Common Infections in Primary Care

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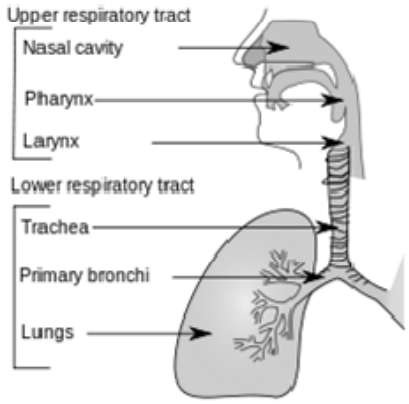
Part 1: Infections of the Respiratory Tract

- **Diagnosis and management of:**
  - **URI**
  - **Pharyngitis**
  - **Otitis Media**
  - **Sinusitis**
  - **Bronchitis**
  - **Pneumonia**
  - **Influenza**

Part 1: Infections of the Respiratory Tract



Source: http://cancer.gov Author: Lord Akryl

CASE 1

- **42 year old female with a "head cold" for 4 days. She has a sore throat and clear rhinorrhea. Over the last 24 hours she developed a hacking cough productive of green sputum.**
- **This is her third "head cold" this year. She is concerned that she has a "bad immune system"**

CASE 1 (cont)

- **Physical Exam:**
  - **T: Afebrile HR 84 BP 122/76**
  - **HEENT: hyperemic nasal mucosa, OP with mild erythema, TM's clear**
  - **Lungs: CTA B**
  - **The rest of the exam is unremarkable**

CASE 1 (cont)

- **What is the appropriate management?**

  a) **Diagnose bronchitis and prescribe an antibiotic**
  b) **Re-assure and recommend decongestants and first-generation antihistimines**
  c) **Evaluate for an underlying cause of her multiple colds**
  d) **Recommend Echinacea and zinc to reduce the duration of symptoms**

CASE 1 (cont)

- What is the appropriate management?

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URI

- Epidemiology
  - "Common cold"
  - No localizing features
  - Average: 2 to 4 per year
  - Fall and winter – peak incidence
  - 25 million individuals received care (1998)
  - 20 million days of work missed (1998)

URI

- Microbiology
  - Rhinovirus - 50%
  - Coronovirus – 18%
  - Influenza – 7%
  - RSV – 5%
  - Parainfluenza
  - Adenovirus
  - Enterovirus

URI

- Symptoms
  - Sore throat
  - Sneezing/coughing
  - Nasal congestion/discharge – green/yellow
  - Headache
  - Sinus pressure
  - Malaise

URI

- Symptoms
  - Purulent sputum and phlegm are not necessarily associated with bacterial infection…
  - Symptoms peak in 3-5 days – may last for 10 days…
  - Cough may persist for several weeks…

URI

- Risk factors
  - Psychological stress
  - Poor hand hygiene – fomites
  - NOT smoking… or asthma… or COPD…

URI

- **Management**
  - **Oral/nasal decongestants**
  - **First-generation antihistamines**
  - **NSAIDs**

  - **…NOT antibiotics**
  - **…No evidence with vitamin C, zinc, Echinacea**

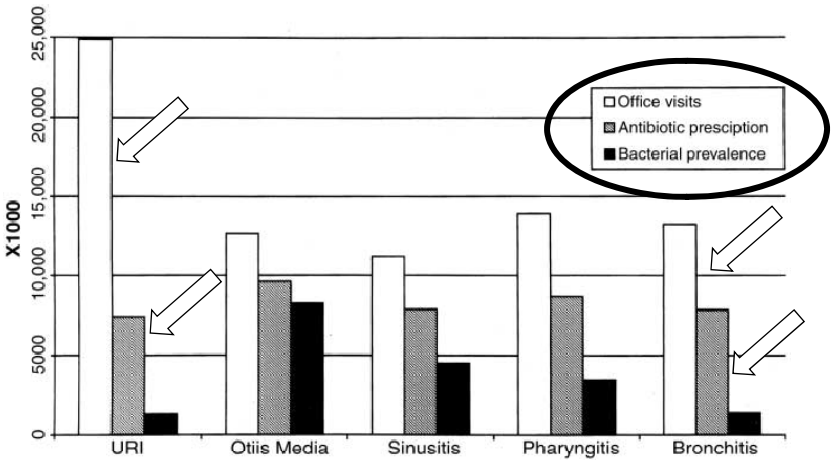

Figure 1. Primary care office visits and antibiotic prescriptions for acute respiratory illnesses in the United States (National Ambulatory Medical Care Survey, 1998). The white bars show estimates of the number of ambulatory office visits for each condition, the shaded bars show the proportion of patients who made an office visit for each condition who were prescribed an antibiotic, and the black bars show estimates of the proportion of cases of each condition likely to be associated with pathogenic bacteria (see table 1 and text).

Excess Antibiotic Use • CID 2001:33 (15 September) • 759

Pharyngitis

- Viral causes (90%)
  - Rhinovirus
  - Coronavirus
  - Adenovirus
  - EBV, Coxsackievirus, HSV, HIV
- Suggested by cough, hoarseness, rhinorrhea, conjunctivitis, rash, diarrhea, stomatitis

Pharyngitis

- Bacterial causes (10%)
  - GABHS (Strep pyogenes)
  - Group C and G strep
  - Neisseria gonorrhoeae
  - Corynebacterium diphtheriae
  - Mycoplasma pneumoniae
  - Chlamydia trachomatis

Pharyngitis

- Complications
  - GABHS - ARF (may delay dx up to 9 days)
  - GABHS - post-strep GN
  - GABHS - peritonsillar abscess, lymphadenitis, mastoiditis, sinusitis, otitis media
  - Lemierre's syndrome - *Fusobacterium necrophorum*

Pharyngitis

- Centor criteria
  - Temperature ≥ 38 C
  - Tonsillar exudate
  - Tender cervical adenopathy
  - No cough or rhinitis

- 2 or 3 = RSAT; Abx if positive
- 4 = Abx… or RSAT; Abx if positive

Strep Pharyngitis

Pharyngitis

- Management
  - Symptomatic: rest, fluids, NSAIDs, salt water gargles, menthol lozenges
  - Antibiotics if Strep: 10 day course
    - PCN
    - Amoxicillin
    - Macrolides

Otitis Media

- Most frequent diagnosis in sick children visiting PCP
- 1/3 of antibiotic scripts written for children
- Persistent middle ear effusion: 10% for up to 3 months

Otitis Media

- Treatment:
  - Analgesics
    - ibuprofen/acetaminophen
    - Benzocaine > 2 years old
  - NOT decongestants or antihistamines
  - Antibiotics???

Otitis Media

- Antibiotics?
  - < 2 years old
  - Bilateral or otorrhea
  - Otherwise, watchful waiting is acceptable
- Amoxicillin
- Macrolide if penicillin allergic

Sinusitis

- Epidemiology
  - CT: 87% of URI – maxillary sinus abnormality
  - Bacterial sinusitis < 2% URI
  - Complications occur 1 per 10,000 cases

Sinusitis

- **Symptoms**
  - **Nasal congestion**
  - **Purulent nasal discharge**
  - **Headache**
  - **Maxillary tooth pain**
  - **Facial pain**
  - **Malaise**

Sinusitis

- **Microbiology**
  - **Rhinovirus, Coronavirus, Adenovirus, Parainfluenza**
  - ***Strep pneumo, Haemophilus, Moraxella, Staph aureus***
  - ***Aspergillus, Mucor, Rhizopus***

Sinusitis

- Symptoms suggestive of bacterial sinusitis
  - Symptoms > 7 days
  - Maxillary tooth pain
  - Unilateral facial pain
  - Unilateral sinus tenderness
  - Fever
  - Purulent nasal discharge
  - Worsening Sx after initial improvement

Sinusitis

- Treatment
  - Symptomatic:
    - NSAIDs
    - Antihistamines (1st generation)
    - Corticosteroid nasal spray
    - ? Decongestants and saline nasal spray
  - Antibiotics:
    - Amoxicillin, doxycycline, Bactrim 10 to 14 days

Bronchitis

- Epidemiology
  - 70% of primary care visits for new onset cough
  - 5% of new onset cough - underlying pneumonia

Bronchitis

- Symptoms
  - URI – persistence of cough
  - May last for 2 weeks
  - Cough – productive vs. non-productive
  - Nasal congestion

Bronchitis

- Treatment
  - Beta agonists
  - NSAIDs
  - Antihistamines (1st generation)
  - Decongestants
  - ? Cough suppressants

Bronchitis

- Differential diagnosis
  - Pneumonia – fever, tachycardia, tachypnea, evidence of consolidation
  - Asthma
  - GERD
  - Pertussis:
    - Catarrhal phase – URTI
    - Paroxysmal phase – 3 to 6 weeks of cough
    - Convalescent phase – months of cough resolution

Community Acquired Pneumonia

- Common Pathogens:
  - S. pneumoniae
  - Mycoplasma pneumoniae
  - Chlamydophila pneumonia
  - Respiratory viruses
  - Legionaella and Haemophilus…

Community Acquired Pneumonia

- Risk Factors for drug resistant S. pneumoniae:
  - >65 years old
  - Abx within the last 3-6 months
  - Alcoholism
  - Medical comorbidities
  - Immunosuppression
  - Child daycare exposure

Community Acquired Pneumonia

- IDSA/ATS Guidelines to empiric outpatient treatment of CAP:
  - 1. Healthy and no Abx history:
    - Macrolide OR Doxycycline
  - 2. Comorbidities or Abx history:
    - Fluoroquinolone OR Beta-lactam + macrolide
  - 3. Regions with known resistance:
    - See above

Community Acquired Pneumonia

- Outpatient vs. Inpatient?
- Risk stratification tools:
  - Pneumonia Severity Index (PSI)
  - CURB-65

PSI

Step 1: Stratify to Risk Class I vs. Risk Classes II-V	
Presence of:	
Over 50 years of age	Yes/No
Altered mental status	Yes/No
Pulse ≥125/minute	Yes/No
Respiratory rate >30/minute	Yes/No
Systolic blood pressure <90 mm Hg	Yes/No
Temperature <35°C or ≥40°C	Yes/No
History of:	
Neoplastic disease	Yes/No
Congestive heart failure	Yes/No
Cerebrovascular disease	Yes/No
Renal disease	Yes/No
Liver disease	Yes/No
If any "Yes", then proceed to Step 2	
If all "No" then assign to **Risk Class I**	

http://en.wikipedia.org/wiki/Pneumonia_severity_index

PSI

Step 2: Stratify to Risk Class II vs III vs IV vs V	
Demographics	**Points Assigned**
If Male	+Age (yr)
If Female	+Age (yr) - 10
Nursing home resident	+10
Comorbidity	
Neoplastic disease	+30
Liver disease	+20
Congestive heart failure	+10
Cerebrovascular disease	+10
Renal disease	+10
Physical Exam Findings	
Altered mental status	+20
Pulse ≥125/minute	+10
Respiratory rate >30/minute	+20
Systolic blood pressure <90 mm Hg	+20
Temperature <35°C or ≥40°C	+15

Lab and Radiographic Findings	
Arterial pH <7.35	+30
Blood urea nitrogen ≥30 mg/dl (9 mmol/liter)	+20
Sodium <130 mmol/liter	+20
Glucose ≥250 mg/dl (14 mmol/liter)	+10
Hematocrit <30%	+10
Partial pressure of arterial O2 <60mmHg	+10
Pleural effusion	+10
∑ <70 = **Risk Class II**	
∑ 71-90 = **Risk Class III**	
∑ 91-130 = **Risk Class IV**	
∑ >130 = **Risk Class V**	

http://en.wikipedia.org/wiki/Pneumonia_severity_index

PSI

PSI Derivation and Validation Data [edit]

	Medisgroup Study (1989)				PORT Validation Study (1991) Cohort					
	Derivation Cohort		Validation Cohort		Inpatients		Outpatients		All Patients	
Risk Class	no. of pts	% died	no. of pts	% died	no. of pts	% died	no. of pts	% died	no. of pts	% died
I	1,372	0.4	3,034	0.1	185	0.5	587	0.0	772	0.1
II (<70)	2,412	0.7	5,778	0.6	233	0.9	244	0.4	477	0.6
III (71–90)	2,632	2.8	6,790	2.8	254	1.2	72	0.0	326	0.9
IV (91–130)	4,697	8.5	13,104	8.2	446	9.0	40	12.5	486	9.3
V (>130)	3,086	31.1	9,333	29.2	225	27.1	1	0.0	226	27.0
Total	**14,199**	10.2	**38,039**	10.6	**1343**	8.0	**944**	0.6	**2287**	5.2

Note: % Died refers to 30-day mortality.

http://en.wikipedia.org/wiki/Pneumonia_severity_index

CURB-65

- **Score:**
  - **0-1: Outpatient**
  - **2: Hospital**
  - **>3: ICU assessment**

CURB65	
Symptom	**Points**
Confusion	1
Urea>7mmol/l	1
Respiratory rate>30	1
S**B**P<90mmHg, D**B**P<60mmHg	1
Age>=**65**	1

http://en.wikipedia.org/wiki/CURB-65

Influenza

- Epidemiology
  - 20% of population affected each season
  - 50,000 annual deaths in the U.S.
  - Aerosolized secretions – spread
  - Glycoproteins – hemagglutinin & neuraminidase
  - Antigenic drift – small mutations of HA/NA
  - Antigenic shift – gene reassortment… pandemics

Influenza

- Symptoms: <u>abrupt onset</u>
  - Fever
  - Myalgias
  - Malaise
  - Non-productive cough and sore throat
  - Delirium
  - Rash

Influenza

- Examination
  - Flushed face
  - Hyperemic mucosal membranes
  - Tender lymphadenopathy
  - Clear nasal discharge
  - Rales/rhonchi (<20%)

Influenza

- Diagnosis
  - October to April
  - Nasopharyngeal aspirate
    - Rapid immunologic test (viral antigen)
    - Viral culture – 5 to 7 days

Influenza

- EBV
  - Fever, sore throat, lymphadenopathy
  - Splenomegaly, hepatitis, atypical lymphs, Heterophile antibody testing
- Acute HIV seroconversion
  - Fever, fatigue, maculopapular rash, LAD, pharyngitis
  - HIV RNA viral load and ELISA for HIV Ab's
- URTI

Influenza

- Treatment: within 24 hours… 48 hours…
  - Amantidine and rimantadine
    - Ion channel
    - Influenza A
    - Resistance
  - Zanamivir (inhaled) and oseltamivir
    - Neuraminidase inhibitor
    - Influenza A and B

Influenza

- Prevention
  - Vaccination
  - Chemoprophylaxis
    - During week of peak activity
    - ECF's
    - Immune deficiency
    - Late vaccination

Influenza

- Complications
  - Secondary bacterial pneumonia
    - Pneumococcus, Haemophilus, Staph
  - Cardiovascular mortality

Part 2: Other Common Infections

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Common Infections in Primary Care

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Case #1

- **63 year old female with diabetes with long standing history of lower extremity swelling and faint redness who presents with increased redness of right leg with some increase in warmth. She does feels a little more tired and her blood glucose is in the 160's which is not normal for her.**
- **What should you do next?**

Cellulitis and Abcesses

- In all, 14.2 million Americans visited primary care physicians, hospital outpatient departments, and emergency services with skin and soft tissue infections in 2005.
- Both erysipelas and cellulitis are manifested clinically by rapidly spreading areas of edema, redness, and heat, sometimes accompanied by lymphangitis and inflammation of the regional lymph nodes
- Cutaneous abscesses are collections of pus within the dermis and deeper skin tissues. They are usually painful, tender, and fluctuant red nodules, often surmounted by a pustule and surrounded by a rim of erythematous swelling

BMJ 2012;345:e4955
Clinical Infectious Diseases 2005; 41:1373–406

Pathogens and Risk Factors for Cellulitis

- A prospective study demonstrated that the majority of *S. aureus* infections in the US are now methicillin resistant; among 389 blood culture isolates of *S aureus*, 63% (244) were CA-MRSA
- In OSU about half of isolates at UH and about 2/3 of isolates at UHE were MRSA.
- General systemic risk factors include venous insufficiency, regarded to be the most frequent 19; lymphoedema, peripheral vascular disease; diabetes mellitus; and obesity.
- Local factors include tinea pedis, ulcers, trauma, and insect bites.

King MD, Humphrey BJ, Wang YF, Kourbatova EV, Ray SM, Blumberg HM. Emergence of community-acquired methicillin-resistant Staphylococcus aureus USA 300 clone at the predominant cause of skin and soft-tissue infections. *Ann Intern Med* 2006;144:309-17.
Halpern J, Holder R, Langford NJ. Ethnicity and other risk factors for acute lower limb cellulitis: a UK-based prospective case-control study. *Br J Dermatol* 2008;158:1288-92.
Cox NH, Colver GB, Paterson WD. Management and morbidity of cellulitis of the leg. *JR Soc Med* 1998;91:634
https://onesource.osumc.edu/departments/Epidemiology/Documents/BugsAndDrugs/ED_STAU.pdf accessed June 13, 2013

Additional testing in cellulitis

- **Blood cultures are positive in low percentage even in hospitalized patients**
- **Ultrasound is beneficial to rule out DVT or deep abscess.**

Tayal VS, Hasan N, Norton HJ, Tomaszewski CA. The effect of soft-tissue ultrasound on the management of cellulitis in the emergency department. *Acad Emerg Med*2006;13:384-8.

Treatment of Cellulitis

- **General measures include rest, elevation of any affected limbs, and analgesia. The area of cellulitis should be clearly marked and reviewed daily for progression or regression to assess the efficacy of the antibiotic regimen.**
- **Duration of therapy is about 7 days, depending on the clinical response.**

Antibiotics in Cellulitis

Linezolid	A: 600 mg twice per day oral C: 10 mg/kg every 12 h po	Bacteriostatic; No Cross-resistance, expensive
Clindamycin	A:300–450 mg 3 times per day po C: 10–20 mg/kg/day in 3 divided doses po	potential of cross-resistance and emergence of resistance in erythromycin-resistant strains; inducible resistance in MRSA

Antibiotics in Cellulitis

Doxycycline, minocycline	A: 100 mg twice per day po C: Not recommended for persons aged <8 years old	Bacteriostatic, limited recent clinical experience
TMP - SMZ	A: 1 or 2 double-strength tablets twice per day po C: 8–12 mg/kg/day (based on the trimethoprim component) in 2 divided doses po	Bactericidal; limited published efficacy data

Cellulitis and Bites

- The rate of infection of bite wounds differs between the animal species due to the oral flora in the biting animal and injury type.
- Infecting organisms most commonly arise from the mouth of the biting animal; however, they can also arise from the host's own flora or the environment.
- Animal bite infections should be considered to be polymicrobial.

- Prophylaxisis-
  - C: 25-45 mg amoxicillin/kg/day/clavulante in divided doses twice daily using the 200 mg/5 mL or 400 mg/5 mL oral suspension
  - A: 875 mg amoxcillin sulbactam every 12 hours

Management of mammalian bites Claire Dendle David LookeAustralian Family Physician Vol. 38, No. 11, November 2009

Case #1 Follow Up

- Our patient had a doppler done on day #1 which was negative. She was treated as an outpatient with Clindamycin.
- Seen at day #2 to observe skin markings and redness was decreasing. She completed 6 days of antibiotics total.
- She has been wearing compression stockings faithfully and has had no recurrence.

Case #2

- **35 year old non pregnant married woman with 2 day history of burning and frequency of urination. She requests medication for UTI over the phone. She denies vaginal discharge, fever, chills, back pain, nausea. This is her second call in a year for similar. What should you do?**

UTI – Incidence and Risk Factors Adults

- **Very common with 8.6 million adult visits per year (84% women)[1]**

1. Schappert SM, Rechtsteiner EA. Ambulatory medical care utilization estimates for 2007. Vital Health Stat 2011;169:1-38
2. Hooton TM, Scholes D, Hughes JP, et al. A prospective study of risk factors for symptomatic urinary tract infection in young women. N Engl J Med 1996;335:468-474
3. Scholes D, Hooton TM, Roberts PL, Gupta K, Stapleton AE, Stamm WE. Risk factors associated with acute pyelonephritis in healthy women. Ann Intern Med 2005;142:20-27
4. Scholes D, Hooton TM, Roberts PL, Stapleton AE, Gupta K, Stamm WE. Risk factors for recurrent urinary tract infection in young women. J Infect Dis 2000;182:1177-1182
5. Scholes D, Hawn TR, Roberts PL, et al. Family history and risk of recurrent cystitis and pyelonephritis in women. J Urol 2010;184:564-569

UTI – Incidence and Risk Factors Adults

- Risk factors [2,3,4,5]
  - sexual intercourse
  - use of spermicides
  - previous urinary tract infection
  - a new sex partner (within the past year)
  - a history of urinary tract infection in a first-degree female relative

1. Schappert SM, Rechtsteiner EA. Ambulatory medical care utilization estimates for 2007. Vital Health Stat 2011;169:1-38
2. Hooton TM, Scholes D, Hughes JP, et al. A prospective study of risk factors for symptomatic urinary tract infection in young women. N Engl J Med 1996;335:468-474
3. Scholes D, Hooton TM, Roberts PL, Gupta K, Stapleton AE, Stamm WE. Risk factors associated with acute pyelonephritis in healthy women. Ann Intern Med 2005;142:20-27
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5. Scholes D, Hawn TR, Roberts PL, et al. Family history and risk of recurrent cystitis and pyelonephritis in women. J Urol 2010;184:564-569

UTI – Adult Classification

- Acute Uncomplicated Cystitis
  - Non pregnant, healthy female,

  Complicated UTI
  - Pregnancy, stone, Male, Neurogenic Bladder including catheter use, immunosuppression

UTI – Adult Diagnosis

- **If a woman has any symptoms of UTI the probability of cystitis is greater than 50% and chances are greater than 90% in women who have dysuria and frequency without vaginal discharge or irritation[6]**

6. Bent S, Nallamothu BK, Simel DL, Fihn SD, Saint S. Does this woman have an acute uncomplicated urinary tract infection? JAMA 2002;287:2701-2710
7. Bent S, Nallamothu BK, Simel DL, Fihn SD, Saint S. Does this woman have an acute uncomplicated urinary tract infection? JAMA 2002;287:2701-10.
8. Hurlbut TA III, Littenberg B. The diagnostic accuracy of rapid dipstick tests to predict urinary tract infection. Am J Clin Pathol 1991;96:582-8.

UTI – Adult Diagnosis

- **The dipstick test is most accurate for predicting UTI when the presence of either leukocyte esterase or nitrite is considered a positive result, with a sensitivity of 75% and a specificity of 82%.[7,8] However, results of the dipstick test provide little useful information when the history is strongly suggestive of urinary tract infection, since even negative results for both tests do not reliably rule out the infection in such cases.[9] This discourages dipstick in clinically positive cases.**

6. Bent S, Nallamothu BK, Simel DL, Fihn SD, Saint S. Does this woman have an acute uncomplicated urinary tract infection? JAMA 2002;287:2701-2710
7. Bent S, Nallamothu BK, Simel DL, Fihn SD, Saint S. Does this woman have an acute uncomplicated urinary tract infection? JAMA 2002;287:2701-10.
8. Hurlbut TA III, Littenberg B. The diagnostic accuracy of rapid dipstick tests to predict urinary tract infection. Am J Clin Pathol 1991;96:582-8.

UTI – Bacteria Associated

- **E Coli causes 70-95 % of cases**
- **Remaining from Enterobacteria such as Klebsiella pneumonia**
- **Gram Positive bacteria -*Staphylococcus saprophyticus*, *Enterococcus faecalis*, and *Streptococcus agalactiae* (group B streptococcus). However, the latter two organisms, when isolated from voided urine from women with symptoms of uncomplicated cystitis, often represent contamination of the voided specimen**

Animicrobial Options	Efficacy
Nitrofurantoin monohydrate macrocrystals, 100 mg twice daily for 5 days	93%
TMP-SMX, 160 mg and 800 mg twice daily for 3 days	93%
Flouroquinalones - ciprofloxacin, 250 mg twice daily for 3 days, levofloxacin, 250 mg or 500 mg once daily for 3 days	90%
Beta-lactams (e.g., amoxicillin–clavulanate, cefdinir, cefaclor, and cefpodoxime–proxetil) for 3 to 7 days	89%

Efficacy rates and ranges and antimicrobial recommendations are based on the Infectious Diseases Society of America guidelines. Gupta K, Hooton TM, Naber KG, et al.
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Guidelines for antimicrobial treatment of uncomplicated acute bacterial cystitis and acute pyelonephritis in women. Clin Infect Dis 1999;29:745-58.

UTI Prevention in Adults

- Behavioral
  - Recommend abstinence or reduction in frequency of intercourse as sexual intercourse is the strongest risk factor for uncomplicated UTIs – Not feasible for most
  - If spermicides are used, recommend changing to another method for contraception or prevention of infection
  - Recommend that patient urinate soon after intercourse, drink fluids liberally, not routinely delay urination, wipe front to back after defecation, avoid tight-fitting underwear, avoid douching

41. Barbosa-Cesnik C, Brown MB, Buxton M, Zhang L, DeBusscher J, Foxman B. Cranberry juice fails to prevent recurrent urinary tract infection: results from a randomizedplacebo-controlled trial. ClinInfect Dis 2011;52:23-30.

42. Raz R, Stamm WE. A controlled trial of intravaginal estriol in postmenopausal women with recurrent urinary tract infections. N Engl J Med 1993;329:753-6

UTI Prevention in Adults

- Biological
  - Cranberry Juice a recent randomized, placebo-controlled trial showed no benefit from cranberry juice [41]
  - In some postmenopausal women, topical estrogen normalizes the vaginal flora and reduces the risk of recurrent UTIs[42]; oral estrogens are not effective

41. Barbosa-Cesnik C, Brown MB, Buxton M, Zhang L, DeBusscher J, Foxman B. Cranberry juice fails to prevent recurrent urinary tract infection: results from a randomizedplacebo-controlled trial. ClinInfect Dis 2011;52:23-30.

42. Raz R, Stamm WE. A controlled trial of intravaginal estriol in postmenopausal women with recurrent urinary tract infections. N Engl J Med 1993;329:753-6

Antimicrobial Prevention in Adults

Antimicrobial Options	Efficacy
Post Coital Nitrofurantoin, 50–100 mg TMP-SMX, 40 mg and 200 mg or 80 mg and 400 mg TMP, 100 mg Cephalexin, 250 mg	In a placebo-controlled trial, the rate of recurrent cystitis with postcoital TMP-SMX, 40 mg and 200 mg, was 0.3 episodes per patient-year, vs. 3.6 with placebo (a 92% reduction)[44]
Daily Prophlyaxsis Nitrofurantoin, 50–100 mg TMP-SMX, 40 mg and 200 mg TMP, 100 mg Cephalexin, 125–250 mg	Randomized, placebo-controlled trials have shown a reduction in cystitis recurrences of approximately 95%; a 6-month trial is recommended, then treatment is discontinued and the patient observed

Case #2 Follow Up

- **Our young married woman with symptoms of cystitis calling for treatment.**
- **First-line antimicrobial regimen is prescribed of cipro 250 mg twice daily for three days for now and can consider for future use; patient would be advised to take it at onset of UTI symptoms**
- **Note – this treatment is not preventive in any way.**

Case #3

- 6 year old first grade female who is developmentally normal presents with complaints of “pain with using potty” for two days. She has never had similar symptoms?
- What should you do?

Case #3 Continued

- General exam shows healthy female, talking easily, able to describe symptoms and no fever or signs of illness.
- GU exam with no signs of trauma, irritation or perineal yeast infection
- UA obtained with mom’s assistance
- No blood, leukocyte positive, nitrite positive
- What should you do now?

UTI Children - presentation

- First item of consideration is you must think of the diagnosis!
- Newborns present with sepsis, failure to thrive, jaundice, nausea
- Infants present with fever, with possible foul smelling urine, hematuria
- Children present with more typical symptoms as adults with dysuria, frequency or urgency

UTI Children Diagnosis

- Young children must have catheterized specimen until reliably toilet trained as bagged specimen are not useful
- Treatment in infants and toddlers should be initiated if child is ill prior to culture and or UA results
- Treatment in children older than three can await results of UA prior to treatment if not clinically ill.
- Nitrates very specific – meaning low false positive rate – if nitrites present, high risk of UTI

UTI Children Treatment

- Amoxicillin well tolerated though resistance increasing
- Trimethoprim/sulfamethoxazole effective
- Amoxicillin/Clavulanate, cefixime, cefpodoxime are effective and well tolerated.
- Avoid flouroquinolones
- A Cochrane review analyzing short-duration (two to four days) versus standard-duration (seven to 14 days) oral antibiotics in children with lower UTIs found no significant difference in positive urine cultures between the therapies immediately after treatment or 15 months after treatment so short course is most effective and no increase in resistance and improved adherence[9]

9. Michael M, Hodson EM, Craig JC, Martin S, Moyer VA. Short versus standard duration oral antibiotic therapy for acute urinary tract infection in children. *Cochrane Database Syst Rev*. 2003;(1):CD003966.

UTI Children Prevention

- Several studies show that in children with mild vesicouretal reflux that prophylaxis is not effective in preventing recurrent infections.[10,11,12,13,14,]
- Constipation should be managed aggressively as this may help reduce repeat infections.[15]

10. Conway PH, Cnaan A, Zaoutis T, Henry BV, Grundmeier RW, Keren R. Recurrent urinary tract infections in children: risk factors and association with prophylactic antimicrobials. *JAMA*. 2007;298(2):179-186.
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15. Loening-Baucke V. Urinary incontinence and urinary tract infection and their resolution with treatment of chronic constipation of childhood. *Pediatrics*. 1997;100(2 pt 1):228-232.

Case #3 Follow up

- Antibiotics started presumptively while awaiting culture based on high sensitivity of nitrite positive.
- Culture revealed e coli with no resistance and her treatment with 4 days of TMP/SMX was effective and patient is symptom free.

Case #4

- 24-year-old single female
- Presents with complaints of a foul smelling, yellow vaginal discharge and slight dysuria for 1 week
- Denies vulvar itching, pelvic pain, or fever
- 2 sex partners during the past year—did not use condoms with these partners—on oral contraceptives for birth control
- No history of sexually transmitted diseases, except for trichomoniasis 1 year ago

Case #4 Continued

- Cooperative, good historian, non ill appearing
- No flank pain on percussion
- Speculum exam reveals a moderate amount of frothy, yellowish, malodorous discharge, without visible cervical mucopus or easily induced cervical bleeding
- Bimanual examination was normal

Vaginitis

- Bacterial Vaginosis (BV)
- Vulvovaginal Candidiasis (VVC)
- Trichomoniasis

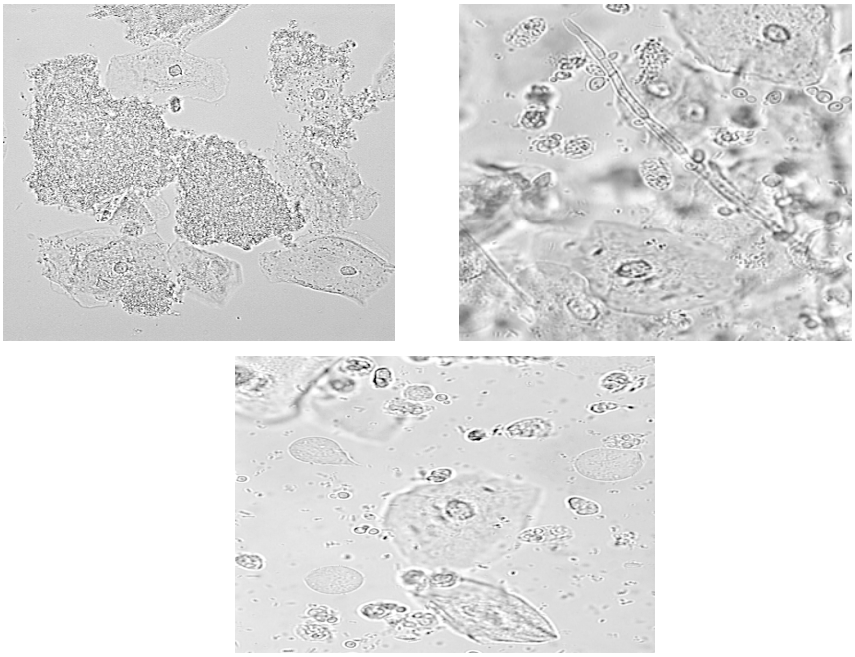
Signs and Symptoms of Vaginitis

- **Usually characterized by:**
  - **Vaginal discharge**
  - **Vulvar itching**
  - **Irritation**
  - **Odor**
- **Common types**
  - **Bacterial vaginosis (40%-45%)**
  - **Vulvovaginal candidiasis (20%-25%)**
  - **Trichomoniasis (15%-20%)**

	Normal	Bacterial Vaginosis	Candidiasis	Trichomoniasis
Symptom presentation		Odor, discharge, itch	Itch, discomfort, dysuria, thick discharge	Itch, discharge, 50% asymptomatic
Vaginal discharge	Clear to white	Homogenous, adherent, thin, milky white; malodorous "foul fishy"	Thick, clumpy, white "cottage cheese"	Frothy, gray or yellow-green; malodorous
Clinical findings			Inflammation and erythema	Cervical petechiae "strawberry cervix"
Vaginal pH	3.8 - 4.2	> 4.5	Usually $\leq$ 4.5	> 4.5
KOH "whiff" test	Negative	Positive	Negative	Often positive
NaCl wet mount	Lacto-bacilli	Clue cells ($\geq$ 20%), no/few WBCs	Few WBCs	Motile flagellated protozoa, many WBCs
KOH wet mount			Pseudohyphae or spores if non-*albicans* species	

Diagnostic Options

- **BV – Vaginal Wet Prep, DNA probe, Rapid Antigen Test, culture**
- **Yeast – Vaginal Wet Prep, DNA probe, Rapid Antigen Test, culture**
- **Trichomonas –**
  - **Female - Motile trichomonads seen on saline wet mount, Culture is the "gold standard", Pap smear has limited sensitivity and low specificity, DNA probe, Rapid antigen test**
  - **Male - 11%-13% of nongonococcal urethritis in males first void urine -examine for motile trichomonads, culture, Urethral swab -Culture**



***Source*: Seattle STD/HIV Prevention Training Center at the University of Washington**

Vaginitis Type	Treatment Options
Bacterial Vaginosis	**CDC-recommended regimens:** Metronidazole 500 mg orally twice a day for 7 days, gel 0.75%, one full applicator (5 grams) intravaginally, once a day for 5 days, Clindamycin cream 2%, one full applicator (5 grams) intravaginally at bedtime for 7 days **Multiple recurrences:** Twice weekly metronidazole gel for 6 months may reduce recurrences
Candidal Vaginosis	**Intravaginal agents:** Clotrimazole 1% cream 5 g intravaginally for 7-14 days 100 mg vaginal tablet, 2 tablets for 3 days Miconazole 100 mg vaginal suppository, 1 suppository for 7 days 200 mg vaginal suppository, 1 suppository for 3 days1,200 mg vaginal suppository, one suppository for 1 day Terconazole 0.4% cream 5 g intravaginally for 7 day, 0.8% cream 5 g intravaginally for 3 days 80 mg vaginal suppository, 1 suppository for 3 days **Oral agent:** Fluconazole 150 mg oral tablet, 1 tablet in a single dose

Vaginitis Type	Treatment Options
Trichomonas Vaginosis	CDC-recommended regimen Metronidazole 2 g orally in a single dose OR Tinidazole 2 g orally in a single dose CDC-recommended alternative regimen Metronidazole 500 mg twice a day for 7 days

Prevention of Vaginitis

- BV-
  - After multiple occurrences, some consider empiric treatment of male sex partners to see if recurrence rate diminishes, but this approach has not been validated
  - Correct and consistent condom use
  - Avoid douching
  - Limit number of sex partners
- Candida - Avoid douching, avoid unnecessary antibiotic use, complete course of treatment
- Trichomonas – Partner treatment, Condoms

Case #4 Follow up

- Saline wet mount of vaginal secretions -- numerous motile trichomonads and no clue cells
- KOH wet mount -- negative for budding yeast and hyphae
- Screening for Chlamydia and Gonorrhea are crucial in this case based on age and was negative
- Patient and partner treatment, safe sex and condom use are crucial

Case #5

- 20 Year old sexually active college female student presents for a physical prior to working as a camp counselor for the summer. She has not been to any health screenings for over 2 years since she went to college. She feels well today and has no symptoms.
- What should you screen for regarding sexually transmitted infections?

STI's – Chlamydia and Gonorrhea

- Discussion today limited to Chlamydia (53,304 cases in Ohio in 2012) and Gonorrhea (16,551 cases 2012) as incidence of other STI's such as HIV (204 cases 2011) , Syphilis (285 cases 2012) and Hepatitis B and C are low in this population[1]
- Clinical presentation - Most people with GC and Chlamydia are asymptomatic

1. http://www.odh.ohio.gov/healthstats/disease/std/std1.aspx accessed June 10, 2013

Screening Chlamydia and Gonorrhea

- **Currently, the U.S. Preventive Services Task Force recommends routine screening in all sexually active women 24 years and younger, and in women 25 years and older who are at increased risk because of having multiple partners or a new sex partner.[1]**
- **Per the CDC, the screening of sexually active young men should be considered in clinical settings with a high prevalence of chlamydia (e.g., adolescent clinics, correctional facilities, sexually transmitted disease clinics), and in certain groups (e.g., men who have sex with men).**

1. U. S. Preventive Services Task Force. Screening for chlamydia infection: recommendation statement. *Ann Intern Med*. 2007;147(2):128–134.

Treatment of Chlamydia and Gonorrhea

Uncomplicated Genitourianry Infection of Chlamydia	**Azithromycin 1 gm Single Dose OR Doxycycline 100 mg Two Times Daily for Seven Days[1]**
Uncomplicated Genital, Rectal, and Pharyngeal Gonorrhea	ceftriaxone 250 mg as a single intramuscular dose **plus** azithromycin 1 g orally in a single dose ***or*** doxycycline 100 mg orally twice daily for 7 days. If unable to use Ceftriaxone- Test of Cure is now recommended [2]

1 Chlamydia Trachomatis Infections: Screening, Diagnosis, and Management
RANIT MISHORI, MD, MHS; ERICA L. McCLASKEY, MD, MS; and VINCE J. WINKLERPRINS, MD, Georgetown University School of Medicine, Washington, District of Columbia
***Am Fam Physician.* 2012 Dec 15;86(12):1127-1132.**
2 http://www.cdc.gov/std/treatment/2010/default.htm accessed June 10, 2013

Case #5 Follow Up

- CDC recommends asking The Five P's: Partners, Prevention of Pregnancy, Protection from STDs, Practices, and Past History of STDs for all of our patients
- Based on age – regardless of risk factors she should be screened for GC and Chlamydia and counseled on safe sex practices

HSV and Zoster

- Herpes simplex virus (HSV) has a worldwide distribution and 90% of adults have antibody to HSV-1 by the fifth decade of life.
- Antibodies against HSV-2 appear in puberty and correlate with sexual activity. The seroprevalence of HSV-2 antibody among patients in the United States is now 20%–25%
- Between 65% and 70% of adult patients are seropositive for VZV, and this identifies those patients at risk for future reactivation infection.

Practice Guidelines for the Diagnosis andManagement of Skin and Soft-Tissue Infections
Clinical Infectious Diseases 2005; 41:1373–406

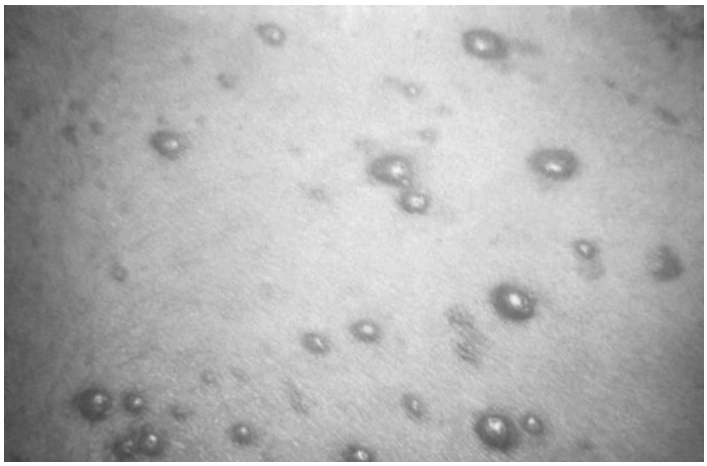


Image provided courtesy of the CDC/ Dr. K.L. Hermann

HSV and Zoster

- Treatment HSV and Zoster the same
  - Acyclovir (Zovirax)800 mg five times daily for seven to 10 days
  - Famciclovir (Famvir)500 mg three times daily for seven days
  - (Valtrex)1,000 mg three times daily for seven days

Herpes Zoster and Postherpetic Neuralgia: Prevention and Management
JULIA FASHNER, MD, Saint Joseph Family Medicine Residency Program, South Bend, Indiana
AMANDA L. BELL, MD, Wright State University Boonshoft School of Medicine, Dayton, Ohio
Am Fam Physician. 2011 Jun 15;83(12):1432-1437

Prevention of Herpes-Viruses

- Suppression therapy can reduce shedding and frequency of HSV virus
- Vaccination shown to reduce post herpetic neuralgia in recurrent episodes of zoster

Diarrheal Illnesses

- The cause of diarrhea depends on geographic location, standard of food hygiene, sanitation, water supply, and season.
- No pathogen is identified in more than one half of persons with diarrhea.
- In returning travelers, about 50 percent of episodes are caused by bacteria, such as enterotoxigenic and enteroadherent *E. COLI*, *SALMONELLA*, *SHIGELLA*, *CAMPYLOBACTER*, *VIBRIO*, *YERSINIA*, and *AEROMONAS* 1

- 1. Diarrhea in Adults (Acute) GUY DE BRUYN, Chris Hani Baragwanath Hospital, Johannesburg, South Africa *AM Fam Physician.* 2008 Aug 15;78(4):503-504
- 2. Gastroenteritis in Children: Principles of Diagnosis and Treatment
- B. CLAIR ELIASON, M.D., Medical College of Wisconsin, Milwaukee, Wisconsin
- RICHARD B. LEWAN, M.D., Waukesha Family Practice Residency Program, Waukesha, Wisconsin
- *Am Fam Physician.* 1998 Nov 15;58(8):1769-1776
- *3. CLOSTRIDIUM DIFFICILE*–Associated Diarrhea MICHAEL S. SCHROEDER, M.D., *KAISER PERMANENTE*, *FONTANA*, *CALIFORNIA Am Fam Physician.* 2005 Mar 1;71(5):921-928

Diarrheal Illnesses

- **Most cases of gastroenteritis in this country are self-limited and require minimal intervention. Worldwide and in the United States, oral rehydration solutions such as the World Health Organization solutions and other clear liquids are the cornerstone of treatment.2**

- **Each year, *C. DIFFICILE* infection results in approximately 3 million cases of diarrhea and colitis in the United States. The case mortality rate is approximately 1 to 2.5 percent. 3**

- **1. Diarrhea in Adults (Acute) GUY DE BRUYN, Chris Hani Baragwanath Hospital, Johannesburg, South Africa *AM Fam Physician.* 2008 Aug 15;78(4):503-504**
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