapular rash	Viral exanthems, trichinosis
	Vesicles (diffuse, dermatome distribution)	HSV, VZV
	Large skin folds	Onchocerciasis
	Lymphadenopathy	Infection of draining area, lymphangitis, parasitemia
Lymphatics	Suppurative lymphadenitis in groin	Lymphogranuloma venereum (LGV)
	Mass	Abscess
Extremities	Joint pain, swelling, redness	Septic arthritis
	Crepitus	Infection with gas-producing organism (emergency)

Paronychia	Infection around nail
Bone pain	Osteomyelitis
Exquisite tenderness in distribution of tendon sheath/compartments with flexion	Suppurative tenosynovitis
Hip/thigh pain, paresthesias	Retropsoas abscess
Inguinal/iliac crest pain, pain with movement of hip	Retrofascial abscess
Hyperreflexia	Tetanus
Progressive weakness—paralysis	Botulism, viral (e.g., polio)
Reduced reflexes	Botulism
Massive edema	Parasitemia (e.g., filariasis)
Severe pain, edema (compartment syndrome)	Gas gangrene (e.g., Clostridia)
Splinter hemorrhages (nail)	Endocarditis, trichinosis
Mental status changes	Meningitis, septic shock, parasitemia (e.g., Chagas' disease, trypanosomiasis), ruptured abscess
Neurologic	Lyme disease
Radiculopathy, cranial neuritis	Lyme disease
Chorea	Perirectal abscess
Perirectal mass/pain, fistula(s)	Retrofascial abscess
Fullness/tenderness	Suprlevator (ischioanal) abscess
Vague to severe pelvic pain, relieved with defecation, anal/coccygeal pain	Proctitis (e.g., STD; bacterial, viral)
Erythema, exudates, ulceration, mucosal bleeding	

potentially transmissible, and thus should isolation precautions be initiated?"

X. LABORATORY STUDIES AND DIAGNOSTIC EVALUATIONS

A. Diagnostic Studies: Microbiologic cultures, in particular, are an integral part of the work-up of a patient with a suspected infection.

1. It is important to be familiar with the unique capabilities of your hospital laboratory and to communicate directly with laboratory personnel about your differential diagnosis.
 - a. Some infections require unique methods of detection, and you must convey your suspicions to the laboratory personnel. For example, if you suspect a skin infection is caused by *Mycobacterium marinum*, the specimen should be cultured at 30°C to optimize growth.
 - b. You should also alert lab personnel if you suspect the patient's infection is caused by an etiologic agent that may pose a danger to lab personnel if cultured (e.g., coccidioidomycosis).
2. The diagnosis of an infection is typically made by the following method:
 - a. Direct examination of a clinical specimen.
 - b. Isolation of the microorganism(s).
 - c. Measurement of the host's immune response to the organism.
3. The proper collection, transport, and handling of specimens are critical to obtaining useful information (Table 16-11). The goal of proper specimen collection and handling is to minimize extrinsic contamination while facilitating growth of the pathogen.

B. Radiologic Studies: These may be critical for arriving at a correct diagnosis (chest x-ray for pneumonia, abdominal CT for abscess).

C. Routine Tests: In hospitalized patients with community-acquired pneumonia.

1. Chest radiograph.
2. Arterial blood gas (ABG) analysis.
3. Complete blood count (CBC).
4. Chemistry profile, including kidney and liver function tests (LFTs) and electrolyte levels.
5. HIV serology (age 15 to 54 years).
6. Blood culture.
7. Sputum Gram stain and culture +/- acid-fast stain and culture, Legionella test (culture, direct fluorescent antibody stain, or urinary antigen assay), Mycoplasma immunoglobulin M.
8. Pleural fluid analysis (if present): White blood cell (WBC) count and differential, lactate dehydrogenase (LDH), pH, protein, glucose, Gram stain, acid-fast stain; and culture for bacteria (aerobes and anaerobes), fungi, and mycobacteria.

Text continued on p. 299.

Table 16-11. SPECIMEN COLLECTION AND TRANSPORT FOR BACTERIOLOGY.

SPECIMEN	COLLECTION AND TRANSPORT	COMMENT
<i>BLOOD</i>		
Adults		
1.	10 mL into each of two 100-mL vacuum bottles <i>or</i>	
2.	5 mL into each of two 50-mL vacuum bottles and 10 mL into isolator, <i>or</i>	
3.	10 mL into one 100-mL vacuum bottle and 10 mL into isolator	
4.	10 mL into each of two BACTEC high-volume resin resin bottles	
Infants		
1.	1-3 mL into each of two 50- or 100-mL vacuum bottles, <i>or</i>	A minimum of two and a maximum of four cultures per septic episode are recommended
2.	0.5-1.0 mL into pediatric isolator and any remaining blood into 50- or 100-mL vacuum bottle	
Intravascular catheter	Remove catheter aseptically, clip one (from 2- to 3-inch catheter) or two (from 8- to 24-inch catheter) 2-inch segments, and transfer into swab transport device (Culturette)	Catheter segments should be cultured semi-quantitatively
Exudate (transudate, drainage, ulcer)	Swab or sterile, screw-capped tube	Such specimens are rarely suitable for anaerobic culture
Feces	Freshly passed specimen in sealed container or rectal swab	Transport medium is recommended if delay is anticipated

Continued

Table 16-11. SPECIMEN COLLECTION AND TRANSPORT FOR BACTERIOLOGY—cont'd

SPECIMEN	COLLECTION AND TRANSPORT	COMMENT
<i>FLUIDS</i>		
Cerebrospinal fluid (CSF)	Sterile, screw-capped tube to be delivered to the laboratory immediately	Refrigeration may be harmful to <i>Neisseria</i> or <i>Haemophilus</i>
Peritoneal (including dialysate)	Inoculate 10 mL into blood culture bottles	Direct inoculation of blood culture systems has increased yield of bacteria from patients with spontaneous peritonitis and continuous ambulatory peritoneal dialysis-associated peritonitis
Pleural	Inoculate a portion of the specimen into an anaerobic transport system	Pleural or empyema fluid is a major source of anaerobic bacteria causing pleuropulmonary infection
GENITOURINARY SYSTEM		
For <i>Neisseria gonorrhoeae</i>	Send swab moistened with Stuart or Amies transport medium directly to laboratory (4-hour maximum transport time) or directly inoculate modified Thayer Martin medium into Transgrow or JEMBEC device	<p>Women Cervix: Moisten speculum with water before inserting into vagina; insert swab into cervical canal Anal swab: Insert swab approximately 2 cm and move from side to side to sample crypts</p> <p>Men Urethra: Swab may be used when a discharge is present; otherwise, a sterile bacteriologic loop is inserted to obtain scrapings for smear and culture Anal swab: Same procedure as for women</p>

Cervix, vagina, for other bacteria	Swab	Specimens from these sites are not suitable for anaerobic culture
<i>URINE</i>		
Midstream catheter	Collect in sterile, screw-capped container, which must be transported to the laboratory within 2 hours unless refrigerated	
Suprapubic aspirate	Inject portion of aspirate into an anaerobic transport tube or vial	This is the only type of urine specimen that is acceptable for anaerobic culture
Abscess, traumatic or postoperative wound	Aspirate pus with syringe and needle and transport to laboratory by injecting aspirate into an anaerobic transport vial or taking syringe directly to the laboratory	A swab provides too little material for Gram-stained smear or aerobic and anaerobic cultures. If the amount of pus is limited, one may inject the area with 0.5 to 1.0 mL bacteriostat-free lactated Ringer's, and aspirate material
<i>RESPIRATORY TRACT</i>		
For <i>Bordetella pertussis</i>	Use flexible-wire, calcium-tipped swab or soft rubber catheter to obtain nasopharyngeal specimen	Cough plate is not recommended
Throat	Swab posterior pharynx, tonsils, any areas of purulence or ulceration; dry swab acceptable if cultured within 2 hours; otherwise, moisten swab with Stuart or Amies transport medium	Avoid contamination with oral secretions. Ordinarily, testing for group A streptococci is sufficient. The laboratory must be notified in case of suspected diphtheria, pertussis, or gonococcal infection

Continued

Table 16-11. SPECIMEN COLLECTION AND TRANSPORT FOR BACTERIOLOGY—cont'd

SPECIMEN	COLLECTION AND TRANSPORT	COMMENT
<i>RESPIRATORY TRACT</i>		
Sputum	Obtain specimen by expectorating a deep cough into a sterile, screw-capped jar	Specimens should be screened cytologically and another specimen requested when >25 squamous epithelial cells are observed per low-power field
Transtracheal aspirate	Collect aspirate in a Lukens trap or inject into an anaerobic transport vial	Such specimens are suitable for anaerobic culture
Protected brush	The brush is severed from the inner cannula and transported to the laboratory in 1 mL of bacteriostatic free lactated Ringer's solution	Quantitative culture of the vortexed lactated Ringer's solution helps differentiate upper from lower respiratory tract bacterial origin
Bronchoalveolar lavage (BAL)	Obtain at least 40 mL for complete microbiologic examination	Cytocentrifuge smears should be made for Gram and other appropriate stains. Quantitative culture will help differentiate upper from lower respiratory tract bacterial origin
Tissue	Sterile, screw-capped container	A sufficient amount of tissue must be obtained for both histopathologic and microbiologic examinations

* Reproduced with permission from Isenberg HD. Clinical microbiology. In Gorbach SL, Bartlett JG, Blacklow NR (eds), Infectious Diseases, ed 2. Philadelphia: WB Saunders, 1998;125.

XI. EPONYMS, ACRONYMS, AND ABBREVIATIONS (Tables 16-12 and 16-13)

Table 16-12. SELECTED INFECTIOUS DISEASE-FOCUSED EPONYMS.

EPONYM	DESCRIPTION	ASSOCIATION(S)
Bezold's abscess	Abscess associated with mastoid disease	Mastoiditis
Biederman's sign	Dark red coloration of the anterior pillars of the throat	Seen in some patients with syphilis
Borsieri's sign (line)	When fingernail drawn along skin, a white line is left, which quickly turns red.	Associated with early stages of scarlet fever
Brudzinski's sign	Flexion of the neck results in flexion of the hip and knee	Associated with meningitis
Brunati's sign	Opacities in the cornea	Appearance in the course of pneumonia or typhoid fever
Clavicular sign	Tumefaction of the inner third of the right clavicle	Associated with congenital syphilis
Filopovitch's (palmoplantar) sign	Yellow discoloration of the prominent parts of the palms/soles	Seen with typhoid fever
Guillard's sign	Brisk flexion of the hip when contralateral quadriceps are pinched	Associated with meningeal irritation
Hatchcock's sign	Tenderness on running finger toward angle of the jaw	Associated with mumps
Jackson's sign	Prolongation of expiratory sound over affected area	Pulmonary tuberculosis
Horn's sign	Pain produced on traction of right spermatic cord	Associated with appendicitis
Kernig's sign	When lying with knee on abdomen or when sitting, the leg cannot be completely extended	Associated with meningitis
Koplik's spots	Bright red spots on buccal/lingual mucosa	Measles
Lenhoff's sign	Furrow appearing on deep inspiration below the lowest rib and above cyst in liver	Echinococcal cyst of liver

Continued

Table 16-12. SELECTED INFECTIOUS DISEASE-FOCUSED EPONYMS—cont'd

EPONYM	DESCRIPTION	ASSOCIATION(S)
McBurney's sign	Tenderness at a point two thirds of the distance from the umbilicus to the anterior superior spine of the ilium	Associated with appendicitis
Murat's sign	Vibration of the affected side of the chest with a feeling of discomfort when speaking	Associated with tuberculosis
Obturator sign	Hypogastric/adductor pain by passive internal rotation of the flexed thigh	Associated with appendicitis
Osler's sign	Painful, small erythematous swellings in the skin of the hands and feet	Associated with endocarditis
Parrot's sign	Dilation of the pupils when skin on the back of the neck is pinched	Seen with meningitis
Romberg's sign	Swaying of the body or falling when standing with feet close together and eyes closed	Seen with tabes dorsalis
Skoda's sign	Tympanic sound heard on percussing chest above large pleural effusion or lung consolidation	Pneumonia
Squire's sign	Alternate dilation and contraction of the pupil	Basilar meningitis
Waterhouse-Friderichsen	Meningitis with sudden onset, short course of fever, coma, collapse, cyanosis, petechial hemorrhages of skin and mucous membranes	Meningitis associated with bilateral adrenal hemorrhage (e.g., meningococcal disease)
Weill's sign	Absence of expansion in the subclavicular region of the affected side	Infantile pneumonia

Table 16-13. SELECTED INFECTIOUS DISEASE-FOCUSED ACRONYMS AND ABBREVIATIONS.

ACRONYM OR ABBREVIATION	TERM	ACRONYM OR ABBREVIATION	TERM
AIDS	Acquired immunodeficiency syndrome	HIV	Human immunodeficiency virus
ARDS	Adult respiratory distress syndrome	HSV	Herpes simplex virus
BAL	Bronchoalveolar lavage	MAC	Mycobacterium avium intracellulare complex
BCG	Bacilli Calmette-Guerin vaccine	MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
CGD	Chronic granulomatous disease	PCP	<i>Pneumocystis carinii</i>
CMV	Cytomegalovirus	PID	Pelvic inflammatory disease
CJD	Creutzfeldt-Jakob disease	PML	Progressive multifocal leukoencephalopathy
CVAT	Costovertebral angle tenderness	RPR	Rapid plasma reagin (serologic test for syphilis)
EBV	Epstein-Barr virus	RSV	Respiratory syncytial virus
EHEC	Enterohemorrhagic <i>E. coli</i>	SBP	Spontaneous bacterial peritonitis
EIA	Enzyme immunoassay	SCIDS	Severe combined immune deficiency syndrome
ELISA	Enzyme-linked immunosorbent assay	SIRS	Systemic inflammatory response syndrome
FUO	Fever of unknown origin	STD	Sexually transmitted disease
GVHD	Graft versus host disease	TMP-SMX	Trimethoprim sulfamethoxazole
HUS	Hemolytic uremic syndrome	UTI	Urinary tract infection
HAV, HBV, HCV	Hepatitis A, B, and C virus	VRE	Vancomycin-resistant enterococcus
		VZV	Varicella Zoster virus

XII. DEFINITIONS (Table 16-14)

Table 16-14. INFECTIOUS DISEASE-FOCUSED DEFINITIONS.

TERM	DEFINITION
Bacteremia	Bacteria present in blood, as confirmed by culture; may be transient
Hypotension	A systolic blood pressure of <90 mmHg or a reduction of >40 mmHg from baseline in the absence of another known cause for hypotension
Infection	Presence of an organism in a normally sterile site that is usually, but not necessarily, accompanied by an inflammatory host response
Refractory septic shock	Septic shock that lasts for more than 1 hour and does not respond to fluid administration or pharmacologic intervention
Sepsis	Describes the inflammatory response to infection. See clinical evidence of infection and evidence of systemic response, manifested by two or more of the following conditions: Temperature >38°C (100.4°F) or <36°C (96.8°F) Heart rate >90 beats per minute Respiratory rate >20 breaths/minute or arterial carbon dioxide tension of <32 mm White blood cell (WBC) count: >12,000 cells/mm ³ , <4000 cells/mm ³ , or >10% immature band forms These changes should represent an acute alteration from baseline in the absence of another known cause for the abnormalities
Sepsis syndrome	Sepsis plus evidence of altered organ perfusion, with at least one of the following: Hypoxemia, elevated lactate, oliguria, altered mentation
Septicemia	Same as bacteremia, but implies greater severity
Septic shock	Sepsis with hypotension despite adequate fluid resuscitation, with the presence of perfusion abnormalities that may include, but are not limited to, lactic acidosis, oliguria, or an acute alteration in mental status. Patients who are receiving inotropic or vasopressor agents may not be hypotensive at the time that perfusion abnormalities are measured

Table 16-14—cont'd

TERM	DEFINITION
Severe sepsis	Sepsis associated with organ dysfunction, hypoperfusion, or hypotension. Hypoperfusion and perfusion abnormalities may include, but are not limited to, lactic acidosis, oliguria, or altered mental status
Systemic inflammatory response syndrome	Response to a wide variety of clinical insults, which can be infectious, as in sepsis, but can be noninfectious in etiology (e.g., burns, pancreatitis)

Table adapted with permission from Young LS. Sepsis syndrome. In Mandell GL, Bennett JE, Dolin R (eds), *Principles and Practice of Infectious Diseases*, ed 5. Philadelphia: Churchill Livingstone, 2000; 690.

XIII. SAMPLE H&P WRITE-UP

CC: “I’ve got the worst headache of my life.”

HPI: J.R. is an 18-year-old white male college student who presents with an acute onset of the worst headache of his life. He was in his usual state of excellent health until 12 hours before admission, when he developed fever, headache, and stiff neck.

PMHx: The patient denies any chronic medical problems. He states that two other students in his dormitory have similar symptoms and are being evaluated in the emergency room.

PSHx: History of an automobile accident at age 16, during which he suffered a ruptured spleen and required a splenectomy. No other hospitalizations or surgeries.

Emergency and Trauma History: No history of head trauma. No prior transfusions.

Childhood History: Varicella at age 7. He denies any other childhood illnesses.

Occupational History: Freshman in college; works at a local fast-food restaurant as a cook.

Travel History: No recent or remote history of travel.

Sexual History: Reports monogamous relationship with healthy female student.

MEDICATIONS: Ibuprofen during the past day for headache and fever. He has not taken any other medications. The patient denies any known allergies.

HEALTH MAINTENANCE

Prevention: The patient received all of the usual childhood immunizations. He does not recall receiving any additional immunizations following his splenectomy.

Diet: Regular diet with no restrictions. Eats meals in college cafeteria and at fast-food restaurant where employed. No ingestion of raw meats.

Exercise: The patient is on the college track team.

Sleep Patterns: Wakes at most once each night to void. Denies recent changes.

Social Habits: The patient denies tobacco use or illicit drug use. Drinks approximately one six-pack of beer per weekend.

FAMILY HISTORY

First-Degree Relatives' Medical History: The patient's father has hypertension and adult-onset diabetes mellitus. The patient's mother has a history of intermittent migraine headaches that respond well to medication. The patient's two siblings have no medical problems.

PSYCHOSOCIAL HISTORY

Personal and Social History: The patient is a white college student who lives in the freshman dormitory.

REVIEW OF SYSTEMS

General: Fever, chills, rigors, and severe headache over past 12 hours.

HEENT/Neck: Positive for headache, photophobia. No discharge, difficulty swallowing, or drainage in back of throat.

Respiratory: Denies cough or dyspnea.

Cardiovascular: No chest pain, dyspnea, or history of murmur.

Gastrointestinal: Mild abdominal pain "all over" without radiation. Reports several episodes of emesis after headache began. No diarrhea.

Genitourinary: No dysuria, urinary urgency, hematuria, or discharge.

Hematopoietic/Lymphatic: No bleeding or adenopathy.

Neurologic: No loss of consciousness (LOC) or change in mentation.

Skin: New onset of rash on legs and lower abdomen.

Musculoskeletal: Recent neck stiffness.

PHYSICAL EXAMINATION

Vitals: T (oral) 102°F P 99 BP 90/60 RR 22 Weight 170 lbs.

General: Agitated, well-developed, well-nourished Caucasian male who appears his stated age. Patient is oriented to person, place, time, and circumstances, but appears in moderate distress secondary to headache.

HEENT: Head is normocephalic without palpable defects. Mild sinus tenderness on percussion. Lids/sclera normal. Conjunctivae slightly injected. Pupils measure 3mm bilaterally and react symmetrically to light. Photophobia present. Tympanic membranes are clear and mobile. Nares are patent with slight mucosal erythema and clear nasal discharge. Neck stiff with limited range of motion. Positive Kernig's and Brudzinski's signs. Trachea normal position. No JVD.

Tonsils slightly injected but otherwise within normal limits. No adenopathy appreciated.

Lungs: Clear to auscultation bilaterally.

Cardiovascular: Normal S1 and S2. Regular rate and rhythm. No JVD, murmur.

Abdomen: Well-healed surgical scar in the left upper quadrant. Soft with diffuse mild tenderness and no localizing signs. No organomegaly, flank pain (CVAT), or suprapubic tenderness.

Genitalia: Normal circumcised male. No penile lesions/discharge, testicular pain, or masses.

Rectum/Prostate: Normal external appearance. Guaiac negative. Prostate normal size with no tenderness on palpation.

Extremities: Normal range of motion. No weakness or muscle tenderness.

Skin: Multiple purpuric lesions noted on both lower extremities and lower abdomen.

Lymphadenopathy: “Fullness” noted bilateral neck (anterior cervical), but otherwise no adenopathy.

Neurologic: Normal mental status examination and gait.